



**CITY OF LAMARQUE
CITY COUNCIL
SPECIAL AGENDA
of
JUNE 27, 2022**

Notice is hereby given that the City Council of the City of La Marque, Texas will conduct a **Special Meeting** on **June 27, 2022**, beginning at **6:00 PM** in the **Council Chambers** at **1109-B Bayou Road La Marque, Texas as well as via videoconference hosted through Zoom (<https://zoom.us/j/92493940502>)**. In accordance with Section 551.127(b) of the Texas Local Government Code the presiding officer and a quorum of the La Marque City Council intend to be and will be physically present at 1109-B Bayou Road, La Marque, Texas. This location will be open to the public and the meeting will be broadcast at this location, on Channel 16, and via YouTube (<https://www.youtube.com/watch?v=L6G8ypjyEDo>).

The Council will meet for the purposes of the following agenda:

1. CALL MEETING TO ORDER
2. ROLL CALL
3. INVOCATION AND PLEDGE OF ALLEGIANCE
4. PRESENTATIONS

4.I. Pride Proclamation

Documents:

[LGBTQIA MONTH- JUNE.PDF](#)

5. CITIZENS PARTICIPATION
LIMITED TO THREE MINUTES PER PERSON

Comments from the public will be heard at this time. Any person with city-related business who has signed up may speak to Council on a specific agenda item (limited to three (3) minutes). If wishing to speak you should give the Mayor your name and the item you wish to speak about. In compliance with Texas Open Meeting Act, the City may not deliberate on comments. Personal attacks will not be allowed, and personnel matters should be addressed to the City Manager during normal business hours. *Press *6 to mute or unmute if you are participating by telephone, press the unmute button if attending via zoom on a smartphone, tablet or computer, or stand if attending in person, and the mayor will call on you in turn.*

6. PUBLIC HEARINGS

Conduct Public Hearing to hear public input on:

- 6.I. Ordinance No. O-2022-0005
authorizing payment of a property tax refund in accordance with Texas law THIS IS THE SECOND AND FINAL READING

Documents:

[AGENDA FORM- TAX REFUNDS.PDF](#)
[ORDINANCE NO. O-2022-0005 - TAX REFUND ORDINANCE.PDF](#)
[ACT REFUND REPORT.PDF](#)

7. ORDINANCES

Discussion/ possible action regarding approving:

- 7.I. Ordinance No. O-2022-0005
authorizing payment of a property tax refund in accordance with Texas law THIS IS THE SECOND AND FINAL READING

Documents:

[AGENDA FORM- TAX REFUNDS.PDF](#)
[ORDINANCE NO. O-2022-0005 - TAX REFUND ORDINANCE.PDF](#)
[ACT REFUND REPORT.PDF](#)

8. RESOLUTIONS- CONSENT

The following items shall be considered for action as a whole unless one or more Councilmembers objects. Unless otherwise specified, the City Manager is authorized to execute all necessary documents upon final approval by the City Attorney.

- 8.I. Resolution No. R-2022-0031
authorizing the purchase of emergency utility repair equipment and services along Grebb Street

Documents:

[AGENDA FORM- GREBB ST REPAIR.PDF](#)
[RESOLUTION NO. R-2022-0031.PDF](#)
[TEXAS PRIDE UTILITY QUOTE.PDF](#)

- 8.II. Resolution No. R-2022-0034
approving La Marque's participation in the 2022 Galveston County Multi-Jurisdictional Hazard Mitigation Plan

Documents:

[RESOLUTION NO. R-2022-0034 HMP UPDATE.PDF](#)
[ITEM 1C -GALVESTON COUNTY HMP_FULL PLAN_APA.PDF](#)

- 8.III. Resolution No. R-2022-0035
approving Final Plat of Sunset Grove Section 4

Documents:

AGENDA FORM- SUNSET GROVE SEC.4.PDF
RESOLUTION NO. R-2022-0035- SUNSET GROVE SEC.4.PDF
02 - STAFF REPORT - SUNSET GROVE SECT 4.PDF
03 - LOR TO APPROVE SUNSET GROVE SEC 4 FP PKG 12172021.PDF

9. NEW BUSINESS

Items presented to the Council for discussion and for Council to provide direction:

9.I. RFP- Disaster Debris

Acknowledging RFP 22-01 : Debris Management, Monitoring, and Consulting Services

Documents:

AGENDA FORM- DISASTER DEBRIS RFP.PDF
LM 2022 RFP DEBRIS MANAGEMENT, MONITORING, AND CONSULTING
SERVICES.PDF

10. EXECUTIVE SESSION

The City Council for the City of La Marque, Texas reserves the right to adjourn into executive session at any time during this meeting to discuss any of the matters listed above, as authorized by the Texas Government Code Section 551.071 (Consultation with Attorney), 551.072 (Deliberations about Real Property), 551.073 (Deliberations about Gifts and Donations), 551.074 (Personnel Matters), 551.076 (Deliberations about Security Devices), and 551.086 (Economic Development)

11. ADJOURNMENT

I hereby certify that the above notice of the meeting was posted at 109-B Bayou Road, La Marque, Texas on or before Friday, June 24, 2022 before 5:30 p.m.

Kierra K. Nance

***This electronic copy is posted for convenience and in compliance with ADA Requirements , a signed version of this agenda can be found with the City Clerk's office.*

*Office of the Mayor
of the City of La Marque*
PROCLAMATION

WHEREAS, 2022 is the 52nd Pride Month Celebration-- a time when millions of people come together in support of the LGBTQ+ community; and

WHEREAS, the celebration began in 1970 to commemorate the Stonewall Rebellion of June 28, 1969, a tipping point for the Gay Liberation Movement in the United States; and

WHEREAS, we celebrate the resilience of the LGBTQ+ community and their hard-won victories of increased acceptance and equality continuously moving towards a better, more inclusive, and safer future for all; and

WHEREAS, we take this month to celebrate the advances in equality, we also acknowledge that there is still important work to be done across intersections of identity to truly create a land of equality for all; and

WHEREAS, The City of La Marque works tirelessly to be a safe city for all people regardless of their sexual orientation, gender identity or expression, and firmly believes all people should be treated with dignity and respect; and

NOW, therefore, we the City Council of La Marque declares the month of June 2022 as:

“LGBTQ+ PRIDE” MONTH

in the City of La Marque and together we stand with the community, loved ones, and allies and continue to demand equal rights for all.

In testimony whereof, witness my hand and the Seal of the City of La Marque, this 23rd day of June 2022.



Keith Bell, Mayor



CITY COUNCIL AGENDA FORM

Meeting Date: **6/27/2022**

Prepared by: Suzy Kou

Department: Finance

Agenda item: _____

Reviewed by: _____

AGENDA ITEM DESCRIPTION: Discussion/possible action regarding **Ordinance No. O-2022-0005**, authorizing payment of a property tax refund in accordance with Texas law THIS IS THE SECOND AND FINAL READING

☒ X

1. Ordinance
2. Refund amount from Galveston County Tax Office

STAFF BRIEFING:

- September 24 2021, Council adopted a tax rate of \$.550764 per \$100 of assessed value
- Due to our adopted tax rate exceeding the Voter Approval Rate of \$.477076 per \$100 of assessed value, voters had the right to roll the tax rate back to the Voters Approval Rate.
- May 7, 2022- Per election results, 2021 tax rate was adjusted to \$.477076
- According to Galveston County Tax Office, refund amounts to those already paid for the 2021 taxes total \$800,380.94. Those who have not paid will be billed based on new rate of .477076.

HISTORY:

- **September 24, 2021-** Council adopted a tax rate of .550764 per \$100 of assessed value
- **May 7, 2022-** City election held regarding tax rollback

TARGET IMPLEMENTATION: Mid July 2022

SIGNIFICANT ACTION DATES:

June 13, 2022 - First Reading of Ordinance

June 20, 2022 - Second Reading of Ordinance

ACTION:

☒ Ordinance ☐ Resolution



CITY COUNCIL AGENDA FORM

- ☐ Special Presentation ☐ Proclamation
- ☐ Finance Report ☐ Public Hearing
- ☐ Municode Codification
- ☒ Mark if this item does not conflict with any Resolution, Ordinance or City Charter, policies, procedures

Cost Details:	
Budgeted	-0-
Actual Bid	n/a
Estimated Expenditure	\$800,380.94
Acct. Name(s)	Current Tax Revenues
Line Items #	01-3100-00-00
Other Funding	

STAFF'S RECOMMENDATION: Motion to approve **Ordinance No. O-2022-0005**, authorizing payment of a property tax refund in accordance with Texas Law

FISCAL IMPACT: Decrease in tax revenues of over \$800,380.94

ORDINANCE NO. O-2022-0005

AN ORDINANCE OF THE CITY OF LA MARQUE, TEXAS AUTHORIZING THE PAYMENT OF A TAX REFUND TO PROPERTY TAXPAYERS IN ACCORDANCE WITH TEXAS LAW

WHEREAS, on May 7, 2022 the City of La Marque, Texas conducted a special election titled:

**SPECIAL ELECTION
MAY 7, 2022
LA MARQUE TAX REFERENDUM**

WHEREAS, the City Council of La Marque, Texas canvassed and certified the results of the Special Election on May 17, 2022 in accordance with the laws of the State of Texas and the City Charter of La Marque, Texas.

WHEREAS, as a result of the Special Election the City of La Marque, Texas shall refund the difference between the amount of taxes paid by the property owners using the tax rate of \$.550764 and the tax rate of \$.477076 in accordance with Texas Tax Code § 26.075(k).

WHEREAS, the City of La Marque, Texas contracts with the Galveston County Tax Assessor Collector's office for the collection of property tax receipts.

WHEREAS, the City Council of La Marque, Texas desires to utilize the Galveston County Tax Assessor Collector's office to process and return the refunds required by Texas Tax Code § 26.075(k).

WHEREAS, the City Council of La Marque, Texas desires to make one payment to the Galveston County Tax Assessor Collector's office who will in turn remit the applicable amounts to the property owners in accordance with Texas Tax Code § 26.075(k).

NOW THEREFORE BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF LA MARQUE, TEXAS THAT:

Section 1. The findings and recitals set out in the preamble to this Ordinance are found to be true and correct and they are hereby adopted by the City Council and made a part hereof for all purposes.

Section 2. The City of La Marque Texas shall utilize the Galveston County Tax Assessor Collector's office to process and return the refunds required by Texas Tax Code § 26.075(k).

Section 3. The City Manager and appropriate city staff are authorized to deliver the amount of \$800,380.94 from the City of La Marque's general fund to the Galveston County Tax Assessor Collector's office for a refund to the property owners in accordance with Texas Tax Code § 26.075(k) and in the amounts set out in Exhibit 1.

Section 4. The City Manager and appropriate city staff are authorized, without further action of the City Council of La Marque, Texas, to make any other payments to the Galveston County Tax Assessor Collector's office that in the determination of the Galveston County Tax Assessor Collector are necessary to cover the property tax refund payments the subject of this Ordinance. The authority granted by this Section 4 shall expire 90 days after the effective date of this Ordinance.

Section 5. Repeal. This ordinance is intended to be cumulative and shall not repeal any provision of a previous ordinance or City Code provision, except to the extent that a provision is inconsistent and cannot be reconciled with this ordinance.

Section 6. Severability. In the event any clause, phrase, provision sentence, or part of this Ordinance or the application of the same to any person or circumstance for any reason be adjudged invalid or held unconstitutional by a court of competent jurisdiction, it is the intention of the City Council that the invalidity or unconstitutionality of the one or more parts shall not affect, impair, or invalidate this Ordinance as a whole or any part or provision other than the part declared to be invalid or unconstitutional; and the City Council of the City of La Marque, Texas, declares that it would have passed each and every part of the same notwithstanding the omission of any such part thus declared to be invalid or unconstitutional, whether there be one or more parts.

Section 7. Publication and Effective Date. This Ordinance shall be effective immediately upon passage by City Council, a public hearing in accordance with Section 2.19 of the City Charter, and publication of this ordinance or a caption that summarizes the purpose of this ordinance.

PASSED AND APPROVED by the City Council of the City of La Marque on First Reading this 13th day of June 2022; and

PASSED, APPROVED AND ADOPTED by the City Council of the City of La Marque on Second and Final Reading this 27th day of June 2022; and

CITY OF LA MARQUE, TEXAS

Keith Bell, Mayor

ATTEST:

Kierra Nance, TRMC, City Clerk

APPROVED AS TO FORM:

Gus Knebel
City Attorney

GALVESTON COUNTY

Run Date: 05/19/2022 08:11:25 PM

Expected Refunds

cad_refund_rpt.rdf v1.2

Request Seq: 4016740

CAD Seq = 4016430, Year = 2021

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	131274	\$226.38	\$261.34	\$34.96
	131276	\$468.39	\$540.74	\$72.35
	131279	\$484.18	\$558.97	\$74.79
	131281	\$364.87	\$421.22	\$56.35
	131283	\$342.87	\$395.83	\$52.96
	131285	\$1,450.12	\$1,674.11	\$223.99
	131296	\$747.15	\$862.55	\$115.40
	131298	\$729.31	\$841.95	\$112.64
	131303	\$20,275.73	\$23,407.47	\$3,131.74
	131305	\$402.60	\$464.79	\$62.19
	131306	\$115.79	\$133.67	\$17.88
	131307	\$447.59	\$516.73	\$69.14
	131308	\$830.38	\$958.64	\$128.26
	131309	\$351.61	\$405.91	\$54.30
	131315	\$31.44	\$36.30	\$4.86
	131316	\$171.13	\$197.56	\$26.43
	131319	\$607.37	\$701.18	\$93.81
	131321	\$19.61	\$22.64	\$3.03
	131333	\$1,066.74	\$1,231.51	\$164.77
	131349	\$5,953.62	\$6,873.20	\$919.58
	131351	\$2,149.70	\$2,481.74	\$332.04
	131352	\$193.22	\$223.06	\$29.84
	131353	\$21,231.79	\$24,511.20	\$3,279.41
	131373	\$38.79	\$44.78	\$5.99
	131374	\$2.86	\$3.30	\$0.44
	131382	\$6.15	\$7.10	\$0.95
	131403	\$668.89	\$772.21	\$103.32
	131427	\$64.83	\$74.85	\$10.02
	131428	\$200.09	\$230.99	\$30.90
	131443	\$12,068.83	\$13,932.95	\$1,864.12
	131478	\$41.55	\$47.97	\$6.42
	131479	\$1,342.11	\$1,549.41	\$207.30
	131480	\$160.82	\$185.66	\$24.84
	131481	\$658.23	\$759.90	\$101.67
	131483	\$1,683.46	\$1,943.48	\$260.02
	131486	\$59.63	\$68.85	\$9.22
	131489	\$357.81	\$413.07	\$55.26
	131490	\$119.27	\$137.69	\$18.42
	131492	\$717.76	\$828.62	\$110.86
	131493	\$2,530.89	\$2,921.80	\$390.91
	131496	\$54.20	\$62.57	\$8.37
	131497	\$5,247.84	\$6,058.40	\$810.56
	131498	\$211.54	\$244.21	\$32.67
	131501	\$667.91	\$771.07	\$103.16
	131511	\$14.98	\$17.29	\$2.31
	131512	\$21.71	\$25.06	\$3.35
	131513	\$37.59	\$43.40	\$5.81

GALVESTON COUNTY

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	131516	\$451.54	\$521.28	\$69.74
	131518	\$6,201.99	\$7,159.93	\$957.94
	131519	\$7,789.94	\$8,993.15	\$1,203.21
	131520	\$1,192.69	\$1,376.91	\$184.22
	131521	\$791.66	\$913.94	\$122.28
	131522	\$883.94	\$922.69	\$38.75
	131523	\$973.33	\$1,123.67	\$150.34
	131567	\$1,216.11	\$1,403.95	\$187.84
	131571	\$607.22	\$701.01	\$93.79
	131590	\$455.46	\$525.81	\$70.35
	131591	\$431.32	\$497.95	\$66.63
	131595	\$324.41	\$374.52	\$50.11
	131596	\$357.33	\$412.52	\$55.19
	131597	\$103.62	\$119.63	\$16.01
	131598	\$980.44	\$1,131.88	\$151.44
	131606	\$1,350.27	\$1,558.83	\$208.56
	131610	\$8,687.08	\$10,028.86	\$1,341.78
	131611	\$695.62	\$803.07	\$107.45
	131612	\$376.89	\$435.10	\$58.21
	131622	\$1,842.32	\$2,126.89	\$284.57
	131623	\$359.53	\$415.06	\$55.53
	131624	\$786.70	\$908.21	\$121.51
	131631	\$948.23	\$1,094.69	\$146.46
	131632	\$16.94	\$19.55	\$2.61
	131633	\$620.20	\$715.99	\$95.79
	131634	\$630.32	\$651.51	\$21.19
	131637	\$900.67	\$1,039.79	\$139.12
	131639	\$51.24	\$59.15	\$7.91
	131643	\$1,406.21	\$1,623.41	\$217.20
	131645	\$805.40	\$929.80	\$124.40
	131647	\$413.62	\$477.51	\$63.89
	131649	\$1,667.86	\$1,925.47	\$257.61
	131651	\$822.48	\$949.52	\$127.04
	131652	\$617.46	\$712.83	\$95.37
	131653	\$264.35	\$305.18	\$40.83
	131659	\$579.72	\$621.36	\$41.64
	131660	\$791.74	\$914.03	\$122.29
	131662	\$768.76	\$887.50	\$118.74
	131663	\$906.02	\$1,045.96	\$139.94
	131671	\$546.92	\$631.40	\$84.48
	131674	\$1,031.30	\$1,190.59	\$159.29
	131676	\$1,111.97	\$1,283.72	\$171.75
	131692	\$435.76	\$503.07	\$67.31
	131694	\$6,201.99	\$7,159.93	\$957.94
	131698	\$165.02	\$190.51	\$25.49
	131699	\$68.08	\$78.59	\$10.51
	131700	\$600.70	\$693.48	\$92.78

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	131701	\$295.79	\$341.47	\$45.68
	131710	\$872.22	\$1,006.95	\$134.73
	131711	\$136.16	\$157.19	\$21.03
	131712	\$132.58	\$153.06	\$20.48
	131713	\$104.67	\$120.84	\$16.17
	131720	\$559.11	\$645.47	\$86.36
	131721	\$412.00	\$475.64	\$63.64
	131725	\$391.30	\$451.74	\$60.44
	131727	\$356.80	\$411.91	\$55.11
	131731	\$89.88	\$103.76	\$13.88
	131732	\$273.17	\$315.37	\$42.20
	131736	\$301.94	\$348.58	\$46.64
	132020	\$1,246.89	\$1,439.48	\$192.59
	132023	\$1,109.34	\$1,280.69	\$171.35
	132024	\$608.66	\$702.67	\$94.01
	132025	\$1,451.69	\$1,675.92	\$224.23
	132026	\$1,300.89	\$1,501.82	\$200.93
	132027	\$948.09	\$1,094.53	\$146.44
	132028	\$903.98	\$1,043.61	\$139.63
	132029	\$1,304.23	\$1,505.68	\$201.45
	132030	\$850.55	\$981.92	\$131.37
	132031	\$1,311.96	\$1,514.60	\$202.64
	132032	\$1,205.39	\$1,391.58	\$186.19
	132033	\$1,221.53	\$1,410.20	\$188.67
	132034	\$897.71	\$1,036.37	\$138.66
	132037	\$1,183.29	\$1,366.05	\$182.76
	132038	\$1,003.43	\$1,158.42	\$154.99
	132039	\$882.50	\$1,018.80	\$136.30
	132040	\$1,063.88	\$1,228.20	\$164.32
	132042	\$1,331.04	\$1,536.63	\$205.59
	132045	\$982.78	\$1,134.57	\$151.79
	132046	\$1,113.04	\$1,284.96	\$171.92
	132229	\$668.77	\$772.07	\$103.30
	132231	\$555.84	\$641.70	\$85.86
	132233	\$81.48	\$94.07	\$12.59
	132235	\$27.53	\$31.78	\$4.25
	132236	\$27.53	\$31.78	\$4.25
	132238	\$843.71	\$974.03	\$130.32
	132239	\$27.53	\$31.78	\$4.25
	132243	\$457.57	\$528.25	\$70.68
	132244	\$282.70	\$326.36	\$43.66
	132248	\$79.62	\$91.92	\$12.30
	132249	\$609.75	\$703.93	\$94.18
	132251	\$26.29	\$30.35	\$4.06
	132252	\$26.29	\$30.35	\$4.06
	132253	\$26.29	\$30.35	\$4.06
	132292	\$691.76	\$798.61	\$106.85

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	132294	\$644.52	\$744.07	\$99.55
	132295	\$1,071.51	\$1,237.02	\$165.51
	132298	\$1,033.01	\$1,192.57	\$159.56
	132302	\$909.50	\$1,049.98	\$140.48
	132303	\$644.05	\$743.53	\$99.48
	132305	\$781.45	\$902.15	\$120.70
	132308	\$739.42	\$853.63	\$114.21
	132310	\$686.02	\$791.98	\$105.96
	132311	\$638.66	\$737.31	\$98.65
	132321	\$773.76	\$893.27	\$119.51
	132322	\$824.16	\$951.46	\$127.30
	132323	\$658.07	\$759.71	\$101.64
	132324	\$697.27	\$804.97	\$107.70
	132327	\$670.29	\$773.82	\$103.53
	132328	\$689.02	\$795.45	\$106.43
	132331	\$744.09	\$859.02	\$114.93
	132332	\$960.35	\$1,108.69	\$148.34
	132333	\$1,134.87	\$1,310.16	\$175.29
	132334	\$572.01	\$660.37	\$88.36
	132335	\$834.88	\$963.84	\$128.96
	132338	\$853.87	\$985.76	\$131.89
	132339	\$739.88	\$854.16	\$114.28
	132341	\$572.77	\$661.24	\$88.47
	132342	\$719.90	\$831.09	\$111.19
	132343	\$1,104.71	\$1,275.34	\$170.63
	132344	\$1,313.72	\$1,516.64	\$202.92
	132345	\$757.89	\$874.95	\$117.06
	132347	\$679.05	\$783.93	\$104.88
	132349	\$678.86	\$783.72	\$104.86
	132350	\$870.74	\$1,005.23	\$134.49
	132351	\$580.62	\$599.35	\$18.73
	132355	\$564.19	\$651.33	\$87.14
	132356	\$464.85	\$536.65	\$71.80
	132357	\$834.12	\$962.96	\$128.84
	132358	\$931.30	\$1,075.15	\$143.85
	132360	\$673.67	\$777.73	\$104.06
	132364	\$873.53	\$1,008.45	\$134.92
	132365	\$581.72	\$671.57	\$89.85
	132367	\$652.71	\$753.52	\$100.81
	132368	\$808.11	\$932.93	\$124.82
	132370	\$1,041.74	\$1,202.65	\$160.91
	132373	\$487.10	\$562.34	\$75.24
	132374	\$853.35	\$985.15	\$131.80
	132381	\$702.95	\$811.52	\$108.57
	132383	\$844.64	\$975.10	\$130.46
	132384	\$348.12	\$401.89	\$53.77
	132385	\$921.58	\$1,063.93	\$142.35

GALVESTON COUNTY

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Expected Refunds

cad_refund_rpt.rdf v1.2

Request Seq: 4016740

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	132387	\$60.25	\$69.56	\$9.31
	132390	\$257.91	\$297.74	\$39.83
	132391	\$20.08	\$23.19	\$3.11
	132392	\$20.08	\$23.19	\$3.11
	132393	\$479.22	\$553.24	\$74.02
	132395	\$295.36	\$340.98	\$45.62
	132397	\$268.31	\$309.75	\$41.44
	132399	\$20.28	\$23.41	\$3.13
	132402	\$342.96	\$395.93	\$52.97
	132404	\$537.00	\$619.94	\$82.94
	132405	\$419.22	\$483.97	\$64.75
	132409	\$706.81	\$815.98	\$109.17
	132410	\$966.99	\$1,116.34	\$149.35
	132411	\$590.39	\$681.58	\$91.19
	132413	\$121.18	\$139.89	\$18.71
	132418	\$644.43	\$743.97	\$99.54
	132419	\$1,226.99	\$1,416.51	\$189.52
	132421	\$748.27	\$863.85	\$115.58
	132422	\$1,018.08	\$1,175.33	\$157.25
	132424	\$102.00	\$117.75	\$15.75
	132425	\$1,431.23	\$1,652.29	\$221.06
	132426	\$511.28	\$590.25	\$78.97
	132428	\$87.78	\$101.34	\$13.56
	132437	\$122.37	\$141.27	\$18.90
	132440	\$1,052.48	\$1,215.04	\$162.56
	132441	\$1,399.10	\$1,615.20	\$216.10
	132448	\$299.79	\$346.10	\$46.31
	132453	\$520.20	\$600.55	\$80.35
	132455	\$1,422.83	\$1,642.60	\$219.77
	132457	\$147.13	\$158.63	\$11.50
	132458	\$405.56	\$468.20	\$62.64
	132460	\$44.65	\$51.55	\$6.90
	132464	\$377.27	\$435.54	\$58.27
	132470	\$83.39	\$96.27	\$12.88
	132472	\$631.17	\$728.66	\$97.49
	132473	\$1,135.49	\$1,310.87	\$175.38
	132477	\$565.34	\$652.66	\$87.32
	132478	\$565.34	\$652.66	\$87.32
	132480	\$68.70	\$79.31	\$10.61
	132481	\$613.33	\$708.06	\$94.73
	132482	\$612.95	\$707.62	\$94.67
	132484	\$101.95	\$117.70	\$15.75
	132621	\$175.52	\$202.63	\$27.11
	132628	\$20.28	\$23.41	\$3.13
	132629	\$20.28	\$23.41	\$3.13
	132630	\$20.28	\$23.41	\$3.13
	132634	\$1,077.00	\$1,243.36	\$166.36

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332	132635	\$202.69	\$233.99	\$31.30
	132636	\$86.35	\$99.69	\$13.34
	132638	\$783.50	\$904.52	\$121.02
	132639	\$609.03	\$703.10	\$94.07
	132640	\$689.28	\$795.75	\$106.47
	132642	\$857.01	\$953.98	\$96.97
	132643	\$226.61	\$261.61	\$35.00
	132644	\$427.73	\$493.80	\$66.07
	132649	\$395.53	\$456.63	\$61.10
	132652	\$1,630.17	\$1,881.96	\$251.79
	132656	\$86.35	\$99.69	\$13.34
	132657	\$893.81	\$1,031.87	\$138.06
	132658	\$86.35	\$99.69	\$13.34
	132659	\$86.35	\$99.69	\$13.34
	132660	\$86.35	\$99.69	\$13.34
	132661	\$86.35	\$99.69	\$13.34
	132662	\$418.01	\$482.57	\$64.56
	132663	\$86.35	\$99.69	\$13.34
	132665	\$391.54	\$452.01	\$60.47
	132666	\$1,468.96	\$1,695.86	\$226.90
	132667	\$1,311.86	\$1,514.49	\$202.63
	132669	\$86.35	\$99.69	\$13.34
	132670	\$1,431.94	\$1,653.12	\$221.18
	132671	\$798.63	\$921.98	\$123.35
	132673	\$3,339.53	\$3,855.35	\$515.82
	132678	\$86.35	\$99.69	\$13.34
	132682	\$86.35	\$99.69	\$13.34
	132687	\$315.71	\$364.47	\$48.76
	132688	\$402.04	\$464.13	\$62.09
	132690	\$500.75	\$578.09	\$77.34
	132691	\$2,266.11	\$2,616.13	\$350.02
	132693	\$405.51	\$468.15	\$62.64
	132695	\$377.61	\$435.93	\$58.32
	132699	\$653.55	\$754.49	\$100.94
	132700	\$164.44	\$167.57	\$3.13
	132703	\$234.56	\$270.79	\$36.23
	132708	\$68.56	\$79.14	\$10.58
	132709	\$32.54	\$37.56	\$5.02
	132711	\$1,049.57	\$1,211.68	\$162.11
	132712	\$38.40	\$44.34	\$5.94
	132716	\$3,005.58	\$3,469.81	\$464.23
	132717	\$4,495.73	\$5,190.12	\$694.39
	132718	\$14,518.19	\$16,760.63	\$2,242.44
	132851	\$8,795.75	\$10,154.33	\$1,358.58
	132855	\$91.07	\$105.14	\$14.07
	132856	\$136.44	\$157.52	\$21.08
	132862	\$244.50	\$282.27	\$37.77

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	132863	\$2,146.84	\$2,478.44	\$331.60
	132864	\$857.23	\$989.64	\$132.41
	132867	\$671.65	\$775.39	\$103.74
	132870	\$413.03	\$476.83	\$63.80
	132871	\$455.08	\$525.37	\$70.29
	132873	\$1,653.32	\$1,908.68	\$255.36
	132875	\$441.01	\$509.13	\$68.12
	132877	\$560.80	\$647.42	\$86.62
	132878	\$1,451.98	\$1,676.25	\$224.27
	132880	\$177.62	\$205.05	\$27.43
	132882	\$265.02	\$305.95	\$40.93
	132883	\$607.84	\$701.73	\$93.89
	132884	\$140.31	\$161.98	\$21.67
	132886	\$348.99	\$402.89	\$53.90
	132887	\$531.99	\$614.16	\$82.17
	132889	\$265.02	\$305.95	\$40.93
	132890	\$268.40	\$309.86	\$41.46
	132892	\$366.33	\$422.92	\$56.59
	132893	\$345.72	\$399.12	\$53.40
	132894	\$475.67	\$549.14	\$73.47
	132895	\$132.53	\$153.00	\$20.47
	132896	\$727.83	\$840.25	\$112.42
	132900	\$318.65	\$367.87	\$49.22
	132903	\$395.48	\$456.57	\$61.09
	132904	\$612.95	\$707.62	\$94.67
	132906	\$790.13	\$912.18	\$122.05
	132907	\$474.40	\$547.68	\$73.28
	132908	\$585.85	\$676.34	\$90.49
	132916	\$586.80	\$677.44	\$90.64
	132918	\$357.81	\$413.07	\$55.26
	132919	\$523.11	\$603.91	\$80.80
	132920	\$635.85	\$734.06	\$98.21
	132922	\$503.70	\$581.50	\$77.80
	132923	\$679.07	\$783.96	\$104.89
	132924	\$522.88	\$603.64	\$80.76
	132970	\$513.66	\$593.00	\$79.34
	132971	\$220.98	\$255.11	\$34.13
	132972	\$296.17	\$341.91	\$45.74
	132974	\$438.93	\$506.72	\$67.79
	132977	\$428.75	\$494.97	\$66.22
	132978	\$487.62	\$562.94	\$75.32
	132981	\$985.35	\$1,137.55	\$152.20
	132982	\$566.71	\$654.25	\$87.54
	132983	\$41.46	\$47.86	\$6.40
	132984	\$71.61	\$82.67	\$11.06
	132985	\$83.39	\$96.27	\$12.88
	132986	\$78.72	\$90.88	\$12.16

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332	132987	\$855.51	\$987.65	\$132.14
	132989	\$812.05	\$937.48	\$125.43
	132990	\$539.63	\$622.99	\$83.36
	132991	\$324.63	\$333.72	\$9.09
	132992	\$460.52	\$531.65	\$71.13
	132994	\$54.34	\$62.73	\$8.39
	132995	\$477.71	\$515.40	\$37.69
	132997	\$336.86	\$388.89	\$52.03
	133000	\$695.02	\$802.38	\$107.36
	133001	\$290.77	\$335.69	\$44.92
	133002	\$43.70	\$50.45	\$6.75
	133004	\$574.11	\$662.79	\$88.68
	133010	\$589.95	\$681.07	\$91.12
	133011	\$578.21	\$667.51	\$89.30
	133012	\$508.10	\$586.57	\$78.47
	133014	\$44.51	\$51.39	\$6.88
	133015	\$737.53	\$851.45	\$113.92
	133016	\$1,130.48	\$1,176.43	\$45.95
	133017	\$1,146.28	\$1,323.34	\$177.06
	133018	\$48.09	\$55.52	\$7.43
	133020	\$1,017.27	\$1,174.39	\$157.12
	133021	\$58.11	\$67.08	\$8.97
	133025	\$1,446.73	\$1,670.19	\$223.46
	133026	\$63.02	\$72.76	\$9.74
	133027	\$744.25	\$859.20	\$114.95
	133113	\$3,575.31	\$4,127.55	\$552.24
	133114	\$766.42	\$884.80	\$118.38
	133115	\$1,252.09	\$1,445.48	\$193.39
	133116	\$631.31	\$728.83	\$97.52
	133119	\$1,032.01	\$1,191.41	\$159.40
	133120	\$981.44	\$1,133.03	\$151.59
	133121	\$1,633.08	\$1,885.32	\$252.24
	133122	\$1,536.80	\$1,774.17	\$237.37
	133123	\$2,963.21	\$3,420.91	\$457.70
	133126	\$34,401.00	\$39,714.49	\$5,313.49
	133140	\$405.51	\$468.15	\$62.64
	133141	\$34.30	\$39.60	\$5.30
	133145	\$552.23	\$637.53	\$85.30
	133152	\$453.46	\$523.50	\$70.04
	133154	\$46.37	\$53.53	\$7.16
	133168	\$2,078.14	\$2,399.13	\$320.99
	133172	\$3,816.61	\$4,406.11	\$589.50
	133173	\$2,194.55	\$2,533.51	\$338.96
	133174	\$1,908.30	\$2,203.06	\$294.76
	133179	\$14.46	\$16.69	\$2.23
	133180	\$1,696.39	\$1,958.41	\$262.02
	133181	\$6,844.42	\$7,901.59	\$1,057.17

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332	133182	\$223.80	\$258.36	\$34.56
	133183	\$309.24	\$357.01	\$47.77
	133186	\$431.04	\$497.62	\$66.58
	133187	\$26.48	\$30.57	\$4.09
	133188	\$26.48	\$30.57	\$4.09
	133189	\$346.40	\$399.91	\$53.51
	133190	\$626.16	\$722.88	\$96.72
	133191	\$524.50	\$605.51	\$81.01
	133192	\$636.45	\$734.75	\$98.30
	133195	\$451.08	\$520.75	\$69.67
	133198	\$1,736.41	\$2,004.62	\$268.21
	133199	\$2,266.11	\$2,616.13	\$350.02
	133204	\$386.71	\$446.44	\$59.73
	133205	\$412.57	\$476.30	\$63.73
	133206	\$816.42	\$942.52	\$126.10
	133207	\$516.30	\$596.05	\$79.75
	133208	\$487.76	\$563.10	\$75.34
	133211	\$527.93	\$609.48	\$81.55
	133212	\$814.37	\$940.15	\$125.78
	133214	\$118.94	\$137.31	\$18.37
	133215	\$806.40	\$930.96	\$124.56
	133216	\$662.49	\$764.81	\$102.32
	133217	\$481.78	\$556.20	\$74.42
	133218	\$617.09	\$712.41	\$95.32
	133219	\$649.54	\$749.87	\$100.33
	133224	\$419.03	\$483.76	\$64.73
	133225	\$892.90	\$1,030.81	\$137.91
	133226	\$725.16	\$837.16	\$112.00
	133227	\$394.07	\$454.94	\$60.87
	133230	\$441.77	\$510.01	\$68.24
	133231	\$572.01	\$660.36	\$88.35
	133233	\$348.22	\$402.00	\$53.78
	133234	\$417.20	\$481.64	\$64.44
	133236	\$1,100.52	\$1,270.50	\$169.98
	133237	\$639.24	\$737.97	\$98.73
	133239	\$555.79	\$641.61	\$85.82
	133242	\$484.23	\$559.03	\$74.80
	133243	\$386.43	\$446.12	\$59.69
	133245	\$461.76	\$533.08	\$71.32
	133247	\$474.76	\$488.25	\$13.49
	133248	\$520.69	\$601.11	\$80.42
	133249	\$641.05	\$740.06	\$99.01
	133253	\$773.99	\$893.54	\$119.55
	133255	\$33.44	\$38.61	\$5.17
	133258	\$11.64	\$13.44	\$1.80
	133259	\$11.64	\$13.44	\$1.80
	133260	\$35.92	\$41.47	\$5.55

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	133261	\$25.76	\$29.74	\$3.98
	133262	\$52.86	\$61.02	\$8.16
	133271	\$36.07	\$41.64	\$5.57
	133272	\$36.07	\$41.64	\$5.57
	133273	\$36.07	\$41.64	\$5.57
	133274	\$36.07	\$41.64	\$5.57
	133279	\$36.07	\$41.64	\$5.57
	133280	\$36.07	\$41.64	\$5.57
	133281	\$36.07	\$41.64	\$5.57
	133282	\$36.07	\$41.64	\$5.57
	133283	\$36.07	\$41.64	\$5.57
	133284	\$36.07	\$41.64	\$5.57
	133285	\$36.07	\$41.64	\$5.57
	133286	\$33.82	\$39.05	\$5.23
	133289	\$12.88	\$14.87	\$1.99
	133290	\$12.88	\$14.87	\$1.99
	133291	\$12.88	\$14.87	\$1.99
	133292	\$12.88	\$14.87	\$1.99
	133293	\$12.88	\$14.87	\$1.99
	133294	\$12.26	\$14.15	\$1.89
	133303	\$72.13	\$83.28	\$11.15
	133304	\$36.07	\$41.64	\$5.57
	133305	\$472.35	\$545.31	\$72.96
	133306	\$652.12	\$752.84	\$100.72
	133307	\$72.13	\$83.28	\$11.15
	133308	\$25.76	\$29.74	\$3.98
	133309	\$35.78	\$41.31	\$5.53
	133310	\$12.50	\$14.43	\$1.93
	133311	\$12.31	\$14.21	\$1.90
	133312	\$12.02	\$13.88	\$1.86
	133322	\$37.26	\$43.01	\$5.75
	133323	\$37.74	\$43.57	\$5.83
	133324	\$38.45	\$44.39	\$5.94
	133325	\$37.64	\$43.46	\$5.82
	133326	\$367.52	\$424.28	\$56.76
	133334	\$33.20	\$38.33	\$5.13
	133335	\$33.20	\$38.33	\$5.13
	133336	\$33.20	\$38.33	\$5.13
	133337	\$33.20	\$38.33	\$5.13
	133338	\$11.83	\$13.66	\$1.83
	133339	\$11.83	\$13.66	\$1.83
	133340	\$11.83	\$13.66	\$1.83
	133341	\$11.83	\$13.66	\$1.83
	133342	\$12.36	\$14.26	\$1.90
	133358	\$316.69	\$322.36	\$5.67
	133359	\$59.68	\$68.90	\$9.22
	133360	\$214.78	\$247.95	\$33.17

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332	133361	\$59.68	\$68.90	\$9.22
	133362	\$1,442.01	\$1,664.74	\$222.73
	133365	\$138.30	\$159.67	\$21.37
	133366	\$103.67	\$119.68	\$16.01
	133389	\$1,144.98	\$1,321.83	\$176.85
	133390	\$1,005.68	\$1,161.01	\$155.33
	133393	\$64.64	\$74.63	\$9.99
	133394	\$71.56	\$82.61	\$11.05
	133395	\$158.58	\$183.07	\$24.49
	133398	\$380.04	\$438.74	\$58.70
	133475	\$1.72	\$1.98	\$0.26
	133476	\$807.54	\$932.27	\$124.73
	133478	\$694.48	\$801.75	\$107.27
	133482	\$1,127.13	\$1,301.22	\$174.09
	133485	\$1,017.08	\$1,174.17	\$157.09
	133486	\$97.80	\$112.91	\$15.11
	133487	\$1,067.71	\$1,232.63	\$164.92
	133488	\$924.35	\$1,067.13	\$142.78
	133489	\$1,040.03	\$1,200.67	\$160.64
	133492	\$817.79	\$944.10	\$126.31
	133493	\$1,031.99	\$1,191.39	\$159.40
	133495	\$1,673.06	\$1,931.47	\$258.41
	133496	\$1,296.49	\$1,496.74	\$200.25
	133498	\$1,437.14	\$1,659.12	\$221.98
	133503	\$1,167.40	\$1,347.72	\$180.32
	133507	\$1,000.66	\$1,155.22	\$154.56
	133508	\$954.15	\$1,101.53	\$147.38
	133511	\$760.58	\$878.06	\$117.48
	133512	\$591.69	\$683.09	\$91.40
	133514	\$848.38	\$979.42	\$131.04
	133516	\$875.23	\$1,010.42	\$135.19
	133519	\$681.99	\$787.33	\$105.34
	133522	\$641.18	\$740.22	\$99.04
	133523	\$34.54	\$39.88	\$5.34
	133524	\$41.22	\$47.59	\$6.37
	133528	\$646.36	\$746.20	\$99.84
	133531	\$771.29	\$890.42	\$119.13
	133532	\$889.79	\$1,027.23	\$137.44
	133536	\$502.70	\$580.35	\$77.65
	133538	\$977.24	\$1,128.18	\$150.94
	133540	\$738.61	\$852.69	\$114.08
	133541	\$4.25	\$4.90	\$0.65
	133543	\$4.25	\$4.90	\$0.65
	133549	\$43.41	\$50.12	\$6.71
	133550	\$543.39	\$627.32	\$83.93
	133551	\$226.40	\$261.37	\$34.97
	133555	\$169.98	\$196.24	\$26.26

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332	133604	\$928.24	\$1,071.61	\$143.37
	133608	\$714.28	\$824.61	\$110.33
	133609	\$1,146.55	\$1,323.64	\$177.09
	133610	\$661.49	\$763.66	\$102.17
	134217	\$4,117.17	\$4,753.09	\$635.92
	134218	\$47.71	\$55.08	\$7.37
	134219	\$2,603.69	\$3,005.85	\$402.16
	134222	\$4,080.86	\$4,711.18	\$630.32
	134225	\$1,755.54	\$2,026.70	\$271.16
	134227	\$215.02	\$248.23	\$33.21
	134228	\$201.90	\$233.08	\$31.18
	134231	\$56.25	\$64.94	\$8.69
	134232	\$1,957.92	\$2,260.34	\$302.42
	134233	\$70.13	\$80.96	\$10.83
	134236	\$50.62	\$58.44	\$7.82
	134237	\$301.49	\$348.06	\$46.57
	134238	\$244.28	\$282.01	\$37.73
	134239	\$71.27	\$82.27	\$11.00
	134245	\$474.51	\$547.80	\$73.29
	134246	\$524.78	\$605.84	\$81.06
	134247	\$1,328.66	\$1,533.88	\$205.22
	134248	\$140.26	\$161.92	\$21.66
	134250	\$57.82	\$66.75	\$8.93
	134251	\$28.05	\$32.38	\$4.33
	134253	\$131.86	\$152.23	\$20.37
	134255	\$1,386.05	\$1,600.14	\$214.09
	134256	\$1,128.86	\$1,303.22	\$174.36
	134257	\$140.26	\$161.92	\$21.66
	134259	\$939.84	\$1,085.01	\$145.17
	134260	\$365.82	\$422.32	\$56.50
	134261	\$48.33	\$55.79	\$7.46
	134262	\$57.01	\$65.82	\$8.81
	134263	\$78.67	\$90.82	\$12.15
	134264	\$721.20	\$832.59	\$111.39
	134265	\$477.08	\$550.76	\$73.68
	134266	\$111.16	\$128.33	\$17.17
	134269	\$140.26	\$161.92	\$21.66
	134270	\$612.70	\$707.34	\$94.64
	134271	\$1,073.42	\$1,239.22	\$165.80
	134272	\$370.59	\$427.83	\$57.24
	134279	\$273.74	\$316.02	\$42.28
	134281	\$2,578.60	\$2,947.20	\$368.60
	134282	\$611.80	\$706.30	\$94.50
	134283	\$2,504.65	\$2,891.51	\$386.86
	134284	\$1,487.05	\$1,716.73	\$229.68
	134288	\$606.00	\$699.60	\$93.60
	134289	\$11.45	\$13.22	\$1.77

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	134527	\$435.90	\$503.23	\$67.33
	134528	\$799.05	\$922.47	\$123.42
	134529	\$1,240.78	\$1,432.43	\$191.65
	134533	\$379.85	\$438.52	\$58.67
	134534	\$137.41	\$158.63	\$21.22
	134536	\$678.07	\$782.81	\$104.74
	134537	\$556.69	\$642.68	\$85.99
	134538	\$632.21	\$729.86	\$97.65
	134539	\$766.66	\$885.08	\$118.42
	134540	\$268.68	\$310.18	\$41.50
	134542	\$381.66	\$440.61	\$58.95
	134543	\$375.68	\$433.71	\$58.03
	134547	\$519.54	\$599.78	\$80.24
	134548	\$331.66	\$382.89	\$51.23
	134549	\$515.54	\$516.95	\$1.41
	134666	\$159.39	\$184.01	\$24.62
	134667	\$86.49	\$99.85	\$13.36
	134668	\$132.05	\$152.45	\$20.40
	134670	\$550.93	\$636.02	\$85.09
	134671	\$36.59	\$42.24	\$5.65
	134675	\$1,687.89	\$1,948.60	\$260.71
	134676	\$1,426.46	\$1,646.78	\$220.32
	134685	\$895.02	\$1,033.26	\$138.24
	134686	\$1,119.85	\$1,292.82	\$172.97
	134687	\$1,014.88	\$1,171.64	\$156.76
	134688	\$439.91	\$507.86	\$67.95
	134689	\$400.69	\$462.58	\$61.89
	134690	\$574.55	\$663.29	\$88.74
	134692	\$669.98	\$773.46	\$103.48
	134694	\$762.26	\$879.99	\$117.73
	134697	\$30.39	\$35.08	\$4.69
	134698	\$676.73	\$781.25	\$104.52
	134699	\$1,222.98	\$1,411.88	\$188.90
	134700	\$12.26	\$14.15	\$1.89
	134701	\$1.81	\$2.09	\$0.28
	134704	\$379.04	\$437.58	\$58.54
	134708	\$13.17	\$15.20	\$2.03
	134713	\$618.00	\$713.46	\$95.46
	134715	\$2,289.96	\$2,643.67	\$353.71
	134717	\$135.44	\$156.36	\$20.92
	134719	\$193.50	\$223.39	\$29.89
	134724	\$2,361.53	\$2,726.28	\$364.75
	134725	\$434.81	\$501.97	\$67.16
	134726	\$948.81	\$1,095.36	\$146.55
	134727	\$684.79	\$790.57	\$105.78
	134827	\$461.81	\$533.14	\$71.33
	134828	\$481.84	\$556.27	\$74.43

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332	134830	\$595.87	\$687.90	\$92.03
	134832	\$728.45	\$840.96	\$112.51
	134833	\$742.95	\$857.70	\$114.75
	134834	\$633.37	\$731.19	\$97.82
	134835	\$682.03	\$787.37	\$105.34
	134836	\$514.57	\$594.05	\$79.48
	134837	\$400.08	\$461.87	\$61.79
	134840	\$429.37	\$495.69	\$66.32
	134843	\$350.40	\$404.52	\$54.12
	134844	\$237.19	\$239.18	\$1.99
	134847	\$175.47	\$202.57	\$27.10
	134852	\$691.90	\$798.77	\$106.87
	134853	\$572.49	\$660.92	\$88.43
	134854	\$437.51	\$505.08	\$67.57
	134855	\$312.58	\$360.86	\$48.28
	134856	\$266.07	\$269.22	\$3.15
	134857	\$575.40	\$664.28	\$88.88
	134858	\$614.43	\$709.33	\$94.90
	134859	\$298.39	\$303.15	\$4.76
	134860	\$258.33	\$261.11	\$2.78
	134861	\$307.62	\$355.14	\$47.52
	134862	\$383.09	\$442.26	\$59.17
	134863	\$314.89	\$363.53	\$48.64
	134864	\$449.86	\$519.34	\$69.48
	134865	\$576.02	\$664.99	\$88.97
	134866	\$229.00	\$264.37	\$35.37
	134867	\$386.86	\$446.61	\$59.75
	134868	\$430.71	\$497.24	\$66.53
	134869	\$921.00	\$1,063.25	\$142.25
	134871	\$379.84	\$388.64	\$8.80
	134872	\$300.63	\$338.01	\$37.38
	134874	\$712.42	\$822.46	\$110.04
	134875	\$684.48	\$790.20	\$105.72
	134877	\$648.82	\$749.04	\$100.22
	134879	\$714.99	\$825.43	\$110.44
	134880	\$588.09	\$678.93	\$90.84
	134881	\$468.97	\$541.40	\$72.43
	134886	\$601.12	\$693.96	\$92.84
	134888	\$739.04	\$853.19	\$114.15
	134889	\$481.27	\$555.61	\$74.34
	134890	\$382.85	\$441.98	\$59.13
	134891	\$260.29	\$300.49	\$40.20
	134892	\$635.80	\$734.00	\$98.20
	134893	\$654.98	\$756.14	\$101.16
	134894	\$757.05	\$873.99	\$116.94
	134895	\$24.62	\$28.42	\$3.80
	134896	\$391.04	\$451.43	\$60.39

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332	134898	\$96.18	\$111.03	\$14.85
	134901	\$524.00	\$604.94	\$80.94
	134902	\$942.27	\$1,087.81	\$145.54
	134904	\$332.91	\$384.33	\$51.42
	134908	\$531.45	\$547.75	\$16.30
	134909	\$892.75	\$1,030.64	\$137.89
	134910	\$648.91	\$749.14	\$100.23
	134911	\$1,140.78	\$1,316.99	\$176.21
	134912	\$727.59	\$839.97	\$112.38
	134913	\$546.41	\$630.81	\$84.40
	134914	\$773.18	\$892.61	\$119.43
	134916	\$1,876.72	\$2,166.60	\$289.88
	134917	\$778.16	\$898.35	\$120.19
	134919	\$1,108.49	\$1,279.70	\$171.21
	134921	\$686.45	\$792.47	\$106.02
	134923	\$625.06	\$721.61	\$96.55
	134924	\$653.40	\$754.33	\$100.93
	134925	\$699.63	\$807.70	\$108.07
	134926	\$504.69	\$582.64	\$77.95
	134927	\$1,443.15	\$1,666.06	\$222.91
	134928	\$1,304.23	\$1,505.68	\$201.45
	134930	\$1,078.28	\$1,244.83	\$166.55
	134931	\$1,691.71	\$1,953.01	\$261.30
	134932	\$679.95	\$784.97	\$105.02
	134934	\$984.83	\$1,136.94	\$152.11
	134935	\$711.13	\$820.97	\$109.84
	134937	\$769.37	\$797.44	\$28.07
	134938	\$555.45	\$572.93	\$17.48
	134941	\$856.15	\$988.39	\$132.24
	134943	\$494.63	\$571.03	\$76.40
	134945	\$658.28	\$680.85	\$22.57
	134947	\$708.84	\$818.33	\$109.49
	134949	\$818.19	\$944.56	\$126.37
	134950	\$967.56	\$1,117.00	\$149.44
	134951	\$824.72	\$952.11	\$127.39
	134952	\$940.98	\$1,086.33	\$145.35
	134953	\$573.93	\$662.58	\$88.65
	134955	\$706.07	\$815.13	\$109.06
	134956	\$683.63	\$789.22	\$105.59
	134958	\$720.43	\$831.71	\$111.28
	134959	\$499.42	\$576.56	\$77.14
	134960	\$739.47	\$853.68	\$114.21
	134961	\$773.10	\$892.51	\$119.41
	134963	\$474.42	\$487.89	\$13.47
	134964	\$559.87	\$646.35	\$86.48
	134965	\$561.58	\$648.32	\$86.74
	134966	\$689.47	\$795.96	\$106.49

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	134967	\$867.28	\$1,001.23	\$133.95
	134969	\$834.98	\$963.95	\$128.97
	134970	\$560.38	\$646.93	\$86.55
	134977	\$931.68	\$1,075.59	\$143.91
	134978	\$759.30	\$876.58	\$117.28
	134979	\$745.29	\$860.40	\$115.11
	134980	\$630.10	\$727.42	\$97.32
	134981	\$453.03	\$465.44	\$12.41
	134986	\$481.49	\$555.86	\$74.37
	134987	\$743.45	\$770.24	\$26.79
	134989	\$749.87	\$865.69	\$115.82
	134991	\$772.86	\$892.24	\$119.38
	134992	\$824.48	\$951.83	\$127.35
	134995	\$588.62	\$679.53	\$90.91
	134996	\$616.46	\$711.68	\$95.22
	134997	\$523.87	\$604.78	\$80.91
	134999	\$600.58	\$693.35	\$92.77
	135001	\$549.31	\$634.15	\$84.84
	135002	\$634.70	\$732.74	\$98.04
	135007	\$574.78	\$663.56	\$88.78
	141118	\$21.80	\$25.17	\$3.37
	141121	\$3.34	\$3.86	\$0.52
	141157	\$2.29	\$2.64	\$0.35
	141160	\$38.42	\$44.36	\$5.94
	141161	\$20.78	\$23.99	\$3.21
	141253	\$80.20	\$92.58	\$12.38
	142681	\$1,424.32	\$1,644.31	\$219.99
	142684	\$1,283.33	\$1,481.56	\$198.23
	142685	\$1,581.44	\$1,825.70	\$244.26
	142686	\$136.21	\$157.24	\$21.03
	142687	\$1,651.55	\$1,906.64	\$255.09
	142690	\$1,280.81	\$1,478.64	\$197.83
	142691	\$2,204.19	\$2,544.64	\$340.45
	142693	\$1,140.02	\$1,316.11	\$176.09
	142695	\$1,185.68	\$1,368.81	\$183.13
	142696	\$944.35	\$1,090.21	\$145.86
	142697	\$1,036.71	\$1,196.84	\$160.13
	142698	\$966.44	\$1,115.72	\$149.28
	142700	\$1,016.29	\$1,050.58	\$34.29
	142701	\$2,356.76	\$2,720.77	\$364.01
	142704	\$163.64	\$188.91	\$25.27
	142705	\$2,239.82	\$2,585.78	\$345.96
	142708	\$2,105.34	\$2,140.43	\$35.09
	142709	\$1,583.99	\$1,828.65	\$244.66
	142711	\$1,602.98	\$1,850.57	\$247.59
	142712	\$1,140.20	\$1,316.31	\$176.11
	142713	\$1,268.93	\$1,464.92	\$195.99

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	142721	\$1,202.86	\$1,388.65	\$185.79
	142723	\$1,760.18	\$2,032.05	\$271.87
	142724	\$1,599.87	\$1,753.80	\$153.93
	142726	\$1,425.46	\$1,643.73	\$218.27
	142730	\$1,211.01	\$1,398.06	\$187.05
	142733	\$1,525.31	\$1,760.90	\$235.59
	142734	\$2,120.41	\$2,447.93	\$327.52
	142736	\$1,574.35	\$1,817.52	\$243.17
	142737	\$1,420.26	\$1,480.56	\$60.30
	142738	\$988.45	\$1,141.13	\$152.68
	142744	\$1,343.92	\$1,551.50	\$207.58
	142746	\$1,841.46	\$1,922.61	\$81.15
	142752	\$1,091.08	\$1,259.60	\$168.52
	142753	\$1,617.62	\$1,867.48	\$249.86
	142754	\$1,098.32	\$1,267.97	\$169.65
	142756	\$1,273.79	\$1,470.54	\$196.75
	142757	\$1,839.58	\$2,123.71	\$284.13
	142759	\$1,534.89	\$1,771.96	\$237.07
	142760	\$1,459.28	\$1,684.68	\$225.40
	142761	\$1,369.21	\$1,580.69	\$211.48
	142764	\$1,671.23	\$1,929.36	\$258.13
	142765	\$1,859.78	\$2,147.04	\$287.26
	142766	\$1,185.33	\$1,368.41	\$183.08
	142767	\$1,918.80	\$2,215.17	\$296.37
	142768	\$1,231.82	\$1,422.09	\$190.27
	142770	\$181.62	\$209.68	\$28.06
	142772	\$1,344.23	\$1,551.86	\$207.63
	142773	\$901.84	\$1,041.14	\$139.30
	142776	\$1,802.87	\$2,081.34	\$278.47
	142777	\$138.50	\$159.89	\$21.39
	142778	\$1,607.75	\$1,856.07	\$248.32
	142779	\$1,961.08	\$2,263.98	\$302.90
	142781	\$181.62	\$209.68	\$28.06
	142784	\$1,138.47	\$1,314.31	\$175.84
	142786	\$1,314.87	\$1,517.96	\$203.09
	142788	\$1,216.50	\$1,404.39	\$187.89
	142789	\$1,262.06	\$1,457.00	\$194.94
	142791	\$1,226.61	\$1,416.07	\$189.46
	142792	\$1,622.06	\$1,872.60	\$250.54
	142793	\$1,979.87	\$2,285.67	\$305.80
	142794	\$1,034.19	\$1,193.93	\$159.74
	142795	\$901.67	\$1,040.94	\$139.27
	142797	\$2,041.41	\$2,356.72	\$315.31
	142798	\$1,371.91	\$1,583.81	\$211.90
	142800	\$1,372.78	\$1,584.82	\$212.04
	142801	\$1,988.02	\$2,118.62	\$130.60
	142802	\$1,112.59	\$1,284.44	\$171.85

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	142804	\$1,178.33	\$1,360.33	\$182.00
	142805	\$1,229.33	\$1,419.21	\$189.88
	142806	\$1,578.50	\$1,822.31	\$243.81
	142807	\$2,003.24	\$2,312.66	\$309.42
	142808	\$1,244.60	\$1,436.83	\$192.23
	142809	\$1,380.61	\$1,593.86	\$213.25
	142810	\$2,040.62	\$2,355.81	\$315.19
	142811	\$1,446.73	\$1,670.19	\$223.46
	142813	\$925.25	\$1,068.16	\$142.91
	142815	\$1,055.71	\$1,218.77	\$163.06
	142816	\$1,222.65	\$1,411.50	\$188.85
	142817	\$1,239.06	\$1,430.44	\$191.38
	142819	\$1,361.81	\$1,572.16	\$210.35
	142820	\$1,020.85	\$1,178.52	\$157.67
	142822	\$948.85	\$1,095.41	\$146.56
	142823	\$1,207.00	\$1,393.43	\$186.43
	142825	\$1,862.41	\$2,150.07	\$287.66
	142827	\$2,251.01	\$2,598.69	\$347.68
	142830	\$1,363.76	\$1,574.40	\$210.64
	142831	\$1,299.08	\$1,499.73	\$200.65
	142833	\$1,204.95	\$1,391.06	\$186.11
	142835	\$1,603.84	\$1,851.57	\$247.73
	142839	\$1,175.71	\$1,357.30	\$181.59
	142840	\$1,154.43	\$1,332.74	\$178.31
	142842	\$1,232.56	\$1,422.94	\$190.38
	142844	\$1,101.71	\$1,271.88	\$170.17
	142847	\$2,004.76	\$2,314.41	\$309.65
	142848	\$1,080.10	\$1,246.93	\$166.83
	142849	\$1,180.70	\$1,363.07	\$182.37
	142854	\$1,281.21	\$1,479.10	\$197.89
	142855	\$1,143.31	\$1,319.91	\$176.60
	142856	\$1,455.85	\$1,680.72	\$224.87
	142857	\$1,117.88	\$1,290.55	\$172.67
	142858	\$1,203.59	\$1,389.49	\$185.90
	142860	\$1,044.46	\$1,205.79	\$161.33
	142863	\$1,495.11	\$1,726.04	\$230.93
	142870	\$1,456.51	\$1,681.48	\$224.97
	142871	\$1,343.05	\$1,550.50	\$207.45
	142874	\$906.44	\$1,046.45	\$140.01
	142875	\$1,298.84	\$1,499.45	\$200.61
	142876	\$1,346.69	\$1,554.70	\$208.01
	142877	\$143.12	\$165.23	\$22.11
	142878	\$1,307.97	\$1,510.00	\$202.03
	142879	\$1,401.64	\$1,618.14	\$216.50
	142881	\$1,315.84	\$1,519.08	\$203.24
	142886	\$1,636.70	\$1,889.51	\$252.81
	142888	\$1,364.44	\$1,575.19	\$210.75

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	142894	\$1,555.51	\$1,795.77	\$240.26
	142896	\$257.00	\$296.70	\$39.70
	142897	\$1,299.32	\$1,500.01	\$200.69
	142898	\$308.38	\$356.01	\$47.63
	142900	\$1,463.45	\$1,525.89	\$62.44
	142902	\$1,013.79	\$1,170.37	\$156.58
	142908	\$1,144.03	\$1,320.73	\$176.70
	142909	\$1,850.63	\$2,136.47	\$285.84
	142910	\$1,290.97	\$1,490.37	\$199.40
	142911	\$1,220.23	\$1,408.70	\$188.47
	142912	\$1,473.88	\$1,701.53	\$227.65
	142913	\$1,312.54	\$1,515.27	\$202.73
	142916	\$2,159.90	\$2,493.52	\$333.62
	142920	\$1,545.73	\$1,784.48	\$238.75
	142921	\$1,463.72	\$1,689.80	\$226.08
	142923	\$1,903.65	\$2,197.68	\$294.03
	142926	\$1,905.79	\$1,990.13	\$84.34
	142927	\$1,196.84	\$1,381.70	\$184.86
	142928	\$976.10	\$1,126.86	\$150.76
	142929	\$1,421.69	\$1,641.28	\$219.59
	142930	\$1,199.85	\$1,385.17	\$185.32
	142931	\$1,608.99	\$1,857.51	\$248.52
	142932	\$1,135.97	\$1,311.42	\$175.45
	142933	\$1,379.60	\$1,592.69	\$213.09
	142934	\$1,585.80	\$1,830.74	\$244.94
	142936	\$1,222.27	\$1,411.06	\$188.79
	142937	\$1,286.87	\$1,485.64	\$198.77
	142938	\$1,343.08	\$1,550.53	\$207.45
	142939	\$2,532.80	\$2,924.01	\$391.21
	142942	\$2,267.12	\$2,370.09	\$102.97
	142943	\$1,320.40	\$1,524.35	\$203.95
	142944	\$1,383.09	\$1,596.72	\$213.63
	142946	\$327.04	\$377.55	\$50.51
	142948	\$2,522.42	\$2,912.03	\$389.61
	142950	\$1,879.87	\$2,038.50	\$158.63
	142952	\$1,834.79	\$2,118.18	\$283.39
	142953	\$162.40	\$187.48	\$25.08
	142954	\$1,962.42	\$2,049.56	\$87.14
	142955	\$1,460.62	\$1,686.22	\$225.60
	142956	\$1,324.60	\$1,380.16	\$55.56
	142960	\$1,113.96	\$1,286.02	\$172.06
	142961	\$1,710.32	\$1,974.49	\$264.17
	142962	\$1,866.45	\$2,154.73	\$288.28
	142964	\$2,056.15	\$2,373.74	\$317.59
	142965	\$1,529.98	\$1,766.30	\$236.32
	142966	\$337.10	\$389.17	\$52.07
	142967	\$320.21	\$369.67	\$49.46

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332	142968	\$2,658.41	\$3,069.02	\$410.61
	142971	\$1,908.30	\$2,203.06	\$294.76
	142972	\$1,669.77	\$1,927.67	\$257.90
	142975	\$1,586.47	\$1,831.51	\$245.04
	142976	\$1,452.65	\$1,677.03	\$224.38
	142979	\$2,055.15	\$2,372.58	\$317.43
	142980	\$1,620.72	\$1,871.06	\$250.34
	142981	\$1,290.86	\$1,490.25	\$199.39
	142982	\$1,645.91	\$1,900.14	\$254.23
	142983	\$1,118.68	\$1,291.47	\$172.79
	142984	\$1,481.80	\$1,640.45	\$158.65
	142986	\$1,846.28	\$2,131.46	\$285.18
	142988	\$1,474.12	\$1,701.81	\$227.69
	142989	\$1,404.42	\$1,463.93	\$59.51
	142990	\$2,434.82	\$2,810.90	\$376.08
	142995	\$7.54	\$8.70	\$1.16
	143023	\$1.24	\$1.43	\$0.19
	143024	\$1.24	\$1.43	\$0.19
	143025	\$1.24	\$1.43	\$0.19
	143027	\$2.19	\$2.53	\$0.34
	143038	\$2.48	\$2.86	\$0.38
	143040	\$1.24	\$1.43	\$0.19
	143043	\$6.20	\$7.16	\$0.96
	143046	\$1.24	\$1.43	\$0.19
	143065	\$3.72	\$4.30	\$0.58
	143070	\$1.24	\$1.43	\$0.19
	143073	\$0.62	\$0.72	\$0.10
	143074	\$1.24	\$1.43	\$0.19
	143075	\$1.24	\$1.43	\$0.19
	143078	\$2.48	\$2.86	\$0.38
	143085	\$1.24	\$1.43	\$0.19
	143086	\$1.24	\$1.43	\$0.19
	143087	\$3.72	\$4.30	\$0.58
	143091	\$2.48	\$2.86	\$0.38
	143092	\$2.48	\$2.86	\$0.38
	143096	\$2.48	\$2.86	\$0.38
	143103	\$0.86	\$0.99	\$0.13
	143106	\$1.24	\$1.43	\$0.19
	143108	\$1.24	\$1.43	\$0.19
	143109	\$1.24	\$1.43	\$0.19
	143128	\$2.48	\$2.86	\$0.38
	143129	\$1.24	\$1.43	\$0.19
	143130	\$1.24	\$1.43	\$0.19
	143131	\$1.24	\$1.43	\$0.19
	143132	\$1.24	\$1.43	\$0.19
	143136	\$3.72	\$4.30	\$0.58
	143138	\$3.72	\$4.30	\$0.58

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332	143139	\$1.24	\$1.43	\$0.19
	143144	\$1.24	\$1.43	\$0.19
	143146	\$3.72	\$4.30	\$0.58
	143147	\$1.24	\$1.43	\$0.19
	143148	\$1.24	\$1.43	\$0.19
	143152	\$2.48	\$2.86	\$0.38
	143153	\$2.48	\$2.86	\$0.38
	143155	\$2.48	\$2.86	\$0.38
	143166	\$9.92	\$11.46	\$1.54
	143176	\$2.48	\$2.86	\$0.38
	143177	\$2.48	\$2.86	\$0.38
	143178	\$1.24	\$1.43	\$0.19
	143188	\$8.68	\$10.02	\$1.34
	143191	\$1.24	\$1.43	\$0.19
	143194	\$6.20	\$7.16	\$0.96
	143196	\$1.38	\$1.60	\$0.22
	143202	\$1.53	\$1.76	\$0.23
	143203	\$8.83	\$10.19	\$1.36
	143205	\$1.67	\$1.93	\$0.26
	143210	\$1.72	\$1.98	\$0.26
	143211	\$1.72	\$1.98	\$0.26
	143221	\$1.81	\$2.09	\$0.28
	143224	\$3.58	\$4.13	\$0.55
	143225	\$3.91	\$4.52	\$0.61
	143227	\$1.86	\$2.15	\$0.29
	143228	\$4.10	\$4.74	\$0.64
	143233	\$2.48	\$2.86	\$0.38
	143235	\$2.48	\$2.86	\$0.38
	143238	\$2.53	\$2.92	\$0.39
	143244	\$2.62	\$3.03	\$0.41
	143246	\$1.29	\$1.49	\$0.20
	143247	\$2.53	\$2.92	\$0.39
	143253	\$1.24	\$1.43	\$0.19
	143255	\$11.78	\$13.60	\$1.82
	143257	\$2.48	\$2.86	\$0.38
	143260	\$1.24	\$1.43	\$0.19
	143261	\$1.24	\$1.43	\$0.19
	143262	\$1.24	\$1.43	\$0.19
	143263	\$15.93	\$18.40	\$2.47
	143264	\$2.48	\$2.86	\$0.38
	143265	\$1.24	\$1.43	\$0.19
	143268	\$11.16	\$12.89	\$1.73
	143270	\$1.24	\$1.43	\$0.19
	143271	\$1.24	\$1.43	\$0.19
	143272	\$1.24	\$1.43	\$0.19
	143275	\$9.92	\$11.46	\$1.54
	143276	\$2.48	\$2.86	\$0.38

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332	143279	\$2.48	\$2.86	\$0.38
	143291	\$4.34	\$5.01	\$0.67
	143292	\$0.62	\$0.72	\$0.10
	143299	\$8.68	\$10.02	\$1.34
	143307	\$4.82	\$5.56	\$0.74
	143309	\$11.64	\$13.44	\$1.80
	143311	\$2.48	\$2.86	\$0.38
	143312	\$1.24	\$1.43	\$0.19
	143313	\$1.24	\$1.43	\$0.19
	143314	\$1.24	\$1.43	\$0.19
	143315	\$1.24	\$1.43	\$0.19
	143316	\$1.24	\$1.43	\$0.19
	143318	\$8.68	\$10.02	\$1.34
	143321	\$9.92	\$11.46	\$1.54
	143329	\$15.50	\$17.90	\$2.40
	143331	\$1.24	\$1.43	\$0.19
	143333	\$4.25	\$4.90	\$0.65
	143337	\$9.02	\$10.41	\$1.39
	194722	\$112.16	\$129.48	\$17.32
	194723	\$1,811.27	\$1,863.23	\$51.96
	194726	\$409.71	\$473.00	\$63.29
	194728	\$5.72	\$6.61	\$0.89
	194734	\$6.58	\$7.60	\$1.02
	194736	\$6.58	\$7.60	\$1.02
	194737	\$11.83	\$13.66	\$1.83
	194739	\$629.50	\$726.73	\$97.23
	194740	\$248.22	\$286.56	\$38.34
	194741	\$445.92	\$514.80	\$68.88
	194742	\$167.41	\$193.26	\$25.85
	194743	\$296.40	\$342.18	\$45.78
	194745	\$35.07	\$40.48	\$5.41
	194746	\$29.67	\$34.26	\$4.59
	194747	\$413.86	\$477.79	\$63.93
	194748	\$29.96	\$34.59	\$4.63
	194749	\$233.77	\$269.87	\$36.10
	194750	\$337.96	\$390.16	\$52.20
	194751	\$275.75	\$318.34	\$42.59
	194753	\$37.59	\$43.40	\$5.81
	194755	\$238.54	\$275.38	\$36.84
	194756	\$49.95	\$57.66	\$7.71
	194757	\$16.22	\$18.73	\$2.51
	194758	\$47.61	\$54.97	\$7.36
	194760	\$50.14	\$57.89	\$7.75
	194764	\$30.44	\$35.14	\$4.70
	194765	\$167.14	\$192.96	\$25.82
	194766	\$88.26	\$101.89	\$13.63
	194767	\$143.12	\$165.23	\$22.11

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332	194768	\$30.01	\$34.64	\$4.63
	194769	\$38.55	\$44.50	\$5.95
	194771	\$488.38	\$563.82	\$75.44
	194772	\$653.59	\$754.55	\$100.96
	194773	\$840.51	\$970.34	\$129.83
	194775	\$746.62	\$861.95	\$115.33
	194779	\$901.86	\$1,041.16	\$139.30
	194781	\$655.61	\$756.88	\$101.27
	194782	\$143.12	\$165.23	\$22.11
	194784	\$513.38	\$592.68	\$79.30
	194785	\$704.02	\$812.76	\$108.74
	194788	\$20.99	\$24.23	\$3.24
	194790	\$184.20	\$212.66	\$28.46
	194792	\$195.29	\$225.45	\$30.16
	194794	\$360.57	\$416.27	\$55.70
	194795	\$164.35	\$189.74	\$25.39
	194797	\$95.61	\$110.37	\$14.76
	194798	\$529.55	\$611.35	\$81.80
	194803	\$527.23	\$608.67	\$81.44
	194805	\$606.22	\$699.86	\$93.64
	194807	\$607.28	\$701.08	\$93.80
	194809	\$844.47	\$974.91	\$130.44
	194810	\$552.44	\$637.77	\$85.33
	194811	\$674.77	\$778.99	\$104.22
	194812	\$60.49	\$69.84	\$9.35
	194815	\$420.13	\$485.02	\$64.89
	194816	\$637.19	\$735.61	\$98.42
	194818	\$523.78	\$604.68	\$80.90
	194820	\$307.10	\$354.54	\$47.44
	194821	\$714.28	\$824.60	\$110.32
	194823	\$548.64	\$633.38	\$84.74
	194824	\$961.21	\$1,109.68	\$148.47
	194826	\$61.07	\$70.50	\$9.43
	194827	\$1,207.19	\$1,393.65	\$186.46
	194828	\$733.22	\$846.47	\$113.25
	194829	\$651.88	\$752.56	\$100.68
	194830	\$415.25	\$479.38	\$64.13
	194831	\$45.80	\$52.87	\$7.07
	194832	\$644.05	\$743.53	\$99.48
	194838	\$426.70	\$492.60	\$65.90
	194840	\$417.87	\$482.41	\$64.54
	194841	\$432.18	\$457.18	\$25.00
	194842	\$421.88	\$487.04	\$65.16
	194844	\$449.83	\$519.32	\$69.49
	194845	\$491.10	\$566.96	\$75.86
	194846	\$529.55	\$611.35	\$81.80
	194847	\$485.81	\$560.84	\$75.03

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332	194849	\$582.03	\$671.93	\$89.90
	194851	\$380.37	\$439.12	\$58.75
	194852	\$430.44	\$496.93	\$66.49
	194853	\$332.97	\$384.39	\$51.42
	194856	\$545.89	\$630.21	\$84.32
	194857	\$166.98	\$192.77	\$25.79
	194859	\$635.62	\$733.80	\$98.18
	194862	\$438.29	\$505.99	\$67.70
	194863	\$539.67	\$623.02	\$83.35
	194864	\$247.47	\$285.70	\$38.23
	194865	\$504.08	\$581.94	\$77.86
	194866	\$487.68	\$563.01	\$75.33
	194867	\$268.78	\$272.07	\$3.29
	194871	\$238.70	\$240.50	\$1.80
	194872	\$400.39	\$462.23	\$61.84
	194873	\$440.10	\$508.08	\$67.98
	194876	\$80.15	\$92.53	\$12.38
	194879	\$337.18	\$389.26	\$52.08
	194880	\$370.20	\$427.38	\$57.18
	194882	\$490.20	\$565.91	\$75.71
	194884	\$356.23	\$411.26	\$55.03
	194885	\$325.92	\$376.27	\$50.35
	194888	\$76.33	\$88.12	\$11.79
	194889	\$383.57	\$442.81	\$59.24
	194890	\$290.13	\$334.95	\$44.82
	194891	\$334.96	\$386.69	\$51.73
	194893	\$423.98	\$489.46	\$65.48
	194894	\$452.35	\$522.22	\$69.87
	194895	\$432.85	\$499.71	\$66.86
	194896	\$306.93	\$354.34	\$47.41
	194897	\$429.37	\$495.69	\$66.32
	194898	\$401.94	\$464.02	\$62.08
	194899	\$589.00	\$679.97	\$90.97
	194900	\$18.27	\$21.09	\$2.82
	194902	\$318.64	\$367.86	\$49.22
	194905	\$309.29	\$357.06	\$47.77
	194906	\$311.20	\$359.26	\$48.06
	194907	\$596.35	\$688.46	\$92.11
	194908	\$641.00	\$740.01	\$99.01
	194910	\$77.86	\$89.88	\$12.02
	194913	\$71.56	\$82.61	\$11.05
	194914	\$205.67	\$237.43	\$31.76
	194915	\$170.03	\$196.29	\$26.26
	194917	\$36.07	\$41.64	\$5.57
	194919	\$67.98	\$78.48	\$10.50
	194920	\$13.12	\$15.15	\$2.03
	194921	\$32.63	\$37.67	\$5.04

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332	194923	\$49.95	\$57.66	\$7.71
	194925	\$1,896.04	\$2,188.90	\$292.86
	194926	\$3.67	\$4.24	\$0.57
	194928	\$22.47	\$25.94	\$3.47
	194931	\$12.83	\$14.82	\$1.99
	194936	\$27.15	\$31.34	\$4.19
	194937	\$1,654.26	\$1,909.77	\$255.51
	194938	\$153.67	\$177.40	\$23.73
	194939	\$1,781.69	\$2,056.88	\$275.19
	194940	\$123.13	\$142.15	\$19.02
	194941	\$939.94	\$1,085.12	\$145.18
	194943	\$511.58	\$590.60	\$79.02
	194945	\$773.39	\$892.84	\$119.45
	194946	\$325.35	\$375.60	\$50.25
	194950	\$715.61	\$826.15	\$110.54
	194952	\$408.07	\$471.10	\$63.03
	194953	\$470.80	\$543.52	\$72.72
	194954	\$437.10	\$504.62	\$67.52
	194955	\$640.07	\$738.93	\$98.86
	194956	\$548.57	\$633.30	\$84.73
	194959	\$578.55	\$667.91	\$89.36
	194961	\$602.88	\$696.00	\$93.12
	194962	\$839.92	\$969.65	\$129.73
	194964	\$681.69	\$786.99	\$105.30
	194965	\$520.97	\$601.43	\$80.46
	194966	\$386.43	\$446.12	\$59.69
	194968	\$415.71	\$479.92	\$64.21
	194969	\$721.34	\$832.76	\$111.42
	194971	\$474.21	\$547.46	\$73.25
	194972	\$353.04	\$407.57	\$54.53
	194974	\$340.36	\$392.93	\$52.57
	194975	\$297.64	\$343.61	\$45.97
	194977	\$357.81	\$413.07	\$55.26
	194978	\$484.76	\$559.63	\$74.87
	194980	\$289.11	\$333.76	\$44.65
	194981	\$496.35	\$573.01	\$76.66
	194982	\$448.45	\$517.72	\$69.27
	194984	\$731.36	\$844.32	\$112.96
	194986	\$553.98	\$639.55	\$85.57
	194988	\$407.28	\$470.19	\$62.91
	194989	\$581.41	\$671.22	\$89.81
	194990	\$514.06	\$593.46	\$79.40
	194991	\$279.39	\$283.20	\$3.81
	194995	\$558.13	\$644.34	\$86.21
	194998	\$225.54	\$260.38	\$34.84
	194999	\$402.35	\$464.50	\$62.15
	195001	\$481.94	\$556.38	\$74.44

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332	195003	\$569.82	\$657.83	\$88.01
	195004	\$453.22	\$523.23	\$70.01
	195005	\$671.44	\$775.15	\$103.71
	195006	\$354.90	\$409.72	\$54.82
	195007	\$245.22	\$283.09	\$37.87
	195011	\$38.79	\$44.78	\$5.99
	195012	\$170.23	\$196.52	\$26.29
	195016	\$501.36	\$578.80	\$77.44
	195017	\$317.54	\$366.59	\$49.05
	195019	\$486.81	\$562.00	\$75.19
	195020	\$303.99	\$345.59	\$41.60
	195021	\$443.87	\$512.43	\$68.56
	195022	\$17.46	\$20.16	\$2.70
	195023	\$17.46	\$20.16	\$2.70
	195027	\$38.79	\$44.78	\$5.99
	195029	\$24.38	\$28.14	\$3.76
	195030	\$31.06	\$35.85	\$4.79
	195032	\$40.12	\$46.32	\$6.20
	195033	\$36.78	\$42.46	\$5.68
	195034	\$1,391.82	\$1,606.80	\$214.98
	195035	\$423.83	\$489.30	\$65.47
	195036	\$642.29	\$741.49	\$99.20
	195037	\$626.59	\$723.37	\$96.78
	195038	\$549.93	\$634.87	\$84.94
	195043	\$589.43	\$680.47	\$91.04
	195045	\$50.71	\$58.55	\$7.84
	195046	\$50.71	\$58.55	\$7.84
	195047	\$50.71	\$58.55	\$7.84
	195048	\$2,081.29	\$2,402.76	\$321.47
	195052	\$15.74	\$18.18	\$2.44
	195053	\$33.87	\$39.10	\$5.23
	195055	\$67.74	\$78.21	\$10.47
	195059	\$814.61	\$940.43	\$125.82
	195060	\$33.01	\$38.11	\$5.10
	195061	\$45.89	\$52.98	\$7.09
	195062	\$33.01	\$38.11	\$5.10
	195063	\$45.89	\$52.98	\$7.09
	195064	\$33.01	\$38.11	\$5.10
	195066	\$33.01	\$38.11	\$5.10
	195067	\$461.81	\$533.14	\$71.33
	195070	\$33.01	\$38.11	\$5.10
	195072	\$553.41	\$638.89	\$85.48
	195073	\$45.89	\$52.98	\$7.09
	195074	\$22.90	\$26.44	\$3.54
	195075	\$22.90	\$26.44	\$3.54
	195076	\$22.90	\$26.44	\$3.54
	195077	\$19.46	\$22.47	\$3.01

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	195078	\$206.43	\$238.32	\$31.89
	195081	\$226.66	\$261.67	\$35.01
	195084	\$194.74	\$224.82	\$30.08
	195085	\$290.89	\$335.82	\$44.93
	195092	\$257.62	\$297.41	\$39.79
	195094	\$352.03	\$406.41	\$54.38
	195100	\$250.66	\$289.37	\$38.71
	195103	\$305.95	\$353.20	\$47.25
	195104	\$2,480.80	\$2,863.97	\$383.17
	195107	\$52.34	\$60.42	\$8.08
	195108	\$43.80	\$50.56	\$6.76
	195109	\$19.46	\$22.47	\$3.01
	195111	\$47.18	\$54.47	\$7.29
	195119	\$38.93	\$44.94	\$6.01
	195120	\$599.21	\$691.76	\$92.55
	195121	\$966.27	\$1,115.52	\$149.25
	195122	\$214.68	\$247.84	\$33.16
	195123	\$174.91	\$201.93	\$27.02
	195124	\$654.83	\$755.98	\$101.15
	195134	\$382.67	\$441.78	\$59.11
	195135	\$257.62	\$297.41	\$39.79
	195136	\$166.98	\$192.77	\$25.79
	195137	\$486.63	\$561.80	\$75.17
	195138	\$38.93	\$44.94	\$6.01
	195140	\$519.54	\$599.78	\$80.24
	195142	\$19.46	\$22.47	\$3.01
	195143	\$317.83	\$366.92	\$49.09
	195144	\$291.02	\$335.97	\$44.95
	195145	\$253.33	\$292.46	\$39.13
	195146	\$333.95	\$385.53	\$51.58
	195147	\$350.22	\$404.32	\$54.10
	195148	\$286.25	\$330.46	\$44.21
	195149	\$200.37	\$231.32	\$30.95
	195151	\$211.23	\$243.85	\$32.62
	195155	\$38.93	\$44.94	\$6.01
	195156	\$218.36	\$252.08	\$33.72
	195159	\$428.89	\$495.14	\$66.25
	195160	\$318.50	\$367.69	\$49.19
	195162	\$453.22	\$523.23	\$70.01
	195163	\$367.01	\$423.70	\$56.69
	195164	\$271.89	\$313.89	\$42.00
	195165	\$14.74	\$17.02	\$2.28
	195166	\$9.88	\$11.40	\$1.52
	195167	\$5.58	\$6.44	\$0.86
	195168	\$1,335.81	\$1,542.14	\$206.33
	195169	\$294.92	\$340.47	\$45.55
	195170	\$313.06	\$361.41	\$48.35

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	195171	\$307.95	\$355.52	\$47.57
	195172	\$355.04	\$409.88	\$54.84
	195173	\$1,387.91	\$1,602.28	\$214.37
	195174	\$19.46	\$22.47	\$3.01
	195175	\$38.93	\$44.94	\$6.01
	195177	\$199.47	\$230.27	\$30.80
	195179	\$190.21	\$219.59	\$29.38
	195180	\$344.21	\$397.38	\$53.17
	195184	\$38.93	\$44.94	\$6.01
	195187	\$1,392.97	\$1,608.12	\$215.15
	195188	\$1,765.18	\$2,037.83	\$272.65
	195189	\$86.59	\$99.96	\$13.37
	195191	\$544.82	\$628.97	\$84.15
	195192	\$596.35	\$688.46	\$92.11
	195193	\$518.50	\$598.58	\$80.08
	195194	\$1,108.72	\$1,279.98	\$171.26
	195196	\$305.81	\$353.04	\$47.23
	195199	\$604.74	\$698.15	\$93.41
	195200	\$714.61	\$824.99	\$110.38
	195201	\$408.28	\$471.34	\$63.06
	195202	\$477.08	\$550.76	\$73.68
	195203	\$751.68	\$867.78	\$116.10
	195205	\$759.55	\$876.87	\$117.32
	195206	\$619.67	\$715.39	\$95.72
	195207	\$94.89	\$109.55	\$14.66
	195210	\$95.42	\$110.15	\$14.73
	195212	\$750.73	\$866.68	\$115.95
	195213	\$523.11	\$603.91	\$80.80
	195214	\$218.78	\$219.60	\$0.82
	195215	\$450.39	\$519.95	\$69.56
	195216	\$408.23	\$471.29	\$63.06
	195217	\$427.41	\$493.43	\$66.02
	195219	\$303.29	\$350.14	\$46.85
	195220	\$578.71	\$668.09	\$89.38
	195221	\$28.62	\$33.05	\$4.43
	195225	\$999.95	\$1,154.40	\$154.45
	195230	\$563.28	\$650.29	\$87.01
	195231	\$1,669.77	\$1,927.67	\$257.90
	195235	\$659.08	\$760.88	\$101.80
	195236	\$112.69	\$130.09	\$17.40
	195237	\$610.66	\$704.98	\$94.32
	195239	\$413.62	\$477.51	\$63.89
	195241	\$1,371.88	\$1,583.78	\$211.90
	195242	\$1,180.33	\$1,362.65	\$182.32
	195243	\$499.78	\$576.98	\$77.20
	195245	\$457.52	\$528.18	\$70.66
	195247	\$642.96	\$742.26	\$99.30

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332	195250	\$442.30	\$510.61	\$68.31
	195251	\$428.27	\$494.42	\$66.15
	195252	\$538.76	\$621.98	\$83.22
	195253	\$58.01	\$66.97	\$8.96
	195255	\$345.88	\$399.30	\$53.42
	195256	\$407.90	\$470.90	\$63.00
	195258	\$652.93	\$753.78	\$100.85
	195259	\$261.56	\$301.96	\$40.40
	195261	\$316.02	\$364.84	\$48.82
	195262	\$635.47	\$733.62	\$98.15
	195263	\$390.44	\$450.75	\$60.31
	195265	\$244.79	\$282.60	\$37.81
	195266	\$364.30	\$420.57	\$56.27
	195268	\$372.04	\$392.92	\$20.88
	195269	\$106.34	\$122.77	\$16.43
	195270	\$58.01	\$66.97	\$8.96
	195273	\$856.30	\$988.57	\$132.27
	195274	\$842.07	\$972.13	\$130.06
	195278	\$822.67	\$949.74	\$127.07
	195280	\$1,016.93	\$1,174.00	\$157.07
	195282	\$896.90	\$1,035.44	\$138.54
	195284	\$953.77	\$1,101.09	\$147.32
	195285	\$590.48	\$681.69	\$91.21
	195290	\$939.22	\$1,084.29	\$145.07
	195291	\$955.87	\$1,103.51	\$147.64
	195293	\$703.63	\$812.31	\$108.68
	195294	\$745.19	\$860.29	\$115.10
	195296	\$882.83	\$1,019.19	\$136.36
	195298	\$1,025.24	\$1,183.59	\$158.35
	195300	\$744.24	\$859.19	\$114.95
	195302	\$970.32	\$1,120.20	\$149.88
	195303	\$912.97	\$1,053.98	\$141.01
	195304	\$800.06	\$923.63	\$123.57
	195305	\$752.18	\$868.36	\$116.18
	195307	\$692.71	\$799.71	\$107.00
	195308	\$1,164.02	\$1,343.81	\$179.79
	195311	\$606.76	\$700.48	\$93.72
	195313	\$871.93	\$1,006.60	\$134.67
	195314	\$641.48	\$740.56	\$99.08
	195316	\$557.35	\$643.44	\$86.09
	195317	\$701.30	\$809.62	\$108.32
	195318	\$714.86	\$825.28	\$110.42
	195320	\$24.71	\$28.53	\$3.82
	195321	\$12.07	\$13.93	\$1.86
	195322	\$19.99	\$23.08	\$3.09
	195325	\$1,495.30	\$1,726.26	\$230.96
	195331	\$46.61	\$53.81	\$7.20

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332	195337	\$137.79	\$159.08	\$21.29
	195338	\$46.61	\$53.81	\$7.20
	195342	\$685.56	\$791.45	\$105.89
	195346	\$758.36	\$875.49	\$117.13
	195347	\$46.61	\$53.81	\$7.20
	195348	\$46.61	\$53.81	\$7.20
	195350	\$1,221.36	\$1,410.01	\$188.65
	195360	\$33.82	\$39.05	\$5.23
	195362	\$357.81	\$413.07	\$55.26
	195365	\$364.35	\$420.62	\$56.27
	195367	\$33.82	\$39.05	\$5.23
	195368	\$33.82	\$38.90	\$5.08
	195370	\$405.51	\$468.15	\$62.64
	195373	\$33.82	\$39.05	\$5.23
	195377	\$33.82	\$38.70	\$4.88
	195379	\$96.61	\$111.53	\$14.92
	195382	\$72.47	\$83.66	\$11.19
	195385	\$478.21	\$552.07	\$73.86
	195386	\$142.49	\$164.50	\$22.01
	195388	\$745.91	\$861.12	\$115.21
	195389	\$40.74	\$47.04	\$6.30
	195390	\$173.54	\$200.35	\$26.81
	195391	\$40.74	\$47.04	\$6.30
	195392	\$41.51	\$47.92	\$6.41
	195394	\$731.83	\$844.87	\$113.04
	195396	\$329.99	\$380.96	\$50.97
	195397	\$43.46	\$50.17	\$6.71
	195401	\$43.46	\$50.17	\$6.71
	195402	\$147.51	\$170.29	\$22.78
	195404	\$43.46	\$50.17	\$6.71
	195405	\$980.15	\$1,131.54	\$151.39
	195406	\$81.01	\$93.52	\$12.51
	195407	\$411.29	\$474.81	\$63.52
	195409	\$824.96	\$952.38	\$127.42
	195410	\$43.46	\$50.17	\$6.71
	195411	\$824.96	\$952.38	\$127.42
	195412	\$729.54	\$842.23	\$112.69
	195414	\$43.46	\$50.17	\$6.71
	195421	\$314.61	\$363.20	\$48.59
	195423	\$321.01	\$370.59	\$49.58
	195424	\$622.78	\$718.97	\$96.19
	195429	\$429.08	\$495.36	\$66.28
	195430	\$412.95	\$476.74	\$63.79
	195431	\$333.95	\$385.53	\$51.58
	195432	\$406.95	\$469.80	\$62.85
	195434	\$336.24	\$388.18	\$51.94
	195435	\$596.35	\$688.46	\$92.11

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332	195437	\$522.36	\$603.05	\$80.69
	195438	\$480.75	\$555.00	\$74.25
	195439	\$878.30	\$1,013.96	\$135.66
	195440	\$446.07	\$514.96	\$68.89
	195441	\$842.80	\$972.98	\$130.18
	195443	\$732.26	\$845.37	\$113.11
	195444	\$293.40	\$302.92	\$9.52
	195445	\$972.52	\$1,122.73	\$150.21
	195447	\$596.35	\$688.46	\$92.11
	195448	\$428.96	\$495.22	\$66.26
	195449	\$702.26	\$810.72	\$108.46
	195450	\$594.91	\$686.80	\$91.89
	195451	\$457.94	\$528.67	\$70.73
	195454	\$716.95	\$827.69	\$110.74
	195455	\$319.17	\$368.47	\$49.30
	195456	\$272.58	\$314.68	\$42.10
	195457	\$275.07	\$317.55	\$42.48
	195459	\$591.57	\$682.95	\$91.38
	195460	\$517.91	\$597.91	\$80.00
	195461	\$411.34	\$474.88	\$63.54
	195462	\$400.55	\$462.42	\$61.87
	195463	\$447.74	\$516.89	\$69.15
	195464	\$429.37	\$495.69	\$66.32
	195465	\$627.98	\$724.97	\$96.99
	195467	\$579.41	\$668.90	\$89.49
	195468	\$208.91	\$241.18	\$32.27
	195469	\$328.54	\$379.29	\$50.75
	195472	\$255.86	\$266.95	\$11.09
	195473	\$537.04	\$620.00	\$82.96
	195476	\$576.64	\$665.71	\$89.07
	195477	\$500.74	\$578.08	\$77.34
	195480	\$602.07	\$695.06	\$92.99
	195481	\$342.64	\$395.56	\$52.92
	195482	\$610.13	\$704.37	\$94.24
	195483	\$444.83	\$513.53	\$68.70
	195484	\$471.35	\$544.15	\$72.80
	195486	\$223.80	\$237.02	\$13.22
	195489	\$399.09	\$460.74	\$61.65
	195492	\$257.36	\$297.11	\$39.75
	195493	\$506.89	\$585.19	\$78.30
	195494	\$356.68	\$411.77	\$55.09
	195495	\$489.05	\$564.59	\$75.54
	195496	\$273.81	\$316.10	\$42.29
	195497	\$644.20	\$743.70	\$99.50
	195498	\$818.52	\$944.95	\$126.43
	195499	\$708.22	\$817.61	\$109.39
	195501	\$481.13	\$555.45	\$74.32

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	195504	\$1,746.10	\$2,015.80	\$269.70
	195505	\$378.39	\$436.83	\$58.44
	195506	\$603.05	\$696.19	\$93.14
	195507	\$720.21	\$831.46	\$111.25
	195508	\$707.12	\$816.34	\$109.22
	195511	\$725.27	\$837.29	\$112.02
	195513	\$1,227.99	\$1,417.67	\$189.68
	195515	\$816.41	\$942.51	\$126.10
	195517	\$925.12	\$1,068.01	\$142.89
	195518	\$711.60	\$736.81	\$25.21
	195519	\$819.83	\$946.45	\$126.62
	195522	\$933.83	\$1,078.07	\$144.24
	195523	\$952.32	\$1,099.42	\$147.10
	195524	\$715.61	\$826.15	\$110.54
	195525	\$1,106.05	\$1,276.89	\$170.84
	195526	\$808.65	\$933.55	\$124.90
	195529	\$1,057.91	\$1,221.31	\$163.40
	195530	\$793.79	\$916.40	\$122.61
	195531	\$685.27	\$709.61	\$24.34
	195533	\$703.86	\$812.58	\$108.72
	195535	\$606.13	\$699.75	\$93.62
	195536	\$1,959.02	\$2,261.60	\$302.58
	195538	\$780.40	\$900.94	\$120.54
	195542	\$469.40	\$541.90	\$72.50
	195543	\$486.64	\$561.81	\$75.17
	195544	\$457.66	\$528.35	\$70.69
	195545	\$214.25	\$247.35	\$33.10
	195547	\$291.97	\$337.07	\$45.10
	195548	\$246.64	\$276.86	\$30.22
	195549	\$387.24	\$447.05	\$59.81
	195551	\$238.54	\$275.38	\$36.84
	195552	\$1,202.23	\$1,387.93	\$185.70
	195553	\$192.81	\$222.59	\$29.78
	195556	\$1,578.81	\$1,768.96	\$190.15
	195560	\$666.16	\$769.05	\$102.89
	195562	\$568.67	\$656.51	\$87.84
	195563	\$622.15	\$718.25	\$96.10
	195564	\$555.08	\$640.81	\$85.73
	195565	\$589.14	\$680.14	\$91.00
	195566	\$654.72	\$755.85	\$101.13
	195568	\$1,100.23	\$1,270.17	\$169.94
	195570	\$741.05	\$855.51	\$114.46
	195571	\$789.38	\$911.31	\$121.93
	195573	\$1,156.19	\$1,334.78	\$178.59
	195574	\$617.27	\$712.61	\$95.34
	195576	\$300.56	\$346.98	\$46.42
	195577	\$273.33	\$315.54	\$42.21

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332	195578	\$739.47	\$853.68	\$114.21
	195579	\$1,083.92	\$1,251.34	\$167.42
	195580	\$702.40	\$810.89	\$108.49
	195581	\$749.53	\$865.31	\$115.78
	195582	\$410.62	\$474.04	\$63.42
	195583	\$461.74	\$533.06	\$71.32
	195584	\$878.28	\$1,013.93	\$135.65
	195585	\$605.89	\$699.47	\$93.58
	195586	\$548.64	\$633.38	\$84.74
	195588	\$1,025.71	\$1,184.14	\$158.43
	195591	\$969.59	\$1,119.35	\$149.76
	195592	\$815.80	\$941.81	\$126.01
	195594	\$1,026.62	\$1,185.19	\$158.57
	195595	\$677.44	\$782.08	\$104.64
	195596	\$902.16	\$1,041.50	\$139.34
	195598	\$796.94	\$920.03	\$123.09
	195599	\$924.95	\$1,067.82	\$142.87
	195600	\$751.63	\$867.73	\$116.10
	195601	\$657.81	\$759.41	\$101.60
	195602	\$801.19	\$924.94	\$123.75
	195603	\$620.76	\$641.47	\$20.71
	195604	\$381.14	\$440.01	\$58.87
	195605	\$696.01	\$803.51	\$107.50
	195612	\$381.66	\$440.61	\$58.95
	195613	\$1,105.86	\$1,276.67	\$170.81
	195614	\$578.71	\$668.09	\$89.38
	195615	\$93.94	\$108.45	\$14.51
	195616	\$598.16	\$690.55	\$92.39
	195617	\$311.20	\$359.27	\$48.07
	195618	\$166.26	\$191.94	\$25.68
	195619	\$541.48	\$625.12	\$83.64
	195621	\$164.21	\$189.57	\$25.36
	195622	\$410.29	\$473.66	\$63.37
	195623	\$684.03	\$789.69	\$105.66
	195624	\$565.53	\$652.88	\$87.35
	195627	\$1,717.90	\$1,983.25	\$265.35
	195628	\$753.45	\$869.82	\$116.37
	195631	\$64.88	\$74.90	\$10.02
	195636	\$441.30	\$509.46	\$68.16
	195637	\$547.68	\$632.28	\$84.60
	195638	\$240.45	\$277.59	\$37.14
	195639	\$1,192.69	\$1,376.91	\$184.22
	195640	\$769.91	\$888.82	\$118.91
	195641	\$723.01	\$834.68	\$111.67
	195643	\$1,468.92	\$1,695.80	\$226.88
	195644	\$54.77	\$63.23	\$8.46
	195645	\$596.35	\$688.46	\$92.11

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332	195646	\$405.51	\$468.15	\$62.64
	195648	\$519.54	\$599.78	\$80.24
	195649	\$85.87	\$99.14	\$13.27
	195650	\$157.10	\$181.37	\$24.27
	195651	\$20.66	\$23.85	\$3.19
	195652	\$390.25	\$450.52	\$60.27
	195653	\$333.95	\$385.53	\$51.58
	195654	\$596.35	\$688.46	\$92.11
	195655	\$985.11	\$1,137.27	\$152.16
	195656	\$71.90	\$83.00	\$11.10
	195657	\$189.11	\$218.32	\$29.21
	195659	\$1,053.81	\$1,216.58	\$162.77
	195660	\$753.78	\$870.21	\$116.43
	195661	\$303.71	\$350.62	\$46.91
	195662	\$585.23	\$675.63	\$90.40
	195666	\$1,431.23	\$1,652.29	\$221.06
	195667	\$54.01	\$62.35	\$8.34
	195668	\$47.03	\$54.29	\$7.26
	195669	\$100.19	\$115.66	\$15.47
	195671	\$152.09	\$175.58	\$23.49
	195672	\$492.81	\$568.93	\$76.12
	195676	\$378.18	\$436.59	\$58.41
	195679	\$812.94	\$938.50	\$125.56
	195680	\$79.24	\$91.48	\$12.24
	195682	\$434.04	\$501.09	\$67.05
	195683	\$321.93	\$371.66	\$49.73
	195685	\$300.41	\$346.82	\$46.41
	195686	\$387.17	\$446.97	\$59.80
	195690	\$422.21	\$487.42	\$65.21
	195692	\$411.24	\$474.76	\$63.52
	195693	\$119.13	\$137.53	\$18.40
	195695	\$944.61	\$1,090.51	\$145.90
	195696	\$537.76	\$620.82	\$83.06
	195697	\$643.10	\$742.43	\$99.33
	195700	\$5.53	\$6.39	\$0.86
	195701	\$22.57	\$26.05	\$3.48
	195703	\$404.45	\$466.92	\$62.47
	195709	\$96.13	\$110.98	\$14.85
	195711	\$78.77	\$90.93	\$12.16
	195712	\$572.49	\$660.92	\$88.43
	195713	\$532.98	\$615.31	\$82.33
	195715	\$534.33	\$616.86	\$82.53
	195717	\$461.57	\$532.86	\$71.29
	195720	\$422.16	\$487.37	\$65.21
	195721	\$344.93	\$398.20	\$53.27
	195722	\$433.19	\$500.09	\$66.90
	195723	\$5,175.34	\$5,974.72	\$799.38

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	195725	\$550.88	\$635.97	\$85.09
	195727	\$333.95	\$385.53	\$51.58
	195728	\$700.63	\$808.85	\$108.22
	195730	\$305.33	\$352.49	\$47.16
	195731	\$926.48	\$1,069.58	\$143.10
	195732	\$338.68	\$390.99	\$52.31
	195734	\$429.61	\$495.96	\$66.35
	195736	\$499.59	\$576.76	\$77.17
	195737	\$957.87	\$1,105.82	\$147.95
	195738	\$400.74	\$462.64	\$61.90
	195741	\$326.80	\$377.27	\$50.47
	195742	\$978.01	\$1,129.07	\$151.06
	195743	\$596.35	\$688.46	\$92.11
	195745	\$608.13	\$702.06	\$93.93
	195746	\$9.59	\$11.07	\$1.48
	195749	\$642.57	\$741.82	\$99.25
	195750	\$98.99	\$114.28	\$15.29
	195751	\$84.68	\$97.76	\$13.08
	195753	\$228.04	\$263.27	\$35.23
	195754	\$19,083.04	\$22,030.56	\$2,947.52
	195760	\$734.65	\$848.12	\$113.47
	195761	\$221.36	\$255.55	\$34.19
	195762	\$45.08	\$52.05	\$6.97
	195764	\$574.45	\$663.17	\$88.72
	195765	\$696.28	\$803.83	\$107.55
	195768	\$45.08	\$52.05	\$6.97
	195771	\$104.91	\$121.11	\$16.20
	195774	\$682.27	\$787.65	\$105.38
	195775	\$352.99	\$407.51	\$54.52
	195776	\$1,998.47	\$2,307.15	\$308.68
	195778	\$238.54	\$275.38	\$36.84
	195779	\$770.38	\$889.37	\$118.99
	195780	\$413.25	\$477.08	\$63.83
	195782	\$787.18	\$908.76	\$121.58
	195783	\$88.21	\$101.84	\$13.63
	195784	\$20.61	\$23.79	\$3.18
	195785	\$320.21	\$369.67	\$49.46
	195787	\$8.78	\$10.13	\$1.35
	195788	\$812.70	\$938.23	\$125.53
	195792	\$429.27	\$495.58	\$66.31
	195793	\$535.80	\$618.56	\$82.76
	195794	\$339.68	\$392.14	\$52.46
	195798	\$128.81	\$148.71	\$19.90
	195799	\$11.64	\$13.44	\$1.80
	195800	\$381.66	\$440.61	\$58.95
	195801	\$1,386.86	\$1,601.07	\$214.21
	195803	\$845.71	\$976.34	\$130.63

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	195804	\$36.73	\$42.41	\$5.68
	195805	\$36.73	\$42.41	\$5.68
	195806	\$51.67	\$59.65	\$7.98
	195807	\$45.32	\$52.32	\$7.00
	195810	\$63.88	\$73.75	\$9.87
	195811	\$48.14	\$55.57	\$7.43
	195812	\$32.68	\$37.73	\$5.05
	195813	\$4,000.81	\$4,618.76	\$617.95
	195815	\$307.28	\$354.74	\$47.46
	195816	\$723.53	\$835.29	\$111.76
	195817	\$62.93	\$72.65	\$9.72
	195822	\$2.10	\$2.42	\$0.32
	195824	\$864.46	\$997.98	\$133.52
	195828	\$85.92	\$99.19	\$13.27
	195830	\$842.56	\$972.70	\$130.14
	195833	\$750.11	\$865.97	\$115.86
	195835	\$751.39	\$867.45	\$116.06
	195836	\$478.27	\$552.14	\$73.87
	195837	\$531.84	\$613.99	\$82.15
	195838	\$22.42	\$25.89	\$3.47
	195839	\$557.70	\$643.84	\$86.14
	195841	\$834.88	\$963.84	\$128.96
	195842	\$6.54	\$7.55	\$1.01
	195844	\$1,546.87	\$1,785.80	\$238.93
	195845	\$507.30	\$585.65	\$78.35
	195848	\$447.26	\$516.34	\$69.08
	195850	\$284.09	\$327.97	\$43.88
	195852	\$243.90	\$281.57	\$37.67
	195853	\$259.40	\$299.46	\$40.06
	195854	\$490.00	\$565.69	\$75.69
	195855	\$249.56	\$288.10	\$38.54
	195856	\$140.90	\$162.67	\$21.77
	195858	\$364.95	\$373.00	\$8.05
	195862	\$81.68	\$94.29	\$12.61
	195866	\$55.10	\$63.61	\$8.51
	195867	\$654.12	\$755.15	\$101.03
	195869	\$2,052.19	\$2,369.17	\$316.98
	195870	\$122.75	\$141.71	\$18.96
	195871	\$401.70	\$463.75	\$62.05
	195872	\$88.02	\$101.62	\$13.60
	195875	\$573.49	\$662.07	\$88.58
	195880	\$67.03	\$77.38	\$10.35
	195881	\$658.36	\$760.05	\$101.69
	195882	\$432.04	\$498.78	\$66.74
	195888	\$87.16	\$100.62	\$13.46
	195890	\$5,114.73	\$5,904.74	\$790.01
	195893	\$443.57	\$512.08	\$68.51

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332	195894	\$270.38	\$312.14	\$41.76
	195895	\$720.34	\$831.60	\$111.26
	195896	\$592.67	\$684.21	\$91.54
	195897	\$347.16	\$400.79	\$53.63
	195898	\$503.17	\$580.89	\$77.72
	195900	\$251.46	\$290.30	\$38.84
	195901	\$396.58	\$457.83	\$61.25
	195902	\$266.06	\$307.16	\$41.10
	195906	\$594.91	\$686.80	\$91.89
	195907	\$317.44	\$366.47	\$49.03
	195908	\$524.31	\$605.29	\$80.98
	195909	\$221.64	\$255.87	\$34.23
	195910	\$619.82	\$715.55	\$95.73
	195912	\$458.33	\$529.12	\$70.79
	195913	\$226.56	\$261.56	\$35.00
	195914	\$531.89	\$614.05	\$82.16
	195915	\$238.35	\$275.17	\$36.82
	195916	\$483.71	\$558.42	\$74.71
	195917	\$130.98	\$151.21	\$20.23
	195918	\$534.71	\$617.30	\$82.59
	195919	\$474.28	\$547.53	\$73.25
	195923	\$83.73	\$96.66	\$12.93
	195924	\$340.60	\$393.21	\$52.61
	195925	\$173.50	\$200.30	\$26.80
	195926	\$500.24	\$577.51	\$77.27
	195927	\$15.79	\$18.23	\$2.44
	195928	\$502.84	\$580.51	\$77.67
	195929	\$269.49	\$311.11	\$41.62
	195930	\$657.74	\$759.34	\$101.60
	195932	\$510.47	\$589.32	\$78.85
	195933	\$359.38	\$414.89	\$55.51
	195935	\$967.49	\$1,116.93	\$149.44
	195936	\$381.66	\$440.61	\$58.95
	195937	\$659.27	\$761.10	\$101.83
	195940	\$532.23	\$614.43	\$82.20
	195943	\$406.85	\$469.69	\$62.84
	195944	\$455.09	\$525.38	\$70.29
	195946	\$262.39	\$302.92	\$40.53
	195947	\$343.47	\$396.52	\$53.05
	195948	\$583.80	\$673.97	\$90.17
	195949	\$318.01	\$367.13	\$49.12
	195950	\$428.40	\$494.57	\$66.17
	195951	\$620.01	\$715.77	\$95.76
	195952	\$674.39	\$778.56	\$104.17
	195953	\$601.45	\$694.35	\$92.90
	195954	\$294.06	\$339.47	\$45.41
	195957	\$327.83	\$378.46	\$50.63

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332	195958	\$562.38	\$649.24	\$86.86
	195959	\$446.17	\$515.08	\$68.91
	195960	\$270.91	\$312.75	\$41.84
	195961	\$574.49	\$663.23	\$88.74
	195965	\$616.62	\$711.86	\$95.24
	195966	\$388.44	\$448.43	\$59.99
	195967	\$333.95	\$385.53	\$51.58
	195968	\$396.55	\$457.80	\$61.25
	195969	\$626.64	\$723.43	\$96.79
	195971	\$528.12	\$609.70	\$81.58
	195972	\$374.12	\$431.91	\$57.79
	195974	\$257.87	\$297.70	\$39.83
	195975	\$224.40	\$259.06	\$34.66
	195977	\$346.26	\$399.74	\$53.48
	195978	\$671.77	\$775.53	\$103.76
	195979	\$14.60	\$16.85	\$2.25
	195980	\$238.30	\$275.11	\$36.81
	195981	\$14.60	\$16.85	\$2.25
	195982	\$389.29	\$449.42	\$60.13
	195983	\$355.71	\$410.65	\$54.94
	195984	\$787.18	\$908.76	\$121.58
	195985	\$14.60	\$16.85	\$2.25
	195989	\$282.40	\$326.02	\$43.62
	195991	\$7.11	\$8.21	\$1.10
	195992	\$830.73	\$959.05	\$128.32
	195993	\$543.29	\$627.21	\$83.92
	195994	\$659.99	\$761.93	\$101.94
	195995	\$28.82	\$33.27	\$4.45
	195997	\$477.03	\$550.71	\$73.68
	195998	\$604.57	\$624.49	\$19.92
	195999	\$138.07	\$159.17	\$21.10
	196000	\$656.70	\$757.06	\$100.36
	196001	\$129.48	\$149.48	\$20.00
	196002	\$453.22	\$466.88	\$13.66
	196007	\$30.44	\$35.14	\$4.70
	196008	\$1,534.75	\$1,771.81	\$237.06
	196009	\$38.40	\$44.34	\$5.94
	196010	\$38.40	\$44.34	\$5.94
	196011	\$257.14	\$296.86	\$39.72
	196014	\$32.82	\$37.89	\$5.07
	196015	\$30.34	\$35.03	\$4.69
	196016	\$357.81	\$413.07	\$55.26
	196020	\$710.70	\$820.47	\$109.77
	196022	\$327.08	\$377.60	\$50.52
	196026	\$11.69	\$13.49	\$1.80
	196027	\$456.70	\$527.25	\$70.55
	196028	\$357.81	\$413.07	\$55.26

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332	196031	\$640.19	\$739.07	\$98.88
	196034	\$11.69	\$13.49	\$1.80
	196035	\$457.99	\$528.73	\$70.74
	196036	\$263.81	\$304.56	\$40.75
	196037	\$11.69	\$13.49	\$1.80
	196038	\$459.23	\$530.17	\$70.94
	196039	\$631.89	\$729.49	\$97.60
	196040	\$11.69	\$13.49	\$1.80
	196041	\$11.69	\$13.49	\$1.80
	196042	\$5.61	\$6.47	\$0.86
	196043	\$609.23	\$703.33	\$94.10
	196044	\$11.69	\$13.49	\$1.80
	196047	\$13.79	\$15.92	\$2.13
	196048	\$793.57	\$916.14	\$122.57
	196049	\$243.31	\$280.89	\$37.58
	196051	\$746.91	\$862.28	\$115.37
	196052	\$624.21	\$720.62	\$96.41
	196053	\$44.70	\$51.61	\$6.91
	196054	\$600.30	\$693.02	\$92.72
	196055	\$136.83	\$157.96	\$21.13
	196058	\$591.57	\$682.95	\$91.38
	196059	\$882.40	\$1,018.69	\$136.29
	196060	\$836.08	\$965.21	\$129.13
	196061	\$11.69	\$13.49	\$1.80
	196062	\$52.81	\$60.97	\$8.16
	196065	\$26.72	\$30.84	\$4.12
	196066	\$524.78	\$605.84	\$81.06
	196067	\$13.55	\$15.64	\$2.09
	196068	\$1,162.83	\$1,342.43	\$179.60
	196069	\$50.38	\$58.16	\$7.78
	196070	\$1,414.63	\$1,633.13	\$218.50
	196073	\$410.29	\$473.66	\$63.37
	196075	\$377.94	\$436.32	\$58.38
	196076	\$565.19	\$652.49	\$87.30
	196078	\$333.95	\$385.53	\$51.58
	196079	\$435.71	\$503.01	\$67.30
	196080	\$432.61	\$499.43	\$66.82
	196081	\$485.14	\$560.07	\$74.93
	196084	\$566.15	\$653.59	\$87.44
	196085	\$530.75	\$612.72	\$81.97
	196086	\$417.30	\$481.75	\$64.45
	196087	\$462.53	\$533.97	\$71.44
	196088	\$469.92	\$542.50	\$72.58
	196089	\$613.81	\$708.61	\$94.80
	196092	\$427.46	\$493.48	\$66.02
	196093	\$412.34	\$476.03	\$63.69
	196094	\$522.92	\$603.69	\$80.77

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332	196095	\$1,902.82	\$2,196.72	\$293.90
	196096	\$1,074.61	\$1,240.60	\$165.99
	196097	\$492.87	\$568.99	\$76.12
	196101	\$536.14	\$618.95	\$82.81
	196102	\$577.26	\$666.42	\$89.16
	196104	\$548.64	\$633.38	\$84.74
	196105	\$505.94	\$584.09	\$78.15
	196106	\$14.74	\$17.02	\$2.28
	196107	\$15.46	\$17.84	\$2.38
	196108	\$14.74	\$17.02	\$2.28
	196109	\$14.74	\$17.02	\$2.28
	196111	\$391.20	\$451.63	\$60.43
	196113	\$281.47	\$324.95	\$43.48
	196114	\$14.74	\$17.02	\$2.28
	196115	\$138.45	\$139.77	\$1.32
	196116	\$962.26	\$1,110.89	\$148.63
	196118	\$639.28	\$738.02	\$98.74
	196119	\$11.69	\$13.49	\$1.80
	196122	\$561.08	\$647.74	\$86.66
	196124	\$11.69	\$13.49	\$1.80
	196125	\$505.70	\$583.81	\$78.11
	196127	\$11.69	\$13.49	\$1.80
	196128	\$11.69	\$13.49	\$1.80
	196129	\$60.11	\$69.40	\$9.29
	196130	\$27.57	\$31.83	\$4.26
	196133	\$303.35	\$350.21	\$46.86
	196135	\$303.35	\$350.21	\$46.86
	196136	\$629.12	\$726.29	\$97.17
	196138	\$212.63	\$245.48	\$32.85
	196139	\$11.69	\$13.49	\$1.80
	196142	\$45.32	\$52.32	\$7.00
	196143	\$888.08	\$1,025.25	\$137.17
	196147	\$151.07	\$174.40	\$23.33
	196148	\$250.88	\$289.64	\$38.76
	196150	\$184.15	\$212.59	\$28.44
	196151	\$20.47	\$23.63	\$3.16
	196152	\$301.33	\$347.87	\$46.54
	196153	\$20.47	\$23.63	\$3.16
	196154	\$190.69	\$220.14	\$29.45
	196155	\$43.89	\$49.75	\$5.86
	196164	\$2,836.12	\$3,274.18	\$438.06
	196169	\$68.27	\$78.81	\$10.54
	196170	\$426.70	\$492.60	\$65.90
	196171	\$56.49	\$65.21	\$8.72
	196172	\$105.58	\$121.88	\$16.30
	196174	\$1,066.36	\$1,231.07	\$164.71
	196175	\$149.85	\$172.99	\$23.14

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332	196176	\$87.69	\$101.23	\$13.54
	196177	\$200.13	\$231.05	\$30.92
	196178	\$323.41	\$373.36	\$49.95
	196180	\$570.82	\$658.99	\$88.17
	196182	\$14.60	\$16.85	\$2.25
	196183	\$14.60	\$16.85	\$2.25
	196184	\$286.25	\$330.46	\$44.21
	196187	\$188.87	\$218.04	\$29.17
	196189	\$5.82	\$6.72	\$0.90
	196190	\$17.51	\$20.21	\$2.70
	196191	\$407.79	\$470.78	\$62.99
	196192	\$284.39	\$328.31	\$43.92
	196196	\$215.88	\$249.22	\$33.34
	196197	\$202.71	\$234.02	\$31.31
	196198	\$497.02	\$573.79	\$76.77
	196203	\$1.35	\$1.55	\$0.20
	196204	\$1.35	\$1.55	\$0.20
	196206	\$27.29	\$31.50	\$4.21
	196208	\$119.27	\$137.69	\$18.42
	196209	\$441.30	\$509.46	\$68.16
	196211	\$352.67	\$407.14	\$54.47
	196212	\$11.93	\$13.77	\$1.84
	196213	\$296.31	\$342.08	\$45.77
	196215	\$500.31	\$577.59	\$77.28
	196216	\$73.05	\$84.33	\$11.28
	196217	\$226.46	\$261.44	\$34.98
	196220	\$443.20	\$511.66	\$68.46
	196221	\$388.09	\$448.04	\$59.95
	196222	\$11.69	\$13.49	\$1.80
	196223	\$5.84	\$6.75	\$0.91
	196225	\$480.32	\$554.51	\$74.19
	196228	\$221.22	\$255.39	\$34.17
	196229	\$19.23	\$22.20	\$2.97
	196230	\$34.92	\$40.32	\$5.40
	196237	\$429.37	\$495.69	\$66.32
	196238	\$23.38	\$26.99	\$3.61
	196240	\$536.81	\$619.72	\$82.91
	196243	\$552.17	\$637.45	\$85.28
	196244	\$560.47	\$647.04	\$86.57
	196245	\$499.64	\$576.82	\$77.18
	196246	\$11.69	\$13.49	\$1.80
	196249	\$732.22	\$845.31	\$113.09
	196250	\$32.58	\$37.62	\$5.04
	196252	\$387.58	\$447.44	\$59.86
	196256	\$239.78	\$276.81	\$37.03
	196257	\$48.52	\$56.01	\$7.49
	196258	\$381.66	\$440.61	\$58.95

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332	196262	\$20.47	\$23.63	\$3.16
	196263	\$17.51	\$20.21	\$2.70
	196264	\$70.94	\$81.90	\$10.96
	196265	\$83.82	\$96.77	\$12.95
	196269	\$348.36	\$402.16	\$53.80
	196270	\$14.03	\$16.17	\$2.14
	196272	\$19.27	\$22.25	\$2.98
	196276	\$31.58	\$36.46	\$4.88
	196277	\$572.59	\$661.03	\$88.44
	196278	\$459.39	\$472.11	\$12.72
	196280	\$814.55	\$940.36	\$125.81
	196281	\$29.24	\$33.76	\$4.52
	196282	\$1,028.53	\$1,187.39	\$158.86
	196285	\$255.20	\$294.62	\$39.42
	196286	\$263.11	\$303.75	\$40.64
	196287	\$11.69	\$13.49	\$1.80
	196290	\$447.69	\$516.84	\$69.15
	196291	\$441.44	\$509.62	\$68.18
	196292	\$658.36	\$760.05	\$101.69
	196293	\$81.91	\$94.57	\$12.66
	196294	\$44.27	\$51.11	\$6.84
	196298	\$642.14	\$741.33	\$99.19
	196299	\$14.84	\$17.13	\$2.29
	196300	\$347.36	\$401.01	\$53.65
	196301	\$584.42	\$674.69	\$90.27
	196302	\$452.41	\$522.29	\$69.88
	196303	\$266.92	\$308.15	\$41.23
	196304	\$403.70	\$466.06	\$62.36
	196305	\$344.04	\$397.18	\$53.14
	196306	\$17,890.35	\$20,653.65	\$2,763.30
	196308	\$1,066.17	\$1,230.85	\$164.68
	196309	\$350.60	\$404.76	\$54.16
	196310	\$364.92	\$421.28	\$56.36
	196311	\$573.05	\$661.56	\$88.51
	196312	\$1,038.59	\$1,199.01	\$160.42
	196314	\$190.83	\$220.31	\$29.48
	196317	\$75.23	\$86.86	\$11.63
	196319	\$853.12	\$929.08	\$75.96
	196320	\$763.32	\$881.04	\$117.72
	196321	\$554.41	\$640.04	\$85.63
	196322	\$23.47	\$27.10	\$3.63
	196324	\$343.69	\$396.77	\$53.08
	196326	\$258.58	\$298.51	\$39.93
	196328	\$319.64	\$369.01	\$49.37
	196331	\$47.56	\$54.91	\$7.35
	196332	\$338.77	\$391.10	\$52.33
	196335	\$492.58	\$568.66	\$76.08

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332	196337	\$671.10	\$774.76	\$103.66
	196342	\$891.99	\$1,029.76	\$137.77
	196343	\$822.96	\$950.07	\$127.11
	196347	\$9,064.44	\$10,464.52	\$1,400.08
	196348	\$973.24	\$1,123.56	\$150.32
	196354	\$1,288.11	\$1,487.06	\$198.95
	196358	\$292.45	\$337.62	\$45.17
	196359	\$965.89	\$1,115.08	\$149.19
	196360	\$71.90	\$83.00	\$11.10
	196364	\$582.84	\$672.87	\$90.03
	196365	\$349.36	\$403.32	\$53.96
	196366	\$103.19	\$119.13	\$15.94
	196367	\$2,997.47	\$3,460.45	\$462.98
	196368	\$26.86	\$31.01	\$4.15
	196369	\$280.47	\$323.79	\$43.32
	196371	\$758.93	\$876.16	\$117.23
	196374	\$389.68	\$449.86	\$60.18
	196375	\$836.98	\$966.26	\$129.28
	196377	\$316.64	\$365.54	\$48.90
	196378	\$90.60	\$104.59	\$13.99
	196380	\$1,216.70	\$1,404.63	\$187.93
	196381	\$207.62	\$239.69	\$32.07
	196385	\$693.62	\$800.76	\$107.14
	196387	\$50.14	\$57.89	\$7.75
	196390	\$2,458.13	\$2,837.81	\$379.68
	196393	\$679.40	\$784.34	\$104.94
	196398	\$968.13	\$1,117.67	\$149.54
	196400	\$75.38	\$87.02	\$11.64
	196401	\$239.04	\$275.97	\$36.93
	196404	\$11.21	\$12.94	\$1.73
	196405	\$1,841.51	\$2,125.95	\$284.44
	196406	\$37.21	\$42.96	\$5.75
	196407	\$858.78	\$977.11	\$118.33
	196409	\$57.20	\$66.04	\$8.84
	196410	\$26.86	\$31.01	\$4.15
	196412	\$235.39	\$271.75	\$36.36
	196413	\$595.62	\$687.62	\$92.00
	196416	\$172.75	\$199.43	\$26.68
	196418	\$48.66	\$56.18	\$7.52
	196419	\$552.09	\$637.37	\$85.28
	196420	\$46.32	\$53.48	\$7.16
	196421	\$379.55	\$438.18	\$58.63
	196422	\$118.84	\$137.20	\$18.36
	196423	\$170.55	\$196.90	\$26.35
	196424	\$41.84	\$48.30	\$6.46
	196426	\$311.72	\$359.87	\$48.15
	196427	\$155.53	\$179.55	\$24.02

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332	196428	\$3.10	\$3.58	\$0.48
	196434	\$51.29	\$59.21	\$7.92
	196440	\$7.20	\$8.31	\$1.11
	196441	\$7.20	\$8.31	\$1.11
	196442	\$1.26	\$1.45	\$0.19
	196443	\$1.26	\$1.45	\$0.19
	196445	\$1.26	\$1.45	\$0.19
	196447	\$0.63	\$0.73	\$0.10
	196448	\$0.43	\$0.50	\$0.07
	196449	\$3.61	\$4.16	\$0.55
	196450	\$3.61	\$4.16	\$0.55
	196451	\$2.10	\$2.42	\$0.32
	196452	\$2.10	\$2.42	\$0.32
	196453	\$2.10	\$2.42	\$0.32
	196454	\$2,287.96	\$2,641.35	\$353.39
	196458	\$51.14	\$59.04	\$7.90
	196464	\$2.74	\$3.17	\$0.43
	196465	\$2.74	\$3.17	\$0.43
	196466	\$2.74	\$3.17	\$0.43
	196467	\$2.74	\$3.17	\$0.43
	196469	\$1.38	\$1.59	\$0.21
	196470	\$7.85	\$9.07	\$1.22
	196471	\$7.85	\$9.07	\$1.22
	196473	\$15.69	\$18.11	\$2.42
	196474	\$4.57	\$5.28	\$0.71
	196476	\$4.57	\$5.28	\$0.71
	196478	\$0.94	\$1.08	\$0.14
	196479	\$5.44	\$6.28	\$0.84
	196480	\$14.98	\$17.29	\$2.31
	196482	\$0.88	\$1.01	\$0.13
	196484	\$1.75	\$2.02	\$0.27
	196490	\$0.15	\$0.18	\$0.03
	196492	\$0.51	\$0.59	\$0.08
	196494	\$0.88	\$1.01	\$0.13
	196495	\$0.10	\$0.12	\$0.02
	196497	\$48.28	\$55.74	\$7.46
	196498	\$2.58	\$2.97	\$0.39
	196499	\$16.51	\$19.06	\$2.55
	196502	\$3.86	\$4.46	\$0.60
	196516	\$482.33	\$556.83	\$74.50
	196517	\$477.08	\$550.76	\$73.68
	196520	\$504.41	\$582.32	\$77.91
	196522	\$874.53	\$1,009.61	\$135.08
	196523	\$280.02	\$323.28	\$43.26
	196526	\$238.54	\$275.38	\$36.84
	196527	\$36.73	\$42.41	\$5.68
	196532	\$377.56	\$435.87	\$58.31

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332	196533	\$995.90	\$1,149.72	\$153.82
	196534	\$829.59	\$957.72	\$128.13
	196535	\$547.54	\$632.11	\$84.57
	196538	\$726.16	\$838.32	\$112.16
	196539	\$396.84	\$458.14	\$61.30
	196540	\$439.93	\$507.88	\$67.95
	196543	\$982.92	\$1,134.74	\$151.82
	196544	\$804.40	\$928.64	\$124.24
	196547	\$629.74	\$727.01	\$97.27
	196550	\$567.72	\$655.41	\$87.69
	196553	\$770.42	\$889.41	\$118.99
	196555	\$604.93	\$698.37	\$93.44
	196556	\$960.93	\$1,109.35	\$148.42
	196557	\$466.27	\$538.29	\$72.02
	196559	\$635.75	\$733.95	\$98.20
	196560	\$792.47	\$914.87	\$122.40
	196561	\$590.00	\$681.13	\$91.13
	196562	\$466.27	\$538.29	\$72.02
	196563	\$695.55	\$802.98	\$107.43
	196564	\$473.20	\$546.29	\$73.09
	196566	\$763.32	\$881.22	\$117.90
	196568	\$148.28	\$171.18	\$22.90
	196571	\$249.32	\$287.83	\$38.51
	196572	\$447.26	\$516.34	\$69.08
	196573	\$321.31	\$370.93	\$49.62
	196575	\$437.95	\$505.60	\$67.65
	196576	\$575.78	\$664.72	\$88.94
	196577	\$537.45	\$620.46	\$83.01
	196579	\$448.26	\$517.50	\$69.24
	196580	\$493.63	\$569.88	\$76.25
	196583	\$546.68	\$631.12	\$84.44
	196584	\$739.09	\$853.24	\$114.15
	196585	\$318.19	\$367.34	\$49.15
	196587	\$418.06	\$482.63	\$64.57
	196588	\$333.14	\$384.59	\$51.45
	196589	\$682.03	\$787.37	\$105.34
	196590	\$783.65	\$904.68	\$121.03
	196593	\$305.37	\$352.54	\$47.17
	196597	\$688.75	\$795.14	\$106.39
	196598	\$1,003.67	\$1,158.70	\$155.03
	196600	\$353.23	\$407.79	\$54.56
	196601	\$722.10	\$833.64	\$111.54
	196602	\$529.08	\$610.80	\$81.72
	196604	\$531.94	\$614.10	\$82.16
	196611	\$382.04	\$441.05	\$59.01
	196613	\$33.78	\$38.99	\$5.21
	196614	\$684.33	\$790.03	\$105.70

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332	196615	\$806.02	\$930.52	\$124.50
	196616	\$899.74	\$1,038.71	\$138.97
	196617	\$889.08	\$1,026.40	\$137.32
	196619	\$256.50	\$259.18	\$2.68
	196621	\$514.03	\$593.42	\$79.39
	196624	\$250.46	\$289.15	\$38.69
	196625	\$433.38	\$500.31	\$66.93
	196627	\$662.42	\$764.74	\$102.32
	196630	\$410.59	\$474.01	\$63.42
	196631	\$367.81	\$424.62	\$56.81
	196632	\$444.78	\$513.48	\$68.70
	196634	\$667.91	\$771.07	\$103.16
	196635	\$319.31	\$368.63	\$49.32
	196637	\$686.66	\$792.71	\$106.05
	196640	\$1,371.59	\$1,583.45	\$211.86
	196645	\$1,689.61	\$1,950.59	\$260.98
	196646	\$93.89	\$108.39	\$14.50
	196647	\$811.03	\$936.30	\$125.27
	196648	\$620.20	\$715.99	\$95.79
	196650	\$417.44	\$481.92	\$64.48
	196651	\$172.70	\$199.38	\$26.68
	196653	\$554.55	\$640.21	\$85.66
	196656	\$511.14	\$590.09	\$78.95
	196658	\$517.15	\$597.03	\$79.88
	196660	\$486.75	\$561.93	\$75.18
	196661	\$480.92	\$555.20	\$74.28
	196662	\$399.69	\$461.43	\$61.74
	196664	\$483.34	\$558.00	\$74.66
	196665	\$455.23	\$525.54	\$70.31
	196666	\$602.02	\$695.01	\$92.99
	196667	\$681.93	\$787.26	\$105.33
	196669	\$78.00	\$90.05	\$12.05
	196670	\$78.00	\$90.05	\$12.05
	196671	\$289.32	\$334.01	\$44.69
	196672	\$457.19	\$527.81	\$70.62
	196673	\$462.18	\$533.56	\$71.38
	196674	\$313.22	\$361.60	\$48.38
	196678	\$339.61	\$392.06	\$52.45
	196679	\$541.39	\$625.01	\$83.62
	196683	\$646.10	\$745.90	\$99.80
	196685	\$476.98	\$550.65	\$73.67
	196687	\$116.88	\$134.94	\$18.06
	196689	\$291.06	\$336.02	\$44.96
	196690	\$274.37	\$316.74	\$42.37
	196691	\$357.95	\$413.23	\$55.28
	196692	\$636.32	\$734.61	\$98.29
	196693	\$335.62	\$387.46	\$51.84

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332	196696	\$69.03	\$79.70	\$10.67
	196698	\$839.70	\$969.40	\$129.70
	196699	\$769.95	\$888.88	\$118.93
	196700	\$413.43	\$477.29	\$63.86
	196701	\$578.00	\$667.27	\$89.27
	196702	\$444.61	\$513.28	\$68.67
	196703	\$562.52	\$649.41	\$86.89
	196705	\$351.18	\$405.42	\$54.24
	196706	\$83.49	\$96.38	\$12.89
	196708	\$421.35	\$432.20	\$10.85
	196709	\$513.19	\$592.46	\$79.27
	196710	\$290.95	\$335.89	\$44.94
	196712	\$315.13	\$363.80	\$48.67
	196713	\$155.91	\$179.99	\$24.08
	196716	\$2,719.33	\$3,139.35	\$420.02
	196717	\$600.73	\$693.52	\$92.79
	196720	\$631.74	\$729.32	\$97.58
	196721	\$512.76	\$591.96	\$79.20
	196722	\$629.64	\$726.89	\$97.25
	196723	\$428.08	\$494.20	\$66.12
	196725	\$1,550.50	\$1,789.98	\$239.48
	196726	\$758.69	\$875.88	\$117.19
	196727	\$543.87	\$627.87	\$84.00
	196728	\$688.85	\$795.24	\$106.39
	196730	\$559.13	\$645.50	\$86.37
	196731	\$75.14	\$86.75	\$11.61
	196733	\$5,040.31	\$5,818.82	\$778.51
	196736	\$1,761.60	\$2,033.70	\$272.10
	196737	\$37.26	\$43.01	\$5.75
	196738	\$814.08	\$939.82	\$125.74
	196740	\$667.91	\$771.07	\$103.16
	196741	\$743.38	\$858.20	\$114.82
	196742	\$41.74	\$45.42	\$3.68
	196743	\$29.82	\$32.44	\$2.62
	196744	\$582.27	\$672.21	\$89.94
	196748	\$444.59	\$513.26	\$68.67
	196749	\$163.00	\$188.18	\$25.18
	196750	\$211.65	\$237.63	\$25.98
	196751	\$41.74	\$48.19	\$6.45
	196752	\$582.65	\$672.65	\$90.00
	196753	\$701.30	\$809.62	\$108.32
	196754	\$350.65	\$404.81	\$54.16
	196755	\$618.10	\$713.57	\$95.47
	196759	\$686.37	\$792.38	\$106.01
	196760	\$400.17	\$461.98	\$61.81
	196763	\$37.31	\$43.07	\$5.76
	196766	\$43.65	\$50.39	\$6.74

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332	196770	\$655.98	\$757.30	\$101.32
	196772	\$37.26	\$43.01	\$5.75
	196776	\$63.31	\$73.09	\$9.78
	196778	\$18.37	\$21.20	\$2.83
	196784	\$83.49	\$96.38	\$12.89
	196786	\$275.03	\$317.52	\$42.49
	196787	\$41.74	\$48.19	\$6.45
	196790	\$917.37	\$1,059.06	\$141.69
	196791	\$219.45	\$253.35	\$33.90
	196792	\$41.74	\$48.19	\$6.45
	196793	\$41.74	\$48.19	\$6.45
	196794	\$741.95	\$856.55	\$114.60
	196796	\$25.05	\$28.92	\$3.87
	196797	\$153.92	\$177.69	\$23.77
	196798	\$426.32	\$492.16	\$65.84
	196801	\$83.49	\$96.38	\$12.89
	196802	\$757.79	\$874.83	\$117.04
	196809	\$41.74	\$48.19	\$6.45
	196811	\$489.48	\$565.08	\$75.60
	196812	\$298.17	\$344.23	\$46.06
	196814	\$207.62	\$239.69	\$32.07
	196815	\$83.49	\$96.38	\$12.89
	196818	\$538.53	\$621.71	\$83.18
	196819	\$245.93	\$283.92	\$37.99
	196820	\$817.71	\$944.01	\$126.30
	196824	\$179.96	\$207.76	\$27.80
	196825	\$41.74	\$48.19	\$6.45
	196826	\$41.74	\$48.19	\$6.45
	196827	\$257.62	\$297.41	\$39.79
	196828	\$27.57	\$31.83	\$4.26
	196829	\$28.39	\$32.77	\$4.38
	196831	\$27.57	\$31.83	\$4.26
	196832	\$28.39	\$32.77	\$4.38
	196836	\$42.41	\$48.96	\$6.55
	196841	\$41.74	\$48.19	\$6.45
	196842	\$56.34	\$65.05	\$8.71
	196855	\$97.51	\$112.58	\$15.07
	196858	\$41.74	\$48.19	\$6.45
	196859	\$41.74	\$48.19	\$6.45
	196860	\$83.49	\$96.38	\$12.89
	196863	\$429.37	\$495.69	\$66.32
	196864	\$86.87	\$100.28	\$13.41
	196865	\$542.01	\$625.72	\$83.71
	196867	\$46.99	\$54.25	\$7.26
	196871	\$620.20	\$715.99	\$95.79
	196874	\$766.09	\$884.42	\$118.33
	196875	\$41.74	\$48.19	\$6.45

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332	196877	\$683.51	\$789.08	\$105.57
	196878	\$536.71	\$619.61	\$82.90
	196880	\$1,186.01	\$1,369.20	\$183.19
	196884	\$41.74	\$48.19	\$6.45
	196886	\$828.16	\$956.07	\$127.91
	196889	\$33.40	\$38.55	\$5.15
	196891	\$524.64	\$605.68	\$81.04
	196892	\$900.72	\$1,039.84	\$139.12
	196896	\$479.49	\$553.56	\$74.07
	196898	\$414.77	\$478.84	\$64.07
	196899	\$18.18	\$20.98	\$2.80
	196900	\$20.37	\$23.52	\$3.15
	196902	\$27.57	\$31.83	\$4.26
	196905	\$753.78	\$870.21	\$116.43
	196908	\$500.43	\$577.73	\$77.30
	196910	\$652.35	\$753.11	\$100.76
	196911	\$691.76	\$798.61	\$106.85
	196913	\$542.40	\$626.17	\$83.77
	196914	\$679.50	\$784.45	\$104.95
	196917	\$310.10	\$358.00	\$47.90
	196920	\$462.05	\$533.41	\$71.36
	196921	\$70.37	\$81.24	\$10.87
	196922	\$45.42	\$52.43	\$7.01
	196923	\$45.42	\$52.43	\$7.01
	196924	\$754.97	\$871.58	\$116.61
	196925	\$754.97	\$871.58	\$116.61
	196926	\$45.42	\$52.43	\$7.01
	196927	\$45.42	\$52.43	\$7.01
	196928	\$706.07	\$815.13	\$109.06
	196929	\$70.42	\$81.29	\$10.87
	196930	\$35.49	\$40.98	\$5.49
	196931	\$24.14	\$27.87	\$3.73
	196932	\$2.81	\$3.25	\$0.44
	196933	\$2.81	\$3.25	\$0.44
	196934	\$2.81	\$3.25	\$0.44
	196935	\$2.81	\$3.25	\$0.44
	196936	\$2.81	\$3.25	\$0.44
	196937	\$2.81	\$3.25	\$0.44
	196938	\$2.96	\$3.41	\$0.45
	196939	\$8.73	\$10.08	\$1.35
	196940	\$3.96	\$4.57	\$0.61
	196941	\$3.96	\$4.57	\$0.61
	196942	\$3.96	\$4.57	\$0.61
	196943	\$4.29	\$4.96	\$0.67
	196944	\$18.13	\$20.93	\$2.80
	196945	\$15.36	\$17.73	\$2.37
	196948	\$307.95	\$355.52	\$47.57

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332	196950	\$376.89	\$435.10	\$58.21
	196952	\$557.64	\$643.77	\$86.13
	196953	\$548.59	\$633.32	\$84.73
	196954	\$439.16	\$506.99	\$67.83
	196958	\$288.63	\$333.21	\$44.58
	196959	\$257.04	\$296.75	\$39.71
	196961	\$533.51	\$615.92	\$82.41
	196963	\$572.49	\$660.92	\$88.43
	196964	\$415.05	\$479.15	\$64.10
	196965	\$234.69	\$270.94	\$36.25
	196968	\$21.28	\$24.56	\$3.28
	196970	\$628.98	\$726.13	\$97.15
	196973	\$410.01	\$421.28	\$11.27
	196976	\$657.89	\$759.50	\$101.61
	196977	\$270.40	\$273.77	\$3.37
	196979	\$877.96	\$1,013.57	\$135.61
	196980	\$415.06	\$479.16	\$64.10
	196982	\$426.17	\$492.00	\$65.83
	196986	\$296.73	\$342.56	\$45.83
	196987	\$750.73	\$866.68	\$115.95
	196988	\$550.38	\$635.39	\$85.01
	196990	\$736.03	\$849.72	\$113.69
	196993	\$595.15	\$687.08	\$91.93
	196999	\$362.20	\$418.14	\$55.94
	197001	\$353.04	\$407.57	\$54.53
	197002	\$400.62	\$462.50	\$61.88
	197004	\$299.37	\$345.60	\$46.23
	197006	\$2,174.80	\$2,510.71	\$335.91
	197010	\$409.43	\$472.67	\$63.24
	197011	\$407.85	\$470.85	\$63.00
	197012	\$351.41	\$405.69	\$54.28
	197014	\$510.47	\$589.32	\$78.85
	197016	\$2.53	\$2.92	\$0.39
	197017	\$172.70	\$199.38	\$26.68
	197018	\$206.53	\$238.43	\$31.90
	197019	\$834.79	\$963.73	\$128.94
	197020	\$870.33	\$1,004.76	\$134.43
	197021	\$286.25	\$330.46	\$44.21
	197022	\$9.49	\$10.96	\$1.47
	197023	\$18.99	\$21.92	\$2.93
	197024	\$238.54	\$275.38	\$36.84
	197028	\$18.99	\$21.92	\$2.93
	197029	\$314.30	\$362.84	\$48.54
	197030	\$6.97	\$8.04	\$1.07
	197031	\$5.63	\$6.50	\$0.87
	197032	\$790.32	\$912.40	\$122.08
	197034	\$7.11	\$8.21	\$1.10

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197035	\$609.23	\$703.33	\$94.10
	197036	\$191.25	\$220.78	\$29.53
	197037	\$19.66	\$22.69	\$3.03
	197038	\$9.83	\$11.35	\$1.52
	197039	\$9.83	\$11.35	\$1.52
	197040	\$5.92	\$6.83	\$0.91
	197041	\$5.96	\$6.88	\$0.92
	197042	\$4.91	\$5.67	\$0.76
	197045	\$20.08	\$23.19	\$3.11
	197046	\$9.73	\$11.24	\$1.51
	197047	\$11.16	\$12.89	\$1.73
	197048	\$11.35	\$13.11	\$1.76
	197049	\$436.67	\$504.11	\$67.44
	197050	\$23.28	\$26.88	\$3.60
	197052	\$8.97	\$10.35	\$1.38
	197053	\$14.46	\$16.69	\$2.23
	197055	\$842.04	\$972.10	\$130.06
	197060	\$41.03	\$47.37	\$6.34
	197065	\$20.71	\$23.90	\$3.19
	197067	\$5.01	\$5.78	\$0.77
	197068	\$7.82	\$9.03	\$1.21
	197069	\$7.82	\$9.03	\$1.21
	197070	\$7.63	\$8.81	\$1.18
	197071	\$7.63	\$8.81	\$1.18
	197072	\$7.44	\$8.59	\$1.15
	197073	\$7.44	\$8.59	\$1.15
	197074	\$357.81	\$413.07	\$55.26
	197076	\$2,909.54	\$3,358.94	\$449.40
	197077	\$357.81	\$413.07	\$55.26
	197078	\$6.87	\$7.93	\$1.06
	197080	\$1,019.32	\$1,176.76	\$157.44
	197093	\$395.40	\$456.47	\$61.07
	197096	\$9.40	\$10.85	\$1.45
	197097	\$115.34	\$133.16	\$17.82
	197098	\$181.39	\$182.10	\$0.71
	197099	\$18.46	\$21.31	\$2.85
	197100	\$264.20	\$305.01	\$40.81
	197101	\$31.68	\$36.57	\$4.89
	197103	\$548.64	\$633.38	\$84.74
	197104	\$969.99	\$1,119.81	\$149.82
	197105	\$204.62	\$236.22	\$31.60
	197107	\$96.46	\$111.36	\$14.90
	197108	\$291.02	\$335.97	\$44.95
	197110	\$356.86	\$411.98	\$55.12
	197112	\$824.54	\$951.90	\$127.36
	197115	\$572.49	\$660.92	\$88.43
	197116	\$432.71	\$499.54	\$66.83

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332	197117	\$310.10	\$357.98	\$47.88
	197118	\$388.82	\$448.87	\$60.05
	197120	\$333.95	\$385.53	\$51.58
	197121	\$592.10	\$683.55	\$91.45
	197122	\$610.66	\$704.98	\$94.32
	197125	\$276.67	\$319.40	\$42.73
	197126	\$442.63	\$511.00	\$68.37
	197127	\$431.75	\$498.44	\$66.69
	197128	\$442.73	\$511.11	\$68.38
	197129	\$18.70	\$21.59	\$2.89
	197130	\$26.24	\$30.29	\$4.05
	197131	\$489.58	\$565.19	\$75.61
	197132	\$917.61	\$1,059.34	\$141.73
	197133	\$24.24	\$27.98	\$3.74
	197134	\$18.70	\$21.59	\$2.89
	197135	\$18.70	\$21.59	\$2.89
	197136	\$18.70	\$21.59	\$2.89
	197137	\$95.42	\$110.15	\$14.73
	197141	\$1,564.95	\$1,806.67	\$241.72
	197143	\$13.98	\$16.14	\$2.16
	197152	\$1.91	\$2.20	\$0.29
	197154	\$1,812.08	\$2,091.97	\$279.89
	197164	\$29.77	\$34.37	\$4.60
	197165	\$156.86	\$181.09	\$24.23
	197166	\$39.22	\$45.27	\$6.05
	197167	\$39.22	\$45.27	\$6.05
	197168	\$517.25	\$597.14	\$79.89
	197170	\$399.46	\$461.15	\$61.69
	197173	\$1,226.42	\$1,415.85	\$189.43
	197175	\$357.81	\$413.07	\$55.26
	197176	\$214.73	\$247.90	\$33.17
	197178	\$552.98	\$638.39	\$85.41
	197179	\$2,438.81	\$2,815.51	\$376.70
	197180	\$108.53	\$125.30	\$16.77
	197181	\$1,862.27	\$2,149.91	\$287.64
	197182	\$378.66	\$437.14	\$58.48
	197183	\$446.07	\$514.96	\$68.89
	197185	\$26.76	\$30.90	\$4.14
	197186	\$2,946.85	\$3,402.01	\$455.16
	197188	\$95.94	\$110.76	\$14.82
	197189	\$90.93	\$104.98	\$14.05
	197193	\$85.97	\$99.25	\$13.28
	197195	\$1,184.87	\$1,367.88	\$183.01
	197196	\$667.91	\$771.07	\$103.16
	197197	\$742.24	\$856.89	\$114.65
	197199	\$719.62	\$830.77	\$111.15
	197200	\$442.36	\$510.69	\$68.33

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332	197201	\$1,226.18	\$1,415.57	\$189.39
	197203	\$397.73	\$459.17	\$61.44
	197204	\$450.12	\$519.65	\$69.53
	197206	\$111.64	\$128.88	\$17.24
	197211	\$247.34	\$285.54	\$38.20
	197212	\$420.78	\$485.77	\$64.99
	197213	\$476.84	\$550.49	\$73.65
	197214	\$304.37	\$351.39	\$47.02
	197217	\$5,781.21	\$6,674.16	\$892.95
	197218	\$2,403.75	\$2,775.02	\$371.27
	197220	\$28.05	\$32.38	\$4.33
	197224	\$103.76	\$119.79	\$16.03
	197225	\$450.93	\$520.58	\$69.65
	197227	\$263.58	\$304.30	\$40.72
	197228	\$744.24	\$859.19	\$114.95
	197229	\$103.76	\$119.79	\$16.03
	197230	\$308.53	\$356.18	\$47.65
	197231	\$250.34	\$289.00	\$38.66
	197232	\$499.80	\$577.00	\$77.20
	197233	\$429.37	\$495.69	\$66.32
	197235	\$115.07	\$132.84	\$17.77
	197236	\$554.89	\$640.59	\$85.70
	197237	\$365.12	\$421.52	\$56.40
	197239	\$313.30	\$361.69	\$48.39
	197240	\$281.47	\$324.95	\$43.48
	197242	\$8.40	\$9.69	\$1.29
	197245	\$41.55	\$47.97	\$6.42
	197246	\$18.99	\$21.92	\$2.93
	197247	\$415.06	\$479.16	\$64.10
	197249	\$374.50	\$432.35	\$57.85
	197250	\$267.16	\$308.43	\$41.27
	197251	\$127.76	\$147.49	\$19.73
	197253	\$545.39	\$629.63	\$84.24
	197254	\$21.90	\$25.28	\$3.38
	197256	\$249.70	\$288.27	\$38.57
	197259	\$814.85	\$939.38	\$124.53
	197260	\$729.93	\$842.67	\$112.74
	197262	\$600.64	\$693.42	\$92.78
	197270	\$710.55	\$820.30	\$109.75
	197272	\$237.47	\$274.15	\$36.68
	197274	\$506.32	\$584.53	\$78.21
	197276	\$415.01	\$479.11	\$64.10
	197279	\$169.43	\$195.60	\$26.17
	197282	\$548.64	\$633.38	\$84.74
	197283	\$934.64	\$1,079.00	\$144.36
	197284	\$353.75	\$408.39	\$54.64
	197289	\$99.35	\$114.70	\$15.35

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332	197290	\$148.37	\$171.29	\$22.92
	197291	\$578.42	\$667.76	\$89.34
	197292	\$1,192.69	\$1,376.91	\$184.22
	197293	\$47.04	\$54.31	\$7.27
	197294	\$71.75	\$82.83	\$11.08
	197295	\$38.17	\$44.06	\$5.89
	197296	\$8.49	\$9.80	\$1.31
	197298	\$21.04	\$24.29	\$3.25
	197299	\$8.49	\$9.80	\$1.31
	197301	\$138.35	\$159.72	\$21.37
	197302	\$16.94	\$19.55	\$2.61
	197306	\$877.01	\$1,012.47	\$135.46
	197309	\$16.94	\$19.55	\$2.61
	197310	\$47.61	\$54.97	\$7.36
	197312	\$486.19	\$561.28	\$75.09
	197313	\$17.51	\$20.21	\$2.70
	197317	\$243.02	\$280.56	\$37.54
	197318	\$318.96	\$368.22	\$49.26
	197319	\$21.56	\$24.89	\$3.33
	197321	\$495.92	\$572.52	\$76.60
	197322	\$539.14	\$622.42	\$83.28
	197326	\$578.55	\$667.91	\$89.36
	197327	\$149.18	\$172.22	\$23.04
	197328	\$300.18	\$346.54	\$46.36
	197330	\$619.53	\$715.22	\$95.69
	197332	\$776.15	\$896.04	\$119.89
	197334	\$627.45	\$724.36	\$96.91
	197335	\$450.07	\$519.59	\$69.52
	197336	\$500.93	\$578.30	\$77.37
	197339	\$268.09	\$309.50	\$41.41
	197341	\$602.78	\$695.88	\$93.10
	197342	\$795.91	\$918.84	\$122.93
	197343	\$400.36	\$462.20	\$61.84
	197345	\$477.08	\$550.76	\$73.68
	197346	\$462.76	\$534.24	\$71.48
	197347	\$419.76	\$484.60	\$64.84
	197348	\$587.71	\$678.49	\$90.78
	197349	\$599.72	\$692.35	\$92.63
	197350	\$442.38	\$510.71	\$68.33
	197351	\$637.24	\$735.67	\$98.43
	197352	\$288.63	\$333.21	\$44.58
	197354	\$32.87	\$37.95	\$5.08
	197355	\$488.52	\$563.98	\$75.46
	197356	\$503.46	\$581.22	\$77.76
	197357	\$457.13	\$527.74	\$70.61
	197358	\$526.04	\$607.29	\$81.25
	197361	\$246.15	\$248.32	\$2.17

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332	197362	\$405.51	\$468.15	\$62.64
	197364	\$405.51	\$468.15	\$62.64
	197365	\$768.14	\$886.79	\$118.65
	197366	\$752.06	\$868.22	\$116.16
	197367	\$682.36	\$787.76	\$105.40
	197368	\$401.20	\$463.17	\$61.97
	197370	\$355.07	\$409.92	\$54.85
	197372	\$572.06	\$660.42	\$88.36
	197373	\$670.10	\$773.60	\$103.50
	197374	\$621.73	\$717.76	\$96.03
	197376	\$592.05	\$683.50	\$91.45
	197379	\$467.30	\$539.47	\$72.17
	197380	\$667.72	\$770.85	\$103.13
	197381	\$674.36	\$778.52	\$104.16
	197382	\$409.54	\$472.80	\$63.26
	197383	\$558.99	\$645.33	\$86.34
	197386	\$385.98	\$445.60	\$59.62
	197387	\$580.95	\$670.69	\$89.74
	197390	\$1,080.00	\$1,246.82	\$166.82
	197393	\$461.35	\$532.61	\$71.26
	197394	\$362.58	\$418.58	\$56.00
	197395	\$412.96	\$476.74	\$63.78
	197397	\$334.81	\$386.53	\$51.72
	197398	\$435.19	\$502.41	\$67.22
	197399	\$400.32	\$462.16	\$61.84
	197401	\$719.05	\$830.11	\$111.06
	197402	\$333.95	\$385.53	\$51.58
	197403	\$671.70	\$775.45	\$103.75
	197404	\$487.09	\$562.33	\$75.24
	197405	\$851.77	\$983.33	\$131.56
	197406	\$783.17	\$904.13	\$120.96
	197407	\$541.12	\$624.70	\$83.58
	197410	\$475.64	\$549.11	\$73.47
	197412	\$603.50	\$696.72	\$93.22
	197415	\$772.82	\$892.19	\$119.37
	197416	\$604.03	\$697.32	\$93.29
	197417	\$525.37	\$606.51	\$81.14
	197419	\$534.33	\$550.76	\$16.43
	197422	\$759.89	\$877.26	\$117.37
	197423	\$572.76	\$661.23	\$88.47
	197426	\$433.70	\$500.68	\$66.98
	197427	\$450.56	\$520.15	\$69.59
	197429	\$514.51	\$593.98	\$79.47
	197430	\$1,004.44	\$1,159.58	\$155.14
	197431	\$1,039.07	\$1,199.56	\$160.49
	197434	\$481.32	\$555.67	\$74.35
	197435	\$363.42	\$419.56	\$56.14

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332	197437	\$528.93	\$610.63	\$81.70
	197439	\$551.69	\$636.90	\$85.21
	197440	\$740.99	\$855.45	\$114.46
	197441	\$726.30	\$838.48	\$112.18
	197443	\$751.89	\$868.02	\$116.13
	197444	\$671.47	\$775.18	\$103.71
	197447	\$1,244.98	\$1,437.27	\$192.29
	197448	\$643.36	\$742.73	\$99.37
	197449	\$657.04	\$758.52	\$101.48
	197452	\$911.84	\$1,052.69	\$140.85
	197454	\$693.58	\$800.71	\$107.13
	197456	\$543.43	\$627.37	\$83.94
	197457	\$572.59	\$661.03	\$88.44
	197458	\$465.91	\$537.87	\$71.96
	197460	\$624.11	\$720.51	\$96.40
	197461	\$393.11	\$453.83	\$60.72
	197462	\$667.91	\$771.07	\$103.16
	197463	\$797.72	\$920.93	\$123.21
	197464	\$648.97	\$749.20	\$100.23
	197465	\$624.83	\$721.34	\$96.51
	197469	\$739.32	\$853.52	\$114.20
	197471	\$644.05	\$743.53	\$99.48
	197473	\$801.87	\$925.73	\$123.86
	197475	\$541.43	\$625.06	\$83.63
	197476	\$787.18	\$908.76	\$121.58
	197477	\$1,019.80	\$1,177.31	\$157.51
	197478	\$689.23	\$795.69	\$106.46
	197480	\$361.89	\$417.78	\$55.89
	197482	\$676.02	\$780.43	\$104.41
	197483	\$676.26	\$780.71	\$104.45
	197484	\$512.09	\$591.19	\$79.10
	197485	\$435.19	\$502.41	\$67.22
	197487	\$629.32	\$726.52	\$97.20
	197488	\$477.79	\$551.59	\$73.80
	197489	\$630.26	\$727.60	\$97.34
	197492	\$718.00	\$828.90	\$110.90
	197493	\$823.29	\$950.45	\$127.16
	197496	\$549.02	\$566.19	\$17.17
	197499	\$444.05	\$512.63	\$68.58
	197500	\$393.98	\$454.84	\$60.86
	197502	\$503.84	\$581.66	\$77.82
	197504	\$539.14	\$622.42	\$83.28
	197505	\$644.17	\$743.66	\$99.49
	197506	\$535.61	\$618.34	\$82.73
	197507	\$528.67	\$610.32	\$81.65
	197509	\$1,431.23	\$1,652.29	\$221.06
	197512	\$861.12	\$994.13	\$133.01

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332	197513	\$565.85	\$653.24	\$87.39
	197514	\$766.89	\$885.35	\$118.46
	197515	\$756.74	\$784.19	\$27.45
	197516	\$521.21	\$601.72	\$80.51
	197517	\$582.56	\$672.54	\$89.98
	197519	\$520.39	\$600.77	\$80.38
	197520	\$620.06	\$715.83	\$95.77
	197521	\$447.49	\$516.61	\$69.12
	197522	\$460.08	\$531.14	\$71.06
	197523	\$533.85	\$616.30	\$82.45
	197524	\$467.74	\$539.99	\$72.25
	197527	\$958.06	\$1,106.04	\$147.98
	197530	\$441.89	\$510.14	\$68.25
	197531	\$663.22	\$765.66	\$102.44
	197532	\$572.82	\$661.30	\$88.48
	197534	\$915.99	\$1,057.47	\$141.48
	197535	\$553.89	\$639.44	\$85.55
	197536	\$552.85	\$638.24	\$85.39
	197537	\$802.87	\$926.88	\$124.01
	197542	\$371.98	\$429.43	\$57.45
	197544	\$400.28	\$410.08	\$9.80
	197545	\$405.51	\$468.15	\$62.64
	197546	\$826.06	\$953.65	\$127.59
	197547	\$597.20	\$621.13	\$23.93
	197548	\$242.97	\$280.50	\$37.53
	197551	\$477.55	\$551.31	\$73.76
	197552	\$591.57	\$682.95	\$91.38
	197553	\$434.19	\$501.25	\$67.06
	197554	\$637.61	\$736.10	\$98.49
	197555	\$475.09	\$548.47	\$73.38
	197556	\$160.98	\$185.85	\$24.87
	197557	\$179.90	\$207.69	\$27.79
	197558	\$649.21	\$749.48	\$100.27
	197559	\$408.36	\$471.44	\$63.08
	197563	\$300.27	\$346.65	\$46.38
	197564	\$394.21	\$455.10	\$60.89
	197566	\$308.20	\$355.80	\$47.60
	197569	\$39.60	\$45.71	\$6.11
	197570	\$758.05	\$790.57	\$32.52
	197571	\$498.70	\$575.73	\$77.03
	197572	\$680.69	\$785.83	\$105.14
	197573	\$449.52	\$518.95	\$69.43
	197574	\$391.90	\$452.44	\$60.54
	197575	\$782.24	\$903.07	\$120.83
	197577	\$457.09	\$527.69	\$70.60
	197578	\$361.06	\$416.82	\$55.76
	197580	\$244.94	\$282.77	\$37.83

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197581	\$367.30	\$424.03	\$56.73
	197582	\$454.18	\$524.33	\$70.15
	197583	\$605.49	\$699.01	\$93.52
	197584	\$460.05	\$531.11	\$71.06
	197587	\$592.50	\$684.02	\$91.52
	197590	\$488.88	\$564.39	\$75.51
	197591	\$522.48	\$603.18	\$80.70
	197592	\$472.31	\$545.26	\$72.95
	197594	\$633.26	\$731.07	\$97.81
	197597	\$710.84	\$820.64	\$109.80
	197599	\$558.37	\$644.61	\$86.24
	197602	\$528.12	\$609.70	\$81.58
	197604	\$301.33	\$306.23	\$4.90
	197605	\$488.31	\$563.73	\$75.42
	197607	\$488.38	\$563.82	\$75.44
	197608	\$670.58	\$774.15	\$103.57
	197609	\$620.20	\$715.99	\$95.79
	197611	\$681.23	\$786.45	\$105.22
	197612	\$835.22	\$964.22	\$129.00
	197613	\$266.35	\$307.49	\$41.14
	197614	\$333.95	\$385.53	\$51.58
	197617	\$710.15	\$819.83	\$109.68
	197619	\$456.32	\$461.02	\$4.70
	197620	\$538.71	\$621.92	\$83.21
	197621	\$432.77	\$499.62	\$66.85
	197630	\$559.51	\$645.94	\$86.43
	197631	\$834.88	\$963.84	\$128.96
	197633	\$664.61	\$767.27	\$102.66
	197637	\$2,981.73	\$3,442.28	\$460.55
	197638	\$417.39	\$481.86	\$64.47
	197639	\$543.57	\$627.53	\$83.96
	197640	\$673.32	\$777.32	\$104.00
	197643	\$517.33	\$597.24	\$79.91
	197644	\$497.31	\$574.13	\$76.82
	197645	\$513.01	\$592.25	\$79.24
	197646	\$419.83	\$484.67	\$64.84
	197648	\$577.88	\$667.14	\$89.26
	197649	\$629.74	\$727.01	\$97.27
	197650	\$495.97	\$572.57	\$76.60
	197651	\$694.19	\$801.42	\$107.23
	197652	\$338.57	\$390.86	\$52.29
	197655	\$435.62	\$502.90	\$67.28
	197658	\$546.68	\$631.12	\$84.44
	197660	\$577.26	\$666.42	\$89.16
	197661	\$305.14	\$352.27	\$47.13
	197663	\$434.93	\$502.10	\$67.17
	197665	\$583.84	\$674.02	\$90.18

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332	197666	\$377.18	\$435.43	\$58.25
	197667	\$791.53	\$913.79	\$122.26
	197669	\$529.60	\$611.40	\$81.80
	197671	\$512.24	\$591.36	\$79.12
	197672	\$395.97	\$457.13	\$61.16
	197673	\$685.17	\$791.00	\$105.83
	197675	\$720.96	\$832.31	\$111.35
	197676	\$437.28	\$448.92	\$11.64
	197678	\$571.06	\$659.26	\$88.20
	197680	\$554.01	\$639.59	\$85.58
	197681	\$480.89	\$555.17	\$74.28
	197685	\$431.91	\$498.62	\$66.71
	197686	\$583.37	\$673.47	\$90.10
	197687	\$520.92	\$601.38	\$80.46
	197688	\$389.44	\$449.59	\$60.15
	197689	\$920.80	\$1,063.03	\$142.23
	197690	\$654.50	\$755.59	\$101.09
	197691	\$807.69	\$932.44	\$124.75
	197696	\$319.86	\$369.27	\$49.41
	197697	\$529.70	\$611.51	\$81.81
	197698	\$391.25	\$451.68	\$60.43
	197699	\$509.90	\$588.66	\$78.76
	197700	\$542.54	\$626.34	\$83.80
	197701	\$310.53	\$358.49	\$47.96
	197706	\$854.73	\$986.75	\$132.02
	197709	\$1,311.48	\$1,514.05	\$202.57
	197711	\$564.48	\$651.66	\$87.18
	197712	\$430.80	\$497.34	\$66.54
	197713	\$562.23	\$649.08	\$86.85
	197714	\$744.95	\$860.02	\$115.07
	197715	\$372.12	\$429.60	\$57.48
	197716	\$442.49	\$510.83	\$68.34
	197718	\$522.47	\$603.17	\$80.70
	197719	\$435.57	\$502.85	\$67.28
	197720	\$452.46	\$522.34	\$69.88
	197721	\$571.48	\$659.75	\$88.27
	197722	\$282.91	\$326.60	\$43.69
	197724	\$545.58	\$629.85	\$84.27
	197725	\$491.66	\$567.60	\$75.94
	197726	\$479.46	\$553.52	\$74.06
	197730	\$377.89	\$436.26	\$58.37
	197732	\$599.40	\$691.98	\$92.58
	197733	\$565.21	\$652.51	\$87.30
	197734	\$576.69	\$665.76	\$89.07
	197735	\$292.21	\$337.34	\$45.13
	197736	\$586.71	\$677.33	\$90.62
	197737	\$372.45	\$429.98	\$57.53

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332	197738	\$468.20	\$540.52	\$72.32
	197740	\$439.20	\$507.03	\$67.83
	197742	\$771.72	\$890.92	\$119.20
	197743	\$355.95	\$363.56	\$7.61
	197744	\$429.65	\$496.02	\$66.37
	197746	\$748.82	\$864.48	\$115.66
	197748	\$610.27	\$704.53	\$94.26
	197749	\$572.91	\$661.40	\$88.49
	197751	\$632.52	\$730.22	\$97.70
	197753	\$653.72	\$754.70	\$100.98
	197754	\$482.07	\$556.52	\$74.45
	197757	\$472.31	\$545.26	\$72.95
	197758	\$383.61	\$392.58	\$8.97
	197759	\$385.72	\$445.29	\$59.57
	197761	\$547.45	\$632.01	\$84.56
	197762	\$434.43	\$501.53	\$67.10
	197764	\$529.41	\$611.18	\$81.77
	197765	\$690.62	\$797.29	\$106.67
	197769	\$535.61	\$618.34	\$82.73
	197770	\$732.79	\$845.97	\$113.18
	197773	\$3.67	\$4.24	\$0.57
	197774	\$3.67	\$4.24	\$0.57
	197775	\$3.34	\$3.86	\$0.52
	197776	\$3.24	\$3.75	\$0.51
	197777	\$2.86	\$3.30	\$0.44
	197780	\$87.59	\$101.12	\$13.53
	197781	\$3.72	\$4.30	\$0.58
	197782	\$1.34	\$1.54	\$0.20
	197783	\$2.86	\$3.30	\$0.44
	197784	\$0.67	\$0.77	\$0.10
	197785	\$0.33	\$0.39	\$0.06
	197786	\$2.00	\$2.31	\$0.31
	197787	\$4.01	\$4.63	\$0.62
	197788	\$2.67	\$3.08	\$0.41
	197789	\$2.67	\$3.08	\$0.41
	197790	\$0.48	\$0.55	\$0.07
	197791	\$4.01	\$4.63	\$0.62
	197792	\$0.43	\$0.50	\$0.07
	197793	\$5.25	\$6.06	\$0.81
	197795	\$16.22	\$18.73	\$2.51
	197796	\$41.89	\$48.36	\$6.47
	197797	\$4.68	\$5.40	\$0.72
	197798	\$5.96	\$6.88	\$0.92
	197800	\$1.77	\$2.04	\$0.27
	197801	\$4.01	\$4.63	\$0.62
	197803	\$4.68	\$5.40	\$0.72
	197804	\$3.43	\$3.97	\$0.54

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332	197805	\$4.87	\$5.62	\$0.75
	197806	\$4.68	\$5.40	\$0.72
	197807	\$9.73	\$11.24	\$1.51
	197812	\$2.29	\$2.64	\$0.35
	197813	\$2.86	\$3.30	\$0.44
	197814	\$2.86	\$3.30	\$0.44
	197815	\$2.86	\$3.30	\$0.44
	197816	\$4.01	\$4.63	\$0.62
	197817	\$6.82	\$7.88	\$1.06
	197818	\$1.72	\$1.98	\$0.26
	197819	\$4.34	\$5.01	\$0.67
	197820	\$2.86	\$3.30	\$0.44
	197821	\$4.01	\$4.63	\$0.62
	197822	\$4.01	\$4.63	\$0.62
	197823	\$0.95	\$1.10	\$0.15
	197824	\$1.14	\$1.32	\$0.18
	197825	\$2.86	\$3.30	\$0.44
	197826	\$4.01	\$4.63	\$0.62
	197828	\$2.86	\$3.30	\$0.44
	197829	\$0.33	\$0.39	\$0.06
	197830	\$2.86	\$3.30	\$0.44
	197831	\$0.52	\$0.61	\$0.09
	197832	\$7.92	\$9.14	\$1.22
	197833	\$4.06	\$4.68	\$0.62
	197834	\$2.86	\$3.30	\$0.44
	197835	\$0.67	\$0.77	\$0.10
	197836	\$2.00	\$2.31	\$0.31
	197837	\$4.01	\$4.63	\$0.62
	197838	\$4.01	\$4.63	\$0.62
	197839	\$2.86	\$3.30	\$0.44
	197840	\$4.01	\$4.63	\$0.62
	197841	\$4.01	\$4.63	\$0.62
	197842	\$2.53	\$2.92	\$0.39
	197843	\$4.82	\$5.56	\$0.74
	197844	\$4.82	\$5.56	\$0.74
	197845	\$2.86	\$3.30	\$0.44
	197846	\$0.33	\$0.39	\$0.06
	197847	\$2.86	\$3.30	\$0.44
	197848	\$2.86	\$3.30	\$0.44
	197849	\$2.86	\$3.30	\$0.44
	197850	\$3.34	\$3.86	\$0.52
	197851	\$2.86	\$3.30	\$0.44
	197852	\$4.01	\$4.63	\$0.62
	197853	\$0.95	\$1.10	\$0.15
	197854	\$0.81	\$0.94	\$0.13
	197855	\$4.01	\$4.63	\$0.62
	197856	\$4.01	\$4.63	\$0.62

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332	197857	\$0.81	\$0.94	\$0.13
	197858	\$4.01	\$4.63	\$0.62
	197859	\$0.33	\$0.39	\$0.06
	197860	\$2.86	\$3.30	\$0.44
	197861	\$2.91	\$3.36	\$0.45
	197862	\$4.01	\$4.63	\$0.62
	197863	\$4.01	\$4.63	\$0.62
	197864	\$6.68	\$7.71	\$1.03
	197865	\$0.33	\$0.39	\$0.06
	197866	\$1.19	\$1.38	\$0.19
	197867	\$0.95	\$1.10	\$0.15
	197868	\$17.75	\$20.49	\$2.74
	197869	\$2.81	\$3.25	\$0.44
	197871	\$514.86	\$594.38	\$79.52
	197872	\$646.92	\$746.84	\$99.92
	197873	\$186.97	\$215.84	\$28.87
	197877	\$462.76	\$534.24	\$71.48
	197878	\$429.37	\$495.69	\$66.32
	197881	\$393.95	\$454.79	\$60.84
	197882	\$1,301.84	\$1,502.92	\$201.08
	197883	\$448.45	\$517.72	\$69.27
	197884	\$45.89	\$52.98	\$7.09
	197885	\$45.89	\$52.98	\$7.09
	197890	\$45.89	\$52.98	\$7.09
	197891	\$686.99	\$793.10	\$106.11
	197892	\$45.89	\$52.98	\$7.09
	197893	\$393.50	\$454.28	\$60.78
	197894	\$506.56	\$584.80	\$78.24
	197896	\$355.61	\$410.54	\$54.93
	197900	\$667.19	\$770.24	\$103.05
	197905	\$698.77	\$806.70	\$107.93
	197909	\$314.87	\$363.50	\$48.63
	197910	\$45.89	\$52.98	\$7.09
	197911	\$45.89	\$52.98	\$7.09
	197912	\$65.41	\$75.51	\$10.10
	197913	\$45.89	\$52.98	\$7.09
	197914	\$45.89	\$52.98	\$7.09
	197915	\$45.89	\$52.98	\$7.09
	197916	\$45.89	\$52.98	\$7.09
	197917	\$45.89	\$52.98	\$7.09
	197918	\$606.79	\$700.52	\$93.73
	197919	\$322.78	\$328.75	\$5.97
	197920	\$548.64	\$633.38	\$84.74
	197921	\$407.38	\$470.30	\$62.92
	197922	\$432.09	\$498.83	\$66.74
	197923	\$357.81	\$413.07	\$55.26
	197924	\$550.40	\$635.42	\$85.02

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197927	\$384.67	\$444.08	\$59.41
	197928	\$523.30	\$604.13	\$80.83
	197929	\$221.21	\$255.37	\$34.16
	197930	\$240.03	\$277.10	\$37.07
	197931	\$519.49	\$599.73	\$80.24
	197932	\$497.83	\$574.72	\$76.89
	197933	\$668.72	\$772.01	\$103.29
	197934	\$582.03	\$671.93	\$89.90
	197935	\$314.61	\$363.20	\$48.59
	197936	\$338.72	\$391.04	\$52.32
	197937	\$372.56	\$430.11	\$57.55
	197939	\$521.44	\$601.99	\$80.55
	197940	\$386.43	\$446.12	\$59.69
	197941	\$632.27	\$729.93	\$97.66
	197943	\$504.98	\$582.98	\$78.00
	197946	\$409.90	\$473.22	\$63.32
	197947	\$312.93	\$361.26	\$48.33
	197948	\$554.52	\$640.17	\$85.65
	197949	\$376.89	\$435.10	\$58.21
	197951	\$400.84	\$462.75	\$61.91
	197952	\$541.15	\$624.73	\$83.58
	197953	\$665.09	\$767.82	\$102.73
	197954	\$335.86	\$387.74	\$51.88
	197955	\$477.08	\$550.76	\$73.68
	197958	\$598.30	\$690.71	\$92.41
	197959	\$89.59	\$103.43	\$13.84
	197961	\$395.97	\$457.13	\$61.16
	197962	\$284.48	\$328.42	\$43.94
	197963	\$589.19	\$680.19	\$91.00
	197964	\$428.89	\$495.14	\$66.25
	197966	\$812.56	\$938.06	\$125.50
	197967	\$517.82	\$597.80	\$79.98
	197970	\$361.66	\$417.52	\$55.86
	197971	\$417.01	\$481.42	\$64.41
	197972	\$634.46	\$732.46	\$98.00
	197973	\$686.04	\$792.00	\$105.96
	197974	\$391.30	\$451.74	\$60.44
	197975	\$241.18	\$278.43	\$37.25
	197977	\$278.70	\$321.75	\$43.05
	197978	\$572.59	\$661.03	\$88.44
	197979	\$486.52	\$561.67	\$75.15
	197980	\$251.40	\$290.23	\$38.83
	197983	\$522.02	\$602.65	\$80.63
	197984	\$486.62	\$561.78	\$75.16
	197985	\$213.93	\$246.97	\$33.04
	197987	\$539.10	\$622.36	\$83.26
	197989	\$511.04	\$589.98	\$78.94

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197990	\$302.37	\$349.07	\$46.70
	197991	\$136.59	\$157.68	\$21.09
	197993	\$448.45	\$517.72	\$69.27
	197994	\$501.58	\$579.06	\$77.48
	197996	\$649.83	\$750.21	\$100.38
	197997	\$164.59	\$190.01	\$25.42
	197998	\$288.63	\$333.21	\$44.58
	197999	\$875.96	\$1,011.26	\$135.30
	198000	\$310.10	\$358.00	\$47.90
	198001	\$310.10	\$358.00	\$47.90
	198002	\$605.89	\$699.47	\$93.58
	198003	\$464.05	\$535.73	\$71.68
	198005	\$212.55	\$245.38	\$32.83
	198006	\$284.41	\$328.34	\$43.93
	198007	\$481.13	\$555.45	\$74.32
	198008	\$310.10	\$358.00	\$47.90
	198011	\$421.88	\$487.04	\$65.16
	198012	\$415.06	\$479.16	\$64.10
	198013	\$500.04	\$577.27	\$77.23
	198014	\$244.41	\$282.16	\$37.75
	198015	\$225.17	\$231.30	\$6.13
	198017	\$346.36	\$399.85	\$53.49
	198020	\$343.78	\$396.88	\$53.10
	198021	\$223.33	\$257.82	\$34.49
	198023	\$650.25	\$750.69	\$100.44
	198024	\$563.52	\$650.56	\$87.04
	198025	\$408.57	\$471.67	\$63.10
	198026	\$510.47	\$589.32	\$78.85
	198029	\$486.62	\$561.78	\$75.16
	198030	\$481.85	\$556.27	\$74.42
	198031	\$565.76	\$653.15	\$87.39
	198032	\$422.12	\$487.32	\$65.20
	198033	\$282.52	\$326.16	\$43.64
	198034	\$333.95	\$385.53	\$51.58
	198036	\$255.32	\$294.76	\$39.44
	198037	\$474.69	\$548.01	\$73.32
	198038	\$297.97	\$344.00	\$46.03
	198039	\$316.78	\$365.71	\$48.93
	198040	\$226.34	\$261.30	\$34.96
	198041	\$451.27	\$520.97	\$69.70
	198043	\$180.85	\$208.79	\$27.94
	198044	\$82.30	\$95.01	\$12.71
	198046	\$303.70	\$350.61	\$46.91
	198047	\$233.50	\$269.57	\$36.07
	198049	\$403.03	\$465.29	\$62.26
	198052	\$563.52	\$650.56	\$87.04
	198053	\$457.71	\$528.40	\$70.69

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332	198054	\$620.20	\$715.99	\$95.79
	198055	\$489.77	\$565.41	\$75.64
	198057	\$356.90	\$412.03	\$55.13
	198058	\$346.32	\$399.81	\$53.49
	198060	\$382.57	\$441.66	\$59.09
	198063	\$73.14	\$84.43	\$11.29
	198064	\$305.60	\$352.80	\$47.20
	198066	\$243.26	\$280.83	\$37.57
	198068	\$443.49	\$511.99	\$68.50
	198069	\$258.27	\$298.16	\$39.89
	198070	\$299.95	\$346.28	\$46.33
	198071	\$262.39	\$302.92	\$40.53
	198072	\$425.73	\$491.49	\$65.76
	198073	\$323.97	\$374.01	\$50.04
	198075	\$224.90	\$259.64	\$34.74
	198077	\$445.91	\$514.78	\$68.87
	198078	\$297.29	\$343.21	\$45.92
	198079	\$386.72	\$446.45	\$59.73
	198080	\$386.34	\$446.01	\$59.67
	198081	\$505.70	\$583.81	\$78.11
	198082	\$314.87	\$363.50	\$48.63
	198084	\$440.68	\$508.74	\$68.06
	198086	\$476.26	\$549.83	\$73.57
	198087	\$256.77	\$296.43	\$39.66
	198088	\$395.97	\$457.13	\$61.16
	198089	\$192.34	\$222.05	\$29.71
	198090	\$515.24	\$594.83	\$79.59
	198091	\$338.72	\$391.04	\$52.32
	198093	\$225.02	\$259.77	\$34.75
	198094	\$275.97	\$318.59	\$42.62
	198096	\$319.21	\$368.52	\$49.31
	198098	\$1,498.97	\$1,730.50	\$231.53
	198099	\$26.72	\$30.84	\$4.12
	198100	\$26.72	\$30.84	\$4.12
	198101	\$1,008.54	\$1,164.32	\$155.78
	198102	\$1,001.86	\$1,156.60	\$154.74
	198103	\$293.88	\$339.27	\$45.39
	198105	\$2,504.65	\$2,891.51	\$386.86
	198108	\$491.39	\$567.29	\$75.90
	198109	\$305.33	\$352.49	\$47.16
	198110	\$17.79	\$20.54	\$2.75
	198111	\$647.44	\$747.44	\$100.00
	198112	\$878.25	\$1,013.90	\$135.65
	198113	\$399.03	\$460.66	\$61.63
	198114	\$415.06	\$479.16	\$64.10
	198115	\$233.77	\$269.87	\$36.10
	198116	\$273.39	\$315.62	\$42.23

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	198117	\$276.70	\$319.44	\$42.74
	198118	\$191.01	\$220.51	\$29.50
	198121	\$863.62	\$896.36	\$32.74
	198122	\$1,093.08	\$1,261.91	\$168.83
	198123	\$1,168.79	\$1,349.32	\$180.53
	198125	\$32.78	\$37.84	\$5.06
	198126	\$240.60	\$277.77	\$37.17
	198127	\$701.21	\$809.51	\$108.30
	198128	\$756.18	\$827.98	\$71.80
	198129	\$28.86	\$33.32	\$4.46
	198130	\$667.91	\$771.07	\$103.16
	198131	\$277.43	\$320.29	\$42.86
	198132	\$538.67	\$621.87	\$83.20
	198133	\$30.39	\$35.08	\$4.69
	198134	\$567.72	\$655.41	\$87.69
	198135	\$593.72	\$685.43	\$91.71
	198136	\$238.59	\$275.44	\$36.85
	198137	\$172.99	\$199.71	\$26.72
	198138	\$304.04	\$351.00	\$46.96
	198139	\$699.68	\$807.75	\$108.07
	198142	\$29.01	\$33.49	\$4.48
	198143	\$41.84	\$48.30	\$6.46
	198144	\$886.12	\$1,022.99	\$136.87
	198146	\$295.37	\$340.99	\$45.62
	198152	\$654.21	\$755.26	\$101.05
	198157	\$41.12	\$47.48	\$6.36
	198159	\$139.25	\$160.76	\$21.51
	198164	\$60.30	\$69.62	\$9.32
	198167	\$334.72	\$386.42	\$51.70
	198168	\$605.89	\$699.47	\$93.58
	198169	\$656.98	\$758.46	\$101.48
	198170	\$605.81	\$699.38	\$93.57
	198172	\$765.66	\$883.92	\$118.26
	198173	\$610.18	\$704.43	\$94.25
	198176	\$936.64	\$1,081.31	\$144.67
	198177	\$836.74	\$965.98	\$129.24
	198178	\$568.24	\$656.00	\$87.76
	198179	\$758.50	\$875.66	\$117.16
	198180	\$565.10	\$652.38	\$87.28
	198181	\$486.62	\$561.78	\$75.16
	198183	\$615.62	\$710.71	\$95.09
	198184	\$694.43	\$801.69	\$107.26
	198185	\$321.98	\$371.71	\$49.73
	198194	\$191.18	\$191.85	\$0.67
	198195	\$393.06	\$453.77	\$60.71
	198196	\$718.14	\$829.07	\$110.93
	198199	\$16.32	\$18.84	\$2.52

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	198200	\$1,245.60	\$1,437.99	\$192.39
	198206	\$27.29	\$31.50	\$4.21
	198208	\$705.12	\$814.03	\$108.91
	198213	\$26.53	\$30.62	\$4.09
	198219	\$1,238.49	\$1,429.78	\$191.29
	198221	\$645.99	\$745.77	\$99.78
	198225	\$781.88	\$902.65	\$120.77
	198226	\$481.14	\$555.46	\$74.32
	198229	\$13.26	\$15.31	\$2.05
	198230	\$26.53	\$30.62	\$4.09
	198232	\$13.26	\$15.31	\$2.05
	198235	\$813.65	\$939.33	\$125.68
	198236	\$562.95	\$649.90	\$86.95
	198238	\$948.56	\$1,095.07	\$146.51
	198239	\$23.62	\$27.26	\$3.64
	198240	\$561.50	\$648.23	\$86.73
	198241	\$270.98	\$312.83	\$41.85
	198242	\$549.69	\$634.59	\$84.90
	198243	\$387.17	\$446.97	\$59.80
	198244	\$797.89	\$921.13	\$123.24
	198246	\$253.31	\$255.84	\$2.53
	198247	\$536.22	\$619.04	\$82.82
	198248	\$623.61	\$719.94	\$96.33
	198249	\$34.35	\$39.66	\$5.31
	198250	\$668.77	\$772.06	\$103.29
	198253	\$575.74	\$664.66	\$88.92
	198255	\$509.04	\$587.66	\$78.62
	198256	\$330.25	\$381.26	\$51.01
	198257	\$467.06	\$539.17	\$72.11
	198262	\$24.57	\$28.36	\$3.79
	198263	\$342.25	\$395.12	\$52.87
	198264	\$792.85	\$915.31	\$122.46
	198266	\$283.91	\$327.76	\$43.85
	198267	\$898.86	\$1,037.69	\$138.83
	198268	\$673.15	\$777.13	\$103.98
	198269	\$393.41	\$454.18	\$60.77
	198275	\$454.94	\$525.21	\$70.27
	198276	\$293.94	\$339.34	\$45.40
	198277	\$538.81	\$622.03	\$83.22
	198278	\$389.06	\$449.15	\$60.09
	198281	\$440.57	\$508.61	\$68.04
	198282	\$277.09	\$319.88	\$42.79
	198283	\$351.56	\$405.86	\$54.30
	198284	\$522.06	\$602.70	\$80.64
	198286	\$682.66	\$788.10	\$105.44
	198287	\$424.06	\$489.56	\$65.50
	198288	\$519.06	\$599.23	\$80.17

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332	198290	\$434.79	\$501.95	\$67.16
	198291	\$555.98	\$641.86	\$85.88
	198292	\$759.79	\$877.15	\$117.36
	198293	\$503.22	\$580.95	\$77.73
	198294	\$358.71	\$414.11	\$55.40
	198295	\$410.71	\$474.15	\$63.44
	198296	\$433.90	\$500.92	\$67.02
	198297	\$529.18	\$610.91	\$81.73
	198298	\$449.40	\$518.81	\$69.41
	198299	\$439.30	\$507.15	\$67.85
	198300	\$719.00	\$830.06	\$111.06
	198304	\$825.44	\$952.93	\$127.49
	198306	\$597.97	\$690.33	\$92.36
	198308	\$471.69	\$544.54	\$72.85
	198310	\$244.93	\$282.76	\$37.83
	198312	\$203.20	\$234.58	\$31.38
	198317	\$390.68	\$451.02	\$60.34
	198318	\$735.60	\$849.22	\$113.62
	198319	\$568.14	\$655.89	\$87.75
	198321	\$508.52	\$587.06	\$78.54
	198322	\$425.84	\$491.61	\$65.77
	198323	\$609.80	\$703.99	\$94.19
	198326	\$533.28	\$615.64	\$82.36
	198327	\$497.35	\$574.17	\$76.82
	198328	\$75.14	\$86.75	\$11.61
	198329	\$75.14	\$86.75	\$11.61
	198330	\$764.42	\$882.49	\$118.07
	198334	\$784.50	\$905.68	\$121.18
	198335	\$31.01	\$35.80	\$4.79
	198336	\$839.89	\$969.62	\$129.73
	198337	\$284.34	\$328.26	\$43.92
	198338	\$1,010.07	\$1,010.44	\$0.37
	198340	\$322.50	\$372.32	\$49.82
	198345	\$800.20	\$923.80	\$123.60
	198347	\$1,105.58	\$1,276.34	\$170.76
	198348	\$793.85	\$916.47	\$122.62
	198349	\$840.49	\$970.31	\$129.82
	198350	\$927.82	\$1,071.13	\$143.31
	198351	\$746.56	\$861.87	\$115.31
	198352	\$586.13	\$676.66	\$90.53
	198353	\$661.70	\$763.90	\$102.20
	198354	\$700.51	\$725.18	\$24.67
	198355	\$591.12	\$682.42	\$91.30
	198356	\$478.50	\$552.41	\$73.91
	198357	\$516.96	\$596.81	\$79.85
	198358	\$498.59	\$575.60	\$77.01
	198359	\$623.16	\$719.41	\$96.25

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332	198360	\$501.98	\$579.51	\$77.53
	198361	\$497.77	\$574.66	\$76.89
	198362	\$679.45	\$784.40	\$104.95
	198365	\$392.35	\$452.95	\$60.60
	198367	\$599.44	\$692.02	\$92.58
	198368	\$665.95	\$768.81	\$102.86
	198369	\$604.34	\$697.69	\$93.35
	198370	\$638.71	\$737.36	\$98.65
	198373	\$853.31	\$985.11	\$131.80
	198375	\$776.20	\$896.09	\$119.89
	198376	\$671.06	\$774.70	\$103.64
	198378	\$799.35	\$922.82	\$123.47
	198379	\$641.45	\$740.53	\$99.08
	198380	\$738.75	\$852.86	\$114.11
	198382	\$729.83	\$842.56	\$112.73
	198383	\$619.12	\$714.74	\$95.62
	198384	\$585.90	\$676.39	\$90.49
	198386	\$657.74	\$759.34	\$101.60
	198389	\$514.86	\$594.38	\$79.52
	198390	\$616.19	\$711.37	\$95.18
	198391	\$651.35	\$751.96	\$100.61
	198392	\$764.51	\$882.60	\$118.09
	198395	\$476.31	\$490.88	\$14.57
	198398	\$921.28	\$1,063.58	\$142.30
	198400	\$524.78	\$605.84	\$81.06
	198403	\$729.50	\$842.17	\$112.67
	198406	\$718.76	\$829.78	\$111.02
	198408	\$659.91	\$682.56	\$22.65
	198409	\$425.56	\$491.29	\$65.73
	198410	\$1,065.36	\$1,229.91	\$164.55
	198413	\$1,326.70	\$1,531.62	\$204.92
	198414	\$499.80	\$577.00	\$77.20
	198415	\$382.42	\$441.49	\$59.07
	198416	\$216.49	\$228.07	\$11.58
	198419	\$401.55	\$463.58	\$62.03
	198423	\$31.73	\$36.63	\$4.90
	198424	\$286.25	\$330.46	\$44.21
	198425	\$15.36	\$17.73	\$2.37
	198428	\$15.36	\$17.73	\$2.37
	198429	\$264.01	\$300.69	\$36.68
	198431	\$418.49	\$483.13	\$64.64
	198433	\$636.66	\$734.99	\$98.33
	198436	\$501.12	\$578.52	\$77.40
	198437	\$305.33	\$352.49	\$47.16
	198439	\$216.24	\$249.64	\$33.40
	198440	\$473.40	\$546.52	\$73.12
	198442	\$405.42	\$468.04	\$62.62

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332	198443	\$310.10	\$358.00	\$47.90
	198444	\$285.05	\$329.08	\$44.03
	198446	\$14.69	\$16.96	\$2.27
	198448	\$387.24	\$447.06	\$59.82
	198449	\$133.87	\$154.54	\$20.67
	198452	\$388.58	\$448.60	\$60.02
	198453	\$226.19	\$261.13	\$34.94
	198454	\$16.03	\$18.51	\$2.48
	198456	\$16.03	\$18.51	\$2.48
	198458	\$342.76	\$395.70	\$52.94
	198459	\$476.50	\$550.07	\$73.57
	198461	\$10.97	\$12.67	\$1.70
	198463	\$397.40	\$458.79	\$61.39
	198465	\$445.26	\$514.03	\$68.77
	198467	\$207.53	\$239.58	\$32.05
	198468	\$219.59	\$253.51	\$33.92
	198469	\$250.06	\$288.68	\$38.62
	198471	\$411.76	\$475.36	\$63.60
	198472	\$373.41	\$431.08	\$57.67
	198473	\$419.30	\$484.07	\$64.77
	198474	\$369.02	\$426.02	\$57.00
	198475	\$324.55	\$374.68	\$50.13
	198476	\$351.75	\$363.04	\$11.29
	198477	\$552.50	\$637.84	\$85.34
	198481	\$351.61	\$405.91	\$54.30
	198482	\$402.99	\$465.23	\$62.24
	198484	\$312.96	\$361.30	\$48.34
	198485	\$219.14	\$252.98	\$33.84
	198486	\$441.20	\$509.35	\$68.15
	198487	\$13.98	\$16.14	\$2.16
	198490	\$324.41	\$374.52	\$50.11
	198492	\$216.99	\$250.51	\$33.52
	198494	\$424.60	\$490.18	\$65.58
	198497	\$15.22	\$17.57	\$2.35
	198499	\$15.12	\$17.46	\$2.34
	198500	\$605.98	\$699.58	\$93.60
	198501	\$188.61	\$217.74	\$29.13
	198504	\$519.54	\$599.78	\$80.24
	198508	\$409.57	\$472.83	\$63.26
	198509	\$3.86	\$4.46	\$0.60
	198510	\$523.54	\$604.41	\$80.87
	198513	\$637.95	\$736.48	\$98.53
	198514	\$562.95	\$649.90	\$86.95
	198515	\$453.22	\$523.23	\$70.01
	198516	\$548.64	\$633.38	\$84.74
	198517	\$517.63	\$597.58	\$79.95
	198518	\$571.06	\$659.26	\$88.20

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	198519	\$764.90	\$883.04	\$118.14
	198520	\$594.68	\$686.53	\$91.85
	198522	\$239.33	\$276.30	\$36.97
	198523	\$396.53	\$457.77	\$61.24
	198524	\$799.67	\$923.19	\$123.52
	198525	\$403.85	\$466.23	\$62.38
	198526	\$713.37	\$823.56	\$110.19
	198528	\$660.32	\$762.31	\$101.99
	198530	\$572.54	\$660.97	\$88.43
	198534	\$193.06	\$222.88	\$29.82
	198536	\$361.77	\$417.65	\$55.88
	198537	\$396.02	\$457.19	\$61.17
	198540	\$272.53	\$314.63	\$42.10
	198542	\$226.18	\$261.12	\$34.94
	198543	\$347.72	\$401.43	\$53.71
	198544	\$548.64	\$633.38	\$84.74
	198548	\$733.60	\$846.91	\$113.31
	198550	\$736.32	\$850.05	\$113.73
	198551	\$404.81	\$467.33	\$62.52
	198552	\$268.28	\$309.72	\$41.44
	198553	\$472.31	\$545.26	\$72.95
	198555	\$458.79	\$529.66	\$70.87
	198556	\$286.25	\$330.46	\$44.21
	198557	\$397.93	\$459.39	\$61.46
	198558	\$430.47	\$496.95	\$66.48
	198559	\$229.00	\$264.37	\$35.37
	198560	\$421.98	\$487.16	\$65.18
	198562	\$530.70	\$612.67	\$81.97
	198563	\$357.81	\$413.07	\$55.26
	198565	\$470.11	\$542.72	\$72.61
	198566	\$320.21	\$369.67	\$49.46
	198567	\$276.28	\$318.95	\$42.67
	198569	\$314.87	\$363.50	\$48.63
	198570	\$298.02	\$344.06	\$46.04
	198571	\$385.49	\$445.03	\$59.54
	198573	\$893.66	\$1,031.69	\$138.03
	198575	\$1,558.08	\$1,798.74	\$240.66
	198577	\$2,580.89	\$2,979.52	\$398.63
	198579	\$429.37	\$495.69	\$66.32
	198580	\$51.72	\$59.70	\$7.98
	198582	\$48.33	\$55.79	\$7.46
	198583	\$355.56	\$410.48	\$54.92
	198590	\$1,072.37	\$1,238.01	\$165.64
	198592	\$292.09	\$337.21	\$45.12
	198593	\$603.74	\$696.99	\$93.25
	198594	\$760.89	\$878.41	\$117.52
	198597	\$461.09	\$532.31	\$71.22

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	198598	\$400.74	\$462.64	\$61.90
	198599	\$231.38	\$267.12	\$35.74
	198600	\$521.77	\$602.37	\$80.60
	198601	\$260.54	\$300.78	\$40.24
	198602	\$386.43	\$446.12	\$59.69
	198603	\$259.05	\$299.06	\$40.01
	198604	\$556.51	\$642.47	\$85.96
	198605	\$400.51	\$462.37	\$61.86
	198606	\$344.93	\$398.20	\$53.27
	198607	\$227.09	\$262.16	\$35.07
	198608	\$221.00	\$255.13	\$34.13
	198609	\$267.78	\$309.14	\$41.36
	198610	\$572.49	\$660.92	\$88.43
	198611	\$529.27	\$611.02	\$81.75
	198613	\$448.01	\$517.21	\$69.20
	198614	\$434.55	\$446.05	\$11.50
	198615	\$383.90	\$443.20	\$59.30
	198616	\$201.67	\$232.82	\$31.15
	198617	\$560.56	\$647.15	\$86.59
	198618	\$26.43	\$30.51	\$4.08
	198619	\$456.13	\$526.59	\$70.46
	198620	\$570.25	\$658.33	\$88.08
	198621	\$26.43	\$30.51	\$4.08
	198622	\$895.28	\$1,033.56	\$138.28
	198628	\$844.59	\$975.04	\$130.45
	198629	\$348.86	\$402.75	\$53.89
	198631	\$652.40	\$753.17	\$100.77
	198633	\$231.52	\$267.28	\$35.76
	198634	\$484.84	\$559.73	\$74.89
	198635	\$326.07	\$376.43	\$50.36
	198636	\$393.00	\$453.70	\$60.70
	198637	\$498.79	\$575.83	\$77.04
	198638	\$416.68	\$481.04	\$64.36
	198639	\$906.44	\$1,046.45	\$140.01
	198642	\$385.63	\$445.19	\$59.56
	198643	\$450.29	\$519.84	\$69.55
	198644	\$696.48	\$804.06	\$107.58
	198645	\$592.86	\$684.43	\$91.57
	198646	\$811.17	\$936.46	\$125.29
	198647	\$686.99	\$793.10	\$106.11
	198650	\$1,309.38	\$1,511.63	\$202.25
	198653	\$672.39	\$776.25	\$103.86
	198654	\$573.33	\$661.89	\$88.56
	198660	\$663.23	\$765.67	\$102.44
	198661	\$143.12	\$165.23	\$22.11
	198662	\$428.17	\$494.31	\$66.14
	198666	\$27.53	\$31.78	\$4.25

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332	198667	\$519.97	\$600.28	\$80.31
	198668	\$443.68	\$512.21	\$68.53
	198669	\$639.28	\$738.02	\$98.74
	198670	\$24.33	\$28.09	\$3.76
	198671	\$579.46	\$668.96	\$89.50
	198672	\$23.14	\$26.71	\$3.57
	198673	\$447.67	\$516.81	\$69.14
	198674	\$285.26	\$329.32	\$44.06
	198676	\$17.46	\$20.16	\$2.70
	198677	\$319.16	\$368.46	\$49.30
	198678	\$463.00	\$534.52	\$71.52
	198680	\$730.21	\$843.00	\$112.79
	198683	\$784.98	\$906.23	\$121.25
	198687	\$226.38	\$261.34	\$34.96
	198688	\$274.30	\$316.67	\$42.37
	198689	\$22.28	\$25.72	\$3.44
	198690	\$395.97	\$457.13	\$61.16
	198691	\$22.90	\$26.44	\$3.54
	198692	\$221.98	\$256.26	\$34.28
	198693	\$278.70	\$321.75	\$43.05
	198694	\$731.12	\$844.05	\$112.93
	198695	\$667.86	\$771.01	\$103.15
	198697	\$333.95	\$385.53	\$51.58
	198698	\$188.38	\$217.48	\$29.10
	198699	\$477.08	\$550.76	\$73.68
	198700	\$143.12	\$165.23	\$22.11
	198701	\$4,896.99	\$5,653.37	\$756.38
	198702	\$693.93	\$801.11	\$107.18
	198704	\$65.55	\$75.67	\$10.12
	198707	\$511.71	\$590.75	\$79.04
	198708	\$623.85	\$720.21	\$96.36
	198709	\$540.48	\$623.96	\$83.48
	198711	\$346.31	\$399.80	\$53.49
	198713	\$348.07	\$401.84	\$53.77
	198715	\$655.83	\$757.12	\$101.29
	198718	\$761.89	\$879.57	\$117.68
	198722	\$877.53	\$1,013.08	\$135.55
	198723	\$75.66	\$87.35	\$11.69
	198725	\$543.06	\$626.93	\$83.87
	198727	\$24.28	\$28.03	\$3.75
	198728	\$195.06	\$225.19	\$30.13
	198729	\$906.44	\$1,046.45	\$140.01
	198731	\$482.13	\$556.60	\$74.47
	198732	\$435.19	\$502.41	\$67.22
	198733	\$419.40	\$484.18	\$64.78
	198734	\$440.53	\$508.58	\$68.05
	198735	\$278.14	\$321.10	\$42.96

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	198736	\$475.02	\$548.40	\$73.38
	198737	\$234.46	\$241.06	\$6.60
	198738	\$174.28	\$201.19	\$26.91
	198741	\$143.12	\$165.23	\$22.11
	198746	\$278.64	\$321.67	\$43.03
	198747	\$439.10	\$506.92	\$67.82
	198748	\$48.80	\$56.34	\$7.54
	198749	\$619.39	\$715.06	\$95.67
	198750	\$48.33	\$55.79	\$7.46
	198751	\$529.94	\$611.79	\$81.85
	198752	\$48.33	\$55.79	\$7.46
	198754	\$357.81	\$413.07	\$55.26
	198755	\$604.69	\$698.09	\$93.40
	198756	\$1,598.01	\$1,844.84	\$246.83
	198757	\$167.29	\$193.13	\$25.84
	198758	\$1,092.36	\$1,261.08	\$168.72
	198760	\$829.83	\$958.00	\$128.17
	198761	\$760.08	\$877.48	\$117.40
	198764	\$850.91	\$982.34	\$131.43
	198765	\$48.33	\$55.79	\$7.46
	198767	\$540.43	\$623.91	\$83.48
	198768	\$238.54	\$275.38	\$36.84
	198770	\$18.32	\$21.15	\$2.83
	198771	\$319.64	\$369.01	\$49.37
	198772	\$18.65	\$21.53	\$2.88
	198773	\$25.00	\$28.86	\$3.86
	198775	\$301.61	\$348.19	\$46.58
	198777	\$387.39	\$447.22	\$59.83
	198780	\$14.31	\$16.52	\$2.21
	198781	\$306.52	\$353.87	\$47.35
	198782	\$38.12	\$44.01	\$5.89
	198784	\$1,031.49	\$1,190.81	\$159.32
	198787	\$254.62	\$293.94	\$39.32
	198791	\$352.18	\$406.57	\$54.39
	198792	\$706.55	\$815.68	\$109.13
	198793	\$499.45	\$576.59	\$77.14
	198794	\$424.06	\$489.56	\$65.50
	198796	\$28.91	\$33.38	\$4.47
	198799	\$1,030.44	\$1,189.60	\$159.16
	198805	\$362.05	\$417.97	\$55.92
	198806	\$992.46	\$1,145.75	\$153.29
	198809	\$644.05	\$743.53	\$99.48
	198815	\$45.89	\$52.98	\$7.09
	198816	\$816.52	\$942.63	\$126.11
	198820	\$748.25	\$863.82	\$115.57
	198822	\$45.89	\$52.98	\$7.09
	198823	\$450.22	\$519.76	\$69.54

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332	198825	\$45.89	\$52.98	\$7.09
	198826	\$45.89	\$52.98	\$7.09
	198828	\$854.59	\$986.58	\$131.99
	198829	\$248.08	\$286.40	\$38.32
	198830	\$91.79	\$105.97	\$14.18
	198831	\$12.67	\$14.63	\$1.96
	198835	\$45.89	\$52.98	\$7.09
	198836	\$91.79	\$105.97	\$14.18
	198837	\$183.58	\$211.93	\$28.35
	198840	\$5.28	\$6.10	\$0.82
	198841	\$5.28	\$6.10	\$0.82
	198842	\$45.89	\$52.98	\$7.09
	198844	\$5.28	\$6.10	\$0.82
	198845	\$45.89	\$52.98	\$7.09
	198846	\$153.28	\$176.96	\$23.68
	198847	\$45.89	\$52.98	\$7.09
	198848	\$5.28	\$6.10	\$0.82
	198849	\$45.89	\$52.98	\$7.09
	198851	\$901.67	\$1,040.94	\$139.27
	198853	\$45.89	\$52.98	\$7.09
	198854	\$45.89	\$52.98	\$7.09
	198855	\$776.01	\$895.87	\$119.86
	198856	\$292.92	\$338.17	\$45.25
	198857	\$45.89	\$52.98	\$7.09
	198858	\$45.89	\$52.98	\$7.09
	198859	\$206.10	\$237.93	\$31.83
	198860	\$286.25	\$330.46	\$44.21
	198861	\$45.89	\$52.98	\$7.09
	198862	\$45.89	\$52.98	\$7.09
	198863	\$45.89	\$52.98	\$7.09
	198865	\$45.89	\$52.98	\$7.09
	198870	\$91.79	\$105.97	\$14.18
	198872	\$314.01	\$362.51	\$48.50
	198874	\$428.89	\$495.14	\$66.25
	198875	\$556.37	\$642.30	\$85.93
	198876	\$45.89	\$52.98	\$7.09
	198877	\$45.89	\$52.98	\$7.09
	198879	\$45.89	\$52.98	\$7.09
	198880	\$357.81	\$413.07	\$55.26
	198882	\$45.89	\$52.98	\$7.09
	198885	\$45.89	\$52.98	\$7.09
	198886	\$45.89	\$52.98	\$7.09
	198887	\$45.89	\$52.98	\$7.09
	198888	\$467.53	\$539.75	\$72.22
	198889	\$98.91	\$105.99	\$7.08
	198892	\$455.19	\$525.50	\$70.31
	198894	\$446.26	\$515.18	\$68.92

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332	198895	\$671.68	\$775.42	\$103.74
	198897	\$553.89	\$639.45	\$85.56
	198899	\$521.55	\$602.11	\$80.56
	198901	\$591.54	\$682.91	\$91.37
	198903	\$386.26	\$445.92	\$59.66
	198905	\$642.29	\$741.49	\$99.20
	198908	\$689.23	\$795.69	\$106.46
	198909	\$406.39	\$469.16	\$62.77
	198910	\$592.53	\$684.05	\$91.52
	198911	\$484.04	\$558.80	\$74.76
	198913	\$469.95	\$542.54	\$72.59
	198917	\$658.67	\$760.41	\$101.74
	198919	\$729.26	\$841.90	\$112.64
	198920	\$23.95	\$27.65	\$3.70
	198924	\$590.95	\$682.23	\$91.28
	198925	\$690.66	\$797.34	\$106.68
	198926	\$577.41	\$666.59	\$89.18
	198927	\$549.90	\$634.84	\$84.94
	198928	\$845.33	\$975.90	\$130.57
	198929	\$575.11	\$663.93	\$88.82
	198931	\$763.99	\$881.99	\$118.00
	198932	\$558.73	\$645.03	\$86.30
	198933	\$832.45	\$961.03	\$128.58
	198935	\$23.95	\$27.65	\$3.70
	198936	\$585.47	\$675.90	\$90.43
	198939	\$518.53	\$598.63	\$80.10
	198940	\$774.15	\$893.72	\$119.57
	198941	\$527.36	\$608.81	\$81.45
	198942	\$323.33	\$373.27	\$49.94
	198944	\$613.59	\$708.36	\$94.77
	198945	\$262.53	\$303.09	\$40.56
	198946	\$1,106.17	\$1,277.03	\$170.86
	198947	\$449.86	\$519.35	\$69.49
	198948	\$712.99	\$823.12	\$110.13
	198949	\$4,007.44	\$4,626.42	\$618.98
	198951	\$593.67	\$685.37	\$91.70
	198953	\$925.01	\$960.79	\$35.78
	198954	\$859.69	\$992.48	\$132.79
	198955	\$9.45	\$10.91	\$1.46
	198956	\$521.01	\$601.48	\$80.47
	198957	\$327.23	\$377.77	\$50.54
	198959	\$566.53	\$654.03	\$87.50
	198962	\$42.56	\$49.13	\$6.57
	198964	\$39.84	\$45.99	\$6.15
	198965	\$39.84	\$45.99	\$6.15
	198966	\$39.84	\$45.99	\$6.15
	198967	\$39.84	\$45.99	\$6.15

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332	198968	\$39.84	\$45.99	\$6.15
	198969	\$39.84	\$45.99	\$6.15
	198970	\$39.84	\$45.99	\$6.15
	198971	\$39.84	\$45.99	\$6.15
	198972	\$5.72	\$6.61	\$0.89
	198973	\$5.72	\$6.61	\$0.89
	198974	\$5.72	\$6.61	\$0.89
	198975	\$5.72	\$6.61	\$0.89
	198976	\$5.72	\$6.61	\$0.89
	198977	\$39.84	\$45.99	\$6.15
	198978	\$535.57	\$618.29	\$82.72
	198980	\$494.49	\$570.87	\$76.38
	198981	\$387.58	\$447.44	\$59.86
	198982	\$711.99	\$821.96	\$109.97
	198983	\$911.84	\$1,052.68	\$140.84
	198984	\$396.53	\$457.77	\$61.24
	198985	\$407.48	\$470.41	\$62.93
	198986	\$488.91	\$564.42	\$75.51
	198987	\$472.31	\$545.26	\$72.95
	198988	\$303.23	\$350.07	\$46.84
	198989	\$685.65	\$791.56	\$105.91
	198990	\$365.49	\$421.94	\$56.45
	198992	\$374.33	\$432.15	\$57.82
	198993	\$502.55	\$580.17	\$77.62
	198995	\$658.36	\$760.05	\$101.69
	198996	\$512.71	\$591.91	\$79.20
	198998	\$234.67	\$270.92	\$36.25
	198999	\$713.22	\$823.38	\$110.16
	199001	\$541.48	\$625.12	\$83.64
	199002	\$327.36	\$377.92	\$50.56
	199003	\$21.99	\$25.39	\$3.40
	199004	\$394.33	\$455.23	\$60.90
	199005	\$22.09	\$25.50	\$3.41
	199006	\$587.42	\$678.16	\$90.74
	199007	\$447.28	\$516.37	\$69.09
	199008	\$555.51	\$641.31	\$85.80
	199009	\$22.95	\$26.49	\$3.54
	199013	\$640.28	\$739.18	\$98.90
	199014	\$739.47	\$853.63	\$114.16
	199016	\$426.46	\$492.33	\$65.87
	199017	\$730.74	\$843.61	\$112.87
	199020	\$256.09	\$295.64	\$39.55
	199021	\$242.59	\$280.06	\$37.47
	199023	\$678.80	\$783.65	\$104.85
	199027	\$429.37	\$495.69	\$66.32
	199029	\$318.83	\$368.08	\$49.25
	199031	\$808.79	\$933.71	\$124.92

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332	199032	\$662.71	\$765.07	\$102.36
	199033	\$516.81	\$596.63	\$79.82
	199035	\$545.84	\$630.15	\$84.31
	199037	\$357.81	\$413.07	\$55.26
	199038	\$269.79	\$311.46	\$41.67
	199039	\$498.64	\$575.66	\$77.02
	199040	\$374.70	\$432.57	\$57.87
	199041	\$415.25	\$479.38	\$64.13
	199042	\$536.28	\$619.11	\$82.83
	199045	\$423.09	\$488.44	\$65.35
	199046	\$338.41	\$345.15	\$6.74
	199047	\$465.44	\$537.34	\$71.90
	199049	\$431.85	\$498.55	\$66.70
	199051	\$463.54	\$535.14	\$71.60
	199052	\$624.97	\$721.50	\$96.53
	199053	\$474.69	\$548.01	\$73.32
	199056	\$585.80	\$676.28	\$90.48
	199057	\$71.56	\$82.61	\$11.05
	199058	\$696.53	\$804.12	\$107.59
	199059	\$441.96	\$510.22	\$68.26
	199066	\$374.12	\$431.91	\$57.79
	199068	\$595.30	\$687.24	\$91.94
	199069	\$450.96	\$520.61	\$69.65
	199070	\$485.52	\$560.51	\$74.99
	199071	\$689.85	\$796.40	\$106.55
	199073	\$618.10	\$713.57	\$95.47
	199075	\$413.48	\$477.35	\$63.87
	199076	\$511.40	\$590.39	\$78.99
	199077	\$398.54	\$460.10	\$61.56
	199080	\$335.11	\$341.68	\$6.57
	199081	\$101.57	\$117.26	\$15.69
	199082	\$712.18	\$822.18	\$110.00
	199085	\$457.52	\$528.18	\$70.66
	199087	\$531.72	\$613.84	\$82.12
	199089	\$757.07	\$874.01	\$116.94
	199090	\$506.94	\$585.24	\$78.30
	199092	\$466.89	\$539.01	\$72.12
	199094	\$84.16	\$97.15	\$12.99
	199096	\$463.95	\$535.61	\$71.66
	199098	\$592.34	\$683.83	\$91.49
	199100	\$363.21	\$419.31	\$56.10
	199102	\$657.03	\$758.51	\$101.48
	199103	\$516.82	\$596.64	\$79.82
	199104	\$597.70	\$690.01	\$92.31
	199105	\$584.19	\$674.42	\$90.23
	199106	\$528.65	\$610.30	\$81.65
	199107	\$494.27	\$570.62	\$76.35

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332	199108	\$481.08	\$555.39	\$74.31
	199109	\$370.95	\$428.25	\$57.30
	199110	\$457.72	\$470.36	\$12.64
	199111	\$605.74	\$699.31	\$93.57
	199112	\$634.94	\$733.01	\$98.07
	199114	\$463.14	\$534.67	\$71.53
	199115	\$640.03	\$738.88	\$98.85
	199117	\$426.98	\$492.93	\$65.95
	199118	\$480.03	\$554.18	\$74.15
	199122	\$301.45	\$348.02	\$46.57
	199124	\$592.39	\$683.88	\$91.49
	199125	\$340.36	\$392.93	\$52.57
	199127	\$622.49	\$718.64	\$96.15
	199128	\$333.95	\$385.53	\$51.58
	199130	\$555.17	\$640.92	\$85.75
	199132	\$338.48	\$390.76	\$52.28
	199133	\$478.92	\$552.89	\$73.97
	199134	\$811.17	\$936.46	\$125.29
	199135	\$643.00	\$742.32	\$99.32
	199136	\$381.14	\$440.01	\$58.87
	199141	\$846.81	\$977.61	\$130.80
	199142	\$645.63	\$745.35	\$99.72
	199144	\$190.68	\$220.13	\$29.45
	199145	\$10.59	\$12.23	\$1.64
	199146	\$37.83	\$43.68	\$5.85
	199150	\$121.03	\$139.73	\$18.70
	199151	\$117.69	\$135.87	\$18.18
	199154	\$1,086.25	\$1,254.03	\$167.78
	199155	\$1,008.69	\$1,164.49	\$155.80
	199157	\$763.66	\$881.61	\$117.95
	199162	\$19.89	\$22.97	\$3.08
	199163	\$367.01	\$423.70	\$56.69
	199164	\$21.18	\$24.45	\$3.27
	199165	\$112.17	\$129.49	\$17.32
	199168	\$18.94	\$21.87	\$2.93
	199169	\$539.63	\$622.97	\$83.34
	199171	\$516.67	\$596.48	\$79.81
	199172	\$478.78	\$552.73	\$73.95
	199173	\$507.76	\$586.19	\$78.43
	199174	\$499.83	\$577.04	\$77.21
	199175	\$372.51	\$430.05	\$57.54
	199178	\$79.00	\$91.21	\$12.21
	199179	\$41.12	\$47.48	\$6.36
	199180	\$41.12	\$47.48	\$6.36
	199182	\$41.12	\$47.48	\$6.36
	199183	\$10.90	\$12.58	\$1.68
	199184	\$62.74	\$72.43	\$9.69

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332	199189	\$41.12	\$47.48	\$6.36
	199191	\$286.25	\$330.46	\$44.21
	199192	\$544.39	\$628.48	\$84.09
	199193	\$460.05	\$531.11	\$71.06
	199194	\$620.20	\$715.99	\$95.79
	199195	\$484.76	\$559.63	\$74.87
	199196	\$357.81	\$413.07	\$55.26
	199198	\$507.66	\$586.07	\$78.41
	199199	\$343.49	\$396.55	\$53.06
	199200	\$596.35	\$688.46	\$92.11
	199201	\$580.12	\$669.73	\$89.61
	199202	\$541.79	\$625.47	\$83.68
	199203	\$444.63	\$513.31	\$68.68
	199204	\$548.64	\$633.38	\$84.74
	199205	\$611.56	\$706.02	\$94.46
	199207	\$457.99	\$528.73	\$70.74
	199209	\$487.19	\$562.44	\$75.25
	199210	\$338.72	\$391.04	\$52.32
	199211	\$357.81	\$413.07	\$55.26
	199212	\$331.46	\$382.66	\$51.20
	199213	\$490.00	\$565.69	\$75.69
	199214	\$324.41	\$374.52	\$50.11
	199217	\$774.15	\$893.72	\$119.57
	199219	\$691.76	\$798.61	\$106.85
	199220	\$737.99	\$851.98	\$113.99
	199221	\$488.05	\$563.43	\$75.38
	199222	\$391.20	\$451.63	\$60.43
	199229	\$612.45	\$707.05	\$94.60
	199231	\$536.50	\$619.37	\$82.87
	199233	\$762.84	\$880.67	\$117.83
	199234	\$744.81	\$859.85	\$115.04
	199239	\$535.93	\$618.71	\$82.78
	199240	\$522.72	\$603.46	\$80.74
	199241	\$491.04	\$566.88	\$75.84
	199243	\$458.24	\$529.02	\$70.78
	199244	\$839.27	\$968.90	\$129.63
	199245	\$608.44	\$702.42	\$93.98
	199246	\$894.90	\$1,033.12	\$138.22
	199247	\$608.13	\$702.06	\$93.93
	199248	\$853.58	\$985.43	\$131.85
	199250	\$2,371.16	\$2,737.41	\$366.25
	199251	\$512.62	\$591.80	\$79.18
	199252	\$726.06	\$838.21	\$112.15
	199253	\$329.18	\$380.03	\$50.85
	199257	\$395.59	\$456.69	\$61.10
	199258	\$509.09	\$587.72	\$78.63
	199260	\$429.37	\$495.69	\$66.32

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332	199261	\$317.26	\$366.26	\$49.00
	199262	\$17.51	\$20.21	\$2.70
	199263	\$424.07	\$489.57	\$65.50
	199265	\$544.20	\$628.26	\$84.06
	199266	\$833.50	\$962.24	\$128.74
	199267	\$231.83	\$267.64	\$35.81
	199268	\$577.31	\$666.48	\$89.17
	199269	\$523.40	\$604.24	\$80.84
	199270	\$640.14	\$739.02	\$98.88
	199271	\$45.89	\$52.98	\$7.09
	199272	\$548.54	\$633.27	\$84.73
	199273	\$395.97	\$457.13	\$61.16
	199275	\$209.91	\$242.34	\$32.43
	199277	\$458.61	\$529.45	\$70.84
	199279	\$699.06	\$807.03	\$107.97
	199280	\$703.54	\$812.21	\$108.67
	199282	\$262.39	\$302.92	\$40.53
	199283	\$45.89	\$52.98	\$7.09
	199284	\$153.60	\$177.33	\$23.73
	199285	\$514.86	\$594.38	\$79.52
	199288	\$276.70	\$319.44	\$42.74
	199289	\$710.56	\$820.31	\$109.75
	199290	\$658.14	\$759.79	\$101.65
	199291	\$792.90	\$915.37	\$122.47
	199292	\$738.79	\$852.90	\$114.11
	199294	\$610.21	\$704.47	\$94.26
	199295	\$29.20	\$33.71	\$4.51
	199296	\$582.24	\$672.17	\$89.93
	199298	\$588.19	\$679.04	\$90.85
	199301	\$577.77	\$667.01	\$89.24
	199302	\$621.12	\$717.06	\$95.94
	199306	\$507.30	\$585.65	\$78.35
	199307	\$636.99	\$735.38	\$98.39
	199309	\$574.26	\$662.95	\$88.69
	199310	\$524.74	\$605.79	\$81.05
	199312	\$737.13	\$850.99	\$113.86
	199313	\$563.35	\$650.36	\$87.01
	199314	\$639.80	\$738.62	\$98.82
	199316	\$705.17	\$814.08	\$108.91
	199317	\$410.24	\$473.61	\$63.37
	199320	\$517.33	\$597.23	\$79.90
	199321	\$541.41	\$625.04	\$83.63
	199322	\$334.69	\$386.39	\$51.70
	199323	\$656.31	\$757.69	\$101.38
	199324	\$571.06	\$659.26	\$88.20
	199325	\$392.67	\$453.32	\$60.65
	199326	\$479.41	\$553.46	\$74.05

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199327	\$577.36	\$666.53	\$89.17
	199329	\$423.43	\$488.83	\$65.40
	199330	\$518.60	\$598.70	\$80.10
	199331	\$524.78	\$605.84	\$81.06
	199332	\$656.95	\$758.42	\$101.47
	199333	\$466.57	\$538.64	\$72.07
	199334	\$515.24	\$594.83	\$79.59
	199337	\$555.22	\$640.98	\$85.76
	199339	\$871.95	\$1,006.63	\$134.68
	199341	\$1,296.22	\$1,496.43	\$200.21
	199347	\$587.82	\$678.61	\$90.79
	199348	\$779.30	\$899.67	\$120.37
	199349	\$420.40	\$485.33	\$64.93
	199350	\$667.91	\$771.07	\$103.16
	199351	\$620.20	\$715.99	\$95.79
	199354	\$675.01	\$779.28	\$104.27
	199355	\$531.60	\$547.90	\$16.30
	199357	\$673.35	\$777.35	\$104.00
	199358	\$606.75	\$700.46	\$93.71
	199359	\$536.38	\$619.23	\$82.85
	199360	\$621.77	\$717.81	\$96.04
	199364	\$674.11	\$778.23	\$104.12
	199366	\$631.70	\$729.27	\$97.57
	199367	\$224.23	\$258.86	\$34.63
	199368	\$599.49	\$692.09	\$92.60
	199369	\$508.92	\$587.52	\$78.60
	199370	\$453.01	\$522.98	\$69.97
	199371	\$790.23	\$912.29	\$122.06
	199372	\$615.62	\$710.71	\$95.09
	199373	\$416.67	\$481.03	\$64.36
	199376	\$763.70	\$881.66	\$117.96
	199379	\$659.23	\$761.06	\$101.83
	199382	\$809.69	\$934.76	\$125.07
	199383	\$684.41	\$790.13	\$105.72
	199384	\$489.67	\$565.30	\$75.63
	199386	\$633.56	\$731.41	\$97.85
	199387	\$494.93	\$571.38	\$76.45
	199388	\$449.41	\$518.82	\$69.41
	199389	\$622.39	\$718.53	\$96.14
	199390	\$613.04	\$707.73	\$94.69
	199391	\$674.35	\$778.50	\$104.15
	199392	\$565.14	\$652.43	\$87.29
	199393	\$681.80	\$705.55	\$23.75
	199394	\$761.13	\$878.69	\$117.56
	199395	\$705.07	\$813.97	\$108.90
	199397	\$557.89	\$644.06	\$86.17
	199399	\$447.94	\$517.13	\$69.19

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199401	\$448.36	\$517.61	\$69.25
	199402	\$601.12	\$693.96	\$92.84
	199403	\$579.37	\$668.86	\$89.49
	199404	\$555.79	\$641.64	\$85.85
	199405	\$497.14	\$573.92	\$76.78
	199406	\$505.66	\$583.77	\$78.11
	199407	\$452.93	\$522.88	\$69.95
	199408	\$451.82	\$521.61	\$69.79
	199411	\$678.02	\$782.75	\$104.73
	199416	\$515.67	\$595.32	\$79.65
	199417	\$685.84	\$791.78	\$105.94
	199419	\$685.21	\$791.05	\$105.84
	199421	\$578.31	\$667.64	\$89.33
	199422	\$716.76	\$827.47	\$110.71
	199423	\$564.16	\$651.29	\$87.13
	199426	\$649.06	\$749.31	\$100.25
	199427	\$466.79	\$538.88	\$72.09
	199428	\$461.49	\$532.78	\$71.29
	199430	\$694.85	\$802.18	\$107.33
	199436	\$493.93	\$570.22	\$76.29
	199444	\$430.94	\$497.51	\$66.57
	199445	\$36.88	\$42.57	\$5.69
	199449	\$461.28	\$532.53	\$71.25
	199450	\$776.62	\$810.06	\$33.44
	199453	\$502.36	\$579.95	\$77.59
	199454	\$433.23	\$500.15	\$66.92
	199456	\$441.29	\$444.72	\$3.43
	199457	\$454.60	\$524.81	\$70.21
	199459	\$18.27	\$21.09	\$2.82
	199464	\$543.10	\$626.99	\$83.89
	199466	\$790.56	\$912.67	\$122.11
	199468	\$131.63	\$148.12	\$16.49
	199470	\$372.12	\$429.60	\$57.48
	199472	\$824.91	\$952.33	\$127.42
	199473	\$434.95	\$502.13	\$67.18
	199477	\$530.10	\$611.98	\$81.88
	199478	\$543.62	\$627.59	\$83.97
	199484	\$406.96	\$469.82	\$62.86
	199485	\$477.60	\$551.37	\$73.77
	199486	\$59.23	\$68.38	\$9.15
	199497	\$600.67	\$693.44	\$92.77
	199500	\$398.75	\$460.34	\$61.59
	199501	\$632.22	\$729.87	\$97.65
	199502	\$555.87	\$641.72	\$85.85
	199503	\$750.35	\$866.24	\$115.89
	199504	\$872.81	\$1,007.62	\$134.81
	199505	\$468.62	\$541.00	\$72.38

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332	199506	\$562.95	\$649.90	\$86.95
	199510	\$890.32	\$1,027.84	\$137.52
	199511	\$24.03	\$27.74	\$3.71
	199513	\$593.08	\$684.68	\$91.60
	199514	\$104.19	\$120.29	\$16.10
	199516	\$442.68	\$511.05	\$68.37
	199518	\$62.02	\$71.60	\$9.58
	199520	\$345.46	\$352.54	\$7.08
	199521	\$609.66	\$703.82	\$94.16
	199522	\$872.91	\$1,007.73	\$134.82
	199525	\$820.90	\$947.70	\$126.80
	199526	\$358.89	\$414.33	\$55.44
	199527	\$423.88	\$489.32	\$65.44
	199528	\$265.81	\$306.87	\$41.06
	199531	\$474.12	\$547.35	\$73.23
	199537	\$596.35	\$688.46	\$92.11
	199539	\$367.35	\$424.09	\$56.74
	199542	\$371.74	\$429.16	\$57.42
	199543	\$744.14	\$859.08	\$114.94
	199544	\$489.67	\$565.30	\$75.63
	199545	\$572.49	\$660.92	\$88.43
	199546	\$452.79	\$522.73	\$69.94
	199548	\$490.93	\$566.76	\$75.83
	199549	\$25.09	\$28.97	\$3.88
	199550	\$309.72	\$357.56	\$47.84
	199551	\$420.21	\$485.11	\$64.90
	199552	\$511.85	\$590.91	\$79.06
	199553	\$252.03	\$290.96	\$38.93
	199559	\$15.50	\$17.90	\$2.40
	199560	\$75.90	\$87.63	\$11.73
	199561	\$145.51	\$167.98	\$22.47
	199562	\$240.88	\$278.08	\$37.20
	199563	\$355.25	\$410.12	\$54.87
	199567	\$443.68	\$512.21	\$68.53
	199568	\$246.74	\$284.86	\$38.12
	199569	\$271.93	\$313.94	\$42.01
	199571	\$26.67	\$30.79	\$4.12
	199572	\$194.07	\$224.05	\$29.98
	199577	\$245.69	\$283.64	\$37.95
	199580	\$1,081.67	\$1,248.75	\$167.08
	199581	\$563.38	\$650.40	\$87.02
	199582	\$453.67	\$523.74	\$70.07
	199583	\$535.76	\$618.51	\$82.75
	199585	\$442.20	\$510.50	\$68.30
	199587	\$422.59	\$487.86	\$65.27
	199588	\$406.42	\$469.20	\$62.78
	199591	\$369.73	\$426.84	\$57.11

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199592	\$24.14	\$27.87	\$3.73
	199593	\$40.22	\$46.43	\$6.21
	199595	\$346.85	\$360.66	\$13.81
	199596	\$282.86	\$326.55	\$43.69
	199597	\$26.24	\$30.29	\$4.05
	199598	\$13.12	\$15.15	\$2.03
	199599	\$338.82	\$391.15	\$52.33
	199605	\$496.83	\$573.57	\$76.74
	199606	\$141.07	\$162.86	\$21.79
	199607	\$288.34	\$332.88	\$44.54
	199609	\$361.02	\$416.78	\$55.76
	199610	\$8.91	\$10.29	\$1.38
	199611	\$859.26	\$991.98	\$132.72
	199612	\$372.29	\$429.79	\$57.50
	199618	\$300.56	\$346.98	\$46.42
	199619	\$499.10	\$576.19	\$77.09
	199620	\$251.17	\$289.96	\$38.79
	199621	\$356.00	\$410.99	\$54.99
	199623	\$27.43	\$31.67	\$4.24
	199626	\$349.53	\$403.52	\$53.99
	199627	\$34.97	\$40.37	\$5.40
	199628	\$194.07	\$224.05	\$29.98
	199629	\$208.51	\$240.71	\$32.20
	199630	\$491.58	\$567.51	\$75.93
	199631	\$569.53	\$657.50	\$87.97
	199632	\$355.42	\$410.32	\$54.90
	199633	\$460.09	\$531.16	\$71.07
	199634	\$196.50	\$226.85	\$30.35
	199635	\$508.61	\$587.17	\$78.56
	199636	\$266.47	\$307.62	\$41.15
	199637	\$422.21	\$487.43	\$65.22
	199638	\$62.43	\$72.07	\$9.64
	199639	\$467.40	\$503.15	\$35.75
	199640	\$584.70	\$675.02	\$90.32
	199643	\$708.70	\$818.16	\$109.46
	199645	\$101.43	\$117.09	\$15.66
	199648	\$38.64	\$44.61	\$5.97
	199651	\$4.96	\$5.73	\$0.77
	199652	\$6.12	\$7.06	\$0.94
	199654	\$471.88	\$544.76	\$72.88
	199655	\$388.20	\$448.16	\$59.96
	199656	\$359.28	\$414.77	\$55.49
	199657	\$1,290.40	\$1,489.71	\$199.31
	199659	\$481.85	\$556.27	\$74.42
	199660	\$576.93	\$666.04	\$89.11
	199661	\$301.95	\$348.59	\$46.64
	199662	\$500.85	\$578.21	\$77.36

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332	199663	\$477.08	\$550.76	\$73.68
	199664	\$466.39	\$538.43	\$72.04
	199665	\$387.29	\$447.11	\$59.82
	199666	\$377.12	\$435.37	\$58.25
	199667	\$460.57	\$531.71	\$71.14
	199668	\$450.46	\$520.04	\$69.58
	199669	\$472.50	\$545.48	\$72.98
	199670	\$333.18	\$384.64	\$51.46
	199671	\$322.17	\$371.93	\$49.76
	199672	\$296.98	\$342.86	\$45.88
	199674	\$491.39	\$567.29	\$75.90
	199678	\$592.72	\$684.27	\$91.55
	199679	\$222.31	\$256.65	\$34.34
	199680	\$698.92	\$806.87	\$107.95
	199681	\$381.66	\$440.61	\$58.95
	199682	\$391.20	\$451.63	\$60.43
	199683	\$39.50	\$45.60	\$6.10
	199684	\$404.47	\$466.94	\$62.47
	199685	\$640.50	\$739.43	\$98.93
	199686	\$39.50	\$45.60	\$6.10
	199687	\$429.37	\$495.69	\$66.32
	199691	\$386.43	\$446.12	\$59.69
	199692	\$548.64	\$633.38	\$84.74
	199693	\$481.23	\$555.56	\$74.33
	199695	\$292.73	\$337.94	\$45.21
	199697	\$730.93	\$843.83	\$112.90
	199698	\$584.37	\$674.63	\$90.26
	199699	\$59.25	\$68.40	\$9.15
	199701	\$286.25	\$330.46	\$44.21
	199708	\$31.68	\$36.57	\$4.89
	199714	\$262.39	\$302.92	\$40.53
	199715	\$402.56	\$464.73	\$62.17
	199717	\$410.29	\$473.66	\$63.37
	199718	\$330.76	\$381.84	\$51.08
	199719	\$338.72	\$391.04	\$52.32
	199721	\$267.16	\$308.43	\$41.27
	199722	\$496.25	\$572.90	\$76.65
	199724	\$391.58	\$452.07	\$60.49
	199725	\$16.08	\$18.56	\$2.48
	199726	\$136.09	\$157.11	\$21.02
	199732	\$532.46	\$614.71	\$82.25
	199733	\$281.62	\$325.12	\$43.50
	199734	\$8.78	\$10.13	\$1.35
	199736	\$8.78	\$10.13	\$1.35
	199739	\$326.32	\$376.72	\$50.40
	199741	\$424.55	\$490.12	\$65.57
	199743	\$8.78	\$10.13	\$1.35

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199745	\$8.78	\$10.13	\$1.35
	199746	\$247.41	\$285.63	\$38.22
	199747	\$212.39	\$245.20	\$32.81
	199748	\$28.29	\$32.66	\$4.37
	199749	\$440.25	\$508.25	\$68.00
	199750	\$3.34	\$3.86	\$0.52
	199751	\$357.28	\$412.47	\$55.19
	199752	\$9.68	\$11.18	\$1.50
	199753	\$47.76	\$55.13	\$7.37
	199759	\$30.15	\$34.81	\$4.66
	199761	\$653.07	\$753.94	\$100.87
	199762	\$75.57	\$87.24	\$11.67
	199770	\$2.91	\$3.36	\$0.45
	199774	\$556.37	\$642.30	\$85.93
	199776	\$727.25	\$839.58	\$112.33
	199777	\$143.12	\$165.23	\$22.11
	199778	\$530.82	\$612.81	\$81.99
	199780	\$180.33	\$208.19	\$27.86
	199784	\$522.97	\$603.75	\$80.78
	199791	\$222.79	\$257.21	\$34.42
	199796	\$329.52	\$380.41	\$50.89
	199798	\$858.74	\$991.38	\$132.64
	199801	\$524.78	\$605.84	\$81.06
	199804	\$8.16	\$9.42	\$1.26
	199805	\$579.89	\$669.45	\$89.56
	199806	\$507.75	\$586.18	\$78.43
	199809	\$473.93	\$547.13	\$73.20
	199810	\$451.84	\$521.63	\$69.79
	199811	\$489.91	\$565.58	\$75.67
	199812	\$662.13	\$764.41	\$102.28
	199814	\$419.49	\$484.29	\$64.80
	199817	\$331.73	\$382.97	\$51.24
	199818	\$54.01	\$62.35	\$8.34
	199819	\$76.28	\$88.07	\$11.79
	199820	\$631.17	\$728.66	\$97.49
	199822	\$426.03	\$491.83	\$65.80
	199823	\$323.46	\$373.42	\$49.96
	199825	\$452.75	\$522.68	\$69.93
	199826	\$45.89	\$52.98	\$7.09
	199828	\$45.89	\$52.98	\$7.09
	199830	\$45.89	\$52.98	\$7.09
	199832	\$45.89	\$52.98	\$7.09
	199834	\$33.01	\$38.11	\$5.10
	199836	\$406.07	\$468.79	\$62.72
	199838	\$495.99	\$572.60	\$76.61
	199839	\$595.15	\$687.08	\$91.93
	199840	\$17.08	\$19.72	\$2.64

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199841	\$287.90	\$332.37	\$44.47
	199842	\$808.26	\$933.10	\$124.84
	199843	\$619.01	\$714.62	\$95.61
	199845	\$1,211.77	\$1,398.94	\$187.17
	199846	\$152.40	\$175.94	\$23.54
	199847	\$532.75	\$615.04	\$82.29
	199848	\$641.67	\$740.78	\$99.11
	199849	\$430.56	\$497.06	\$66.50
	199850	\$544.68	\$628.81	\$84.13
	199851	\$649.84	\$750.21	\$100.37
	199852	\$283.84	\$327.68	\$43.84
	199853	\$86.02	\$99.30	\$13.28
	199854	\$55.58	\$64.16	\$8.58
	199855	\$81.44	\$94.02	\$12.58
	199857	\$45.61	\$52.65	\$7.04
	199858	\$329.71	\$380.63	\$50.92
	199860	\$483.85	\$558.58	\$74.73
	199863	\$591.86	\$683.28	\$91.42
	199864	\$297.76	\$343.75	\$45.99
	199868	\$26.72	\$30.84	\$4.12
	199871	\$584.42	\$674.69	\$90.27
	199872	\$372.12	\$429.60	\$57.48
	199873	\$104.33	\$120.44	\$16.11
	199874	\$262.39	\$302.92	\$40.53
	199875	\$6.06	\$6.99	\$0.93
	199876	\$661.66	\$763.85	\$102.19
	199877	\$95.56	\$110.32	\$14.76
	199878	\$197.51	\$228.02	\$30.51
	199880	\$728.50	\$841.02	\$112.52
	199881	\$185.53	\$214.19	\$28.66
	199887	\$202.76	\$234.07	\$31.31
	199889	\$171.89	\$198.44	\$26.55
	199890	\$491.01	\$566.85	\$75.84
	199893	\$27.00	\$31.17	\$4.17
	199894	\$43.27	\$49.95	\$6.68
	199895	\$531.24	\$613.29	\$82.05
	199897	\$440.30	\$508.31	\$68.01
	199899	\$787.41	\$909.04	\$121.63
	199900	\$776.54	\$896.48	\$119.94
	199901	\$27.00	\$31.17	\$4.17
	199902	\$402.64	\$464.83	\$62.19
	199903	\$475.35	\$548.78	\$73.43
	199904	\$508.90	\$587.50	\$78.60
	199905	\$190.83	\$211.93	\$21.10
	199906	\$378.37	\$436.81	\$58.44
	199907	\$347.91	\$401.65	\$53.74
	199908	\$728.54	\$841.07	\$112.53

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332	199909	\$238.54	\$275.38	\$36.84
	199910	\$291.94	\$337.03	\$45.09
	199912	\$424.75	\$490.36	\$65.61
	199914	\$783.98	\$905.07	\$121.09
	199915	\$745.48	\$860.62	\$115.14
	199919	\$4.39	\$5.07	\$0.68
	199922	\$730.16	\$842.94	\$112.78
	199926	\$357.47	\$412.69	\$55.22
	199928	\$1,071.61	\$1,237.13	\$165.52
	199929	\$269.56	\$311.19	\$41.63
	199931	\$763.32	\$881.22	\$117.90
	199932	\$273.17	\$315.36	\$42.19
	199933	\$177.85	\$205.32	\$27.47
	199941	\$72.75	\$83.99	\$11.24
	199942	\$806.02	\$930.52	\$124.50
	199943	\$72.75	\$83.99	\$11.24
	199945	\$369.74	\$426.85	\$57.11
	199947	\$102.75	\$118.62	\$15.87
	199948	\$9.40	\$10.86	\$1.46
	199950	\$527.12	\$608.54	\$81.42
	199952	\$859.07	\$991.76	\$132.69
	199953	\$46.61	\$53.81	\$7.20
	199954	\$230.84	\$266.49	\$35.65
	199955	\$93.22	\$107.62	\$14.40
	199957	\$135.82	\$156.80	\$20.98
	199958	\$46.61	\$53.81	\$7.20
	199959	\$729.59	\$842.28	\$112.69
	199961	\$573.11	\$661.63	\$88.52
	199965	\$329.60	\$380.51	\$50.91
	199966	\$46.61	\$53.81	\$7.20
	199967	\$249.46	\$287.99	\$38.53
	199968	\$305.33	\$352.49	\$47.16
	199969	\$451.84	\$521.63	\$69.79
	199970	\$93.22	\$107.62	\$14.40
	199972	\$698.68	\$806.59	\$107.91
	199976	\$22.35	\$25.80	\$3.45
	199978	\$46.61	\$53.81	\$7.20
	199979	\$46.61	\$53.81	\$7.20
	199981	\$891.61	\$1,029.32	\$137.71
	199982	\$46.61	\$53.81	\$7.20
	199983	\$46.61	\$53.81	\$7.20
	199984	\$166.98	\$192.77	\$25.79
	199986	\$258.62	\$298.57	\$39.95
	199988	\$289.97	\$334.75	\$44.78
	199998	\$367.35	\$424.09	\$56.74
	199999	\$197.61	\$228.13	\$30.52
	200000	\$493.06	\$569.21	\$76.15

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	200001	\$41.22	\$47.59	\$6.37
	200002	\$266.17	\$307.28	\$41.11
	200007	\$318.23	\$367.38	\$49.15
	200011	\$34.35	\$39.66	\$5.31
	200012	\$199.26	\$230.04	\$30.78
	200013	\$561.90	\$648.69	\$86.79
	200014	\$433.19	\$500.09	\$66.90
	200015	\$345.78	\$399.19	\$53.41
	200016	\$34.35	\$39.66	\$5.31
	200018	\$27.43	\$31.67	\$4.24
	200019	\$192.81	\$222.59	\$29.78
	200022	\$324.55	\$374.68	\$50.13
	200023	\$225.99	\$260.90	\$34.91
	200025	\$767.47	\$886.01	\$118.54
	200026	\$386.29	\$445.95	\$59.66
	200027	\$440.53	\$508.58	\$68.05
	200031	\$381.66	\$440.61	\$58.95
	200033	\$297.46	\$343.41	\$45.95
	200034	\$228.47	\$263.76	\$35.29
	200037	\$32.35	\$37.35	\$5.00
	200038	\$427.36	\$493.36	\$66.00
	200039	\$826.49	\$954.14	\$127.65
	200040	\$514.77	\$594.27	\$79.50
	200041	\$650.25	\$750.69	\$100.44
	200042	\$632.79	\$730.53	\$97.74
	200043	\$383.71	\$442.97	\$59.26
	200044	\$388.15	\$448.10	\$59.95
	200046	\$693.53	\$800.65	\$107.12
	200047	\$452.36	\$522.23	\$69.87
	200048	\$603.88	\$697.16	\$93.28
	200050	\$229.04	\$264.42	\$35.38
	200054	\$538.00	\$621.10	\$83.10
	200056	\$423.83	\$489.30	\$65.47
	200057	\$361.37	\$417.18	\$55.81
	200059	\$429.75	\$496.13	\$66.38
	200061	\$420.97	\$485.99	\$65.02
	200062	\$760.98	\$878.52	\$117.54
	200064	\$719.79	\$830.97	\$111.18
	200066	\$460.04	\$531.10	\$71.06
	200068	\$338.07	\$390.28	\$52.21
	200069	\$398.84	\$460.44	\$61.60
	200071	\$569.78	\$657.78	\$88.00
	200072	\$375.03	\$432.96	\$57.93
	200073	\$601.77	\$694.72	\$92.95
	200075	\$954.51	\$1,101.94	\$147.43
	200077	\$394.97	\$455.98	\$61.01
	200078	\$470.82	\$543.54	\$72.72

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332	200079	\$410.24	\$473.60	\$63.36
	200080	\$17.03	\$19.66	\$2.63
	200081	\$17.03	\$19.66	\$2.63
	200084	\$429.37	\$495.69	\$66.32
	200085	\$34.06	\$39.32	\$5.26
	200086	\$458.81	\$529.68	\$70.87
	200087	\$152.76	\$176.35	\$23.59
	200088	\$316.45	\$365.33	\$48.88
	200089	\$137.49	\$158.73	\$21.24
	200090	\$423.25	\$488.62	\$65.37
	200091	\$332.57	\$383.94	\$51.37
	200092	\$586.48	\$677.07	\$90.59
	200093	\$466.82	\$538.92	\$72.10
	200094	\$392.97	\$453.66	\$60.69
	200095	\$468.54	\$540.91	\$72.37
	200096	\$369.02	\$426.02	\$57.00
	200097	\$14.84	\$17.13	\$2.29
	200098	\$14.84	\$17.13	\$2.29
	200099	\$14.84	\$17.13	\$2.29
	200101	\$546.25	\$630.62	\$84.37
	200102	\$403.85	\$466.23	\$62.38
	200103	\$127.00	\$146.61	\$19.61
	200104	\$648.82	\$749.04	\$100.22
	200108	\$386.45	\$446.14	\$59.69
	200109	\$381.66	\$440.61	\$58.95
	200110	\$290.59	\$335.48	\$44.89
	200111	\$350.27	\$404.37	\$54.10
	200113	\$487.86	\$563.21	\$75.35
	200116	\$1,815.70	\$2,096.15	\$280.45
	200117	\$565.81	\$653.21	\$87.40
	200118	\$347.26	\$400.90	\$53.64
	200119	\$366.39	\$422.98	\$56.59
	200120	\$291.97	\$337.07	\$45.10
	200121	\$292.39	\$337.55	\$45.16
	200123	\$262.39	\$302.92	\$40.53
	200124	\$157.44	\$181.75	\$24.31
	200125	\$737.08	\$850.93	\$113.85
	200126	\$804.83	\$929.14	\$124.31
	200127	\$551.17	\$636.30	\$85.13
	200128	\$622.54	\$718.69	\$96.15
	200129	\$398.37	\$459.90	\$61.53
	200132	\$545.11	\$629.30	\$84.19
	200133	\$470.64	\$543.33	\$72.69
	200135	\$572.49	\$660.92	\$88.43
	200137	\$582.32	\$672.26	\$89.94
	200138	\$361.54	\$417.38	\$55.84
	200140	\$519.25	\$599.45	\$80.20

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332	200141	\$756.83	\$873.73	\$116.90
	200142	\$430.32	\$496.79	\$66.47
	200144	\$786.22	\$907.66	\$121.44
	200146	\$516.72	\$596.53	\$79.81
	200147	\$764.51	\$882.60	\$118.09
	200149	\$680.31	\$785.39	\$105.08
	200150	\$16.79	\$19.39	\$2.60
	200151	\$550.78	\$635.86	\$85.08
	200152	\$223.26	\$257.75	\$34.49
	200153	\$640.33	\$739.24	\$98.91
	200157	\$17.99	\$20.76	\$2.77
	200158	\$15.36	\$17.73	\$2.37
	200159	\$10.02	\$11.57	\$1.55
	200160	\$268.78	\$310.29	\$41.51
	200161	\$280.30	\$323.60	\$43.30
	200164	\$315.92	\$364.72	\$48.80
	200167	\$534.95	\$617.57	\$82.62
	200168	\$635.89	\$734.11	\$98.22
	200169	\$317.54	\$366.59	\$49.05
	200172	\$241.62	\$278.95	\$37.33
	200175	\$17.99	\$20.76	\$2.77
	200176	\$15.36	\$17.73	\$2.37
	200180	\$333.95	\$385.53	\$51.58
	200181	\$27.96	\$32.27	\$4.31
	200186	\$28.96	\$33.43	\$4.47
	200188	\$30.49	\$35.19	\$4.70
	200189	\$41.12	\$47.48	\$6.36
	200190	\$41.12	\$47.48	\$6.36
	200192	\$107.19	\$123.75	\$16.56
	200196	\$203.58	\$235.02	\$31.44
	200197	\$41.12	\$47.48	\$6.36
	200208	\$954.15	\$1,101.53	\$147.38
	200209	\$407.90	\$470.90	\$63.00
	200210	\$12.83	\$14.82	\$1.99
	200211	\$515.24	\$594.83	\$79.59
	200212	\$460.78	\$531.96	\$71.18
	200213	\$881.87	\$1,018.09	\$136.22
	200214	\$548.64	\$633.38	\$84.74
	200215	\$524.78	\$605.84	\$81.06
	200220	\$431.51	\$442.86	\$11.35
	200221	\$370.95	\$428.25	\$57.30
	200222	\$681.88	\$787.21	\$105.33
	200223	\$629.74	\$727.01	\$97.27
	200224	\$23.85	\$27.54	\$3.69
	200225	\$669.34	\$772.72	\$103.38
	200226	\$600.57	\$693.33	\$92.76
	200229	\$565.62	\$652.99	\$87.37

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332	200230	\$721.11	\$832.49	\$111.38
	200231	\$654.88	\$756.03	\$101.15
	200233	\$534.47	\$617.03	\$82.56
	200234	\$509.22	\$587.87	\$78.65
	200239	\$1,097.42	\$1,266.92	\$169.50
	200240	\$616.05	\$711.20	\$95.15
	200241	\$804.64	\$928.92	\$124.28
	200244	\$653.59	\$754.55	\$100.96
	200246	\$540.31	\$623.77	\$83.46
	200249	\$681.26	\$786.49	\$105.23
	200252	\$1,503.08	\$1,735.24	\$232.16
	200253	\$543.87	\$627.87	\$84.00
	200257	\$915.13	\$1,056.48	\$141.35
	200258	\$1,035.56	\$1,195.50	\$159.94
	200259	\$486.62	\$561.78	\$75.16
	200260	\$480.42	\$554.62	\$74.20
	200261	\$910.50	\$1,051.13	\$140.63
	200263	\$50.24	\$58.00	\$7.76
	200264	\$726.11	\$838.26	\$112.15
	200265	\$613.23	\$707.95	\$94.72
	200267	\$1,012.55	\$1,168.94	\$156.39
	200268	\$906.25	\$1,046.23	\$139.98
	200269	\$640.67	\$739.62	\$98.95
	200270	\$197.89	\$228.45	\$30.56
	200272	\$517.10	\$596.97	\$79.87
	20401515	\$344.65	\$397.89	\$53.24
	20403714	\$98.99	\$114.28	\$15.29
	205301	\$3,211.91	\$3,708.02	\$496.11
	205307	\$1,360.57	\$1,570.72	\$210.15
	205308	\$41.55	\$47.97	\$6.42
	205316	\$10.88	\$12.56	\$1.68
	205317	\$41.55	\$47.97	\$6.42
	205318	\$41.55	\$47.97	\$6.42
	205319	\$41.55	\$47.97	\$6.42
	205320	\$42.75	\$49.35	\$6.60
	205358	\$41.55	\$47.97	\$6.42
	205359	\$41.55	\$47.97	\$6.42
	205360	\$32.58	\$37.62	\$5.04
	205361	\$124.71	\$143.97	\$19.26
	205362	\$41.55	\$47.97	\$6.42
	205364	\$1,280.66	\$1,478.47	\$197.81
	205365	\$2,146.84	\$2,478.44	\$331.60
	205518	\$1,738.51	\$2,007.04	\$268.53
	205521	\$1,283.04	\$1,481.22	\$198.18
	205522	\$2,081.15	\$2,402.60	\$321.45
	205523	\$3,835.74	\$4,428.20	\$592.46
	205524	\$1,153.53	\$1,331.70	\$178.17

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332	205525	\$146.51	\$169.14	\$22.63
	205526	\$1,598.40	\$1,845.28	\$246.88
	205528	\$1,013.36	\$1,169.88	\$156.52
	205529	\$982.60	\$1,021.23	\$38.63
	205530	\$1,286.82	\$1,485.58	\$198.76
	205532	\$1,491.43	\$1,721.80	\$230.37
	205533	\$1,794.52	\$2,071.70	\$277.18
	205534	\$1,224.58	\$1,413.73	\$189.15
	205535	\$145.84	\$168.37	\$22.53
	205536	\$1,056.39	\$1,219.56	\$163.17
	205539	\$1,514.48	\$1,748.40	\$233.92
	205540	\$1,834.94	\$2,118.37	\$283.43
	205542	\$1,060.43	\$1,224.22	\$163.79
	205543	\$1,469.39	\$1,696.35	\$226.96
	205545	\$1,239.01	\$1,430.39	\$191.38
	205547	\$1,097.85	\$1,267.42	\$169.57
	205548	\$1,407.37	\$1,624.75	\$217.38
	205554	\$1,002.65	\$1,157.52	\$154.87
	205555	\$906.30	\$1,046.29	\$139.99
	205556	\$1,324.19	\$1,528.72	\$204.53
	205558	\$1,374.51	\$1,586.82	\$212.31
	205559	\$2,020.42	\$2,332.49	\$312.07
	205561	\$2,242.26	\$2,588.59	\$346.33
	205562	\$1,011.42	\$1,167.64	\$156.22
	228661	\$3,760.50	\$4,341.34	\$580.84
	228664	\$13,420.00	\$15,492.83	\$2,072.83
	232987	\$15.22	\$17.57	\$2.35
	234084	\$21,678.05	\$25,026.39	\$3,348.34
	238251	\$12,741.27	\$14,709.25	\$1,967.98
	238278	\$2,087.21	\$2,409.59	\$322.38
	238292	\$19.04	\$21.98	\$2.94
	238395	\$11.31	\$13.05	\$1.74
	238438	\$225.37	\$260.18	\$34.81
	238567	\$135.76	\$156.73	\$20.97
	238568	\$136.03	\$157.04	\$21.01
	238570	\$5,202.61	\$6,006.19	\$803.58
	238591	\$110.46	\$127.53	\$17.07
	238613	\$34.68	\$40.04	\$5.36
	238618	\$131.10	\$151.35	\$20.25
	238621	\$470.11	\$542.72	\$72.61
	238640	\$1,926.74	\$2,224.34	\$297.60
	238658	\$62.98	\$72.70	\$9.72
	238790	\$10.02	\$11.57	\$1.55
	238820	\$54.67	\$63.12	\$8.45
	238836	\$7.56	\$8.72	\$1.16
	238937	\$301.81	\$348.41	\$46.60
	238938	\$574.11	\$662.79	\$88.68

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332	238962	\$28.62	\$33.05	\$4.43
	238975	\$620.72	\$716.60	\$95.88
	238998	\$13.60	\$15.70	\$2.10
	239016	\$58.51	\$67.55	\$9.04
	239078	\$18,484.88	\$21,340.01	\$2,855.13
	239117	\$75.76	\$87.46	\$11.70
	239123	\$991.79	\$1,144.98	\$153.19
	239166	\$4.39	\$5.07	\$0.68
	239513	\$3,880.77	\$4,480.19	\$599.42
	239519	\$450.21	\$519.75	\$69.54
	239525	\$23.38	\$26.99	\$3.61
	240132	\$307.86	\$355.41	\$47.55
	240209	\$62.26	\$71.87	\$9.61
	240304	\$1,072.97	\$1,238.70	\$165.73
	241018	\$820.28	\$946.98	\$126.70
	241212	\$59.97	\$69.23	\$9.26
	273138	\$3,674.76	\$4,242.35	\$567.59
	273143	\$9,655.25	\$11,146.58	\$1,491.33
	273144	\$1,138.46	\$1,314.30	\$175.84
	274264	\$5,859.64	\$6,764.70	\$905.06
	274265	\$155.37	\$179.37	\$24.00
	274283	\$452.51	\$522.40	\$69.89
	274284	\$630.60	\$728.00	\$97.40
	274287	\$289.59	\$334.31	\$44.72
	274303	\$261.39	\$301.76	\$40.37
	274306	\$547.54	\$632.11	\$84.57
	274326	\$179.00	\$206.65	\$27.65
	274328	\$110.49	\$127.56	\$17.07
	274355	\$170.17	\$196.46	\$26.29
	274396	\$74.14	\$85.59	\$11.45
	274398	\$167.56	\$193.44	\$25.88
	274408	\$160.87	\$185.72	\$24.85
	274414	\$32.15	\$37.12	\$4.97
	274416	\$7.63	\$8.81	\$1.18
	274419	\$9.30	\$10.74	\$1.44
	274464	\$711.13	\$820.97	\$109.84
	274473	\$1,373.55	\$1,585.70	\$212.15
	274487	\$220.74	\$254.84	\$34.10
	274523	\$191.69	\$221.30	\$29.61
	274530	\$166.59	\$192.33	\$25.74
	274661	\$60.40	\$69.73	\$9.33
	274662	\$7.01	\$8.10	\$1.09
	274669	\$75.76	\$87.46	\$11.70
	274671	\$8.78	\$10.13	\$1.35
	274672	\$75.76	\$87.46	\$11.70
	274673	\$8.78	\$10.13	\$1.35
	274679	\$112.02	\$129.32	\$17.30

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332	274681	\$13.02	\$15.04	\$2.02
	274719	\$210.25	\$242.72	\$32.47
	274738	\$974.09	\$1,124.55	\$150.46
	274764	\$208.72	\$240.96	\$32.24
	274833	\$372.02	\$429.49	\$57.47
	274841	\$235.10	\$271.42	\$36.32
	274844	\$333.57	\$385.09	\$51.52
	274966	\$569.63	\$657.61	\$87.98
	274968	\$86.73	\$100.13	\$13.40
	274969	\$53.86	\$62.18	\$8.32
	274970	\$186.87	\$215.73	\$28.86
	274972	\$248.17	\$286.51	\$38.34
	274973	\$20.04	\$23.13	\$3.09
	274974	\$75.00	\$86.58	\$11.58
	274975	\$102.52	\$118.36	\$15.84
	274976	\$105.39	\$121.66	\$16.27
	274978	\$58.87	\$67.96	\$9.09
	275002	\$149.99	\$173.16	\$23.17
	275003	\$18.80	\$21.70	\$2.90
	275041	\$678.21	\$782.97	\$104.76
	275059	\$252.66	\$291.68	\$39.02
	275062	\$274.65	\$317.07	\$42.42
	275113	\$61.64	\$71.16	\$9.52
	275114	\$35.78	\$41.31	\$5.53
	276655	\$46.42	\$53.59	\$7.17
	276807	\$14.12	\$16.30	\$2.18
	278295	\$11.93	\$13.77	\$1.84
	278398	\$12.31	\$14.21	\$1.90
	278415	\$17.79	\$20.54	\$2.75
	278908	\$20.37	\$23.52	\$3.15
	278917	\$20.71	\$23.90	\$3.19
	279647	\$14.93	\$17.24	\$2.31
	279768	\$12.50	\$14.43	\$1.93
	279908	\$51.81	\$59.81	\$8.00
	280225	\$15.22	\$17.57	\$2.35
	280295	\$24.95	\$28.80	\$3.85
	280529	\$47.37	\$54.69	\$7.32
	280561	\$18.18	\$20.98	\$2.80
	280610	\$24.09	\$27.81	\$3.72
	280623	\$4.77	\$5.51	\$0.74
	286721	\$12.02	\$13.88	\$1.86
	286807	\$29.77	\$34.37	\$4.60
	287566	\$56.67	\$65.43	\$8.76
	287988	\$14,329.03	\$16,542.25	\$2,213.22
	287991	\$16.27	\$18.78	\$2.51
	288060	\$23.66	\$27.32	\$3.66
	288664	\$10.88	\$12.56	\$1.68

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	289158	\$1,358.33	\$1,568.14	\$209.81
	289815	\$14.60	\$16.85	\$2.25
	289838	\$113.26	\$130.75	\$17.49
	289944	\$1,097.27	\$1,266.76	\$169.49
	289996	\$838.94	\$968.52	\$129.58
	289998	\$583.94	\$674.14	\$90.20
	290000	\$2,225.08	\$2,568.76	\$343.68
	290354	\$613.52	\$708.28	\$94.76
	290365	\$3,357.73	\$3,876.35	\$518.62
	290444	\$772.05	\$891.30	\$119.25
	290492	\$400.27	\$462.09	\$61.82
	290551	\$107.77	\$124.42	\$16.65
	290552	\$594.63	\$686.47	\$91.84
	290576	\$5,821.76	\$6,720.97	\$899.21
	290616	\$750.12	\$865.98	\$115.86
	290669	\$5,831.82	\$6,732.59	\$900.77
	290702	\$0.81	\$0.94	\$0.13
	290755	\$5,367.11	\$6,196.10	\$828.99
	290829	\$875.96	\$1,011.26	\$135.30
	291183	\$613.33	\$708.06	\$94.73
	291418	\$76.88	\$88.76	\$11.88
	292483	\$37.26	\$43.01	\$5.75
	292673	\$25.76	\$29.74	\$3.98
	292901	\$8.35	\$9.64	\$1.29
	292957	\$7.56	\$8.72	\$1.16
	292991	\$12.83	\$14.82	\$1.99
	293381	\$14,086.10	\$16,261.80	\$2,175.70
	293651	\$82.25	\$94.95	\$12.70
	293985	\$75.38	\$87.02	\$11.64
	294023	\$116.88	\$134.94	\$18.06
	294031	\$782.26	\$903.09	\$120.83
	294032	\$704.88	\$813.75	\$108.87
	294068	\$23.00	\$26.55	\$3.55
	294235	\$258.10	\$297.96	\$39.86
	294346	\$615.28	\$710.32	\$95.04
	294348	\$348.27	\$402.06	\$53.79
	294397	\$0.43	\$0.50	\$0.07
	294407	\$43.37	\$50.06	\$6.69
	294617	\$81,896.73	\$94,546.30	\$12,649.57
	294746	\$327.27	\$377.82	\$50.55
	294849	\$38.07	\$43.95	\$5.88
	294890	\$20,991.34	\$24,233.62	\$3,242.28
	294984	\$1,828.54	\$2,110.97	\$282.43
	295070	\$18.61	\$21.48	\$2.87
	295202	\$739.47	\$853.63	\$114.16
	295665	\$748.29	\$863.86	\$115.57
	295710	\$0.83	\$0.96	\$0.13

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332	295711	\$0.73	\$0.84	\$0.11
	295712	\$3.42	\$3.95	\$0.53
	295713	\$1.43	\$1.65	\$0.22
	295714	\$1.43	\$1.65	\$0.22
	295715	\$1.43	\$1.65	\$0.22
	295716	\$7.47	\$8.62	\$1.15
	295717	\$3.11	\$3.59	\$0.48
	295719	\$3.12	\$3.60	\$0.48
	295721	\$3.11	\$3.59	\$0.48
	296153	\$11.93	\$13.77	\$1.84
	296548	\$816.18	\$942.25	\$126.07
	297365	\$22.42	\$25.89	\$3.47
	297371	\$13.74	\$15.86	\$2.12
	297534	\$9.54	\$11.02	\$1.48
	297887	\$56.87	\$65.65	\$8.78
	297942	\$811.03	\$936.30	\$125.27
	298504	\$133.87	\$154.54	\$20.67
	298769	\$750.65	\$866.59	\$115.94
	298838	\$341.01	\$393.69	\$52.68
	299661	\$57.20	\$66.04	\$8.84
	299676	\$1,481.30	\$1,710.10	\$228.80
	299700	\$42.94	\$49.57	\$6.63
	300512	\$830.18	\$958.41	\$128.23
	300749	\$13.88	\$16.03	\$2.15
	300995	\$332.81	\$384.21	\$51.40
	301025	\$70.61	\$81.51	\$10.90
	301458	\$105.20	\$121.44	\$16.24
	301727	\$45.08	\$52.05	\$6.97
	301749	\$1,717.38	\$1,982.64	\$265.26
	301857	\$1,038.59	\$1,199.01	\$160.42
	301859	\$2,859.83	\$3,301.55	\$441.72
	301899	\$21.52	\$24.84	\$3.32
	301905	\$262.68	\$303.25	\$40.57
	302640	\$1.24	\$1.43	\$0.19
	302641	\$1.24	\$1.43	\$0.19
	302643	\$2.48	\$2.86	\$0.38
	302646	\$1.24	\$1.43	\$0.19
	302647	\$2.48	\$2.86	\$0.38
	302648	\$4.34	\$5.01	\$0.67
	302892	\$110.54	\$127.61	\$17.07
	302896	\$1.24	\$1.43	\$0.19
	302970	\$2.77	\$3.19	\$0.42
	302971	\$4.77	\$5.51	\$0.74
	302972	\$5.39	\$6.22	\$0.83
	303033	\$587.86	\$678.67	\$90.81
	303723	\$16.98	\$19.61	\$2.63
	303729	\$24.33	\$28.09	\$3.76

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332	303757	\$2.29	\$2.64	\$0.35
	303781	\$2.00	\$2.31	\$0.31
	303827	\$1.67	\$1.93	\$0.26
	303829	\$4.06	\$4.68	\$0.62
	303830	\$1.67	\$1.93	\$0.26
	303831	\$0.14	\$0.17	\$0.03
	303832	\$1.34	\$1.54	\$0.20
	303833	\$0.33	\$0.39	\$0.06
	303834	\$333.95	\$385.53	\$51.58
	303868	\$79.58	\$91.87	\$12.29
	303874	\$39.50	\$45.60	\$6.10
	303891	\$13.79	\$15.92	\$2.13
	303900	\$38.17	\$44.06	\$5.89
	303903	\$22.80	\$26.33	\$3.53
	303904	\$9.06	\$10.46	\$1.40
	303972	\$544.49	\$628.59	\$84.10
	304706	\$25.62	\$29.58	\$3.96
	304820	\$618.54	\$714.08	\$95.54
	304858	\$5,923.28	\$6,838.18	\$914.90
	304888	\$10.16	\$11.73	\$1.57
	305169	\$820.95	\$947.75	\$126.80
	305324	\$62.98	\$72.70	\$9.72
	305667	\$1,171.89	\$1,352.90	\$181.01
	307218	\$5.49	\$6.33	\$0.84
	307225	\$15.36	\$17.73	\$2.37
	307247	\$38.83	\$44.83	\$6.00
	307556	\$718.80	\$829.82	\$111.02
	308105	\$115.36	\$133.17	\$17.81
	308396	\$576.93	\$666.04	\$89.11
	308924	\$415.63	\$479.83	\$64.20
	308982	\$941.18	\$1,086.55	\$145.37
	309193	\$1,231.71	\$1,421.96	\$190.25
	309422	\$4,863.65	\$5,614.87	\$751.22
	309629	\$422.31	\$487.54	\$65.23
	309745	\$33,810.95	\$39,033.31	\$5,222.36
	311751	\$37.07	\$42.79	\$5.72
	311804	\$883.26	\$1,019.69	\$136.43
	311826	\$709.09	\$818.61	\$109.52
	312317	\$444.40	\$513.04	\$68.64
	312862	\$452.41	\$522.29	\$69.88
	313276	\$332.24	\$383.55	\$51.31
	313277	\$34.97	\$40.37	\$5.40
	313283	\$1,039.79	\$1,200.39	\$160.60
	350769	\$1,198.11	\$1,383.17	\$185.06
	350859	\$239.60	\$276.60	\$37.00
	352044	\$543.87	\$627.87	\$84.00
	353179	\$39.31	\$45.38	\$6.07

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332	354038	\$17.82	\$20.58	\$2.76
	354039	\$8.91	\$10.29	\$1.38
	354041	\$1.78	\$2.06	\$0.28
	354440	\$3.05	\$3.52	\$0.47
	354443	\$1,346.26	\$1,554.20	\$207.94
	354448	\$699.35	\$807.36	\$108.01
	354600	\$4,866.18	\$5,617.79	\$751.61
	354689	\$5.82	\$6.72	\$0.90
	354947	\$280.47	\$323.79	\$43.32
	355195	\$28.67	\$33.10	\$4.43
	355567	\$32.06	\$37.01	\$4.95
	356792	\$701.11	\$809.40	\$108.29
	358152	\$1.62	\$1.87	\$0.25
	358155	\$16.55	\$19.11	\$2.56
	358325	\$40.36	\$46.59	\$6.23
	358489	\$31.87	\$36.79	\$4.92
	358506	\$543.34	\$627.27	\$83.93
	358513	\$949.43	\$1,096.08	\$146.65
	358541	\$8.25	\$9.53	\$1.28
	358701	\$44.42	\$51.28	\$6.86
	358814	\$18.80	\$21.70	\$2.90
	359167	\$123.53	\$142.62	\$19.09
	359743	\$50.57	\$58.38	\$7.81
	359809	\$2,207.43	\$2,548.39	\$340.96
	360173	\$1,346.69	\$1,554.70	\$208.01
	360659	\$74.89	\$86.45	\$11.56
	360674	\$19.18	\$22.14	\$2.96
	360945	\$11.64	\$13.44	\$1.80
	360991	\$754.21	\$870.70	\$116.49
	362242	\$16.41	\$18.95	\$2.54
	363293	\$1,240.40	\$1,431.99	\$191.59
	363493	\$3,117.21	\$3,598.69	\$481.48
	363690	\$5,534.08	\$6,388.86	\$854.78
	363747	\$531.99	\$614.16	\$82.17
	363751	\$624.06	\$720.45	\$96.39
	363968	\$40.89	\$47.20	\$6.31
	364099	\$9.54	\$11.02	\$1.48
	364353	\$528.41	\$610.03	\$81.62
	364736	\$431.37	\$498.00	\$66.63
	364760	\$3,007.96	\$3,472.57	\$464.61
	364938	\$39,597.31	\$45,713.41	\$6,116.10
	364983	\$622.20	\$718.31	\$96.11
	364993	\$2,732.88	\$3,155.00	\$422.12
	364994	\$796.72	\$919.78	\$123.06
	365015	\$201.67	\$232.82	\$31.15
	366723	\$999.13	\$1,153.46	\$154.33
	366813	\$206.81	\$238.76	\$31.95

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	366839	\$33.73	\$38.94	\$5.21
	366938	\$14.31	\$16.52	\$2.21
	367518	\$282.19	\$325.78	\$43.59
	367573	\$57.25	\$66.09	\$8.84
	367830	\$97.82	\$112.93	\$15.11
	368123	\$800.77	\$924.46	\$123.69
	368131	\$18.42	\$21.26	\$2.84
	368642	\$518.49	\$597.29	\$78.80
	368733	\$29.76	\$34.36	\$4.60
	368734	\$29.75	\$34.35	\$4.60
	368735	\$29.75	\$34.35	\$4.60
	368827	\$5.84	\$6.75	\$0.91
	368860	\$8.54	\$9.86	\$1.32
	369515	\$13.74	\$15.86	\$2.12
	370241	\$44.08	\$50.89	\$6.81
	372166	\$1,785.79	\$2,061.62	\$275.83
	372167	\$29,101.64	\$33,596.60	\$4,494.96
	372184	\$400.74	\$462.64	\$61.90
	372186	\$442.59	\$510.95	\$68.36
	372269	\$1,038.71	\$1,199.15	\$160.44
	372543	\$4.77	\$5.51	\$0.74
	372793	\$630.12	\$727.45	\$97.33
	374856	\$408.47	\$471.56	\$63.09
	375087	\$848.38	\$979.42	\$131.04
	375152	\$132.25	\$152.67	\$20.42
	375738	\$504.08	\$581.94	\$77.86
	375739	\$593.77	\$685.48	\$91.71
	375979	\$19.23	\$22.20	\$2.97
	375987	\$780.97	\$901.60	\$120.63
	376062	\$1,519.07	\$1,753.70	\$234.63
	376117	\$24.90	\$28.75	\$3.85
	376119	\$2.19	\$2.53	\$0.34
	376242	\$11,093.40	\$12,806.86	\$1,713.46
	376294	\$13,263.33	\$15,311.96	\$2,048.63
	376311	\$853.22	\$985.00	\$131.78
	376416	\$5,647.63	\$6,519.94	\$872.31
	376546	\$2,429.27	\$2,804.49	\$375.22
	377778	\$1,943.32	\$2,243.48	\$300.16
	378328	\$2,332.42	\$2,692.69	\$360.27
	380688	\$500.23	\$500.81	\$0.58
	380699	\$839.84	\$969.56	\$129.72
	380703	\$553.09	\$638.52	\$85.43
	380758	\$95.61	\$110.37	\$14.76
	380759	\$67.94	\$78.43	\$10.49
	380796	\$14,789.36	\$17,073.68	\$2,284.32
	380908	\$90.12	\$104.04	\$13.92
	380909	\$43.32	\$50.01	\$6.69

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332	381001	\$214.11	\$247.18	\$33.07
	381002	\$58.39	\$67.41	\$9.02
	381291	\$667.91	\$771.07	\$103.16
	381350	\$564.04	\$651.16	\$87.12
	381351	\$422.78	\$488.09	\$65.31
	381353	\$19.75	\$22.80	\$3.05
	381372	\$435.36	\$502.60	\$67.24
	381398	\$473.16	\$546.25	\$73.09
	381461	\$219.60	\$220.46	\$0.86
	381479	\$1,410.52	\$1,628.39	\$217.87
	381881	\$4,254.75	\$4,911.93	\$657.18
	383656	\$377.41	\$435.71	\$58.30
	383854	\$930.92	\$1,074.71	\$143.79
	383855	\$818.81	\$945.28	\$126.47
	383860	\$1,703.07	\$1,966.12	\$263.05
	384382	\$562.95	\$649.90	\$86.95
	384928	\$22.14	\$25.56	\$3.42
	385497	\$355.49	\$410.40	\$54.91
	385517	\$33.82	\$39.05	\$5.23
	385533	\$3,809.98	\$4,398.46	\$588.48
	385536	\$78.72	\$90.87	\$12.15
	385996	\$457.34	\$469.97	\$12.63
	388996	\$34.25	\$39.54	\$5.29
	388998	\$449.45	\$518.87	\$69.42
	389009	\$41.12	\$47.48	\$6.36
	389011	\$41.12	\$47.48	\$6.36
	389017	\$2,024.09	\$2,336.73	\$312.64
	389039	\$849.20	\$980.36	\$131.16
	389045	\$1,264.49	\$1,459.80	\$195.31
	389073	\$285.63	\$329.75	\$44.12
	389094	\$268.58	\$310.07	\$41.49
	389095	\$493.63	\$569.88	\$76.25
	389108	\$660.75	\$762.81	\$102.06
	389109	\$654.88	\$756.03	\$101.15
	389110	\$586.76	\$677.39	\$90.63
	389111	\$16.36	\$18.89	\$2.53
	389113	\$549.08	\$633.89	\$84.81
	389115	\$569.06	\$656.95	\$87.89
	389129	\$751.89	\$868.02	\$116.13
	389200	\$3.82	\$4.41	\$0.59
	389321	\$385.82	\$445.41	\$59.59
	389346	\$2,261.58	\$2,610.90	\$349.32
	390025	\$1,290.01	\$1,489.27	\$199.26
	390120	\$2,649.49	\$3,058.72	\$409.23
	390127	\$4,770.76	\$5,507.64	\$736.88
	390579	\$321.88	\$371.60	\$49.72
	390661	\$19.89	\$22.97	\$3.08

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332	390677	\$24.14	\$27.87	\$3.73
	390681	\$21.85	\$25.22	\$3.37
	390721	\$466.58	\$538.65	\$72.07
	390907	\$2,480.80	\$2,863.97	\$383.17
	391140	\$339.68	\$392.14	\$52.46
	391141	\$439.39	\$507.25	\$67.86
	391238	\$43.80	\$50.56	\$6.76
	391818	\$575.26	\$664.11	\$88.85
	391928	\$14.60	\$16.85	\$2.25
	392259	\$26.91	\$31.06	\$4.15
	392460	\$187.63	\$216.62	\$28.99
	394982	\$1,438.15	\$1,660.28	\$222.13
	395899	\$12.02	\$13.88	\$1.86
	396362	\$319.45	\$368.79	\$49.34
	396363	\$76.38	\$88.18	\$11.80
	396406	\$198.89	\$229.61	\$30.72
	396444	\$38.88	\$44.89	\$6.01
	396450	\$22.28	\$25.72	\$3.44
	396988	\$607.45	\$701.28	\$93.83
	397178	\$1,598.16	\$1,845.00	\$246.84
	397300	\$4,270.40	\$4,930.00	\$659.60
	397642	\$312.86	\$361.18	\$48.32
	397664	\$34.44	\$39.77	\$5.33
	397771	\$79.34	\$91.59	\$12.25
	398090	\$257.29	\$297.03	\$39.74
	398343	\$136.92	\$158.07	\$21.15
	398688	\$48.66	\$56.18	\$7.52
	398689	\$7.30	\$8.43	\$1.13
	398810	\$1,160.86	\$1,208.32	\$47.46
	398811	\$1,184.10	\$1,367.00	\$182.90
	398812	\$1,235.18	\$1,425.97	\$190.79
	398815	\$1,130.33	\$1,304.92	\$174.59
	398817	\$1,049.57	\$1,211.68	\$162.11
	398820	\$1,283.62	\$1,481.89	\$198.27
	398821	\$1,388.29	\$1,602.72	\$214.43
	398823	\$1,408.47	\$1,626.02	\$217.55
	398824	\$1,144.98	\$1,321.83	\$176.85
	398825	\$1,040.26	\$1,200.94	\$160.68
	398826	\$1,342.49	\$1,549.85	\$207.36
	398829	\$1,377.56	\$1,590.33	\$212.77
	398834	\$1,526.64	\$1,762.44	\$235.80
	398835	\$1,270.61	\$1,466.86	\$196.25
	398837	\$1,195.14	\$1,379.74	\$184.60
	398838	\$1,130.70	\$1,305.34	\$174.64
	398839	\$1,260.16	\$1,454.80	\$194.64
	398840	\$1,188.05	\$1,203.86	\$15.81
	398846	\$1,271.66	\$1,468.07	\$196.41

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	398847	\$1,162.24	\$1,341.75	\$179.51
	398848	\$660.15	\$762.12	\$101.97
	398852	\$1,116.82	\$1,289.32	\$172.50
	398853	\$1,066.89	\$1,231.67	\$164.78
	398855	\$1,076.75	\$1,243.06	\$166.31
	398857	\$1,020.94	\$1,178.63	\$157.69
	398858	\$1,142.12	\$1,318.53	\$176.41
	398860	\$1,160.15	\$1,339.35	\$179.20
	398862	\$1,056.34	\$1,219.50	\$163.16
	398863	\$1,040.96	\$1,201.75	\$160.79
	398864	\$1,019.08	\$1,176.48	\$157.40
	398865	\$1,143.71	\$1,320.37	\$176.66
	398866	\$1,101.63	\$1,271.78	\$170.15
	398867	\$1,035.02	\$1,194.88	\$159.86
	398868	\$1,138.57	\$1,314.43	\$175.86
	398876	\$58.39	\$67.41	\$9.02
	400341	\$4,169.64	\$4,813.68	\$644.04
	400840	\$2,920.66	\$3,371.78	\$451.12
	401694	\$593.53	\$685.21	\$91.68
	401750	\$225.85	\$260.73	\$34.88
	402830	\$26.10	\$30.13	\$4.03
	402838	\$16.41	\$18.95	\$2.54
	402839	\$17.56	\$20.27	\$2.71
	402843	\$21.13	\$24.40	\$3.27
	402967	\$16.65	\$19.22	\$2.57
	403137	\$16.41	\$18.95	\$2.54
	403141	\$13.98	\$16.14	\$2.16
	403393	\$48.33	\$55.79	\$7.46
	403517	\$106.53	\$122.99	\$16.46
	403882	\$17.75	\$20.49	\$2.74
	403888	\$5.25	\$6.06	\$0.81
	403889	\$479.46	\$553.52	\$74.06
	403890	\$304.31	\$351.32	\$47.01
	404044	\$322.32	\$372.11	\$49.79
	404231	\$2,700.01	\$3,117.05	\$417.04
	404286	\$959.45	\$1,107.64	\$148.19
	404334	\$59.92	\$69.18	\$9.26
	404371	\$1.77	\$2.04	\$0.27
	404455	\$93.08	\$107.45	\$14.37
	404709	\$155.96	\$180.04	\$24.08
	404897	\$860.17	\$993.03	\$132.86
	404963	\$1,803.30	\$2,081.83	\$278.53
	404968	\$1,116.60	\$1,289.06	\$172.46
	404969	\$58.54	\$67.58	\$9.04
	405365	\$396.11	\$457.29	\$61.18
	406232	\$17.56	\$20.27	\$2.71
	406311	\$18.70	\$21.59	\$2.89

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Expected Refunds

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	407283	\$143.26	\$165.40	\$22.14
	407294	\$617.29	\$712.63	\$95.34
	407455	\$1,267.61	\$1,463.40	\$195.79
	407457	\$850.77	\$982.18	\$131.41
	407458	\$1,435.29	\$1,656.98	\$221.69
	407459	\$81.82	\$94.46	\$12.64
	407460	\$81.68	\$94.29	\$12.61
	407461	\$81.48	\$94.07	\$12.59
	407462	\$81.39	\$93.96	\$12.57
	407465	\$82.68	\$95.45	\$12.77
	407466	\$82.53	\$95.28	\$12.75
	407468	\$1,378.40	\$1,591.30	\$212.90
	407469	\$1,711.94	\$1,976.36	\$264.42
	407471	\$1,335.78	\$1,542.11	\$206.33
	407473	\$1,189.95	\$1,373.74	\$183.79
	407475	\$1,018.68	\$1,059.09	\$40.41
	407476	\$1,416.92	\$1,635.77	\$218.85
	407477	\$1,266.11	\$1,461.67	\$195.56
	407479	\$1,031.12	\$1,190.39	\$159.27
	407480	\$1,267.76	\$1,463.57	\$195.81
	407481	\$83.01	\$95.83	\$12.82
	407482	\$1,188.87	\$1,372.50	\$183.63
	407484	\$1,094.13	\$1,263.12	\$168.99
	407486	\$1,210.76	\$1,397.77	\$187.01
	407487	\$1,322.88	\$1,527.21	\$204.33
	407489	\$1,139.55	\$1,315.57	\$176.02
	407492	\$1,042.98	\$1,204.08	\$161.10
	407493	\$1,307.71	\$1,509.70	\$201.99
	407494	\$1,082.96	\$1,250.23	\$167.27
	407497	\$1,075.81	\$1,241.97	\$166.16
	407499	\$1,310.10	\$1,512.45	\$202.35
	407500	\$1,189.95	\$1,373.74	\$183.79
	407501	\$1,079.22	\$1,245.91	\$166.69
	407502	\$1,178.85	\$1,360.94	\$182.09
	407503	\$1,169.48	\$1,350.12	\$180.64
	407504	\$881.06	\$1,017.15	\$136.09
	407505	\$1,134.77	\$1,310.05	\$175.28
	407508	\$1,070.39	\$1,085.50	\$15.11
	407509	\$1,345.01	\$1,394.48	\$49.47
	407510	\$1,221.31	\$1,409.96	\$188.65
	407511	\$1,097.27	\$1,266.76	\$169.49
	407512	\$1,652.21	\$1,907.41	\$255.20
	407515	\$1,164.97	\$1,167.45	\$2.48
	407516	\$1,191.97	\$1,376.08	\$184.11
	407518	\$1,203.14	\$1,388.97	\$185.83
	407519	\$1,379.70	\$1,437.99	\$58.29
	407520	\$1,221.52	\$1,410.19	\$188.67

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	407521	\$1,261.87	\$1,456.77	\$194.90
	407522	\$1,349.98	\$1,558.50	\$208.52
	407523	\$1,185.30	\$1,368.37	\$183.07
	407524	\$181.53	\$209.57	\$28.04
	407525	\$1,345.50	\$1,553.32	\$207.82
	407526	\$1,062.31	\$1,226.39	\$164.08
	407527	\$1,164.49	\$1,344.36	\$179.87
	407528	\$945.56	\$1,091.61	\$146.05
	407529	\$1,327.61	\$1,433.69	\$106.08
	407533	\$996.23	\$1,150.11	\$153.88
	407535	\$1,135.92	\$1,200.67	\$64.75
	407937	\$38.17	\$44.06	\$5.89
	408215	\$1,042.22	\$1,203.20	\$160.98
	408549	\$13.12	\$15.15	\$2.03
	408552	\$17.13	\$19.77	\$2.64
	408572	\$14.31	\$16.52	\$2.21
	408636	\$13.74	\$15.86	\$2.12
	408639	\$15.31	\$17.68	\$2.37
	409796	\$60.30	\$69.62	\$9.32
	410415	\$116.07	\$134.00	\$17.93
	410743	\$176.61	\$203.89	\$27.28
	410984	\$0.48	\$0.55	\$0.07
	411069	\$174.47	\$201.41	\$26.94
	411071	\$143.89	\$166.11	\$22.22
	411073	\$435.28	\$502.52	\$67.24
	411252	\$157.63	\$181.97	\$24.34
	411289	\$4.06	\$4.68	\$0.62
	411529	\$66,790.64	\$77,106.96	\$10,316.32
	411530	\$8,348.83	\$9,638.37	\$1,289.54
	411574	\$14,312.28	\$16,522.92	\$2,210.64
	411735	\$0.38	\$0.44	\$0.06
	412055	\$89.88	\$103.76	\$13.88
	412965	\$2,981.73	\$3,442.28	\$460.55
	412966	\$7,781.11	\$8,982.96	\$1,201.85
	412967	\$6,833.78	\$7,889.31	\$1,055.53
	413616	\$2,863.74	\$3,306.07	\$442.33
	413626	\$357.06	\$412.21	\$55.15
	413793	\$4,648.03	\$5,365.96	\$717.93
	414582	\$201.80	\$232.97	\$31.17
	414993	\$275.75	\$318.34	\$42.59
	414998	\$4.77	\$5.51	\$0.74
	415295	\$368.40	\$425.30	\$56.90
	415814	\$381.66	\$440.61	\$58.95
	416001	\$549.73	\$634.65	\$84.92
	416002	\$549.73	\$634.65	\$84.92
	416005	\$569.68	\$657.67	\$87.99
	416006	\$569.68	\$657.67	\$87.99

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332	416033	\$2,398.74	\$2,769.24	\$370.50
	416037	\$581.28	\$671.06	\$89.78
	416066	\$3,268.16	\$3,772.95	\$504.79
	416245	\$536.76	\$619.66	\$82.90
	416341	\$286.25	\$330.46	\$44.21
	416472	\$453.27	\$523.28	\$70.01
	416729	\$116.50	\$134.50	\$18.00
	416762	\$731.50	\$844.49	\$112.99
	416886	\$392.25	\$452.84	\$60.59
	417062	\$188.64	\$217.77	\$29.13
	417271	\$17.84	\$20.60	\$2.76
	417377	\$727.61	\$840.00	\$112.39
	417378	\$972.33	\$1,122.51	\$150.18
	417379	\$846.00	\$976.68	\$130.68
	417380	\$929.06	\$1,072.56	\$143.50
	417381	\$771.29	\$890.42	\$119.13
	417382	\$1,092.93	\$1,261.75	\$168.82
	417383	\$754.59	\$871.14	\$116.55
	417385	\$812.27	\$937.73	\$125.46
	417386	\$833.83	\$962.62	\$128.79
	417387	\$751.87	\$868.00	\$116.13
	417388	\$518.85	\$598.99	\$80.14
	417389	\$525.07	\$606.18	\$81.11
	417390	\$584.50	\$674.79	\$90.29
	417392	\$496.60	\$573.31	\$76.71
	417393	\$524.55	\$605.57	\$81.02
	417394	\$580.41	\$670.06	\$89.65
	417396	\$652.78	\$753.61	\$100.83
	417397	\$612.28	\$706.85	\$94.57
	417398	\$954.10	\$1,101.47	\$147.37
	417399	\$776.78	\$896.75	\$119.97
	417400	\$857.16	\$989.56	\$132.40
	417444	\$3.82	\$4.41	\$0.59
	418875	\$9.54	\$11.02	\$1.48
	418955	\$25.71	\$29.69	\$3.98
	419179	\$42.94	\$49.57	\$6.63
	419190	\$29,389.55	\$33,928.99	\$4,539.44
	419191	\$205.43	\$237.16	\$31.73
	419201	\$492.82	\$568.94	\$76.12
	419203	\$3,209.15	\$3,704.82	\$495.67
	420154	\$76.76	\$88.62	\$11.86
	421315	\$1,228.73	\$1,418.51	\$189.78
	421317	\$1,133.01	\$1,308.01	\$175.00
	421318	\$1,045.83	\$1,207.36	\$161.53
	421319	\$943.23	\$1,088.92	\$145.69
	421321	\$951.04	\$1,097.94	\$146.90
	421322	\$1,140.96	\$1,317.19	\$176.23

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	421323	\$853.73	\$917.41	\$63.68
	421324	\$1,077.09	\$1,243.46	\$166.37
	421325	\$1,025.79	\$1,184.24	\$158.45
	421326	\$942.90	\$1,088.54	\$145.64
	421327	\$1,093.91	\$1,262.87	\$168.96
	421328	\$1,040.03	\$1,200.67	\$160.64
	421330	\$763.32	\$881.22	\$117.90
	421331	\$1,014.19	\$1,170.84	\$156.65
	421332	\$925.61	\$1,068.58	\$142.97
	421333	\$1,272.98	\$1,469.60	\$196.62
	421336	\$1,032.11	\$1,191.52	\$159.41
	421337	\$1,121.13	\$1,294.30	\$173.17
	421338	\$1,509.56	\$1,742.73	\$233.17
	421340	\$1,338.91	\$1,545.72	\$206.81
	421341	\$1,187.92	\$1,371.40	\$183.48
	421342	\$1,221.98	\$1,410.73	\$188.75
	421346	\$1,357.70	\$1,567.40	\$209.70
	421347	\$1,241.11	\$1,432.81	\$191.70
	421350	\$142.98	\$165.06	\$22.08
	421351	\$1,008.42	\$1,164.18	\$155.76
	421352	\$1,171.50	\$1,352.45	\$180.95
	421353	\$1,058.01	\$1,221.42	\$163.41
	421354	\$1,349.17	\$1,557.56	\$208.39
	421355	\$928.24	\$1,071.61	\$143.37
	421356	\$1,068.65	\$1,233.71	\$165.06
	421357	\$1,217.76	\$1,405.85	\$188.09
	421358	\$1,051.37	\$1,213.76	\$162.39
	421361	\$964.83	\$1,113.86	\$149.03
	421362	\$1,141.30	\$1,317.59	\$176.29
	421363	\$1,304.04	\$1,505.46	\$201.42
	421572	\$74.28	\$85.75	\$11.47
	421579	\$39.17	\$45.22	\$6.05
	421580	\$34.83	\$40.21	\$5.38
	422200	\$859.74	\$992.53	\$132.79
	422201	\$405.75	\$468.42	\$62.67
	422402	\$106.96	\$123.48	\$16.52
	422418	\$747.67	\$863.16	\$115.49
	422827	\$72.45	\$83.64	\$11.19
	423157	\$51.19	\$59.10	\$7.91
	423163	\$7.25	\$8.37	\$1.12
	423405	\$542.91	\$626.77	\$83.86
	423563	\$379.28	\$437.86	\$58.58
	424510	\$312.48	\$360.75	\$48.27
	424511	\$308.67	\$356.34	\$47.67
	424512	\$757.60	\$874.61	\$117.01
	424513	\$814.85	\$940.70	\$125.85
	424514	\$720.38	\$831.65	\$111.27

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	424515	\$745.77	\$860.97	\$115.20
	424572	\$13.17	\$15.20	\$2.03
	424576	\$213.83	\$246.85	\$33.02
	424577	\$13.17	\$15.20	\$2.03
	424751	\$5,724.91	\$6,609.17	\$884.26
	424753	\$6,395.82	\$7,383.71	\$987.89
	424754	\$395.59	\$441.68	\$46.09
	424756	\$491.01	\$566.85	\$75.84
	424757	\$576.74	\$665.82	\$89.08
	424761	\$35.54	\$41.03	\$5.49
	424762	\$504.18	\$582.05	\$77.87
	424764	\$407.14	\$470.03	\$62.89
	426515	\$61.29	\$70.76	\$9.47
	426944	\$9.97	\$11.51	\$1.54
	426946	\$6.11	\$7.05	\$0.94
	426949	\$3,929.87	\$4,536.86	\$606.99
	427016	\$444.44	\$513.09	\$68.65
	427547	\$262.77	\$303.36	\$40.59
	427548	\$98.99	\$114.28	\$15.29
	427549	\$49.62	\$57.28	\$7.66
	427553	\$793.28	\$915.81	\$122.53
	428249	\$87.16	\$100.62	\$13.46
	428253	\$29.10	\$33.60	\$4.50
	428273	\$734.02	\$847.39	\$113.37
	428281	\$37.79	\$43.63	\$5.84
	428581	\$644.05	\$743.53	\$99.48
	429487	\$329.18	\$380.03	\$50.85
	429794	\$2,128.71	\$2,457.51	\$328.80
	429799	\$31.63	\$36.52	\$4.89
	430231	\$50.09	\$57.83	\$7.74
	430253	\$19.56	\$22.58	\$3.02
	430423	\$0.48	\$0.55	\$0.07
	430424	\$923.46	\$1,066.10	\$142.64
	430425	\$752.08	\$868.24	\$116.16
	430426	\$1,069.84	\$1,235.09	\$165.25
	430427	\$771.05	\$890.14	\$119.09
	430428	\$1,017.92	\$1,175.15	\$157.23
	430429	\$1,202.10	\$1,387.77	\$185.67
	430430	\$752.21	\$868.40	\$116.19
	430431	\$925.53	\$1,068.48	\$142.95
	430433	\$734.70	\$848.18	\$113.48
	430434	\$1,154.04	\$1,332.29	\$178.25
	430435	\$1,125.90	\$1,299.80	\$173.90
	430436	\$1,006.63	\$1,162.11	\$155.48
	430437	\$1,106.82	\$1,277.77	\$170.95
	430438	\$773.77	\$893.28	\$119.51
	430439	\$1,139.35	\$1,315.33	\$175.98

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332	430440	\$729.93	\$842.67	\$112.74
	430442	\$1,170.17	\$1,350.91	\$180.74
	430443	\$992.30	\$1,145.57	\$153.27
	430444	\$1,516.10	\$1,750.27	\$234.17
	430445	\$1,117.46	\$1,290.05	\$172.59
	430446	\$1,137.35	\$1,313.02	\$175.67
	430448	\$1,007.22	\$1,162.79	\$155.57
	430449	\$786.94	\$908.49	\$121.55
	430450	\$1,172.32	\$1,353.39	\$181.07
	430451	\$1,069.22	\$1,234.37	\$165.15
	430452	\$936.55	\$1,081.20	\$144.65
	430453	\$1,069.27	\$1,234.43	\$165.16
	430454	\$739.47	\$853.68	\$114.21
	430455	\$927.27	\$1,070.50	\$143.23
	430456	\$1,128.76	\$1,303.11	\$174.35
	430457	\$951.67	\$1,098.66	\$146.99
	430458	\$936.02	\$1,080.59	\$144.57
	430460	\$913.79	\$1,054.93	\$141.14
	430461	\$1,057.25	\$1,220.55	\$163.30
	430462	\$860.84	\$993.80	\$132.96
	430463	\$985.54	\$1,137.77	\$152.23
	430464	\$873.24	\$1,008.12	\$134.88
	430465	\$918.13	\$1,059.95	\$141.82
	430466	\$744.24	\$859.19	\$114.95
	430467	\$991.84	\$1,145.04	\$153.20
	430468	\$1,136.87	\$1,312.47	\$175.60
	430469	\$757.17	\$874.12	\$116.95
	430470	\$1,164.07	\$1,343.86	\$179.79
	430471	\$1,006.77	\$1,162.28	\$155.51
	430472	\$1,451.65	\$1,675.86	\$224.21
	430473	\$858.74	\$991.38	\$132.64
	430475	\$1,194.41	\$1,292.79	\$98.38
	430476	\$787.75	\$909.42	\$121.67
	430477	\$686.37	\$792.38	\$106.01
	430478	\$1,124.66	\$1,298.37	\$173.71
	430479	\$1,101.52	\$1,271.66	\$170.14
	430480	\$811.03	\$936.30	\$125.27
	430481	\$1,106.82	\$1,277.77	\$170.95
	430482	\$864.18	\$997.65	\$133.47
	430483	\$772.43	\$891.74	\$119.31
	430484	\$847.58	\$978.50	\$130.92
	430485	\$858.26	\$990.82	\$132.56
	430486	\$911.22	\$1,051.96	\$140.74
	430487	\$803.01	\$927.05	\$124.04
	430488	\$941.70	\$1,087.15	\$145.45
	430489	\$834.88	\$963.84	\$128.96
	430490	\$1,025.71	\$1,184.14	\$158.43

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	430491	\$788.27	\$910.03	\$121.76
	430492	\$1,092.12	\$1,260.81	\$168.69
	430494	\$1,051.05	\$1,213.39	\$162.34
	430495	\$676.02	\$780.43	\$104.41
	430496	\$982.78	\$1,134.57	\$151.79
	430497	\$753.78	\$870.21	\$116.43
	430498	\$1,058.68	\$1,222.20	\$163.52
	430499	\$1,012.93	\$1,169.38	\$156.45
	430501	\$1,081.58	\$1,248.64	\$167.06
	430502	\$1,011.64	\$1,167.90	\$156.26
	430503	\$724.71	\$836.65	\$111.94
	430504	\$896.90	\$1,035.44	\$138.54
	430505	\$1,065.36	\$1,229.91	\$164.55
	430507	\$968.03	\$1,117.56	\$149.53
	430508	\$910.64	\$1,051.30	\$140.66
	430509	\$786.70	\$908.21	\$121.51
	430510	\$926.96	\$1,070.13	\$143.17
	430511	\$934.35	\$1,078.67	\$144.32
	430513	\$644.34	\$743.86	\$99.52
	430514	\$920.71	\$1,062.92	\$142.21
	430515	\$819.04	\$945.55	\$126.51
	430516	\$1,036.45	\$1,196.53	\$160.08
	430517	\$793.74	\$916.33	\$122.59
	430826	\$86.35	\$99.69	\$13.34
	430966	\$36.02	\$41.58	\$5.56
	431375	\$147.47	\$170.24	\$22.77
	431391	\$286.25	\$330.46	\$44.21
	431405	\$25.67	\$29.63	\$3.96
	431418	\$84.16	\$97.15	\$12.99
	431423	\$561.90	\$648.70	\$86.80
	431436	\$186.87	\$215.73	\$28.86
	431723	\$686.99	\$793.10	\$106.11
	431724	\$686.99	\$793.10	\$106.11
	431795	\$15.61	\$18.02	\$2.41
	431797	\$15.61	\$18.02	\$2.41
	431798	\$15.61	\$18.02	\$2.41
	431799	\$15.61	\$18.02	\$2.41
	431800	\$15.61	\$18.02	\$2.41
	431923	\$1,343.54	\$1,551.06	\$207.52
	432142	\$194.60	\$224.66	\$30.06
	432356	\$656.31	\$757.69	\$101.38
	432798	\$562.95	\$649.90	\$86.95
	433325	\$767.13	\$885.62	\$118.49
	433357	\$0.62	\$0.72	\$0.10
	433358	\$0.72	\$0.83	\$0.11
	433366	\$1,113.22	\$1,285.17	\$171.95
	433368	\$1,185.82	\$1,368.98	\$183.16

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	433369	\$1,049.57	\$1,211.68	\$162.11
	433370	\$1,408.38	\$1,625.91	\$217.53
	433371	\$1,159.67	\$1,338.79	\$179.12
	433372	\$1,101.52	\$1,271.66	\$170.14
	433373	\$1,468.66	\$1,695.50	\$226.84
	433374	\$1,338.43	\$1,545.16	\$206.73
	433375	\$1,328.23	\$1,533.38	\$205.15
	433376	\$1,088.59	\$1,256.73	\$168.14
	433379	\$1,121.13	\$1,294.30	\$173.17
	433380	\$1,361.39	\$1,571.67	\$210.28
	433381	\$1,052.29	\$1,214.82	\$162.53
	433383	\$1,498.47	\$1,729.92	\$231.45
	433387	\$1,047.56	\$1,209.37	\$161.81
	433388	\$1,033.38	\$1,192.99	\$159.61
	433389	\$972.80	\$1,123.06	\$150.26
	433390	\$1,210.22	\$1,397.15	\$186.93
	433392	\$1,086.85	\$1,254.72	\$167.87
	433394	\$1,090.60	\$1,134.57	\$43.97
	433395	\$1,071.04	\$1,236.47	\$165.43
	433396	\$1,371.26	\$1,583.06	\$211.80
	433397	\$992.27	\$1,145.53	\$153.26
	433398	\$1,082.96	\$1,250.23	\$167.27
	433400	\$982.44	\$1,134.19	\$151.75
	433401	\$1,049.57	\$1,211.68	\$162.11
	433402	\$1,049.57	\$1,211.68	\$162.11
	433403	\$1,178.41	\$1,360.43	\$182.02
	433404	\$1,374.69	\$1,587.03	\$212.34
	433406	\$1,048.18	\$1,210.08	\$161.90
	433408	\$1,481.15	\$1,709.92	\$228.77
	433409	\$1,183.39	\$1,366.17	\$182.78
	433411	\$1,244.90	\$1,437.18	\$192.28
	433412	\$1,466.35	\$1,533.93	\$67.58
	433413	\$1,338.87	\$1,545.66	\$206.79
	433415	\$1,049.57	\$1,211.68	\$162.11
	433417	\$1,188.81	\$1,372.43	\$183.62
	433418	\$1,288.11	\$1,487.06	\$198.95
	433420	\$1,346.07	\$1,553.98	\$207.91
	433422	\$1,043.41	\$1,204.58	\$161.17
	433423	\$1,079.22	\$1,245.91	\$166.69
	433442	\$1,137.21	\$1,312.86	\$175.65
	433444	\$1,015.98	\$1,172.91	\$156.93
	433446	\$1,120.51	\$1,293.58	\$173.07
	433451	\$1,318.29	\$1,521.92	\$203.63
	433452	\$1,002.58	\$1,157.43	\$154.85
	433453	\$993.56	\$1,147.02	\$153.46
	433456	\$1,154.41	\$1,332.72	\$178.31
	433457	\$1,507.55	\$1,740.40	\$232.85

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332	433458	\$1,121.13	\$1,294.30	\$173.17
	433460	\$1,200.04	\$1,385.39	\$185.35
	433461	\$1,347.91	\$1,556.10	\$208.19
	433465	\$1,168.84	\$1,349.37	\$180.53
	433466	\$997.18	\$1,151.21	\$154.03
	433508	\$0.52	\$0.61	\$0.09
	433513	\$0.48	\$0.55	\$0.07
	433516	\$822.53	\$854.35	\$31.82
	433518	\$1,123.17	\$1,296.65	\$173.48
	433520	\$1,022.16	\$1,180.04	\$157.88
	433521	\$1,201.59	\$1,387.18	\$185.59
	433524	\$1,075.92	\$1,242.11	\$166.19
	433525	\$1,032.49	\$1,191.96	\$159.47
	433526	\$909.23	\$944.23	\$35.00
	433527	\$793.53	\$916.09	\$122.56
	433528	\$1,035.54	\$1,195.49	\$159.95
	433529	\$1,005.68	\$1,161.01	\$155.33
	433530	\$914.85	\$1,056.15	\$141.30
	433532	\$1,114.28	\$1,286.39	\$172.11
	433537	\$1,131.96	\$1,306.80	\$174.84
	433538	\$973.62	\$1,124.00	\$150.38
	433539	\$991.70	\$1,071.42	\$79.72
	433540	\$180.54	\$208.42	\$27.88
	433541	\$1,059.96	\$1,223.68	\$163.72
	433542	\$1,179.17	\$1,361.31	\$182.14
	433544	\$1,075.07	\$1,241.12	\$166.05
	433545	\$1,130.67	\$1,305.31	\$174.64
	433546	\$1,132.25	\$1,307.13	\$174.88
	433549	\$1,060.40	\$1,224.18	\$163.78
	433551	\$858.82	\$991.47	\$132.65
	433552	\$1,240.26	\$1,431.83	\$191.57
	433553	\$1,197.24	\$1,382.16	\$184.92
	433554	\$824.33	\$951.66	\$127.33
	433555	\$999.47	\$1,153.85	\$154.38
	433557	\$1,252.96	\$1,446.49	\$193.53
	433558	\$1,185.44	\$1,368.54	\$183.10
	433559	\$1,536.09	\$1,773.35	\$237.26
	433560	\$1,218.67	\$1,406.90	\$188.23
	433561	\$1,309.09	\$1,511.29	\$202.20
	433562	\$1,069.41	\$1,234.59	\$165.18
	433564	\$978.01	\$1,129.07	\$151.06
	433565	\$1,208.77	\$1,395.47	\$186.70
	433566	\$1,025.71	\$1,184.14	\$158.43
	433567	\$876.39	\$1,011.75	\$135.36
	433568	\$1,097.27	\$1,266.76	\$169.49
	433569	\$984.35	\$1,136.39	\$152.04
	433571	\$876.39	\$1,011.75	\$135.36

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332	433572	\$994.10	\$1,147.64	\$153.54
	433574	\$1,039.07	\$1,199.56	\$160.49
	433575	\$885.63	\$1,022.43	\$136.80
	433576	\$1,116.21	\$1,288.62	\$172.41
	433577	\$955.30	\$1,102.85	\$147.55
	433579	\$975.13	\$1,125.75	\$150.62
	433580	\$1,282.23	\$1,480.28	\$198.05
	433581	\$1,029.77	\$1,188.82	\$159.05
	433582	\$1,211.87	\$1,399.05	\$187.18
	433583	\$1,215.83	\$1,403.62	\$187.79
	433584	\$1,059.11	\$1,222.70	\$163.59
	433585	\$1,082.00	\$1,249.12	\$167.12
	433588	\$1,010.78	\$1,166.90	\$156.12
	433589	\$978.39	\$1,129.51	\$151.12
	433590	\$1,034.84	\$1,194.68	\$159.84
	433593	\$934.60	\$970.85	\$36.25
	433594	\$1,111.86	\$1,283.60	\$171.74
	434191	\$1,111.48	\$1,283.16	\$171.68
	434297	\$584.07	\$674.29	\$90.22
	434318	\$1,258.67	\$1,453.09	\$194.42
	434350	\$77.52	\$89.50	\$11.98
	434353	\$388.63	\$448.65	\$60.02
	434354	\$389.53	\$449.70	\$60.17
	434393	\$43.65	\$50.39	\$6.74
	434394	\$259.34	\$299.40	\$40.06
	434512	\$108.01	\$124.69	\$16.68
	434513	\$100.85	\$116.43	\$15.58
	434514	\$86.54	\$99.91	\$13.37
	434515	\$86.54	\$99.91	\$13.37
	434516	\$100.85	\$116.43	\$15.58
	434517	\$765.97	\$884.28	\$118.31
	434518	\$661.91	\$764.15	\$102.24
	434869	\$844.53	\$974.98	\$130.45
	434870	\$1,154.52	\$1,332.85	\$178.33
	434871	\$917.95	\$1,059.74	\$141.79
	434891	\$1,486.85	\$1,716.51	\$229.66
	435391	\$9.16	\$10.57	\$1.41
	435392	\$143.37	\$165.52	\$22.15
	435395	\$110.00	\$126.98	\$16.98
	435397	\$777.73	\$897.85	\$120.12
	435934	\$58.01	\$66.97	\$8.96
	435943	\$857.50	\$989.94	\$132.44
	436223	\$190.26	\$219.64	\$29.38
	436297	\$15.74	\$18.17	\$2.43
	436487	\$257.72	\$297.52	\$39.80
	436500	\$512.33	\$591.47	\$79.14
	436720	\$130.72	\$150.91	\$20.19

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332	437113	\$15.93	\$18.40	\$2.47
	437353	\$551.74	\$636.96	\$85.22
	437803	\$330.14	\$381.13	\$50.99
	438079	\$119.60	\$138.08	\$18.48
	438456	\$66.70	\$77.00	\$10.30
	438504	\$5.25	\$6.06	\$0.81
	438505	\$5.25	\$6.06	\$0.81
	438506	\$5.25	\$6.06	\$0.81
	438507	\$5.25	\$6.06	\$0.81
	438508	\$5.25	\$6.06	\$0.81
	438654	\$53.86	\$62.18	\$8.32
	438778	\$2.48	\$2.86	\$0.38
	438909	\$49.85	\$57.55	\$7.70
	438989	\$183.39	\$211.71	\$28.32
	439020	\$3.72	\$4.30	\$0.58
	439021	\$2.05	\$2.37	\$0.32
	439068	\$65.93	\$76.12	\$10.19
	439230	\$36.50	\$42.13	\$5.63
	439335	\$3.48	\$4.02	\$0.54
	439370	\$9.21	\$10.63	\$1.42
	439371	\$4.39	\$5.07	\$0.68
	439388	\$10.97	\$12.67	\$1.70
	439390	\$4.63	\$5.34	\$0.71
	439538	\$2.43	\$2.81	\$0.38
	439545	\$14.55	\$16.80	\$2.25
	439570	\$33.01	\$38.11	\$5.10
	439571	\$42.60	\$49.18	\$6.58
	439657	\$35.97	\$41.53	\$5.56
	439664	\$56.82	\$65.60	\$8.78
	439673	\$76.82	\$88.69	\$11.87
	439877	\$19.51	\$22.53	\$3.02
	440069	\$71.85	\$82.95	\$11.10
	440116	\$11.12	\$12.83	\$1.71
	440551	\$4.68	\$5.40	\$0.72
	440618	\$4,638.75	\$5,355.24	\$716.49
	440640	\$926.48	\$1,069.58	\$143.10
	440718	\$33.97	\$39.21	\$5.24
	500438	\$16.22	\$18.73	\$2.51
	500443	\$57.92	\$66.86	\$8.94
	500449	\$710.84	\$820.64	\$109.80
	500593	\$1,364.75	\$1,575.55	\$210.80
	500820	\$48.47	\$55.96	\$7.49
	501128	\$46.66	\$53.86	\$7.20
	501231	\$726.97	\$839.25	\$112.28
	501569	\$111.44	\$128.66	\$17.22
	501844	\$19.23	\$22.20	\$2.97
	501864	\$15.70	\$18.12	\$2.42

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332	502101	\$46.75	\$53.97	\$7.22
	502266	\$31.49	\$36.35	\$4.86
	502376	\$94.37	\$108.94	\$14.57
	502616	\$1,279.66	\$1,477.31	\$197.65
	502619	\$83.82	\$96.77	\$12.95
	502884	\$8.78	\$10.13	\$1.35
	502897	\$3.67	\$4.25	\$0.58
	503534	\$958.16	\$1,106.15	\$147.99
	503536	\$1,216.50	\$1,404.39	\$187.89
	503538	\$875.10	\$908.41	\$33.31
	503539	\$1,188.35	\$1,371.90	\$183.55
	503541	\$1,327.70	\$1,532.78	\$205.08
	503542	\$963.97	\$1,112.87	\$148.90
	503543	\$1,312.77	\$1,515.54	\$202.77
	503544	\$1,141.69	\$1,318.03	\$176.34
	503546	\$0.48	\$0.55	\$0.07
	503547	\$0.81	\$0.94	\$0.13
	503548	\$0.48	\$0.55	\$0.07
	503549	\$0.48	\$0.55	\$0.07
	503550	\$0.48	\$0.55	\$0.07
	503883	\$1.91	\$2.20	\$0.29
	504085	\$1,209.78	\$1,396.64	\$186.86
	504603	\$65.60	\$75.73	\$10.13
	504609	\$2,689.95	\$3,105.43	\$415.48
	504644	\$91.84	\$106.02	\$14.18
	504645	\$71.56	\$82.61	\$11.05
	505761	\$744.24	\$859.19	\$114.95
	505762	\$998.35	\$1,152.55	\$154.20
	505764	\$1,051.95	\$1,214.43	\$162.48
	505765	\$913.65	\$1,054.77	\$141.12
	505766	\$786.99	\$908.55	\$121.56
	505767	\$1,079.58	\$1,246.32	\$166.74
	505768	\$854.68	\$986.69	\$132.01
	505769	\$989.93	\$1,142.84	\$152.91
	505770	\$833.83	\$962.63	\$128.80
	505771	\$1,068.27	\$1,233.27	\$165.00
	505772	\$751.63	\$867.73	\$116.10
	505773	\$937.79	\$1,082.64	\$144.85
	505774	\$896.14	\$1,034.56	\$138.42
	505775	\$849.24	\$980.41	\$131.17
	505776	\$1,081.72	\$1,248.80	\$167.08
	505777	\$740.09	\$854.40	\$114.31
	505778	\$1,085.63	\$1,253.32	\$167.69
	505779	\$861.60	\$994.68	\$133.08
	505780	\$716.66	\$827.36	\$110.70
	505781	\$978.10	\$1,129.18	\$151.08
	505783	\$804.16	\$928.37	\$124.21

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332	505784	\$835.55	\$964.61	\$129.06
	505785	\$921.42	\$1,063.75	\$142.33
	505787	\$836.12	\$965.27	\$129.15
	505788	\$971.76	\$1,077.79	\$106.03
	505789	\$921.42	\$1,063.75	\$142.33
	505790	\$835.55	\$964.61	\$129.06
	505791	\$952.48	\$1,099.60	\$147.12
	505792	\$814.56	\$940.37	\$125.81
	505793	\$748.68	\$834.63	\$85.95
	505795	\$1,025.67	\$1,184.09	\$158.42
	505796	\$818.57	\$945.00	\$126.43
	505797	\$874.00	\$1,009.00	\$135.00
	505798	\$827.73	\$955.58	\$127.85
	505799	\$814.23	\$890.14	\$75.91
	505800	\$813.32	\$938.94	\$125.62
	505801	\$742.38	\$811.98	\$69.60
	505803	\$1,083.01	\$1,250.29	\$167.28
	505804	\$918.90	\$1,060.83	\$141.93
	505805	\$782.40	\$903.25	\$120.85
	505806	\$819.52	\$946.10	\$126.58
	505807	\$925.53	\$1,068.48	\$142.95
	505808	\$744.24	\$777.52	\$33.28
	505809	\$812.22	\$937.68	\$125.46
	505810	\$971.57	\$1,121.63	\$150.06
	505811	\$718.67	\$829.67	\$111.00
	505813	\$925.91	\$1,068.92	\$143.01
	505814	\$806.12	\$930.63	\$124.51
	505815	\$1,028.58	\$1,187.45	\$158.87
	505819	\$1,073.37	\$1,239.16	\$165.79
	505820	\$1,168.45	\$1,348.93	\$180.48
	505821	\$1,073.13	\$1,238.89	\$165.76
	505822	\$903.53	\$1,043.09	\$139.56
	505824	\$1,070.70	\$1,236.08	\$165.38
	505825	\$864.65	\$998.20	\$133.55
	505826	\$828.44	\$956.40	\$127.96
	505827	\$960.64	\$1,109.02	\$148.38
	505828	\$926.10	\$1,069.14	\$143.04
	505829	\$741.57	\$856.11	\$114.54
	505831	\$1,067.31	\$1,232.17	\$164.86
	505832	\$787.18	\$908.76	\$121.58
	505833	\$734.12	\$847.52	\$113.40
	505834	\$864.65	\$998.20	\$133.55
	505836	\$830.49	\$958.77	\$128.28
	505837	\$1,163.40	\$1,343.09	\$179.69
	505838	\$925.43	\$1,068.37	\$142.94
	505839	\$1,068.51	\$1,233.55	\$165.04
	505840	\$914.94	\$1,056.26	\$141.32

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332	505842	\$1,224.56	\$1,413.70	\$189.14
	505844	\$906.44	\$1,046.45	\$140.01
	505846	\$1,074.71	\$1,240.71	\$166.00
	505848	\$1,095.68	\$1,264.91	\$169.23
	505849	\$923.19	\$1,065.78	\$142.59
	505850	\$846.43	\$977.17	\$130.74
	505854	\$1,135.44	\$1,310.82	\$175.38
	505856	\$1,133.29	\$1,308.34	\$175.05
	505857	\$1,109.85	\$1,281.27	\$171.42
	505858	\$1,009.87	\$1,165.86	\$155.99
	505859	\$1,244.41	\$1,436.61	\$192.20
	505860	\$1,223.22	\$1,412.16	\$188.94
	505861	\$922.47	\$1,064.96	\$142.49
	505862	\$1,157.39	\$1,336.15	\$178.76
	505863	\$1,001.86	\$1,156.60	\$154.74
	505864	\$1,077.80	\$1,244.27	\$166.47
	505865	\$1,304.95	\$1,506.50	\$201.55
	505867	\$1,265.16	\$1,460.57	\$195.41
	505868	\$1,161.78	\$1,341.22	\$179.44
	505869	\$1,053.15	\$1,215.81	\$162.66
	505870	\$1,136.63	\$1,312.19	\$175.56
	505871	\$1,060.49	\$1,110.78	\$50.29
	505872	\$1,064.21	\$1,228.59	\$164.38
	505873	\$1,166.85	\$1,347.08	\$180.23
	505874	\$930.30	\$1,073.99	\$143.69
	505876	\$1,047.28	\$1,209.04	\$161.76
	505877	\$1,233.24	\$1,423.72	\$190.48
	505879	\$1,143.55	\$1,320.18	\$176.63
	505881	\$1,154.52	\$1,332.85	\$178.33
	505882	\$992.32	\$1,145.59	\$153.27
	505883	\$1,089.64	\$1,257.94	\$168.30
	505884	\$1,153.76	\$1,331.97	\$178.21
	505886	\$864.32	\$997.82	\$133.50
	505887	\$1,049.47	\$1,211.57	\$162.10
	505888	\$1,198.61	\$1,383.74	\$185.13
	505889	\$1,019.23	\$1,176.66	\$157.43
	505892	\$1,301.75	\$1,502.81	\$201.06
	505894	\$1,109.92	\$1,281.35	\$171.43
	505895	\$1,076.43	\$1,242.69	\$166.26
	505896	\$1,225.89	\$1,415.24	\$189.35
	505897	\$1,121.13	\$1,294.30	\$173.17
	505898	\$1,118.22	\$1,290.94	\$172.72
	505899	\$1,115.73	\$1,288.06	\$172.33
	505901	\$1,049.57	\$1,211.68	\$162.11
	505902	\$1,051.28	\$1,213.66	\$162.38
	505903	\$1,113.09	\$1,285.01	\$171.92
	505905	\$1,045.89	\$1,207.44	\$161.55

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	505906	\$1,165.31	\$1,345.30	\$179.99
	505907	\$1,169.74	\$1,350.42	\$180.68
	505908	\$1,026.38	\$1,184.91	\$158.53
	505909	\$984.83	\$1,136.94	\$152.11
	505910	\$1,309.76	\$1,512.07	\$202.31
	505911	\$1,073.61	\$1,239.44	\$165.83
	505912	\$1,006.63	\$1,162.11	\$155.48
	505913	\$1,096.23	\$1,265.55	\$169.32
	505914	\$1,034.83	\$1,194.66	\$159.83
	505915	\$1,011.45	\$1,167.67	\$156.22
	505916	\$1,237.92	\$1,429.12	\$191.20
	505917	\$1,053.53	\$1,216.25	\$162.72
	505919	\$1,254.47	\$1,448.23	\$193.76
	505921	\$1,275.89	\$1,472.96	\$197.07
	505922	\$939.84	\$1,085.01	\$145.17
	505923	\$790.23	\$912.29	\$122.06
	505924	\$1,053.38	\$1,216.09	\$162.71
	505925	\$1,258.34	\$1,452.70	\$194.36
	505926	\$1,161.16	\$1,340.50	\$179.34
	505931	\$1,293.35	\$1,493.12	\$199.77
	505933	\$918.00	\$1,059.80	\$141.80
	505935	\$845.62	\$976.23	\$130.61
	505936	\$883.21	\$1,019.62	\$136.41
	505937	\$919.04	\$1,060.99	\$141.95
	505938	\$862.79	\$996.06	\$133.27
	505939	\$925.34	\$1,068.26	\$142.92
	505940	\$797.91	\$921.15	\$123.24
	505941	\$1,134.87	\$1,310.16	\$175.29
	505942	\$967.94	\$1,117.45	\$149.51
	505943	\$1,155.72	\$1,334.23	\$178.51
	505944	\$1,264.16	\$1,459.41	\$195.25
	505946	\$934.64	\$1,079.00	\$144.36
	505947	\$892.50	\$1,030.35	\$137.85
	505948	\$883.21	\$1,019.62	\$136.41
	505949	\$930.01	\$1,073.66	\$143.65
	505950	\$807.02	\$931.67	\$124.65
	505951	\$382.19	\$382.87	\$0.68
	505952	\$1,106.15	\$1,277.00	\$170.85
	505953	\$866.61	\$1,000.46	\$133.85
	505954	\$986.31	\$1,138.65	\$152.34
	505957	\$1,002.24	\$1,157.05	\$154.81
	505958	\$743.75	\$858.63	\$114.88
	505959	\$1,091.12	\$1,157.43	\$66.31
	505960	\$757.69	\$874.72	\$117.03
	505961	\$907.88	\$1,048.10	\$140.22
	505962	\$1,029.48	\$1,188.49	\$159.01
	505966	\$892.13	\$1,029.93	\$137.80

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332	505967	\$939.08	\$1,084.12	\$145.04
	505968	\$1,036.25	\$1,196.31	\$160.06
	505969	\$939.84	\$1,085.01	\$145.17
	505970	\$853.06	\$984.82	\$131.76
	505971	\$1,106.86	\$1,277.83	\$170.97
	505972	\$740.66	\$855.06	\$114.40
	505973	\$879.74	\$1,015.62	\$135.88
	505974	\$854.87	\$986.91	\$132.04
	505976	\$981.75	\$1,133.39	\$151.64
	505979	\$821.39	\$948.26	\$126.87
	505980	\$766.61	\$885.02	\$118.41
	505981	\$962.02	\$1,110.62	\$148.60
	505982	\$1,042.37	\$1,203.37	\$161.00
	505984	\$842.47	\$972.59	\$130.12
	505986	\$1,005.06	\$1,160.29	\$155.23
	505987	\$810.89	\$936.13	\$125.24
	505988	\$910.93	\$1,051.63	\$140.70
	505989	\$1,099.37	\$1,269.18	\$169.81
	505991	\$1,146.60	\$1,323.71	\$177.11
	505992	\$943.80	\$1,089.58	\$145.78
	505993	\$996.47	\$1,150.38	\$153.91
	505994	\$988.26	\$1,140.91	\$152.65
	505995	\$796.76	\$919.83	\$123.07
	505996	\$811.65	\$937.01	\$125.36
	505997	\$1,022.19	\$1,180.08	\$157.89
	505998	\$679.83	\$784.84	\$105.01
	505999	\$1,160.44	\$1,339.68	\$179.24
	506000	\$856.07	\$988.29	\$132.22
	506001	\$816.75	\$942.91	\$126.16
	506002	\$863.17	\$996.50	\$133.33
	506003	\$853.78	\$985.65	\$131.87
	506010	\$920.18	\$1,062.31	\$142.13
	506011	\$835.36	\$964.39	\$129.03
	506014	\$1,082.77	\$1,250.01	\$167.24
	506015	\$912.74	\$1,053.72	\$140.98
	506016	\$825.82	\$898.48	\$72.66
	506017	\$954.15	\$1,101.53	\$147.38
	506018	\$921.23	\$1,063.53	\$142.30
	506019	\$818.66	\$945.11	\$126.45
	506022	\$858.69	\$991.32	\$132.63
	506023	\$981.11	\$1,132.65	\$151.54
	506024	\$847.33	\$978.21	\$130.88
	506025	\$966.89	\$1,116.23	\$149.34
	506027	\$847.33	\$978.21	\$130.88
	506028	\$760.65	\$878.14	\$117.49
	506029	\$867.90	\$1,001.95	\$134.05
	506030	\$769.24	\$796.68	\$27.44

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332	506031	\$853.97	\$985.87	\$131.90
	506032	\$779.59	\$900.00	\$120.41
	506033	\$852.96	\$984.71	\$131.75
	506034	\$1,107.96	\$1,279.09	\$171.13
	506035	\$929.82	\$1,073.44	\$143.62
	506181	\$17.27	\$19.94	\$2.67
	506507	\$109.82	\$126.79	\$16.97
	506642	\$274.78	\$317.22	\$42.44
	509061	\$668.00	\$771.18	\$103.18
	509062	\$255.47	\$294.93	\$39.46
	509543	\$2.39	\$2.75	\$0.36
	509783	\$17.84	\$20.60	\$2.76
	509841	\$10.35	\$11.95	\$1.60
	510449	\$362.05	\$417.97	\$55.92
	510466	\$116.93	\$134.99	\$18.06
	510476	\$135.58	\$156.53	\$20.95
	510674	\$78.41	\$90.51	\$12.10
	510679	\$142.17	\$164.13	\$21.96
	510689	\$4.01	\$4.63	\$0.62
	510730	\$152.81	\$176.41	\$23.60
	510738	\$5.10	\$5.89	\$0.79
	510809	\$5.01	\$5.78	\$0.77
	511447	\$111.68	\$128.93	\$17.25
	511696	\$9,302.98	\$10,739.90	\$1,436.92
	511697	\$293.21	\$338.50	\$45.29
	511698	\$348.79	\$402.66	\$53.87
	511835	\$74.31	\$85.79	\$11.48
	512276	\$28.20	\$32.55	\$4.35
	512902	\$634.04	\$731.98	\$97.94
	512908	\$4,365.25	\$5,039.49	\$674.24
	513571	\$644.96	\$744.58	\$99.62
	513840	\$345.98	\$399.41	\$53.43
	513900	\$0.48	\$0.55	\$0.07
	513901	\$0.48	\$0.55	\$0.07
	513902	\$1,268.55	\$1,464.48	\$195.93
	513903	\$1,036.50	\$1,196.59	\$160.09
	513904	\$1,106.43	\$1,277.33	\$170.90
	513905	\$775.34	\$895.10	\$119.76
	513906	\$1,152.14	\$1,330.10	\$177.96
	513907	\$1,273.55	\$1,470.26	\$196.71
	513909	\$835.60	\$964.66	\$129.06
	513910	\$1,205.28	\$1,391.45	\$186.17
	513911	\$1,031.20	\$1,190.48	\$159.28
	513912	\$1,058.11	\$1,221.54	\$163.43
	513913	\$894.76	\$1,032.96	\$138.20
	513916	\$1,044.80	\$1,206.17	\$161.37
	513917	\$1,558.65	\$1,799.40	\$240.75

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	513918	\$1,265.30	\$1,460.74	\$195.44
	513919	\$1,047.56	\$1,209.36	\$161.80
	513920	\$858.74	\$991.38	\$132.64
	513921	\$938.80	\$1,083.81	\$145.01
	513922	\$914.46	\$1,055.70	\$141.24
	513924	\$763.32	\$881.22	\$117.90
	513925	\$865.18	\$998.81	\$133.63
	513926	\$1,186.97	\$1,370.30	\$183.33
	513927	\$1,071.04	\$1,236.47	\$165.43
	513928	\$818.19	\$944.56	\$126.37
	513929	\$845.86	\$976.51	\$130.65
	513930	\$975.67	\$1,126.37	\$150.70
	513931	\$890.32	\$1,027.84	\$137.52
	513932	\$774.58	\$894.22	\$119.64
	513934	\$801.49	\$925.28	\$123.79
	513935	\$1,260.72	\$1,455.45	\$194.73
	513936	\$882.59	\$1,018.91	\$136.32
	513937	\$849.24	\$980.41	\$131.17
	513938	\$1,003.77	\$1,158.81	\$155.04
	513939	\$824.10	\$951.39	\$127.29
	513940	\$1,202.04	\$1,387.70	\$185.66
	513941	\$1,059.20	\$1,222.81	\$163.61
	513942	\$839.65	\$969.34	\$129.69
	513943	\$890.32	\$1,027.84	\$137.52
	513944	\$971.76	\$1,121.85	\$150.09
	513945	\$787.18	\$908.76	\$121.58
	513948	\$1,014.07	\$1,170.70	\$156.63
	513949	\$916.27	\$1,057.80	\$141.53
	513950	\$1,083.49	\$1,250.84	\$167.35
	513951	\$824.86	\$952.27	\$127.41
	513952	\$935.07	\$1,079.50	\$144.43
	513953	\$974.38	\$1,124.88	\$150.50
	513954	\$930.25	\$1,073.93	\$143.68
	513955	\$1,199.23	\$1,384.46	\$185.23
	513956	\$882.59	\$1,018.91	\$136.32
	513958	\$714.37	\$824.71	\$110.34
	513959	\$997.52	\$1,151.59	\$154.07
	513960	\$796.72	\$919.78	\$123.06
	513961	\$768.95	\$887.72	\$118.77
	513962	\$819.52	\$946.10	\$126.58
	513963	\$1,091.07	\$1,259.60	\$168.53
	513964	\$1,035.25	\$1,195.16	\$159.91
	513965	\$1,035.96	\$1,195.97	\$160.01
	513966	\$1,270.98	\$1,467.29	\$196.31
	513967	\$1,090.68	\$1,259.14	\$168.46
	513968	\$1,120.89	\$1,294.02	\$173.13
	513969	\$913.63	\$1,054.75	\$141.12

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	513970	\$1,035.96	\$1,195.97	\$160.01
	513971	\$840.38	\$970.18	\$129.80
	513972	\$1,073.13	\$1,238.88	\$165.75
	513973	\$668.91	\$772.23	\$103.32
	513974	\$831.26	\$959.65	\$128.39
	513975	\$1,121.13	\$1,294.30	\$173.17
	513976	\$1,091.41	\$1,259.98	\$168.57
	513977	\$867.41	\$1,001.39	\$133.98
	513978	\$825.29	\$952.77	\$127.48
	513979	\$1,195.65	\$1,380.32	\$184.67
	513980	\$795.05	\$917.85	\$122.80
	513982	\$923.19	\$1,065.78	\$142.59
	513983	\$1,123.51	\$1,297.05	\$173.54
	513984	\$813.89	\$939.60	\$125.71
	513985	\$910.83	\$1,051.52	\$140.69
	513986	\$877.82	\$1,013.41	\$135.59
	513987	\$1,244.79	\$1,437.05	\$192.26
	513988	\$1,224.27	\$1,413.37	\$189.10
	513990	\$908.44	\$1,048.75	\$140.31
	513991	\$1,193.88	\$1,378.29	\$184.41
	513992	\$844.95	\$975.46	\$130.51
	513993	\$1,109.30	\$1,280.64	\$171.34
	513994	\$1,067.80	\$1,232.73	\$164.93
	513995	\$971.09	\$1,121.08	\$149.99
	513996	\$1,245.84	\$1,438.27	\$192.43
	513998	\$1,044.08	\$1,205.35	\$161.27
	513999	\$884.29	\$1,020.87	\$136.58
	514000	\$971.95	\$1,122.07	\$150.12
	514001	\$1,362.53	\$1,572.98	\$210.45
	514002	\$1,227.47	\$1,417.06	\$189.59
	514004	\$1,054.34	\$1,217.19	\$162.85
	514006	\$1,068.65	\$1,233.71	\$165.06
	514007	\$1,075.85	\$1,242.03	\$166.18
	514008	\$772.48	\$891.80	\$119.32
	514010	\$1,087.73	\$1,255.74	\$168.01
	514011	\$1,059.30	\$1,222.92	\$163.62
	514012	\$830.59	\$958.88	\$128.29
	514013	\$820.75	\$947.52	\$126.77
	514014	\$817.42	\$910.80	\$93.38
	514015	\$1,263.68	\$1,458.86	\$195.18
	514017	\$1,199.18	\$1,384.40	\$185.22
	514018	\$1,094.13	\$1,263.12	\$168.99
	514019	\$1,096.80	\$1,266.21	\$169.41
	514020	\$821.56	\$948.45	\$126.89
	514021	\$1,088.97	\$1,257.17	\$168.20
	514022	\$1,270.64	\$1,466.90	\$196.26
	514023	\$849.56	\$980.78	\$131.22

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332	514024	\$1,263.77	\$1,458.97	\$195.20
	514025	\$949.38	\$1,096.02	\$146.64
	514026	\$847.91	\$978.87	\$130.96
	514027	\$923.05	\$1,065.62	\$142.57
	514028	\$1,011.11	\$1,167.29	\$156.18
	514029	\$1,068.89	\$1,233.99	\$165.10
	514030	\$794.24	\$916.91	\$122.67
	514031	\$1,198.22	\$1,383.30	\$185.08
	514032	\$1,235.58	\$1,426.42	\$190.84
	514033	\$1,016.41	\$1,173.40	\$156.99
	514034	\$916.89	\$1,058.51	\$141.62
	514035	\$1,095.65	\$1,264.88	\$169.23
	514036	\$1,102.05	\$1,272.26	\$170.21
	514039	\$1,191.07	\$1,375.04	\$183.97
	514040	\$915.51	\$1,056.92	\$141.41
	514041	\$1,368.11	\$1,579.43	\$211.32
	514042	\$1,171.70	\$1,352.68	\$180.98
	514043	\$991.22	\$1,144.32	\$153.10
	514044	\$774.91	\$894.61	\$119.70
	514047	\$770.48	\$798.61	\$28.13
	514048	\$1,041.84	\$1,202.76	\$160.92
	514049	\$908.54	\$1,048.87	\$140.33
	514050	\$912.74	\$1,053.72	\$140.98
	514051	\$1,260.67	\$1,455.39	\$194.72
	514052	\$1,080.48	\$1,247.37	\$166.89
	514053	\$769.95	\$888.88	\$118.93
	514054	\$1,178.14	\$1,360.11	\$181.97
	514057	\$846.52	\$977.28	\$130.76
	514058	\$1,132.82	\$1,307.79	\$174.97
	514060	\$922.06	\$1,064.48	\$142.42
	514061	\$1,108.44	\$1,279.65	\$171.21
	514062	\$824.79	\$952.19	\$127.40
	514063	\$842.63	\$972.78	\$130.15
	514064	\$916.13	\$1,057.63	\$141.50
	514066	\$1,007.61	\$1,163.25	\$155.64
	514067	\$822.15	\$949.13	\$126.98
	514068	\$1,051.90	\$1,214.38	\$162.48
	514069	\$905.49	\$1,045.35	\$139.86
	514070	\$777.11	\$897.14	\$120.03
	514071	\$1,001.10	\$1,155.72	\$154.62
	514072	\$866.51	\$1,000.35	\$133.84
	514073	\$893.30	\$1,031.28	\$137.98
	514074	\$1,094.13	\$1,263.12	\$168.99
	514075	\$1,054.86	\$1,217.79	\$162.93
	514076	\$991.60	\$1,144.76	\$153.16
	514077	\$1,136.25	\$1,311.75	\$175.50
	514078	\$1,233.81	\$1,424.39	\$190.58

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	514079	\$810.55	\$935.75	\$125.20
	514528	\$59.63	\$68.85	\$9.22
	514537	\$707.69	\$817.00	\$109.31
	516595	\$181.77	\$209.84	\$28.07
	516857	\$500.60	\$577.92	\$77.32
	516859	\$154.91	\$178.85	\$23.94
	516860	\$23.85	\$27.54	\$3.69
	517373	\$137.24	\$158.43	\$21.19
	517374	\$74.21	\$85.67	\$11.46
	517377	\$3.34	\$3.86	\$0.52
	517523	\$3,730.73	\$4,306.97	\$576.24
	517539	\$2.48	\$2.86	\$0.38
	517542	\$2.24	\$2.59	\$0.35
	517550	\$3,770.38	\$4,352.74	\$582.36
	517594	\$9.21	\$10.63	\$1.42
	517613	\$175.75	\$202.90	\$27.15
	517641	\$94.56	\$109.16	\$14.60
	517642	\$44.75	\$51.66	\$6.91
	517732	\$1.29	\$1.49	\$0.20
	517839	\$2,558.94	\$2,954.18	\$395.24
	517942	\$9.47	\$10.93	\$1.46
	518006	\$1,895.04	\$2,187.74	\$292.70
	518078	\$802.45	\$926.39	\$123.94
	518224	\$829.64	\$957.78	\$128.14
	518527	\$193.36	\$223.22	\$29.86
	518780	\$253.57	\$292.74	\$39.17
	518784	\$76.48	\$88.29	\$11.81
	519248	\$355.99	\$410.98	\$54.99
	519279	\$56.77	\$65.54	\$8.77
	520150	\$71.56	\$82.61	\$11.05
	520681	\$1,337.10	\$1,543.63	\$206.53
	520704	\$0.43	\$0.50	\$0.07
	520705	\$0.94	\$1.08	\$0.14
	520709	\$0.10	\$0.12	\$0.02
	520710	\$0.10	\$0.12	\$0.02
	520711	\$0.10	\$0.12	\$0.02
	521840	\$1,350.65	\$1,559.27	\$208.62
	522221	\$11.69	\$13.49	\$1.80
	525300	\$309.67	\$357.50	\$47.83
	525317	\$3,864.32	\$4,461.19	\$596.87
	525318	\$10,719.28	\$12,374.95	\$1,655.67
	525319	\$3,652.49	\$4,216.65	\$564.16
	525320	\$9,090.78	\$10,494.92	\$1,404.14
	525321	\$709.41	\$818.99	\$109.58
	525322	\$37,853.12	\$43,699.82	\$5,846.70
	600291	\$243.50	\$281.11	\$37.61
	600480	\$322.12	\$371.88	\$49.76

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	600487	\$127.13	\$146.77	\$19.64
	600488	\$127.13	\$146.77	\$19.64
	601140	\$6,679.06	\$7,710.70	\$1,031.64
	601141	\$7,394.68	\$8,536.84	\$1,142.16
	602691	\$5,286.67	\$6,103.24	\$816.57
	602894	\$47.09	\$54.36	\$7.27
	603279	\$127.24	\$146.89	\$19.65
	604248	\$1,908.21	\$2,202.95	\$294.74
	605238	\$13.12	\$15.15	\$2.03
	605545	\$132.34	\$152.78	\$20.44
	606243	\$20.13	\$23.24	\$3.11
	606298	\$975.03	\$1,125.63	\$150.60
	606299	\$607.27	\$701.07	\$93.80
	606881	\$351.56	\$405.86	\$54.30
	607072	\$1,159.29	\$1,338.36	\$179.07
	607073	\$1,025.71	\$1,184.14	\$158.43
	607074	\$1,256.86	\$1,450.99	\$194.13
	607075	\$971.66	\$1,121.74	\$150.08
	607076	\$986.12	\$1,138.43	\$152.31
	607077	\$1,328.98	\$1,534.25	\$205.27
	607078	\$971.66	\$1,121.74	\$150.08
	607079	\$1,343.21	\$1,550.68	\$207.47
	607080	\$1,265.37	\$1,460.82	\$195.45
	607081	\$955.15	\$1,102.68	\$147.53
	607082	\$1,018.56	\$1,175.88	\$157.32
	607083	\$970.23	\$1,120.09	\$149.86
	607084	\$993.27	\$1,146.69	\$153.42
	607085	\$1,159.29	\$1,338.36	\$179.07
	607086	\$943.23	\$1,088.92	\$145.69
	607087	\$1,164.07	\$1,343.86	\$179.79
	607088	\$1,154.52	\$1,332.85	\$178.33
	607089	\$970.23	\$1,120.09	\$149.86
	607090	\$1,330.47	\$1,535.97	\$205.50
	607091	\$978.67	\$1,129.84	\$151.17
	607092	\$899.53	\$1,038.47	\$138.94
	607093	\$996.81	\$1,150.77	\$153.96
	607094	\$899.53	\$1,038.47	\$138.94
	607095	\$1,281.15	\$1,479.03	\$197.88
	607096	\$1,217.50	\$1,405.55	\$188.05
	607097	\$1,176.47	\$1,358.18	\$181.71
	607098	\$903.21	\$1,042.71	\$139.50
	607099	\$1,086.68	\$1,254.53	\$167.85
	607100	\$1,100.50	\$1,270.48	\$169.98
	607101	\$1,084.25	\$1,251.72	\$167.47
	607102	\$1,206.19	\$1,392.50	\$186.31
	607103	\$1,096.31	\$1,265.64	\$169.33
	607104	\$1,125.90	\$1,299.80	\$173.90

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	607105	\$986.93	\$1,139.37	\$152.44
	607106	\$1,162.40	\$1,341.94	\$179.54
	607107	\$1,360.05	\$1,570.12	\$210.07
	607108	\$1,045.75	\$1,207.27	\$161.52
	607109	\$978.72	\$1,129.89	\$151.17
	607110	\$1,087.92	\$1,255.96	\$168.04
	607111	\$1,353.27	\$1,562.30	\$209.03
	607112	\$1,044.80	\$1,206.17	\$161.37
	607113	\$1,216.54	\$1,404.45	\$187.91
	607114	\$1,045.03	\$1,206.44	\$161.41
	607115	\$980.63	\$1,132.10	\$151.47
	607116	\$1,179.95	\$1,362.20	\$182.25
	607117	\$1,359.71	\$1,569.73	\$210.02
	607118	\$1,096.80	\$1,266.21	\$169.41
	607119	\$1,183.39	\$1,366.17	\$182.78
	607120	\$901.30	\$1,040.51	\$139.21
	607122	\$901.30	\$1,040.51	\$139.21
	607123	\$1,085.59	\$1,253.26	\$167.67
	607124	\$978.58	\$1,129.73	\$151.15
	607125	\$980.68	\$1,132.15	\$151.47
	607126	\$1,049.51	\$1,211.62	\$162.11
	607127	\$1,185.59	\$1,368.71	\$183.12
	607129	\$1,068.65	\$1,233.71	\$165.06
	607130	\$971.66	\$1,121.74	\$150.08
	607131	\$1,319.31	\$1,523.08	\$203.77
	607132	\$971.66	\$1,121.74	\$150.08
	607133	\$1,164.88	\$1,344.80	\$179.92
	607134	\$1,217.50	\$1,405.55	\$188.05
	607135	\$1,038.12	\$1,198.46	\$160.34
	607136	\$1,143.90	\$1,320.59	\$176.69
	607998	\$0.48	\$0.55	\$0.07
	607999	\$0.48	\$0.55	\$0.07
	608000	\$0.48	\$0.55	\$0.07
	608001	\$1,233.00	\$1,423.45	\$190.45
	608002	\$1,102.05	\$1,272.26	\$170.21
	608003	\$1,183.15	\$1,365.89	\$182.74
	608004	\$985.83	\$1,138.10	\$152.27
	608005	\$1,248.94	\$1,441.85	\$192.91
	608008	\$1,035.25	\$1,195.16	\$159.91
	608009	\$1,196.94	\$1,381.81	\$184.87
	608010	\$989.93	\$1,142.84	\$152.91
	608011	\$1,431.40	\$1,652.49	\$221.09
	608012	\$1,178.85	\$1,360.94	\$182.09
	608013	\$983.73	\$1,135.68	\$151.95
	608014	\$1,164.21	\$1,344.03	\$179.82
	608015	\$1,097.27	\$1,266.76	\$169.49
	608016	\$1,090.12	\$1,258.50	\$168.38

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332	608017	\$1,102.00	\$1,272.21	\$170.21
	608018	\$1,093.41	\$1,262.30	\$168.89
	608019	\$1,207.96	\$1,394.53	\$186.57
	608020	\$1,202.33	\$1,388.04	\$185.71
	608021	\$1,041.60	\$1,202.48	\$160.88
	608022	\$1,202.57	\$1,388.31	\$185.74
	608023	\$1,231.19	\$1,421.35	\$190.16
	608024	\$985.31	\$1,137.49	\$152.18
	608025	\$1,124.33	\$1,297.99	\$173.66
	608028	\$1,251.42	\$1,444.71	\$193.29
	608030	\$974.62	\$1,125.16	\$150.54
	608031	\$1,116.79	\$1,289.28	\$172.49
	608032	\$1,264.51	\$1,459.83	\$195.32
	608292	\$1,094.08	\$1,263.07	\$168.99
	608669	\$177.62	\$205.05	\$27.43
	608734	\$2,014.69	\$2,325.88	\$311.19
	608824	\$119.13	\$137.53	\$18.40
	609041	\$15.55	\$17.95	\$2.40
	609215	\$244.50	\$282.27	\$37.77
	609245	\$95.42	\$110.15	\$14.73
	609248	\$47.71	\$55.08	\$7.37
	609867	\$0.48	\$0.55	\$0.07
	609868	\$0.48	\$0.55	\$0.07
	609869	\$935.88	\$1,080.43	\$144.55
	609870	\$1,030.91	\$1,190.15	\$159.24
	609871	\$921.00	\$1,063.25	\$142.25
	609872	\$996.13	\$1,150.00	\$153.87
	609873	\$923.95	\$1,066.66	\$142.71
	609874	\$1,020.32	\$1,177.92	\$157.60
	609875	\$978.20	\$1,129.29	\$151.09
	609876	\$933.92	\$1,078.18	\$144.26
	609877	\$1,030.25	\$1,189.37	\$159.12
	609878	\$1,063.88	\$1,228.20	\$164.32
	609879	\$915.84	\$1,057.30	\$141.46
	609880	\$1,171.36	\$1,352.29	\$180.93
	609884	\$1,112.02	\$1,283.78	\$171.76
	609885	\$926.82	\$1,069.97	\$143.15
	609886	\$934.93	\$1,079.33	\$144.40
	609887	\$957.97	\$1,105.93	\$147.96
	609888	\$996.04	\$1,149.89	\$153.85
	609889	\$949.38	\$1,096.02	\$146.64
	609890	\$1,158.91	\$1,337.92	\$179.01
	609891	\$957.97	\$1,105.93	\$147.96
	609892	\$1,010.02	\$1,166.02	\$156.00
	609893	\$1,163.25	\$1,342.93	\$179.68
	609894	\$917.42	\$1,059.12	\$141.70
	609895	\$1,167.17	\$1,347.44	\$180.27

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	609896	\$962.64	\$1,111.33	\$148.69
	609897	\$919.28	\$1,061.27	\$141.99
	609899	\$1,019.13	\$1,176.54	\$157.41
	609900	\$1,059.11	\$1,222.70	\$163.59
	609901	\$1,177.09	\$1,358.90	\$181.81
	609902	\$1,306.71	\$1,508.54	\$201.83
	609904	\$922.00	\$1,064.41	\$142.41
	609905	\$1,245.17	\$1,437.49	\$192.32
	609906	\$1,239.68	\$1,431.16	\$191.48
	609907	\$1,039.50	\$1,200.06	\$160.56
	609908	\$1,082.01	\$1,249.13	\$167.12
	609909	\$915.13	\$1,056.48	\$141.35
	609910	\$1,163.02	\$1,342.65	\$179.63
	609911	\$915.99	\$1,057.47	\$141.48
	609912	\$1,073.23	\$1,239.00	\$165.77
	609913	\$1,010.35	\$1,166.41	\$156.06
	609914	\$1,164.49	\$1,344.36	\$179.87
	609915	\$924.72	\$1,067.55	\$142.83
	609916	\$986.59	\$1,138.98	\$152.39
	609918	\$1,173.56	\$1,354.82	\$181.26
	609919	\$1,123.61	\$1,297.16	\$173.55
	609920	\$704.79	\$813.65	\$108.86
	609921	\$1,166.93	\$1,347.17	\$180.24
	609922	\$1,013.55	\$1,170.10	\$156.55
	609923	\$1,167.69	\$1,348.05	\$180.36
	609925	\$1,168.45	\$1,348.93	\$180.48
	609926	\$958.30	\$1,106.32	\$148.02
	609927	\$899.10	\$1,037.97	\$138.87
	609928	\$1,198.37	\$1,383.46	\$185.09
	609929	\$882.59	\$1,018.91	\$136.32
	609930	\$1,337.29	\$1,543.84	\$206.55
	609931	\$1,169.17	\$1,349.76	\$180.59
	609932	\$920.57	\$1,062.75	\$142.18
	609933	\$1,172.08	\$1,353.12	\$181.04
	609934	\$1,018.60	\$1,175.94	\$157.34
	609935	\$1,172.65	\$1,353.78	\$181.13
	609936	\$1,019.18	\$1,176.60	\$157.42
	609937	\$977.39	\$1,128.35	\$150.96
	609938	\$1,029.82	\$1,188.88	\$159.06
	609940	\$1,032.15	\$1,191.58	\$159.43
	609941	\$923.52	\$1,066.17	\$142.65
	609942	\$962.93	\$1,111.66	\$148.73
	609943	\$940.79	\$1,086.11	\$145.32
	609944	\$962.31	\$1,110.95	\$148.64
	609945	\$949.41	\$1,096.05	\$146.64
	609946	\$988.50	\$1,141.18	\$152.68
	609947	\$1,182.24	\$1,364.85	\$182.61

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	609948	\$944.37	\$1,090.24	\$145.87
	609949	\$971.52	\$1,121.58	\$150.06
	609952	\$966.03	\$1,115.24	\$149.21
	609953	\$898.76	\$1,037.58	\$138.82
	609954	\$1,174.75	\$1,356.20	\$181.45
	609955	\$963.26	\$1,112.05	\$148.79
	609956	\$837.27	\$966.59	\$129.32
	609957	\$881.64	\$1,017.81	\$136.17
	609958	\$857.21	\$989.61	\$132.40
	609959	\$992.13	\$1,145.37	\$153.24
	609960	\$1,021.90	\$1,179.74	\$157.84
	609961	\$1,187.35	\$1,370.75	\$183.40
	609962	\$917.37	\$1,059.06	\$141.69
	609963	\$961.83	\$1,110.40	\$148.57
	609964	\$1,400.93	\$1,617.32	\$216.39
	609965	\$1,018.37	\$1,175.66	\$157.29
	609967	\$961.64	\$1,110.17	\$148.53
	609968	\$952.72	\$1,099.88	\$147.16
	609969	\$1,166.78	\$1,347.00	\$180.22
	609970	\$938.41	\$1,083.35	\$144.94
	609971	\$961.36	\$1,109.84	\$148.48
	609972	\$917.89	\$1,059.67	\$141.78
	609973	\$917.08	\$1,058.73	\$141.65
	609974	\$1,166.40	\$1,346.56	\$180.16
	609975	\$1,013.12	\$1,169.60	\$156.48
	609976	\$870.72	\$1,005.21	\$134.49
	609977	\$1,011.31	\$1,167.51	\$156.20
	609978	\$1,373.84	\$1,586.04	\$212.20
	609979	\$914.89	\$1,056.20	\$141.31
	609980	\$959.02	\$1,107.15	\$148.13
	609981	\$914.84	\$1,056.15	\$141.31
	609982	\$963.26	\$1,112.05	\$148.79
	609984	\$958.88	\$1,106.98	\$148.10
	609985	\$1,010.88	\$1,167.01	\$156.13
	609987	\$915.17	\$963.46	\$48.29
	609988	\$1,127.84	\$1,302.04	\$174.20
	609989	\$1,344.27	\$1,551.90	\$207.63
	609990	\$922.71	\$1,065.23	\$142.52
	609991	\$1,111.55	\$1,283.24	\$171.69
	609992	\$856.85	\$989.20	\$132.35
	609993	\$920.23	\$1,062.37	\$142.14
	609994	\$930.30	\$1,073.99	\$143.69
	609995	\$1,014.50	\$1,171.20	\$156.70
	609996	\$85.89	\$99.16	\$13.27
	609997	\$1,198.46	\$1,383.57	\$185.11
	609998	\$961.40	\$1,109.90	\$148.50
	609999	\$916.89	\$1,058.51	\$141.62

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	610000	\$1,012.74	\$1,169.16	\$156.42
	610001	\$1,165.59	\$1,345.63	\$180.04
	610002	\$864.56	\$998.09	\$133.53
	610004	\$1,011.83	\$1,168.12	\$156.29
	610005	\$1,169.74	\$1,350.42	\$180.68
	610520	\$0.48	\$0.55	\$0.07
	610521	\$0.48	\$0.55	\$0.07
	610522	\$0.48	\$0.55	\$0.07
	610524	\$0.48	\$0.55	\$0.07
	610525	\$548.35	\$633.05	\$84.70
	610526	\$1,199.85	\$1,385.17	\$185.32
	610527	\$932.16	\$998.15	\$65.99
	610528	\$978.10	\$1,129.18	\$151.08
	610529	\$1,170.16	\$1,350.90	\$180.74
	610530	\$1,262.72	\$1,457.76	\$195.04
	610531	\$1,223.89	\$1,412.93	\$189.04
	610532	\$1,113.54	\$1,285.54	\$172.00
	610533	\$1,223.74	\$1,412.75	\$189.01
	610536	\$1,135.36	\$1,310.72	\$175.36
	610537	\$1,205.14	\$1,391.28	\$186.14
	610538	\$997.90	\$1,152.03	\$154.13
	610539	\$1,039.01	\$1,199.50	\$160.49
	610540	\$1,296.50	\$1,496.76	\$200.26
	610541	\$1,094.03	\$1,198.30	\$104.27
	610543	\$1,259.48	\$1,454.02	\$194.54
	610544	\$1,116.98	\$1,289.50	\$172.52
	610545	\$1,388.00	\$1,602.39	\$214.39
	610546	\$1,206.10	\$1,392.39	\$186.29
	610547	\$1,112.02	\$1,283.78	\$171.76
	610548	\$1,121.13	\$1,294.30	\$173.17
	610549	\$1,240.45	\$1,432.04	\$191.59
	610550	\$1,034.49	\$1,194.28	\$159.79
	610551	\$1,112.97	\$1,284.88	\$171.91
	610553	\$1,066.12	\$1,230.79	\$164.67
	610554	\$1,345.59	\$1,553.43	\$207.84
	610555	\$1,093.94	\$1,262.90	\$168.96
	610556	\$1,121.13	\$1,294.30	\$173.17
	610557	\$1,207.34	\$1,393.82	\$186.48
	610558	\$963.69	\$1,112.54	\$148.85
	610559	\$1,035.25	\$1,195.16	\$159.91
	610560	\$1,068.51	\$1,233.55	\$165.04
	610561	\$1,290.16	\$1,489.43	\$199.27
	610562	\$1,221.36	\$1,251.12	\$29.76
	610563	\$1,208.77	\$1,395.47	\$186.70
	610565	\$1,211.15	\$1,398.22	\$187.07
	610566	\$1,243.68	\$1,435.78	\$192.10
	610567	\$1,114.45	\$1,286.58	\$172.13

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	610568	\$1,121.08	\$1,294.24	\$173.16
	610570	\$1,060.54	\$1,224.35	\$163.81
	610571	\$1,204.81	\$1,390.90	\$186.09
	610572	\$1,146.22	\$1,154.24	\$8.02
	610851	\$60.11	\$69.40	\$9.29
	610898	\$1,539.09	\$1,776.82	\$237.73
	611795	\$35.07	\$40.48	\$5.41
	611814	\$23.95	\$27.65	\$3.70
	611928	\$9,722.90	\$11,224.68	\$1,501.78
	612009	\$3,649.63	\$4,213.34	\$563.71
	612010	\$519.77	\$600.06	\$80.29
	612274	\$66.79	\$77.11	\$10.32
	612333	\$122.37	\$141.27	\$18.90
	612337	\$14,312.28	\$16,522.92	\$2,210.64
	612710	\$0.48	\$0.55	\$0.07
	612711	\$0.48	\$0.55	\$0.07
	612713	\$0.48	\$0.55	\$0.07
	612714	\$0.48	\$0.55	\$0.07
	612715	\$1,115.02	\$1,287.25	\$172.23
	612716	\$979.34	\$1,130.61	\$151.27
	612717	\$1,199.66	\$1,384.95	\$185.29
	612718	\$1,076.90	\$1,243.24	\$166.34
	612719	\$1,092.55	\$1,261.30	\$168.75
	612722	\$1,121.13	\$1,294.30	\$173.17
	612723	\$1,154.52	\$1,332.85	\$178.33
	612725	\$1,032.46	\$1,060.86	\$28.40
	612726	\$1,221.70	\$1,410.40	\$188.70
	612729	\$978.01	\$1,129.07	\$151.06
	612732	\$1,255.81	\$1,449.78	\$193.97
	612733	\$1,094.27	\$1,263.29	\$169.02
	612735	\$1,216.54	\$1,404.45	\$187.91
	612737	\$1,213.68	\$1,401.14	\$187.46
	612738	\$1,092.27	\$1,260.97	\$168.70
	612739	\$1,090.07	\$1,258.44	\$168.37
	612740	\$1,222.75	\$1,411.61	\$188.86
	612741	\$1,204.52	\$1,390.57	\$186.05
	612742	\$869.85	\$951.61	\$81.76
	612743	\$1,049.61	\$1,211.74	\$162.13
	612744	\$1,165.45	\$1,345.46	\$180.01
	612746	\$1,133.39	\$1,308.46	\$175.07
	612748	\$1,001.91	\$1,156.66	\$154.75
	612749	\$1,198.03	\$1,383.08	\$185.05
	612750	\$1,116.69	\$1,289.17	\$172.48
	612752	\$1,097.27	\$1,266.76	\$169.49
	612753	\$1,203.66	\$1,389.58	\$185.92
	612754	\$1,249.94	\$1,443.00	\$193.06
	614197	\$1.77	\$2.04	\$0.27

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332	614257	\$46,503.70	\$53,686.55	\$7,182.85
	614318	\$0.48	\$0.55	\$0.07
	614319	\$0.48	\$0.55	\$0.07
	614320	\$0.48	\$0.55	\$0.07
	614321	\$0.48	\$0.55	\$0.07
	614322	\$0.48	\$0.55	\$0.07
	614323	\$1,177.90	\$1,359.84	\$181.94
	614325	\$1,125.90	\$1,299.80	\$173.90
	614326	\$1,084.58	\$1,252.11	\$167.53
	614327	\$1,068.65	\$1,233.71	\$165.06
	614328	\$1,190.88	\$1,374.82	\$183.94
	614329	\$1,254.57	\$1,448.34	\$193.77
	614330	\$1,104.62	\$1,275.24	\$170.62
	614331	\$1,168.74	\$1,349.26	\$180.52
	614332	\$1,227.85	\$1,417.50	\$189.65
	614333	\$1,140.12	\$1,316.22	\$176.10
	614334	\$1,117.79	\$1,290.44	\$172.65
	614335	\$1,106.34	\$1,277.22	\$170.88
	614336	\$1,227.85	\$1,417.50	\$189.65
	614337	\$946.57	\$1,092.77	\$146.20
	614338	\$1,109.34	\$1,280.69	\$171.35
	614339	\$1,388.20	\$1,602.61	\$214.41
	614340	\$1,129.53	\$1,303.99	\$174.46
	614341	\$1,115.45	\$1,287.74	\$172.29
	614342	\$1,044.80	\$1,206.17	\$161.37
	614343	\$1,428.36	\$1,648.98	\$220.62
	614344	\$1,067.51	\$1,232.39	\$164.88
	614345	\$1,411.19	\$1,629.16	\$217.97
	614348	\$1,185.96	\$1,369.14	\$183.18
	614349	\$1,226.66	\$1,416.12	\$189.46
	614350	\$1,005.25	\$1,160.51	\$155.26
	614351	\$1,011.40	\$1,167.62	\$156.22
	614353	\$1,242.88	\$1,434.85	\$191.97
	614354	\$1,187.92	\$1,371.40	\$183.48
	614355	\$960.83	\$1,109.24	\$148.41
	614356	\$1,216.54	\$1,268.28	\$51.74
	614357	\$1,035.25	\$1,195.16	\$159.91
	614359	\$1,100.66	\$1,270.67	\$170.01
	614360	\$1,209.05	\$1,395.80	\$186.75
	614361	\$1,161.11	\$1,340.45	\$179.34
	614362	\$1,188.49	\$1,372.06	\$183.57
	614364	\$987.17	\$1,139.64	\$152.47
	614810	\$18.99	\$21.92	\$2.93
	614917	\$204.46	\$236.04	\$31.58
	615052	\$17,890.35	\$20,653.65	\$2,763.30
	615110	\$4,590.52	\$5,299.56	\$709.04
	700224	\$54.86	\$63.34	\$8.48

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332	700857	\$215.69	\$249.00	\$33.31
	700859	\$269.95	\$311.64	\$41.69
	700926	\$429.37	\$495.69	\$66.32
	701129	\$16.13	\$18.62	\$2.49
	701187	\$7.01	\$8.10	\$1.09
	701302	\$3.24	\$3.75	\$0.51
	701317	\$10.83	\$12.50	\$1.67
	701442	\$3.39	\$3.91	\$0.52
	701452	\$8.30	\$9.58	\$1.28
	701460	\$97.32	\$112.36	\$15.04
	701463	\$6.06	\$6.99	\$0.93
	701493	\$5.92	\$6.83	\$0.91
	701600	\$5.39	\$6.22	\$0.83
	701616	\$3,694.57	\$4,265.23	\$570.66
	701646	\$84.87	\$97.98	\$13.11
	701732	\$225.14	\$259.91	\$34.77
	701865	\$21.75	\$25.11	\$3.36
	701884	\$60.59	\$69.95	\$9.36
	702276	\$35.21	\$40.65	\$5.44
	702347	\$128.43	\$148.27	\$19.84
	702481	\$107.32	\$123.89	\$16.57
	702776	\$23.28	\$26.88	\$3.60
	702880	\$1.29	\$1.49	\$0.20
	702886	\$175.23	\$202.30	\$27.07
	703035	\$61.16	\$70.61	\$9.45
	703317	\$8.59	\$9.91	\$1.32
	703318	\$14.69	\$16.96	\$2.27
	703405	\$26.35	\$30.42	\$4.07
	703542	\$396.12	\$457.30	\$61.18
	703549	\$84.11	\$97.10	\$12.99
	703550	\$3,166.93	\$3,656.08	\$489.15
	703560	\$141.64	\$163.52	\$21.88
	703712	\$2,094.77	\$2,418.33	\$323.56
	703723	\$23.85	\$27.54	\$3.69
	703927	\$162.21	\$187.26	\$25.05
	703949	\$2.96	\$3.41	\$0.45
	704267	\$13.12	\$15.15	\$2.03
	704352	\$5.77	\$6.66	\$0.89
	704379	\$157.34	\$181.64	\$24.30
	704598	\$53.86	\$62.18	\$8.32
	704643	\$143.12	\$165.23	\$22.11
	704661	\$2.58	\$2.97	\$0.39
	704669	\$29.72	\$34.31	\$4.59
	704751	\$694.10	\$801.31	\$107.21
	704761	\$133.49	\$154.10	\$20.61
	704808	\$551.02	\$636.13	\$85.11
	704906	\$395.02	\$456.03	\$61.01

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332	705079	\$131.98	\$152.37	\$20.39
	705174	\$53.53	\$61.80	\$8.27
	705368	\$55.42	\$62.80	\$7.38
	705510	\$91.42	\$105.53	\$14.11
	705586	\$1,699.77	\$1,962.32	\$262.55
	705587	\$902.48	\$1,041.88	\$139.40
	705653	\$139.80	\$161.39	\$21.59
	705654	\$37.45	\$43.23	\$5.78
	705723	\$54.39	\$62.79	\$8.40
	705912	\$152.71	\$176.30	\$23.59
	705917	\$88.26	\$101.89	\$13.63
	706150	\$779.67	\$900.10	\$120.43
	706174	\$94.46	\$109.05	\$14.59
	706395	\$47.34	\$54.65	\$7.31
	706397	\$35.30	\$40.76	\$5.46
	706594	\$23.04	\$26.60	\$3.56
	706596	\$1.62	\$1.87	\$0.25
	706605	\$66.46	\$76.72	\$10.26
	706606	\$35.45	\$40.92	\$5.47
	706666	\$6.73	\$7.77	\$1.04
	706674	\$5.63	\$6.50	\$0.87
	706682	\$76.38	\$86.17	\$9.79
	706838	\$40.62	\$46.89	\$6.27
	707068	\$346.40	\$399.91	\$53.51
	707084	\$7.16	\$8.26	\$1.10
	707128	\$35.78	\$41.31	\$5.53
	707189	\$28.34	\$32.71	\$4.37
	707263	\$3.41	\$3.94	\$0.53
	707475	\$87.69	\$101.23	\$13.54
	707482	\$6.39	\$7.38	\$0.99
	707578	\$126.71	\$146.28	\$19.57
	707677	\$7.97	\$9.20	\$1.23
	707754	\$5.53	\$6.39	\$0.86
	708102	\$21.47	\$24.78	\$3.31
	708251	\$59.83	\$69.07	\$9.24
	708497	\$37.79	\$43.63	\$5.84
	708521	\$52.10	\$60.14	\$8.04
	708644	\$3,863.72	\$4,460.50	\$596.78
	708659	\$22.71	\$26.22	\$3.51
	708712	\$46.32	\$53.48	\$7.16
	709511	\$85.75	\$98.99	\$13.24
	709513	\$500.64	\$577.97	\$77.33
	709648	\$92.84	\$107.18	\$14.34
	709711	\$7.59	\$8.76	\$1.17
	709729	\$2.53	\$2.92	\$0.39
	709756	\$362.84	\$418.88	\$56.04
	709757	\$4.82	\$5.56	\$0.74

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332	709758	\$38.79	\$44.78	\$5.99
	709794	\$0.52	\$0.61	\$0.09
	709796	\$0.38	\$0.44	\$0.06
	709817	\$8.06	\$9.31	\$1.25
	709913	\$5.20	\$6.00	\$0.80
	709963	\$2.15	\$2.48	\$0.33
	710019	\$21.37	\$24.67	\$3.30
	710098	\$12.74	\$14.71	\$1.97
	710117	\$0.76	\$0.88	\$0.12
	710118	\$5.15	\$5.95	\$0.80
	710172	\$53.66	\$61.95	\$8.29
	710349	\$349.46	\$403.43	\$53.97
	710436	\$168.55	\$194.58	\$26.03
	710565	\$3,437.91	\$3,968.92	\$531.01
	710624	\$32.73	\$37.78	\$5.05
	711014	\$91.12	\$105.20	\$14.08
	711054	\$62.98	\$72.70	\$9.72
	711075	\$129.10	\$149.04	\$19.94
	711093	\$80.58	\$93.02	\$12.44
	711156	\$4.10	\$4.74	\$0.64
	711172	\$1,665.81	\$1,923.10	\$257.29
	711184	\$18.22	\$21.04	\$2.82
	711215	\$124.69	\$143.95	\$19.26
	711292	\$0.24	\$0.28	\$0.04
	711344	\$4.06	\$4.68	\$0.62
	711377	\$172.27	\$198.88	\$26.61
	711517	\$46.75	\$53.97	\$7.22
	711571	\$127.71	\$147.44	\$19.73
	711572	\$331.81	\$383.06	\$51.25
	711577	\$2,083.63	\$2,405.46	\$321.83
	711602	\$30.23	\$34.89	\$4.66
	711685	\$86.59	\$99.97	\$13.38
	711686	\$105.80	\$122.13	\$16.33
	711774	\$7.56	\$8.72	\$1.16
	711777	\$40.55	\$46.81	\$6.26
	711953	\$339.64	\$392.10	\$52.46
	712029	\$289.87	\$334.64	\$44.77
	712112	\$893.95	\$1,032.02	\$138.07
	712187	\$28.67	\$33.10	\$4.43
	712242	\$41.27	\$47.64	\$6.37
	712258	\$48.71	\$56.23	\$7.52
	712308	\$2,902.86	\$3,351.23	\$448.37
	712323	\$545.54	\$629.80	\$84.26
	712409	\$4,483.94	\$5,176.52	\$692.58
	712507	\$16,889.67	\$19,498.41	\$2,608.74
	712535	\$109.68	\$126.62	\$16.94
	712537	\$790.61	\$912.73	\$122.12

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332	712687	\$6,679.06	\$7,710.70	\$1,031.64
	712775	\$212.16	\$244.92	\$32.76
	712808	\$1.48	\$1.71	\$0.23
	712847	\$5.92	\$6.83	\$0.91
	712851	\$1.53	\$1.76	\$0.23
	712888	\$4.68	\$5.40	\$0.72
	712981	\$3,236.63	\$3,736.55	\$499.92
	713012	\$128.24	\$148.05	\$19.81
	713026	\$63.50	\$73.31	\$9.81
	713121	\$525.91	\$607.15	\$81.24
	713137	\$68.15	\$78.67	\$10.52
	713212	\$140.45	\$162.14	\$21.69
	713213	\$188.73	\$217.88	\$29.15
	713214	\$850.15	\$981.46	\$131.31
	713267	\$1,628.21	\$1,879.70	\$251.49
	713297	\$195.70	\$225.92	\$30.22
	713775	\$14.65	\$16.91	\$2.26
	713877	\$87.59	\$101.12	\$13.53
	713878	\$61.21	\$70.66	\$9.45
	713879	\$28.29	\$32.66	\$4.37
	713880	\$26.10	\$30.13	\$4.03
	714111	\$41.12	\$47.48	\$6.36
	714163	\$60.97	\$70.39	\$9.42
	714246	\$16.13	\$18.62	\$2.49
	715948	\$1.57	\$1.82	\$0.25
	716015	\$2,367.82	\$2,733.55	\$365.73
	716060	\$105.64	\$121.96	\$16.32
	716081	\$50.38	\$58.16	\$7.78
	716178	\$256.19	\$295.76	\$39.57
	716349	\$213.21	\$246.14	\$32.93
	716350	\$79.53	\$91.81	\$12.28
	716387	\$87.54	\$101.07	\$13.53
	716412	\$1.48	\$1.71	\$0.23
	716640	\$2.19	\$2.53	\$0.34
	716664	\$881.59	\$1,017.76	\$136.17
	716688	\$12.74	\$14.71	\$1.97
	716706	\$33.25	\$38.39	\$5.14
	716707	\$31.01	\$35.80	\$4.79
	716788	\$17.22	\$19.88	\$2.66
	718642	\$163.49	\$185.45	\$21.96
	718655	\$1,485.23	\$1,714.64	\$229.41
	718712	\$2.10	\$2.42	\$0.32
	718713	\$3.34	\$3.86	\$0.52
	718717	\$27.72	\$32.00	\$4.28
	718765	\$32.01	\$36.96	\$4.95
	718886	\$13.79	\$15.92	\$2.13
	719002	\$13.26	\$15.31	\$2.05

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332	719075	\$148.04	\$170.90	\$22.86
	719125	\$4.72	\$5.45	\$0.73
	719327	\$32.15	\$37.12	\$4.97
	719363	\$9.45	\$10.90	\$1.45
	719796	\$0.48	\$0.55	\$0.07
	719797	\$0.48	\$0.55	\$0.07
	719798	\$0.48	\$0.55	\$0.07
	719799	\$0.48	\$0.55	\$0.07
	719800	\$0.48	\$0.55	\$0.07
	719801	\$0.48	\$0.55	\$0.07
	719802	\$1,208.29	\$1,394.92	\$186.63
	719803	\$1,077.43	\$1,243.85	\$166.42
	719804	\$1,274.77	\$1,471.66	\$196.89
	719805	\$1,092.50	\$1,261.25	\$168.75
	719806	\$1,101.62	\$1,271.77	\$170.15
	719807	\$1,215.28	\$1,402.99	\$187.71
	719808	\$1,190.26	\$1,374.10	\$183.84
	719809	\$1,437.27	\$1,659.26	\$221.99
	719811	\$1,075.28	\$1,241.37	\$166.09
	719812	\$1,241.11	\$1,432.81	\$191.70
	719814	\$1,128.52	\$1,302.83	\$174.31
	719815	\$769.57	\$769.94	\$0.37
	719816	\$1,272.60	\$1,469.16	\$196.56
	719817	\$1,191.31	\$1,375.31	\$184.00
	719818	\$1,135.39	\$1,310.76	\$175.37
	719819	\$1,073.18	\$1,238.94	\$165.76
	719820	\$1,153.95	\$1,332.19	\$178.24
	719821	\$1,253.37	\$1,446.97	\$193.60
	719822	\$1,122.46	\$1,228.26	\$105.80
	719823	\$1,116.02	\$1,288.40	\$172.38
	719824	\$1,192.69	\$1,376.91	\$184.22
	719825	\$1,285.61	\$1,484.19	\$198.58
	719827	\$1,130.72	\$1,305.37	\$174.65
	719828	\$1,512.86	\$1,746.53	\$233.67
	719829	\$1,110.87	\$1,156.05	\$45.18
	719830	\$1,171.13	\$1,352.02	\$180.89
	719831	\$974.00	\$1,124.44	\$150.44
	719832	\$1,188.06	\$1,371.57	\$183.51
	719833	\$1,289.06	\$1,488.16	\$199.10
	719834	\$1,202.37	\$1,388.09	\$185.72
	719835	\$1,118.22	\$1,290.94	\$172.72
	719836	\$989.69	\$1,142.56	\$152.87
	719838	\$1,264.73	\$1,460.08	\$195.35
	719839	\$1,125.76	\$1,299.64	\$173.88
	719840	\$1,202.61	\$1,388.37	\$185.76
	719841	\$1,371.36	\$1,583.18	\$211.82
	719842	\$1,063.88	\$1,228.20	\$164.32

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	719843	\$1,078.19	\$1,244.73	\$166.54
	719844	\$1,154.52	\$1,332.85	\$178.33
	719846	\$1,101.14	\$1,271.22	\$170.08
	719847	\$1,087.64	\$1,255.63	\$167.99
	719848	\$1,024.23	\$1,182.44	\$158.21
	720134	\$0.48	\$0.55	\$0.07
	720136	\$0.48	\$0.55	\$0.07
	720137	\$0.48	\$0.55	\$0.07
	720139	\$981.35	\$1,132.92	\$151.57
	720140	\$1,206.95	\$1,393.38	\$186.43
	720141	\$1,279.37	\$1,476.98	\$197.61
	720142	\$1,042.79	\$1,203.86	\$161.07
	720143	\$1,085.87	\$1,253.59	\$167.72
	720144	\$1,122.81	\$1,296.23	\$173.42
	720145	\$1,211.73	\$1,398.89	\$187.16
	720146	\$1,130.67	\$1,305.31	\$174.64
	720147	\$1,274.22	\$1,471.04	\$196.82
	720148	\$1,015.22	\$1,172.03	\$156.81
	720149	\$1,207.00	\$1,393.43	\$186.43
	720150	\$1,474.26	\$1,701.97	\$227.71
	720151	\$1,198.84	\$1,384.01	\$185.17
	720152	\$1,168.79	\$1,349.32	\$180.53
	720153	\$1,152.04	\$1,329.98	\$177.94
	720154	\$985.88	\$1,138.15	\$152.27
	720155	\$1,306.71	\$1,508.54	\$201.83
	720156	\$924.57	\$1,067.38	\$142.81
	720157	\$1,027.86	\$1,186.62	\$158.76
	720158	\$1,082.87	\$1,250.12	\$167.25
	720159	\$1,142.55	\$1,319.02	\$176.47
	720160	\$1,211.30	\$1,398.39	\$187.09
	720162	\$1,051.48	\$1,213.88	\$162.40
	720163	\$986.12	\$1,138.43	\$152.31
	720164	\$1,184.05	\$1,366.94	\$182.89
	720165	\$1,076.47	\$1,242.74	\$166.27
	720166	\$1,193.64	\$1,378.01	\$184.37
	720167	\$1,347.85	\$1,556.03	\$208.18
	720168	\$983.25	\$1,135.12	\$151.87
	720169	\$1,205.77	\$1,392.01	\$186.24
	720170	\$1,114.59	\$1,286.75	\$172.16
	720171	\$1,216.54	\$1,404.45	\$187.91
	720172	\$1,003.00	\$1,157.93	\$154.93
	720173	\$1,145.99	\$1,323.00	\$177.01
	720174	\$906.44	\$1,003.99	\$97.55
	720175	\$1,203.85	\$1,389.80	\$185.95
	720176	\$1,288.06	\$1,487.01	\$198.95
	720177	\$1,310.81	\$1,513.28	\$202.47
	720178	\$1,140.16	\$1,316.27	\$176.11

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	720179	\$1,258.00	\$1,452.31	\$194.31
	720181	\$1,140.07	\$1,316.16	\$176.09
	720182	\$1,167.36	\$1,347.66	\$180.30
	720183	\$1,073.42	\$1,239.22	\$165.80
	720184	\$1,082.77	\$1,250.01	\$167.24
	720185	\$1,263.77	\$1,458.97	\$195.20
	721039	\$34.11	\$39.38	\$5.27
	721048	\$44.92	\$51.87	\$6.95
	721049	\$696.96	\$804.61	\$107.65
	721051	\$398.36	\$459.89	\$61.53
	721063	\$920.28	\$1,062.42	\$142.14
	721938	\$461.76	\$533.08	\$71.32
	722200	\$353.04	\$407.57	\$54.53
	722201	\$428.94	\$495.19	\$66.25
	722214	\$12.59	\$14.54	\$1.95
	722215	\$12.45	\$14.37	\$1.92
	722240	\$157.01	\$181.26	\$24.25
	722294	\$159.25	\$183.85	\$24.60
	722398	\$1,380.66	\$1,593.91	\$213.25
	722736	\$104.96	\$121.17	\$16.21
	722789	\$1,144.89	\$1,321.72	\$176.83
	722915	\$167.02	\$192.82	\$25.80
	722936	\$55.10	\$63.61	\$8.51
	722961	\$12.98	\$14.98	\$2.00
	722963	\$12.98	\$14.98	\$2.00
	722983	\$12.98	\$14.98	\$2.00
	722985	\$12.98	\$14.98	\$2.00
	722986	\$12.98	\$14.98	\$2.00
	722987	\$7.78	\$8.98	\$1.20
	722988	\$12.98	\$14.98	\$2.00
	722989	\$12.98	\$14.98	\$2.00
	722991	\$903.82	\$1,043.42	\$139.60
	722993	\$12.98	\$14.98	\$2.00
	723017	\$0.48	\$0.55	\$0.07
	723019	\$0.48	\$0.55	\$0.07
	723020	\$0.62	\$0.72	\$0.10
	723021	\$0.48	\$0.55	\$0.07
	723022	\$0.48	\$0.55	\$0.07
	723023	\$0.48	\$0.55	\$0.07
	723026	\$109.78	\$126.73	\$16.95
	723027	\$93.79	\$108.28	\$14.49
	723028	\$93.79	\$108.28	\$14.49
	723029	\$1,223.56	\$1,412.54	\$188.98
	723031	\$1,240.40	\$1,431.99	\$191.59
	723032	\$944.23	\$1,090.07	\$145.84
	723034	\$1,083.77	\$1,251.17	\$167.40
	723035	\$1,264.06	\$1,459.30	\$195.24

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	723036	\$1,235.39	\$1,426.20	\$190.81
	723037	\$973.24	\$1,123.56	\$150.32
	723039	\$1,273.51	\$1,470.21	\$196.70
	723040	\$1,078.00	\$1,244.51	\$166.51
	723041	\$618.72	\$714.29	\$95.57
	723042	\$1,288.06	\$1,487.01	\$198.95
	723043	\$1,187.87	\$1,371.35	\$183.48
	723045	\$1,182.39	\$1,365.01	\$182.62
	723063	\$6.49	\$7.49	\$1.00
	723068	\$1,121.22	\$1,294.41	\$173.19
	723069	\$1,202.28	\$1,387.98	\$185.70
	723070	\$967.65	\$1,117.11	\$149.46
	723071	\$1,199.08	\$1,384.29	\$185.21
	723072	\$1,156.00	\$1,334.56	\$178.56
	723073	\$1,214.64	\$1,402.25	\$187.61
	723074	\$1,252.94	\$1,446.47	\$193.53
	723075	\$1,254.95	\$1,448.78	\$193.83
	723076	\$966.70	\$1,116.01	\$149.31
	723077	\$1,111.44	\$1,283.11	\$171.67
	723078	\$1,144.84	\$1,321.67	\$176.83
	723079	\$1,146.80	\$1,323.93	\$177.13
	723080	\$984.88	\$1,077.85	\$92.97
	723081	\$1,255.23	\$1,449.12	\$193.89
	723082	\$91.55	\$105.69	\$14.14
	723083	\$91.55	\$105.69	\$14.14
	723084	\$100.90	\$116.49	\$15.59
	723085	\$123.66	\$142.76	\$19.10
	723107	\$9.16	\$10.57	\$1.41
	723108	\$17.59	\$20.30	\$2.71
	723111	\$11.72	\$13.53	\$1.81
	723112	\$11.72	\$13.53	\$1.81
	723113	\$4.58	\$5.29	\$0.71
	723115	\$16.49	\$19.03	\$2.54
	723205	\$759.36	\$876.65	\$117.29
	723206	\$1,093.46	\$1,262.35	\$168.89
	723207	\$93.79	\$108.28	\$14.49
	723208	\$93.79	\$108.28	\$14.49
	723209	\$1,083.77	\$1,251.17	\$167.40
	723210	\$1,239.06	\$1,430.44	\$191.38
	723211	\$1,261.48	\$1,456.33	\$194.85
	723212	\$1,148.80	\$1,326.24	\$177.44
	723213	\$1,192.69	\$1,376.91	\$184.22
	723214	\$1,111.59	\$1,283.28	\$171.69
	723215	\$1,311.96	\$1,514.60	\$202.64
	723216	\$1,223.56	\$1,412.54	\$188.98
	723217	\$993.03	\$1,146.42	\$153.39
	723218	\$1,190.50	\$1,374.38	\$183.88

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	723220	\$0.48	\$0.55	\$0.07
	723222	\$0.48	\$0.55	\$0.07
	723223	\$0.48	\$0.55	\$0.07
	723224	\$0.48	\$0.55	\$0.07
	723225	\$0.48	\$0.55	\$0.07
	723226	\$0.48	\$0.55	\$0.07
	723227	\$0.48	\$0.55	\$0.07
	723232	\$550.50	\$635.53	\$85.03
	723233	\$544.82	\$628.97	\$84.15
	723234	\$979.25	\$1,130.50	\$151.25
	723235	\$1,098.46	\$1,268.12	\$169.66
	723236	\$1,247.79	\$1,440.52	\$192.73
	723237	\$1,284.05	\$1,482.38	\$198.33
	723238	\$1,238.92	\$1,430.28	\$191.36
	723239	\$521.87	\$602.48	\$80.61
	723240	\$583.51	\$673.64	\$90.13
	723241	\$1,320.07	\$1,523.96	\$203.89
	723242	\$1,079.72	\$1,246.49	\$166.77
	723244	\$1,199.27	\$1,384.51	\$185.24
	723245	\$502.69	\$580.34	\$77.65
	723246	\$734.41	\$847.85	\$113.44
	723247	\$662.61	\$764.96	\$102.35
	723248	\$961.98	\$1,110.56	\$148.58
	723249	\$1,105.77	\$1,276.56	\$170.79
	723250	\$1,231.24	\$1,421.41	\$190.17
	723251	\$1,059.11	\$1,222.70	\$163.59
	723252	\$935.07	\$1,079.50	\$144.43
	723253	\$954.15	\$1,101.53	\$147.38
	723254	\$1,049.52	\$1,211.63	\$162.11
	723255	\$1,282.57	\$1,480.67	\$198.10
	723256	\$1,326.27	\$1,531.12	\$204.85
	723257	\$1,309.05	\$1,511.24	\$202.19
	723258	\$450.98	\$520.64	\$69.66
	723259	\$1,238.25	\$1,429.51	\$191.26
	723261	\$1,396.07	\$1,611.70	\$215.63
	723262	\$472.21	\$545.15	\$72.94
	723263	\$1,108.20	\$1,279.37	\$171.17
	723264	\$973.81	\$1,124.22	\$150.41
	723265	\$1,044.80	\$1,206.17	\$161.37
	723266	\$1,338.20	\$1,544.89	\$206.69
	723267	\$1,154.47	\$1,332.79	\$178.32
	723269	\$1,113.07	\$1,284.99	\$171.92
	723270	\$1,386.53	\$1,600.69	\$214.16
	723271	\$1,209.48	\$1,396.30	\$186.82
	723272	\$983.87	\$1,135.84	\$151.97
	723306	\$1,112.64	\$1,284.49	\$171.85
	723307	\$1,134.39	\$1,309.61	\$175.22

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	723308	\$1,197.46	\$1,382.42	\$184.96
	723309	\$1,131.05	\$1,305.75	\$174.70
	723310	\$861.17	\$974.19	\$113.02
	723312	\$1,270.69	\$1,466.96	\$196.27
	723372	\$639.17	\$737.89	\$98.72
	723373	\$607.66	\$701.51	\$93.85
	723374	\$667.52	\$770.63	\$103.11
	723375	\$605.65	\$699.19	\$93.54
	723376	\$662.71	\$765.07	\$102.36
	723377	\$635.94	\$734.17	\$98.23
	723378	\$689.80	\$796.35	\$106.55
	723379	\$617.57	\$712.96	\$95.39
	723380	\$646.77	\$746.67	\$99.90
	723381	\$608.84	\$702.89	\$94.05
	723382	\$670.48	\$774.04	\$103.56
	723383	\$614.19	\$709.05	\$94.86
	723384	\$706.31	\$815.41	\$109.10
	723385	\$649.92	\$750.31	\$100.39
	723386	\$682.74	\$788.20	\$105.46
	723387	\$617.10	\$712.41	\$95.31
	723388	\$636.23	\$734.50	\$98.27
	723389	\$610.23	\$704.48	\$94.25
	723390	\$655.26	\$756.47	\$101.21
	723391	\$621.74	\$717.78	\$96.04
	723392	\$649.01	\$749.26	\$100.25
	723393	\$633.03	\$730.81	\$97.78
	723394	\$693.00	\$800.04	\$107.04
	723395	\$617.67	\$713.07	\$95.40
	723396	\$643.86	\$743.31	\$99.45
	723397	\$596.73	\$688.90	\$92.17
	723398	\$659.37	\$761.21	\$101.84
	723399	\$593.10	\$684.71	\$91.61
	723400	\$648.01	\$748.10	\$100.09
	723401	\$606.65	\$700.35	\$93.70
	723402	\$707.93	\$817.28	\$109.35
	723403	\$612.57	\$707.18	\$94.61
	723404	\$636.47	\$734.77	\$98.30
	723405	\$606.36	\$700.02	\$93.66
	723406	\$669.91	\$773.38	\$103.47
	723407	\$632.13	\$729.76	\$97.63
	725637	\$642.72	\$741.99	\$99.27
	725638	\$628.74	\$725.85	\$97.11
	725639	\$682.36	\$787.76	\$105.40
	725640	\$602.83	\$695.95	\$93.12
	725641	\$655.22	\$756.42	\$101.20
	725642	\$597.82	\$690.16	\$92.34
	725643	\$623.40	\$719.68	\$96.28

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	725644	\$604.46	\$697.82	\$93.36
	725645	\$678.26	\$783.02	\$104.76
	725646	\$629.26	\$726.46	\$97.20
	725647	\$602.50	\$695.56	\$93.06
	725649	\$654.88	\$756.03	\$101.15
	725650	\$612.23	\$706.80	\$94.57
	725651	\$665.33	\$768.10	\$102.77
	725652	\$599.21	\$691.76	\$92.55
	725653	\$683.17	\$788.69	\$105.52
	725654	\$626.16	\$722.88	\$96.72
	725655	\$663.47	\$765.95	\$102.48
	725656	\$602.50	\$695.56	\$93.06
	725657	\$632.79	\$730.53	\$97.74
	725658	\$612.47	\$707.07	\$94.60
	725659	\$667.86	\$771.01	\$103.15
	725660	\$614.76	\$709.71	\$94.95
	725661	\$635.42	\$733.56	\$98.14
	725662	\$644.24	\$743.75	\$99.51
	725663	\$602.21	\$695.23	\$93.02
	725664	\$694.19	\$801.42	\$107.23
	725665	\$643.77	\$743.20	\$99.43
	725667	\$653.45	\$754.38	\$100.93
	725668	\$617.00	\$712.30	\$95.30
	725669	\$660.03	\$761.98	\$101.95
	725670	\$596.39	\$688.51	\$92.12
	725671	\$651.02	\$751.57	\$100.55
	725672	\$635.85	\$734.06	\$98.21
	725673	\$670.72	\$774.32	\$103.60
	725674	\$625.02	\$721.56	\$96.54
	725675	\$666.62	\$769.58	\$102.96
	725676	\$602.79	\$695.89	\$93.10
	725677	\$628.79	\$725.91	\$97.12
	725678	\$606.51	\$700.19	\$93.68
	725679	\$692.14	\$799.05	\$106.91
	725680	\$655.17	\$756.36	\$101.19
	725681	\$615.67	\$710.76	\$95.09
	725682	\$694.48	\$801.75	\$107.27
	725683	\$636.85	\$735.21	\$98.36
	725684	\$661.94	\$764.19	\$102.25
	725685	\$626.83	\$723.65	\$96.82
	725686	\$685.27	\$791.12	\$105.85
	725687	\$600.97	\$693.80	\$92.83
	725688	\$625.26	\$721.83	\$96.57
	725689	\$611.52	\$705.97	\$94.45
	725690	\$608.08	\$702.00	\$93.92
	725691	\$657.08	\$758.57	\$101.49
	725694	\$632.41	\$730.09	\$97.68

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	725695	\$692.62	\$799.60	\$106.98
	725696	\$636.80	\$735.16	\$98.36
	725697	\$666.33	\$769.25	\$102.92
	725698	\$610.37	\$704.65	\$94.28
	725699	\$671.10	\$774.76	\$103.66
	725700	\$616.00	\$711.15	\$95.15
	725701	\$643.91	\$743.37	\$99.46
	725702	\$648.44	\$748.60	\$100.16
	725703	\$634.37	\$732.35	\$97.98
	725704	\$691.47	\$798.28	\$106.81
	725705	\$615.91	\$711.04	\$95.13
	725706	\$606.36	\$700.02	\$93.66
	725707	\$658.51	\$760.22	\$101.71
	725708	\$599.78	\$692.42	\$92.64
	725709	\$663.18	\$765.62	\$102.44
	725710	\$680.93	\$786.11	\$105.18
	725711	\$615.86	\$710.98	\$95.12
	725712	\$677.02	\$781.59	\$104.57
	725713	\$610.75	\$705.09	\$94.34
	725714	\$682.31	\$787.70	\$105.39
	725715	\$646.96	\$746.89	\$99.93
	725716	\$712.85	\$822.95	\$110.10
	725717	\$638.14	\$736.70	\$98.56
	725718	\$670.34	\$773.88	\$103.54
	725719	\$680.64	\$785.77	\$105.13
	725720	\$614.28	\$709.16	\$94.88
	725721	\$671.39	\$775.09	\$103.70
	725722	\$602.12	\$695.12	\$93.00
	725723	\$656.36	\$757.74	\$101.38
	725724	\$623.73	\$720.07	\$96.34
	725725	\$717.43	\$828.24	\$110.81
	725726	\$648.68	\$748.87	\$100.19
	725727	\$684.27	\$789.96	\$105.69
	725728	\$618.39	\$713.90	\$95.51
	725729	\$729.35	\$842.01	\$112.66
	725730	\$676.40	\$780.87	\$104.47
	725731	\$617.81	\$713.24	\$95.43
	725732	\$699.39	\$807.42	\$108.03
	725733	\$643.10	\$742.43	\$99.33
	725734	\$658.60	\$760.33	\$101.73
	725735	\$617.77	\$713.18	\$95.41
	725736	\$677.54	\$782.20	\$104.66
	725737	\$624.30	\$720.73	\$96.43
	725738	\$705.45	\$814.41	\$108.96
	725739	\$675.87	\$780.27	\$104.40
	725740	\$717.52	\$828.35	\$110.83
	725741	\$639.14	\$737.86	\$98.72

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	725742	\$621.30	\$717.26	\$95.96
	725743	\$659.27	\$761.10	\$101.83
	725744	\$618.58	\$714.12	\$95.54
	725745	\$676.64	\$781.15	\$104.51
	725746	\$612.90	\$707.57	\$94.67
	725747	\$693.67	\$800.81	\$107.14
	725748	\$702.64	\$811.17	\$108.53
	725749	\$636.80	\$735.16	\$98.36
	725750	\$735.65	\$849.28	\$113.63
	725751	\$653.07	\$753.94	\$100.87
	725752	\$677.54	\$782.20	\$104.66
	725753	\$612.80	\$707.46	\$94.66
	725754	\$683.79	\$789.41	\$105.62
	725755	\$635.61	\$733.78	\$98.17
	725756	\$660.94	\$763.03	\$102.09
	725757	\$635.23	\$733.34	\$98.11
	725758	\$686.04	\$792.00	\$105.96
	725759	\$645.63	\$745.35	\$99.72
	725797	\$2.00	\$2.31	\$0.31
	725933	\$1,246.41	\$1,438.93	\$192.52
	725962	\$393.83	\$454.66	\$60.83
	725997	\$1,006.68	\$1,162.17	\$155.49
	726005	\$868.23	\$1,002.34	\$134.11
	726006	\$1,068.65	\$1,233.71	\$165.06
	726007	\$997.09	\$1,151.10	\$154.01
	726008	\$858.74	\$991.38	\$132.64
	726009	\$997.09	\$1,151.10	\$154.01
	726010	\$1,172.80	\$1,353.94	\$181.14
	726011	\$888.79	\$1,026.07	\$137.28
	726012	\$937.36	\$1,082.14	\$144.78
	726013	\$1,089.64	\$1,257.94	\$168.30
	726014	\$1,172.70	\$1,353.83	\$181.13
	726015	\$897.52	\$1,036.15	\$138.63
	726016	\$1,135.30	\$1,310.65	\$175.35
	726021	\$1,185.53	\$1,368.65	\$183.12
	726022	\$890.84	\$1,028.44	\$137.60
	726023	\$1,091.98	\$1,260.64	\$168.66
	726024	\$873.05	\$1,007.90	\$134.85
	726025	\$997.09	\$1,151.10	\$154.01
	726026	\$1,073.42	\$1,239.22	\$165.80
	726027	\$868.28	\$1,002.39	\$134.11
	726028	\$1,001.86	\$1,156.60	\$154.74
	726029	\$868.28	\$1,002.39	\$134.11
	726030	\$1,001.86	\$1,156.60	\$154.74
	726031	\$869.38	\$1,003.66	\$134.28
	726032	\$873.05	\$1,007.90	\$134.85
	726033	\$1,030.48	\$1,189.65	\$159.17

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332	726034	\$1,102.24	\$1,272.49	\$170.25
	726035	\$863.51	\$996.88	\$133.37
	726036	\$858.74	\$991.38	\$132.64
	726037	\$1,001.86	\$1,156.60	\$154.74
	726038	\$863.51	\$996.88	\$133.37
	726039	\$858.74	\$991.38	\$132.64
	726040	\$1,001.86	\$1,156.60	\$154.74
	726041	\$863.51	\$996.88	\$133.37
	726042	\$858.74	\$991.38	\$132.64
	726043	\$868.28	\$1,002.39	\$134.11
	726044	\$1,073.42	\$1,239.22	\$165.80
	726045	\$1,001.86	\$1,156.60	\$154.74
	726046	\$863.51	\$996.88	\$133.37
	726047	\$858.74	\$991.38	\$132.64
	726048	\$868.28	\$1,002.39	\$134.11
	726049	\$863.51	\$996.88	\$133.37
	726050	\$1,001.86	\$1,156.60	\$154.74
	726051	\$863.51	\$996.88	\$133.37
	726052	\$868.28	\$1,002.39	\$134.11
	726053	\$1,073.42	\$1,239.22	\$165.80
	726054	\$868.28	\$1,002.39	\$134.11
	726055	\$858.74	\$991.38	\$132.64
	726056	\$863.51	\$996.88	\$133.37
	726057	\$1,041.46	\$1,202.32	\$160.86
	726058	\$1,025.71	\$1,184.14	\$158.43
	726059	\$873.53	\$1,008.45	\$134.92
	726060	\$869.95	\$1,004.32	\$134.37
	726065	\$868.28	\$1,002.39	\$134.11
	726066	\$868.28	\$1,002.39	\$134.11
	726067	\$863.51	\$996.88	\$133.37
	726068	\$868.28	\$1,002.39	\$134.11
	726069	\$1,073.42	\$1,239.22	\$165.80
	726070	\$868.28	\$1,002.39	\$134.11
	726071	\$863.51	\$996.88	\$133.37
	726072	\$1,001.86	\$1,156.60	\$154.74
	726073	\$868.28	\$1,002.39	\$134.11
	726074	\$871.86	\$1,006.52	\$134.66
	726075	\$868.28	\$1,002.39	\$134.11
	726076	\$863.51	\$996.88	\$133.37
	726078	\$1,082.96	\$1,250.23	\$167.27
	726079	\$1,001.86	\$1,156.60	\$154.74
	726080	\$868.28	\$1,002.39	\$134.11
	726081	\$1,006.63	\$1,162.11	\$155.48
	726082	\$868.28	\$1,002.39	\$134.11
	726083	\$1,006.63	\$1,162.11	\$155.48
	726084	\$868.28	\$1,002.39	\$134.11
	726085	\$1,078.19	\$1,244.73	\$166.54

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332	726086	\$1,006.63	\$1,162.11	\$155.48
	726087	\$887.36	\$1,024.42	\$137.06
	726088	\$1,025.71	\$1,184.14	\$158.43
	726089	\$1,078.19	\$1,244.73	\$166.54
	726090	\$1,011.40	\$1,167.62	\$156.22
	726091	\$1,092.50	\$1,261.25	\$168.75
	726092	\$1,010.26	\$1,166.30	\$156.04
	726093	\$868.28	\$1,002.39	\$134.11
	726094	\$863.51	\$996.88	\$133.37
	726095	\$869.95	\$1,004.32	\$134.37
	726096	\$868.28	\$1,002.39	\$134.11
	726097	\$1,001.86	\$1,156.60	\$154.74
	726098	\$868.28	\$1,002.39	\$134.11
	726099	\$863.51	\$996.88	\$133.37
	726100	\$1,073.42	\$1,239.22	\$165.80
	726101	\$863.51	\$996.88	\$133.37
	726102	\$1,073.42	\$1,239.22	\$165.80
	726103	\$863.51	\$996.88	\$133.37
	726104	\$1,001.86	\$1,156.60	\$154.74
	726105	\$1,073.42	\$1,239.22	\$165.80
	726106	\$863.51	\$996.88	\$133.37
	726107	\$1,073.42	\$1,239.22	\$165.80
	726108	\$868.28	\$1,002.39	\$134.11
	726109	\$1,001.86	\$1,156.60	\$154.74
	726110	\$863.51	\$996.88	\$133.37
	726111	\$868.28	\$1,002.39	\$134.11
	726112	\$1,001.86	\$1,156.60	\$154.74
	726113	\$863.51	\$996.88	\$133.37
	726114	\$1,001.86	\$1,156.60	\$154.74
	726115	\$863.51	\$996.88	\$133.37
	726116	\$1,073.42	\$1,239.22	\$165.80
	726117	\$863.51	\$996.88	\$133.37
	726118	\$1,001.86	\$1,156.60	\$154.74
	726119	\$939.27	\$1,084.34	\$145.07
	726120	\$1,098.85	\$1,268.57	\$169.72
	726121	\$1,001.86	\$1,156.60	\$154.74
	726122	\$1,001.86	\$1,156.60	\$154.74
	726123	\$1,073.42	\$1,239.22	\$165.80
	726124	\$1,001.86	\$1,156.60	\$154.74
	726125	\$1,073.42	\$1,239.22	\$165.80
	726126	\$863.51	\$996.88	\$133.37
	726127	\$1,001.86	\$1,156.60	\$154.74
	726128	\$1,073.42	\$1,239.22	\$165.80
	726129	\$1,011.40	\$1,167.62	\$156.22
	726130	\$1,011.40	\$1,167.62	\$156.22
	726131	\$863.51	\$996.88	\$133.37
	726132	\$1,001.86	\$1,156.60	\$154.74

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332	726133	\$863.51	\$996.88	\$133.37
	726134	\$863.51	\$996.88	\$133.37
	726135	\$1,001.86	\$1,156.60	\$154.74
	726136	\$869.95	\$1,004.32	\$134.37
	726137	\$863.51	\$996.88	\$133.37
	726138	\$1,096.46	\$1,265.82	\$169.36
	726139	\$1,179.62	\$1,361.82	\$182.20
	726140	\$1,001.86	\$1,156.60	\$154.74
	726141	\$863.51	\$996.88	\$133.37
	726142	\$1,001.86	\$1,156.60	\$154.74
	726143	\$863.51	\$996.88	\$133.37
	726144	\$1,010.26	\$1,166.30	\$156.04
	726145	\$863.51	\$996.88	\$133.37
	726146	\$863.51	\$996.88	\$133.37
	726261	\$42.94	\$49.57	\$6.63
	726273	\$102.33	\$118.14	\$15.81
	726281	\$99.90	\$115.33	\$15.43
	726324	\$254.09	\$293.34	\$39.25
	726375	\$169.08	\$195.19	\$26.11
	726389	\$77.91	\$89.94	\$12.03
	726478	\$80.15	\$92.53	\$12.38
	726551	\$13.36	\$15.42	\$2.06
	726576	\$1,077.71	\$1,244.18	\$166.47
	726585	\$98.13	\$113.29	\$15.16
	726770	\$45.04	\$51.99	\$6.95
	726775	\$3.77	\$4.35	\$0.58
	726777	\$317.40	\$366.42	\$49.02
	726817	\$79.10	\$91.32	\$12.22
	726839	\$2,359.30	\$2,387.34	\$28.04
	726849	\$4.63	\$5.34	\$0.71
	726852	\$11.21	\$12.94	\$1.73
	726853	\$210.63	\$243.16	\$32.53
	727069	\$39.98	\$46.15	\$6.17
	727379	\$0.48	\$0.55	\$0.07
	727380	\$0.48	\$0.55	\$0.07
	727381	\$0.48	\$0.55	\$0.07
	727382	\$0.48	\$0.55	\$0.07
	727383	\$0.95	\$1.10	\$0.15
	727384	\$1,257.67	\$1,451.92	\$194.25
	727385	\$906.40	\$1,046.40	\$140.00
	727386	\$1,466.01	\$1,692.44	\$226.43
	727387	\$1,003.91	\$1,158.97	\$155.06
	727388	\$1,139.11	\$1,315.06	\$175.95
	727389	\$1,298.93	\$1,499.57	\$200.64
	727391	\$1,462.43	\$1,688.31	\$225.88
	727392	\$1,197.94	\$1,382.97	\$185.03
	727393	\$946.18	\$1,092.33	\$146.15

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332	727394	\$1,214.16	\$1,401.69	\$187.53
	727395	\$1,074.66	\$1,240.65	\$165.99
	727396	\$1,202.76	\$1,388.53	\$185.77
	727397	\$1,075.81	\$1,241.97	\$166.16
	727398	\$1,240.39	\$1,431.98	\$191.59
	727399	\$111.35	\$128.55	\$17.20
	727429	\$1,333.05	\$1,538.94	\$205.89
	727430	\$1,293.26	\$1,493.01	\$199.75
	727432	\$1,038.31	\$1,198.68	\$160.37
	727433	\$1,233.62	\$1,424.17	\$190.55
	727434	\$1,280.95	\$1,478.80	\$197.85
	727435	\$1,133.39	\$1,308.45	\$175.06
	727436	\$1,164.07	\$1,343.86	\$179.79
	727437	\$1,232.38	\$1,422.73	\$190.35
	727438	\$1,306.62	\$1,508.43	\$201.81
	727439	\$1,462.29	\$1,688.15	\$225.86
	727441	\$1,277.51	\$1,474.84	\$197.33
	727442	\$1,179.09	\$1,361.21	\$182.12
	727448	\$1,166.93	\$1,347.17	\$180.24
	727449	\$763.80	\$881.77	\$117.97
	727450	\$1,448.26	\$1,671.95	\$223.69
	727451	\$1,069.08	\$1,234.21	\$165.13
	727452	\$1,305.90	\$1,507.61	\$201.71
	727453	\$1,211.73	\$1,398.89	\$187.16
	727454	\$1,302.94	\$1,504.19	\$201.25
	727455	\$1,229.47	\$1,419.37	\$189.90
	727456	\$1,008.20	\$1,163.93	\$155.73
	727457	\$694.62	\$705.31	\$10.69
	727608	\$1,072.94	\$1,238.67	\$165.73
	727733	\$872.67	\$1,007.46	\$134.79
	727869	\$608.08	\$702.00	\$93.92
	727923	\$20.52	\$23.68	\$3.16
	728275	\$734.70	\$848.18	\$113.48
	728309	\$39.12	\$45.16	\$6.04
	728386	\$587.38	\$678.10	\$90.72
	728523	\$53.67	\$61.96	\$8.29
	728567	\$3,913.26	\$4,517.70	\$604.44
	728579	\$75.57	\$87.24	\$11.67
	728581	\$53.53	\$61.80	\$8.27
	728598	\$343.73	\$396.83	\$53.10
	728622	\$862.65	\$995.89	\$133.24
	728975	\$346.31	\$399.80	\$53.49
	728976	\$388.77	\$448.82	\$60.05
	729055	\$40.04	\$46.22	\$6.18
	729226	\$23.85	\$27.54	\$3.69
	729294	\$131.20	\$151.46	\$20.26
	729303	\$62.98	\$72.70	\$9.72

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	729317	\$157.01	\$181.26	\$24.25
	729319	\$137.21	\$158.40	\$21.19
	729333	\$3,309.43	\$3,820.59	\$511.16
	729378	\$31.20	\$36.02	\$4.82
	729486	\$26.24	\$30.29	\$4.05
	729498	\$84.68	\$97.76	\$13.08
	729682	\$9.54	\$11.02	\$1.48
	729859	\$221.35	\$255.54	\$34.19
	729886	\$64.17	\$74.08	\$9.91
	729905	\$93.03	\$107.40	\$14.37
	729917	\$499.26	\$576.37	\$77.11
	729955	\$43.22	\$49.90	\$6.68
	730199	\$192.36	\$222.07	\$29.71
	730200	\$489.38	\$564.97	\$75.59
	730509	\$23.47	\$27.10	\$3.63
	730514	\$49.28	\$56.89	\$7.61
	730522	\$376.08	\$434.17	\$58.09
	730523	\$3,836.07	\$4,428.58	\$592.51
	730565	\$0.72	\$0.83	\$0.11
	730580	\$942.98	\$1,088.63	\$145.65
	730581	\$125.90	\$145.35	\$19.45
	730595	\$3,615.47	\$4,173.91	\$558.44
	730623	\$8,277.65	\$9,556.20	\$1,278.55
	730629	\$263.92	\$304.68	\$40.76
	731140	\$105.96	\$122.32	\$16.36
	731194	\$125.47	\$144.85	\$19.38
	731507	\$128.52	\$148.38	\$19.86
	731622	\$45.94	\$53.04	\$7.10
	731746	\$20.04	\$23.13	\$3.09
	731761	\$1.81	\$2.09	\$0.28
	731788	\$5.82	\$6.72	\$0.90
	731826	\$5.30	\$6.11	\$0.81
	731933	\$300.56	\$346.98	\$46.42
	732590	\$1,121.13	\$1,294.30	\$173.17
	732638	\$673.35	\$777.35	\$104.00
	732670	\$9,928.43	\$11,461.95	\$1,533.52
	732672	\$7,967.17	\$9,197.76	\$1,230.59
	732696	\$23.47	\$27.10	\$3.63
	732873	\$394.21	\$455.10	\$60.89
	732874	\$424.88	\$490.51	\$65.63
	733015	\$0.48	\$0.55	\$0.07
	733016	\$0.48	\$0.55	\$0.07
	733017	\$0.48	\$0.55	\$0.07
	733018	\$0.48	\$0.55	\$0.07
	733019	\$982.35	\$1,134.08	\$151.73
	733020	\$1,155.48	\$1,333.95	\$178.47
	733021	\$1,157.39	\$1,336.15	\$178.76

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332	733022	\$147.42	\$170.19	\$22.77
	733023	\$147.42	\$170.19	\$22.77
	733024	\$1,176.47	\$1,358.18	\$181.71
	733025	\$1,157.39	\$1,336.15	\$178.76
	733026	\$982.35	\$1,134.08	\$151.73
	733027	\$1,236.91	\$1,427.97	\$191.06
	733028	\$1,111.54	\$1,283.23	\$171.69
	733029	\$982.35	\$1,134.08	\$151.73
	733030	\$1,157.39	\$1,336.15	\$178.76
	733031	\$1,155.38	\$1,333.84	\$178.46
	733032	\$1,243.40	\$1,435.46	\$192.06
	733033	\$1,316.68	\$1,520.05	\$203.37
	733034	\$1,110.11	\$1,281.57	\$171.46
	733035	\$1,155.96	\$1,334.50	\$178.54
	733037	\$1,235.48	\$1,426.31	\$190.83
	733038	\$149.18	\$172.22	\$23.04
	733039	\$144.94	\$167.32	\$22.38
	733040	\$1,427.79	\$1,648.33	\$220.54
	733042	\$1,092.46	\$1,261.19	\$168.73
	733043	\$983.21	\$1,135.07	\$151.86
	733044	\$1,237.11	\$1,428.19	\$191.08
	733045	\$742.81	\$857.54	\$114.73
	733046	\$1,144.98	\$1,321.83	\$176.85
	733047	\$1,297.65	\$1,498.08	\$200.43
	733048	\$171.56	\$198.05	\$26.49
	733049	\$144.70	\$167.05	\$22.35
	733050	\$1,109.06	\$1,280.36	\$171.30
	733051	\$1,173.99	\$1,355.32	\$181.33
	733052	\$979.87	\$1,131.21	\$151.34
	733053	\$1,109.06	\$1,280.36	\$171.30
	733054	\$1,149.71	\$1,327.29	\$177.58
	733056	\$144.94	\$167.32	\$22.38
	733057	\$1,248.41	\$1,441.24	\$192.83
	733058	\$1,253.56	\$1,447.19	\$193.63
	733059	\$884.45	\$1,021.06	\$136.61
	733060	\$1,013.64	\$1,170.21	\$156.57
	733061	\$1,234.43	\$1,425.10	\$190.67
	733062	\$1,173.99	\$1,355.32	\$181.33
	733074	\$5.25	\$6.06	\$0.81
	733238	\$739.47	\$853.68	\$114.21
	733246	\$2,749.96	\$3,174.71	\$424.75
	733260	\$415.63	\$479.83	\$64.20
	733290	\$183.68	\$212.05	\$28.37
	733292	\$117.03	\$135.10	\$18.07
	733298	\$143.12	\$165.23	\$22.11
	733318	\$23.85	\$27.54	\$3.69
	733329	\$78.72	\$90.87	\$12.15

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332	733331	\$14.79	\$17.07	\$2.28
	733336	\$16.27	\$18.78	\$2.51
	733337	\$39.36	\$45.44	\$6.08
	733345	\$111.25	\$128.44	\$17.19
	733346	\$5,328.84	\$6,151.92	\$823.08
	733349	\$39.36	\$45.44	\$6.08
	733351	\$1,353.95	\$1,563.07	\$209.12
	733498	\$237.11	\$273.73	\$36.62
	733543	\$12.12	\$13.99	\$1.87
	733571	\$243.69	\$281.33	\$37.64
	733583	\$82.06	\$94.73	\$12.67
	733624	\$293.64	\$339.00	\$45.36
	733628	\$86.78	\$100.18	\$13.40
	733802	\$68.70	\$79.31	\$10.61
	734274	\$212.15	\$244.91	\$32.76
	734305	\$5,900.43	\$6,811.79	\$911.36
	734473	\$137.21	\$158.40	\$21.19
	734516	\$718.14	\$829.07	\$110.93
	734517	\$137.21	\$158.40	\$21.19
	734518	\$172.03	\$198.61	\$26.58
	734677	\$1,454.70	\$1,679.39	\$224.69
	734684	\$29.48	\$34.04	\$4.56
	735015	\$1,323.03	\$1,527.38	\$204.35
	735034	\$16.08	\$18.56	\$2.48
	735139	\$686.99	\$793.10	\$106.11
	735140	\$758.55	\$875.71	\$117.16
	735141	\$686.99	\$793.10	\$106.11
	735164	\$1.14	\$1.32	\$0.18
	735468	\$107.82	\$124.47	\$16.65
	735600	\$171.94	\$198.50	\$26.56
	735602	\$0.48	\$0.55	\$0.07
	735603	\$0.48	\$0.55	\$0.07
	735604	\$0.48	\$0.55	\$0.07
	735605	\$170.22	\$196.51	\$26.29
	735606	\$170.32	\$196.62	\$26.30
	735607	\$171.41	\$197.89	\$26.48
	735608	\$173.89	\$200.75	\$26.86
	735609	\$582.41	\$672.37	\$89.96
	735610	\$178.95	\$206.59	\$27.64
	735611	\$183.48	\$211.82	\$28.34
	735612	\$378.51	\$436.98	\$58.47
	735613	\$186.92	\$215.79	\$28.87
	735614	\$186.49	\$215.29	\$28.80
	735615	\$386.62	\$446.34	\$59.72
	735616	\$505.22	\$583.26	\$78.04
	735617	\$506.37	\$584.58	\$78.21
	735618	\$1,095.13	\$1,264.28	\$169.15

GALVESTON COUNTY

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Expected Refunds

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	735619	\$1,004.91	\$1,160.13	\$155.22
	735620	\$173.13	\$199.87	\$26.74
	735621	\$173.13	\$199.87	\$26.74
	735623	\$501.88	\$579.40	\$77.52
	735624	\$170.03	\$196.29	\$26.26
	735625	\$740.80	\$855.23	\$114.43
	735626	\$173.75	\$200.59	\$26.84
	735627	\$174.47	\$201.41	\$26.94
	735628	\$174.51	\$201.47	\$26.96
	735629	\$174.42	\$201.36	\$26.94
	735630	\$174.75	\$201.74	\$26.99
	735631	\$1,054.05	\$1,216.86	\$162.81
	735632	\$870.00	\$1,004.37	\$134.37
	735633	\$773.86	\$893.39	\$119.53
	735634	\$1,196.75	\$1,381.59	\$184.84
	735635	\$168.60	\$194.64	\$26.04
	735636	\$171.03	\$197.45	\$26.42
	735637	\$178.90	\$206.54	\$27.64
	735638	\$336.24	\$388.18	\$51.94
	735639	\$171.65	\$198.16	\$26.51
	735640	\$171.94	\$198.50	\$26.56
	735641	\$171.94	\$198.50	\$26.56
	735923	\$4.53	\$5.23	\$0.70
	735925	\$3.01	\$3.47	\$0.46
	736025	\$2.67	\$3.08	\$0.41
	736028	\$14.50	\$16.74	\$2.24
	736031	\$0.38	\$0.44	\$0.06
	736103	\$2.34	\$2.70	\$0.36
	736105	\$0.67	\$0.77	\$0.10
	736116	\$0.38	\$0.44	\$0.06
	736133	\$38.74	\$44.72	\$5.98
	736178	\$11.02	\$12.72	\$1.70
	736180	\$6.54	\$7.55	\$1.01
	736182	\$39.65	\$45.77	\$6.12
	736192	\$7.39	\$8.54	\$1.15
	736218	\$69.89	\$80.69	\$10.80
	736243	\$2.54	\$2.94	\$0.40
	736340	\$51.86	\$59.87	\$8.01
	736377	\$3,101.47	\$3,580.52	\$479.05
	736426	\$695.05	\$802.41	\$107.36
	736428	\$0.48	\$0.55	\$0.07
	736429	\$0.48	\$0.55	\$0.07
	736430	\$0.48	\$0.55	\$0.07
	736431	\$821.48	\$948.36	\$126.88
	736432	\$657.55	\$759.12	\$101.57
	736433	\$655.45	\$756.69	\$101.24
	736434	\$94.77	\$107.49	\$12.72

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Expected Refunds

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	736435	\$647.44	\$747.44	\$100.00
	736436	\$573.68	\$662.29	\$88.61
	736438	\$478.17	\$552.03	\$73.86
	736439	\$434.76	\$501.91	\$67.15
	736440	\$256.33	\$295.93	\$39.60
	736442	\$278.85	\$321.92	\$43.07
	736443	\$117.41	\$135.54	\$18.13
	736444	\$535.85	\$618.62	\$82.77
	736445	\$122.94	\$141.93	\$18.99
	736446	\$120.80	\$139.45	\$18.65
	736447	\$126.85	\$146.45	\$19.60
	736448	\$124.28	\$143.47	\$19.19
	736449	\$134.15	\$154.87	\$20.72
	736450	\$131.24	\$151.52	\$20.28
	736451	\$129.34	\$149.31	\$19.97
	736452	\$120.41	\$139.01	\$18.60
	736453	\$123.61	\$142.70	\$19.09
	736454	\$119.98	\$138.52	\$18.54
	736455	\$118.46	\$136.75	\$18.29
	736456	\$116.41	\$134.39	\$17.98
	736457	\$116.41	\$134.39	\$17.98
	736458	\$116.41	\$134.39	\$17.98
	736459	\$116.41	\$134.39	\$17.98
	736460	\$116.41	\$134.39	\$17.98
	736461	\$114.26	\$131.91	\$17.65
	736462	\$119.56	\$138.02	\$18.46
	736463	\$119.56	\$138.02	\$18.46
	736464	\$114.26	\$131.91	\$17.65
	736465	\$114.26	\$131.91	\$17.65
	736466	\$120.18	\$138.74	\$18.56
	736467	\$120.27	\$138.85	\$18.58
	736468	\$120.18	\$138.74	\$18.56
	736469	\$120.08	\$138.63	\$18.55
	736470	\$119.94	\$138.46	\$18.52
	736471	\$118.36	\$136.64	\$18.28
	736472	\$114.26	\$131.91	\$17.65
	736473	\$114.26	\$131.91	\$17.65
	736474	\$174.75	\$201.74	\$26.99
	736476	\$507.04	\$585.35	\$78.31
	736477	\$628.36	\$725.41	\$97.05
	736478	\$793.14	\$915.65	\$122.51
	736479	\$584.04	\$674.25	\$90.21
	736480	\$632.79	\$730.53	\$97.74
	736810	\$74.19	\$85.64	\$11.45
	736813	\$33.11	\$38.22	\$5.11
	736830	\$266.40	\$307.55	\$41.15
	736845	\$11.93	\$13.77	\$1.84

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	736857	\$197.27	\$227.74	\$30.47
	736858	\$16.36	\$18.89	\$2.53
	736874	\$37.64	\$43.46	\$5.82
	736878	\$62.98	\$72.70	\$9.72
	737023	\$11.86	\$13.70	\$1.84
	737037	\$10.49	\$12.12	\$1.63
	737060	\$262.96	\$303.58	\$40.62
	737086	\$1,746.34	\$2,016.07	\$269.73
	737090	\$261.01	\$301.32	\$40.31
	737091	\$787.17	\$908.77	\$121.60
	737214	\$79.81	\$92.14	\$12.33
	737261	\$33.40	\$38.55	\$5.15
	737273	\$120.41	\$139.01	\$18.60
	737275	\$0.48	\$0.55	\$0.07
	737276	\$0.48	\$0.55	\$0.07
	737277	\$0.48	\$0.55	\$0.07
	737279	\$0.48	\$0.55	\$0.07
	737280	\$118.65	\$136.98	\$18.33
	737281	\$118.65	\$136.98	\$18.33
	737282	\$119.65	\$138.13	\$18.48
	737283	\$120.37	\$138.96	\$18.59
	737284	\$120.70	\$139.34	\$18.64
	737285	\$116.50	\$134.50	\$18.00
	737286	\$117.07	\$135.16	\$18.09
	737287	\$117.07	\$135.16	\$18.09
	737288	\$117.07	\$135.16	\$18.09
	737289	\$117.07	\$135.16	\$18.09
	737290	\$117.07	\$135.16	\$18.09
	737291	\$117.07	\$135.16	\$18.09
	737292	\$117.07	\$135.16	\$18.09
	737293	\$117.07	\$135.16	\$18.09
	737294	\$117.07	\$135.16	\$18.09
	737295	\$116.69	\$134.72	\$18.03
	737296	\$123.09	\$142.10	\$19.01
	737297	\$122.80	\$141.77	\$18.97
	737298	\$117.69	\$135.87	\$18.18
	737299	\$114.26	\$131.91	\$17.65
	737300	\$119.56	\$138.02	\$18.46
	737301	\$119.56	\$138.02	\$18.46
	737302	\$114.26	\$131.91	\$17.65
	737303	\$114.26	\$131.91	\$17.65
	737304	\$114.26	\$131.91	\$17.65
	737305	\$114.26	\$131.91	\$17.65
	737306	\$114.26	\$131.91	\$17.65
	737307	\$114.26	\$131.91	\$17.65
	737308	\$114.26	\$131.91	\$17.65
	737309	\$114.26	\$131.91	\$17.65

GALVESTON COUNTY

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	737310	\$117.31	\$135.43	\$18.12
	737311	\$117.46	\$135.60	\$18.14
	737312	\$117.46	\$135.60	\$18.14
	737313	\$117.46	\$135.60	\$18.14
	737314	\$117.46	\$135.60	\$18.14
	737315	\$117.46	\$135.60	\$18.14
	737316	\$117.46	\$135.60	\$18.14
	737317	\$117.46	\$135.60	\$18.14
	737318	\$117.46	\$135.60	\$18.14
	737319	\$117.46	\$135.60	\$18.14
	737320	\$118.89	\$137.25	\$18.36
	737525	\$4,293.68	\$4,956.88	\$663.20
	737526	\$435.00	\$502.19	\$67.19
	737740	\$2.86	\$3.30	\$0.44
	737778	\$219.12	\$252.97	\$33.85
	737788	\$28.43	\$32.83	\$4.40
	737931	\$26.57	\$30.68	\$4.11
	737933	\$26.57	\$30.68	\$4.11
	738144	\$75.00	\$86.58	\$11.58
	738553	\$104.29	\$120.40	\$16.11
	738556	\$135.25	\$156.14	\$20.89
	738557	\$109.01	\$125.85	\$16.84
	738558	\$130.53	\$150.69	\$20.16
	738653	\$140.26	\$161.92	\$21.66
	738655	\$11.93	\$13.77	\$1.84
	738656	\$18.13	\$20.93	\$2.80
	738664	\$262.39	\$302.92	\$40.53
	738665	\$183.68	\$212.05	\$28.37
	738666	\$72.71	\$83.94	\$11.23
	738785	\$339.25	\$384.59	\$45.34
	738886	\$433.69	\$500.67	\$66.98
	738992	\$5.25	\$6.06	\$0.81
	739028	\$4.77	\$5.51	\$0.74
	739102	\$26.24	\$30.29	\$4.05
	739152	\$66.36	\$76.61	\$10.25
	739379	\$813.89	\$939.60	\$125.71
	739551	\$2,550.59	\$2,944.55	\$393.96
	739677	\$45.89	\$52.98	\$7.09
	739780	\$2.72	\$3.14	\$0.42
	739783	\$7.30	\$8.43	\$1.13
	739809	\$77.86	\$89.88	\$12.02
	739832	\$543.87	\$627.87	\$84.00
	739853	\$623.11	\$719.35	\$96.24
	739860	\$13.79	\$15.92	\$2.13
	739861	\$32.10	\$37.06	\$4.96
	739912	\$132.01	\$152.40	\$20.39
	739918	\$95.46	\$110.21	\$14.75

GALVESTON COUNTY

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Expected Refunds

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	740040	\$151.38	\$174.76	\$23.38
	740042	\$98.04	\$113.18	\$15.14
	740091	\$104.91	\$121.11	\$16.20
	740166	\$23.85	\$27.54	\$3.69
	740168	\$23.85	\$27.54	\$3.69
	740169	\$23.85	\$27.54	\$3.69
	740188	\$86.83	\$100.24	\$13.41
	740192	\$1,342.78	\$1,550.18	\$207.40
	740202	\$19.85	\$22.91	\$3.06
	740210	\$77.24	\$89.17	\$11.93
	740238	\$9.26	\$10.68	\$1.42
	740245	\$1.53	\$1.76	\$0.23
	740252	\$41.51	\$47.92	\$6.41
	740268	\$184.01	\$212.43	\$28.42
	740473	\$24.24	\$27.98	\$3.74
	740497	\$3.67	\$4.24	\$0.57
	740549	\$88.26	\$101.89	\$13.63
	740552	\$176.33	\$203.56	\$27.23
	740595	\$0.91	\$1.05	\$0.14
	740636	\$0.76	\$0.88	\$0.12
	740688	\$220.41	\$254.45	\$34.04
	740693	\$742.33	\$856.99	\$114.66
	740703	\$37.50	\$43.29	\$5.79
	740704	\$37.50	\$43.29	\$5.79
	740757	\$8.78	\$10.13	\$1.35
	740759	\$53.00	\$59.80	\$6.80
	740778	\$4.77	\$5.51	\$0.74
	740795	\$8.97	\$10.35	\$1.38
	741329	\$90.64	\$104.65	\$14.01
	741771	\$234.72	\$270.98	\$36.26
	741816	\$149.75	\$172.88	\$23.13
	743287	\$166.98	\$192.77	\$25.79
	9909208	\$79.90	\$92.24	\$12.34
	9909209	\$62.58	\$72.25	\$9.67
	9909210	\$23.97	\$27.67	\$3.70
Count of Accounts: 7414			Total:	\$800,380.94



CITY COUNCIL AGENDA FORM

Meeting Date: **6/27/2022**

Prepared by: Suzy Kou

Department: Finance

Agenda item: _____

Reviewed by: _____

AGENDA ITEM DESCRIPTION: Discussion/possible action regarding **Ordinance No. O-2022-0005**, authorizing payment of a property tax refund in accordance with Texas law THIS IS THE SECOND AND FINAL READING

☒ X

1. Ordinance
2. Refund amount from Galveston County Tax Office

STAFF BRIEFING:

- September 24 2021, Council adopted a tax rate of \$.550764 per \$100 of assessed value
- Due to our adopted tax rate exceeding the Voter Approval Rate of \$.477076 per \$100 of assessed value, voters had the right to roll the tax rate back to the Voters Approval Rate.
- May 7, 2022- Per election results, 2021 tax rate was adjusted to \$.477076
- According to Galveston County Tax Office, refund amounts to those already paid for the 2021 taxes total \$800,380.94. Those who have not paid will be billed based on new rate of .477076.

HISTORY:

- **September 24, 2021-** Council adopted a tax rate of .550764 per \$100 of assessed value
- **May 7, 2022-** City election held regarding tax rollback

TARGET IMPLEMENTATION: Mid July 2022

SIGNIFICANT ACTION DATES:

June 13, 2022 - First Reading of Ordinance

June 20, 2022 - Second Reading of Ordinance

ACTION:

☒ Ordinance ☐ Resolution



CITY COUNCIL AGENDA FORM

- ☐ Special Presentation ☐ Proclamation
- ☐ Finance Report ☐ Public Hearing
- ☐ Municode Codification
- ☒ Mark if this item does not conflict with any Resolution, Ordinance or City Charter, policies, procedures

Cost Details:	
Budgeted	-0-
Actual Bid	n/a
Estimated Expenditure	\$800,380.94
Acct. Name(s)	Current Tax Revenues
Line Items #	01-3100-00-00
Other Funding	

STAFF'S RECOMMENDATION: Motion to approve **Ordinance No. O-2022-0005**, authorizing payment of a property tax refund in accordance with Texas Law

FISCAL IMPACT: Decrease in tax revenues of over \$800,380.94

ORDINANCE NO. O-2022-0005

**AN ORDINANCE OF THE CITY OF LA MARQUE, TEXAS AUTHORIZING THE PAYMENT
OF A TAX REFUND TO PROPERTY TAXPAYERS IN ACCORDANCE WITH TEXAS LAW**

WHEREAS, on May 7, 2022 the City of La Marque, Texas conducted a special election titled:

**SPECIAL ELECTION
MAY 7, 2022
LA MARQUE TAX REFERENDUM**

WHEREAS, the City Council of La Marque, Texas canvassed and certified the results of the Special Election on May 17, 2022 in accordance with the laws of the State of Texas and the City Charter of La Marque, Texas.

WHEREAS, as a result of the Special Election the City of La Marque, Texas shall refund the difference between the amount of taxes paid by the property owners using the tax rate of \$.550764 and the tax rate of \$.477076 in accordance with Texas Tax Code § 26.075(k).

WHEREAS, the City of La Marque, Texas contracts with the Galveston County Tax Assessor Collector's office for the collection of property tax receipts.

WHEREAS, the City Council of La Marque, Texas desires to utilize the Galveston County Tax Assessor Collector's office to process and return the refunds required by Texas Tax Code § 26.075(k).

WHEREAS, the City Council of La Marque, Texas desires to make one payment to the Galveston County Tax Assessor Collector's office who will in turn remit the applicable amounts to the property owners in accordance with Texas Tax Code § 26.075(k).

NOW THEREFORE BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF LA MARQUE, TEXAS THAT:

Section 1. The findings and recitals set out in the preamble to this Ordinance are found to be true and correct and they are hereby adopted by the City Council and made a part hereof for all purposes.

Section 2. The City of La Marque Texas shall utilize the Galveston County Tax Assessor Collector's office to process and return the refunds required by Texas Tax Code § 26.075(k).

Section 3. The City Manager and appropriate city staff are authorized to deliver the amount of \$800,380.94 from the City of La Marque's general fund to the Galveston County Tax Assessor Collector's office for a refund to the property owners in accordance with Texas Tax Code § 26.075(k) and in the amounts set out in Exhibit 1.

Section 4. The City Manager and appropriate city staff are authorized, without further action of the City Council of La Marque, Texas, to make any other payments to the Galveston County Tax Assessor Collector's office that in the determination of the Galveston County Tax Assessor Collector are necessary to cover the property tax refund payments the subject of this Ordinance. The authority granted by this Section 4 shall expire 90 days after the effective date of this Ordinance.

Section 5. Repeal. This ordinance is intended to be cumulative and shall not repeal any provision of a previous ordinance or City Code provision, except to the extent that a provision is inconsistent and cannot be reconciled with this ordinance.

Section 6. Severability. In the event any clause, phrase, provision sentence, or part of this Ordinance or the application of the same to any person or circumstance for any reason be adjudged invalid or held unconstitutional by a court of competent jurisdiction, it is the intention of the City Council that the invalidity or unconstitutionality of the one or more parts shall not affect, impair, or invalidate this Ordinance as a whole or any part or provision other than the part declared to be invalid or unconstitutional; and the City Council of the City of La Marque, Texas, declares that it would have passed each and every part of the same notwithstanding the omission of any such part thus declared to be invalid or unconstitutional, whether there be one or more parts.

Section 7. Publication and Effective Date. This Ordinance shall be effective immediately upon passage by City Council, a public hearing in accordance with Section 2.19 of the City Charter, and publication of this ordinance or a caption that summarizes the purpose of this ordinance.

PASSED AND APPROVED by the City Council of the City of La Marque on First Reading this 13th day of June 2022; and

PASSED, APPROVED AND ADOPTED by the City Council of the City of La Marque on Second and Final Reading this 27th day of June 2022; and

CITY OF LA MARQUE, TEXAS

Keith Bell, Mayor

ATTEST:

Kierra Nance, TRMC, City Clerk

APPROVED AS TO FORM:

Gus Knebel
City Attorney

GALVESTON COUNTY

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Expected Refunds

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	131274	\$226.38	\$261.34	\$34.96
	131276	\$468.39	\$540.74	\$72.35
	131279	\$484.18	\$558.97	\$74.79
	131281	\$364.87	\$421.22	\$56.35
	131283	\$342.87	\$395.83	\$52.96
	131285	\$1,450.12	\$1,674.11	\$223.99
	131296	\$747.15	\$862.55	\$115.40
	131298	\$729.31	\$841.95	\$112.64
	131303	\$20,275.73	\$23,407.47	\$3,131.74
	131305	\$402.60	\$464.79	\$62.19
	131306	\$115.79	\$133.67	\$17.88
	131307	\$447.59	\$516.73	\$69.14
	131308	\$830.38	\$958.64	\$128.26
	131309	\$351.61	\$405.91	\$54.30
	131315	\$31.44	\$36.30	\$4.86
	131316	\$171.13	\$197.56	\$26.43
	131319	\$607.37	\$701.18	\$93.81
	131321	\$19.61	\$22.64	\$3.03
	131333	\$1,066.74	\$1,231.51	\$164.77
	131349	\$5,953.62	\$6,873.20	\$919.58
	131351	\$2,149.70	\$2,481.74	\$332.04
	131352	\$193.22	\$223.06	\$29.84
	131353	\$21,231.79	\$24,511.20	\$3,279.41
	131373	\$38.79	\$44.78	\$5.99
	131374	\$2.86	\$3.30	\$0.44
	131382	\$6.15	\$7.10	\$0.95
	131403	\$668.89	\$772.21	\$103.32
	131427	\$64.83	\$74.85	\$10.02
	131428	\$200.09	\$230.99	\$30.90
	131443	\$12,068.83	\$13,932.95	\$1,864.12
	131478	\$41.55	\$47.97	\$6.42
	131479	\$1,342.11	\$1,549.41	\$207.30
	131480	\$160.82	\$185.66	\$24.84
	131481	\$658.23	\$759.90	\$101.67
	131483	\$1,683.46	\$1,943.48	\$260.02
	131486	\$59.63	\$68.85	\$9.22
	131489	\$357.81	\$413.07	\$55.26
	131490	\$119.27	\$137.69	\$18.42
	131492	\$717.76	\$828.62	\$110.86
	131493	\$2,530.89	\$2,921.80	\$390.91
	131496	\$54.20	\$62.57	\$8.37
	131497	\$5,247.84	\$6,058.40	\$810.56
	131498	\$211.54	\$244.21	\$32.67
	131501	\$667.91	\$771.07	\$103.16
	131511	\$14.98	\$17.29	\$2.31
	131512	\$21.71	\$25.06	\$3.35
	131513	\$37.59	\$43.40	\$5.81

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	131516	\$451.54	\$521.28	\$69.74
	131518	\$6,201.99	\$7,159.93	\$957.94
	131519	\$7,789.94	\$8,993.15	\$1,203.21
	131520	\$1,192.69	\$1,376.91	\$184.22
	131521	\$791.66	\$913.94	\$122.28
	131522	\$883.94	\$922.69	\$38.75
	131523	\$973.33	\$1,123.67	\$150.34
	131567	\$1,216.11	\$1,403.95	\$187.84
	131571	\$607.22	\$701.01	\$93.79
	131590	\$455.46	\$525.81	\$70.35
	131591	\$431.32	\$497.95	\$66.63
	131595	\$324.41	\$374.52	\$50.11
	131596	\$357.33	\$412.52	\$55.19
	131597	\$103.62	\$119.63	\$16.01
	131598	\$980.44	\$1,131.88	\$151.44
	131606	\$1,350.27	\$1,558.83	\$208.56
	131610	\$8,687.08	\$10,028.86	\$1,341.78
	131611	\$695.62	\$803.07	\$107.45
	131612	\$376.89	\$435.10	\$58.21
	131622	\$1,842.32	\$2,126.89	\$284.57
	131623	\$359.53	\$415.06	\$55.53
	131624	\$786.70	\$908.21	\$121.51
	131631	\$948.23	\$1,094.69	\$146.46
	131632	\$16.94	\$19.55	\$2.61
	131633	\$620.20	\$715.99	\$95.79
	131634	\$630.32	\$651.51	\$21.19
	131637	\$900.67	\$1,039.79	\$139.12
	131639	\$51.24	\$59.15	\$7.91
	131643	\$1,406.21	\$1,623.41	\$217.20
	131645	\$805.40	\$929.80	\$124.40
	131647	\$413.62	\$477.51	\$63.89
	131649	\$1,667.86	\$1,925.47	\$257.61
	131651	\$822.48	\$949.52	\$127.04
	131652	\$617.46	\$712.83	\$95.37
	131653	\$264.35	\$305.18	\$40.83
	131659	\$579.72	\$621.36	\$41.64
	131660	\$791.74	\$914.03	\$122.29
	131662	\$768.76	\$887.50	\$118.74
	131663	\$906.02	\$1,045.96	\$139.94
	131671	\$546.92	\$631.40	\$84.48
	131674	\$1,031.30	\$1,190.59	\$159.29
	131676	\$1,111.97	\$1,283.72	\$171.75
	131692	\$435.76	\$503.07	\$67.31
	131694	\$6,201.99	\$7,159.93	\$957.94
	131698	\$165.02	\$190.51	\$25.49
	131699	\$68.08	\$78.59	\$10.51
	131700	\$600.70	\$693.48	\$92.78

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	131701	\$295.79	\$341.47	\$45.68
	131710	\$872.22	\$1,006.95	\$134.73
	131711	\$136.16	\$157.19	\$21.03
	131712	\$132.58	\$153.06	\$20.48
	131713	\$104.67	\$120.84	\$16.17
	131720	\$559.11	\$645.47	\$86.36
	131721	\$412.00	\$475.64	\$63.64
	131725	\$391.30	\$451.74	\$60.44
	131727	\$356.80	\$411.91	\$55.11
	131731	\$89.88	\$103.76	\$13.88
	131732	\$273.17	\$315.37	\$42.20
	131736	\$301.94	\$348.58	\$46.64
	132020	\$1,246.89	\$1,439.48	\$192.59
	132023	\$1,109.34	\$1,280.69	\$171.35
	132024	\$608.66	\$702.67	\$94.01
	132025	\$1,451.69	\$1,675.92	\$224.23
	132026	\$1,300.89	\$1,501.82	\$200.93
	132027	\$948.09	\$1,094.53	\$146.44
	132028	\$903.98	\$1,043.61	\$139.63
	132029	\$1,304.23	\$1,505.68	\$201.45
	132030	\$850.55	\$981.92	\$131.37
	132031	\$1,311.96	\$1,514.60	\$202.64
	132032	\$1,205.39	\$1,391.58	\$186.19
	132033	\$1,221.53	\$1,410.20	\$188.67
	132034	\$897.71	\$1,036.37	\$138.66
	132037	\$1,183.29	\$1,366.05	\$182.76
	132038	\$1,003.43	\$1,158.42	\$154.99
	132039	\$882.50	\$1,018.80	\$136.30
	132040	\$1,063.88	\$1,228.20	\$164.32
	132042	\$1,331.04	\$1,536.63	\$205.59
	132045	\$982.78	\$1,134.57	\$151.79
	132046	\$1,113.04	\$1,284.96	\$171.92
	132229	\$668.77	\$772.07	\$103.30
	132231	\$555.84	\$641.70	\$85.86
	132233	\$81.48	\$94.07	\$12.59
	132235	\$27.53	\$31.78	\$4.25
	132236	\$27.53	\$31.78	\$4.25
	132238	\$843.71	\$974.03	\$130.32
	132239	\$27.53	\$31.78	\$4.25
	132243	\$457.57	\$528.25	\$70.68
	132244	\$282.70	\$326.36	\$43.66
	132248	\$79.62	\$91.92	\$12.30
	132249	\$609.75	\$703.93	\$94.18
	132251	\$26.29	\$30.35	\$4.06
	132252	\$26.29	\$30.35	\$4.06
	132253	\$26.29	\$30.35	\$4.06
	132292	\$691.76	\$798.61	\$106.85

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	132294	\$644.52	\$744.07	\$99.55
	132295	\$1,071.51	\$1,237.02	\$165.51
	132298	\$1,033.01	\$1,192.57	\$159.56
	132302	\$909.50	\$1,049.98	\$140.48
	132303	\$644.05	\$743.53	\$99.48
	132305	\$781.45	\$902.15	\$120.70
	132308	\$739.42	\$853.63	\$114.21
	132310	\$686.02	\$791.98	\$105.96
	132311	\$638.66	\$737.31	\$98.65
	132321	\$773.76	\$893.27	\$119.51
	132322	\$824.16	\$951.46	\$127.30
	132323	\$658.07	\$759.71	\$101.64
	132324	\$697.27	\$804.97	\$107.70
	132327	\$670.29	\$773.82	\$103.53
	132328	\$689.02	\$795.45	\$106.43
	132331	\$744.09	\$859.02	\$114.93
	132332	\$960.35	\$1,108.69	\$148.34
	132333	\$1,134.87	\$1,310.16	\$175.29
	132334	\$572.01	\$660.37	\$88.36
	132335	\$834.88	\$963.84	\$128.96
	132338	\$853.87	\$985.76	\$131.89
	132339	\$739.88	\$854.16	\$114.28
	132341	\$572.77	\$661.24	\$88.47
	132342	\$719.90	\$831.09	\$111.19
	132343	\$1,104.71	\$1,275.34	\$170.63
	132344	\$1,313.72	\$1,516.64	\$202.92
	132345	\$757.89	\$874.95	\$117.06
	132347	\$679.05	\$783.93	\$104.88
	132349	\$678.86	\$783.72	\$104.86
	132350	\$870.74	\$1,005.23	\$134.49
	132351	\$580.62	\$599.35	\$18.73
	132355	\$564.19	\$651.33	\$87.14
	132356	\$464.85	\$536.65	\$71.80
	132357	\$834.12	\$962.96	\$128.84
	132358	\$931.30	\$1,075.15	\$143.85
	132360	\$673.67	\$777.73	\$104.06
	132364	\$873.53	\$1,008.45	\$134.92
	132365	\$581.72	\$671.57	\$89.85
	132367	\$652.71	\$753.52	\$100.81
	132368	\$808.11	\$932.93	\$124.82
	132370	\$1,041.74	\$1,202.65	\$160.91
	132373	\$487.10	\$562.34	\$75.24
	132374	\$853.35	\$985.15	\$131.80
	132381	\$702.95	\$811.52	\$108.57
	132383	\$844.64	\$975.10	\$130.46
	132384	\$348.12	\$401.89	\$53.77
	132385	\$921.58	\$1,063.93	\$142.35

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332	132387	\$60.25	\$69.56	\$9.31
	132390	\$257.91	\$297.74	\$39.83
	132391	\$20.08	\$23.19	\$3.11
	132392	\$20.08	\$23.19	\$3.11
	132393	\$479.22	\$553.24	\$74.02
	132395	\$295.36	\$340.98	\$45.62
	132397	\$268.31	\$309.75	\$41.44
	132399	\$20.28	\$23.41	\$3.13
	132402	\$342.96	\$395.93	\$52.97
	132404	\$537.00	\$619.94	\$82.94
	132405	\$419.22	\$483.97	\$64.75
	132409	\$706.81	\$815.98	\$109.17
	132410	\$966.99	\$1,116.34	\$149.35
	132411	\$590.39	\$681.58	\$91.19
	132413	\$121.18	\$139.89	\$18.71
	132418	\$644.43	\$743.97	\$99.54
	132419	\$1,226.99	\$1,416.51	\$189.52
	132421	\$748.27	\$863.85	\$115.58
	132422	\$1,018.08	\$1,175.33	\$157.25
	132424	\$102.00	\$117.75	\$15.75
	132425	\$1,431.23	\$1,652.29	\$221.06
	132426	\$511.28	\$590.25	\$78.97
	132428	\$87.78	\$101.34	\$13.56
	132437	\$122.37	\$141.27	\$18.90
	132440	\$1,052.48	\$1,215.04	\$162.56
	132441	\$1,399.10	\$1,615.20	\$216.10
	132448	\$299.79	\$346.10	\$46.31
	132453	\$520.20	\$600.55	\$80.35
	132455	\$1,422.83	\$1,642.60	\$219.77
	132457	\$147.13	\$158.63	\$11.50
	132458	\$405.56	\$468.20	\$62.64
	132460	\$44.65	\$51.55	\$6.90
	132464	\$377.27	\$435.54	\$58.27
	132470	\$83.39	\$96.27	\$12.88
	132472	\$631.17	\$728.66	\$97.49
	132473	\$1,135.49	\$1,310.87	\$175.38
	132477	\$565.34	\$652.66	\$87.32
	132478	\$565.34	\$652.66	\$87.32
	132480	\$68.70	\$79.31	\$10.61
	132481	\$613.33	\$708.06	\$94.73
	132482	\$612.95	\$707.62	\$94.67
	132484	\$101.95	\$117.70	\$15.75
	132621	\$175.52	\$202.63	\$27.11
	132628	\$20.28	\$23.41	\$3.13
	132629	\$20.28	\$23.41	\$3.13
	132630	\$20.28	\$23.41	\$3.13
	132634	\$1,077.00	\$1,243.36	\$166.36

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	132635	\$202.69	\$233.99	\$31.30
	132636	\$86.35	\$99.69	\$13.34
	132638	\$783.50	\$904.52	\$121.02
	132639	\$609.03	\$703.10	\$94.07
	132640	\$689.28	\$795.75	\$106.47
	132642	\$857.01	\$953.98	\$96.97
	132643	\$226.61	\$261.61	\$35.00
	132644	\$427.73	\$493.80	\$66.07
	132649	\$395.53	\$456.63	\$61.10
	132652	\$1,630.17	\$1,881.96	\$251.79
	132656	\$86.35	\$99.69	\$13.34
	132657	\$893.81	\$1,031.87	\$138.06
	132658	\$86.35	\$99.69	\$13.34
	132659	\$86.35	\$99.69	\$13.34
	132660	\$86.35	\$99.69	\$13.34
	132661	\$86.35	\$99.69	\$13.34
	132662	\$418.01	\$482.57	\$64.56
	132663	\$86.35	\$99.69	\$13.34
	132665	\$391.54	\$452.01	\$60.47
	132666	\$1,468.96	\$1,695.86	\$226.90
	132667	\$1,311.86	\$1,514.49	\$202.63
	132669	\$86.35	\$99.69	\$13.34
	132670	\$1,431.94	\$1,653.12	\$221.18
	132671	\$798.63	\$921.98	\$123.35
	132673	\$3,339.53	\$3,855.35	\$515.82
	132678	\$86.35	\$99.69	\$13.34
	132682	\$86.35	\$99.69	\$13.34
	132687	\$315.71	\$364.47	\$48.76
	132688	\$402.04	\$464.13	\$62.09
	132690	\$500.75	\$578.09	\$77.34
	132691	\$2,266.11	\$2,616.13	\$350.02
	132693	\$405.51	\$468.15	\$62.64
	132695	\$377.61	\$435.93	\$58.32
	132699	\$653.55	\$754.49	\$100.94
	132700	\$164.44	\$167.57	\$3.13
	132703	\$234.56	\$270.79	\$36.23
	132708	\$68.56	\$79.14	\$10.58
	132709	\$32.54	\$37.56	\$5.02
	132711	\$1,049.57	\$1,211.68	\$162.11
	132712	\$38.40	\$44.34	\$5.94
	132716	\$3,005.58	\$3,469.81	\$464.23
	132717	\$4,495.73	\$5,190.12	\$694.39
	132718	\$14,518.19	\$16,760.63	\$2,242.44
	132851	\$8,795.75	\$10,154.33	\$1,358.58
	132855	\$91.07	\$105.14	\$14.07
	132856	\$136.44	\$157.52	\$21.08
	132862	\$244.50	\$282.27	\$37.77

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	132863	\$2,146.84	\$2,478.44	\$331.60
	132864	\$857.23	\$989.64	\$132.41
	132867	\$671.65	\$775.39	\$103.74
	132870	\$413.03	\$476.83	\$63.80
	132871	\$455.08	\$525.37	\$70.29
	132873	\$1,653.32	\$1,908.68	\$255.36
	132875	\$441.01	\$509.13	\$68.12
	132877	\$560.80	\$647.42	\$86.62
	132878	\$1,451.98	\$1,676.25	\$224.27
	132880	\$177.62	\$205.05	\$27.43
	132882	\$265.02	\$305.95	\$40.93
	132883	\$607.84	\$701.73	\$93.89
	132884	\$140.31	\$161.98	\$21.67
	132886	\$348.99	\$402.89	\$53.90
	132887	\$531.99	\$614.16	\$82.17
	132889	\$265.02	\$305.95	\$40.93
	132890	\$268.40	\$309.86	\$41.46
	132892	\$366.33	\$422.92	\$56.59
	132893	\$345.72	\$399.12	\$53.40
	132894	\$475.67	\$549.14	\$73.47
	132895	\$132.53	\$153.00	\$20.47
	132896	\$727.83	\$840.25	\$112.42
	132900	\$318.65	\$367.87	\$49.22
	132903	\$395.48	\$456.57	\$61.09
	132904	\$612.95	\$707.62	\$94.67
	132906	\$790.13	\$912.18	\$122.05
	132907	\$474.40	\$547.68	\$73.28
	132908	\$585.85	\$676.34	\$90.49
	132916	\$586.80	\$677.44	\$90.64
	132918	\$357.81	\$413.07	\$55.26
	132919	\$523.11	\$603.91	\$80.80
	132920	\$635.85	\$734.06	\$98.21
	132922	\$503.70	\$581.50	\$77.80
	132923	\$679.07	\$783.96	\$104.89
	132924	\$522.88	\$603.64	\$80.76
	132970	\$513.66	\$593.00	\$79.34
	132971	\$220.98	\$255.11	\$34.13
	132972	\$296.17	\$341.91	\$45.74
	132974	\$438.93	\$506.72	\$67.79
	132977	\$428.75	\$494.97	\$66.22
	132978	\$487.62	\$562.94	\$75.32
	132981	\$985.35	\$1,137.55	\$152.20
	132982	\$566.71	\$654.25	\$87.54
	132983	\$41.46	\$47.86	\$6.40
	132984	\$71.61	\$82.67	\$11.06
	132985	\$83.39	\$96.27	\$12.88
	132986	\$78.72	\$90.88	\$12.16

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332	132987	\$855.51	\$987.65	\$132.14
	132989	\$812.05	\$937.48	\$125.43
	132990	\$539.63	\$622.99	\$83.36
	132991	\$324.63	\$333.72	\$9.09
	132992	\$460.52	\$531.65	\$71.13
	132994	\$54.34	\$62.73	\$8.39
	132995	\$477.71	\$515.40	\$37.69
	132997	\$336.86	\$388.89	\$52.03
	133000	\$695.02	\$802.38	\$107.36
	133001	\$290.77	\$335.69	\$44.92
	133002	\$43.70	\$50.45	\$6.75
	133004	\$574.11	\$662.79	\$88.68
	133010	\$589.95	\$681.07	\$91.12
	133011	\$578.21	\$667.51	\$89.30
	133012	\$508.10	\$586.57	\$78.47
	133014	\$44.51	\$51.39	\$6.88
	133015	\$737.53	\$851.45	\$113.92
	133016	\$1,130.48	\$1,176.43	\$45.95
	133017	\$1,146.28	\$1,323.34	\$177.06
	133018	\$48.09	\$55.52	\$7.43
	133020	\$1,017.27	\$1,174.39	\$157.12
	133021	\$58.11	\$67.08	\$8.97
	133025	\$1,446.73	\$1,670.19	\$223.46
	133026	\$63.02	\$72.76	\$9.74
	133027	\$744.25	\$859.20	\$114.95
	133113	\$3,575.31	\$4,127.55	\$552.24
	133114	\$766.42	\$884.80	\$118.38
	133115	\$1,252.09	\$1,445.48	\$193.39
	133116	\$631.31	\$728.83	\$97.52
	133119	\$1,032.01	\$1,191.41	\$159.40
	133120	\$981.44	\$1,133.03	\$151.59
	133121	\$1,633.08	\$1,885.32	\$252.24
	133122	\$1,536.80	\$1,774.17	\$237.37
	133123	\$2,963.21	\$3,420.91	\$457.70
	133126	\$34,401.00	\$39,714.49	\$5,313.49
	133140	\$405.51	\$468.15	\$62.64
	133141	\$34.30	\$39.60	\$5.30
	133145	\$552.23	\$637.53	\$85.30
	133152	\$453.46	\$523.50	\$70.04
	133154	\$46.37	\$53.53	\$7.16
	133168	\$2,078.14	\$2,399.13	\$320.99
	133172	\$3,816.61	\$4,406.11	\$589.50
	133173	\$2,194.55	\$2,533.51	\$338.96
	133174	\$1,908.30	\$2,203.06	\$294.76
	133179	\$14.46	\$16.69	\$2.23
	133180	\$1,696.39	\$1,958.41	\$262.02
	133181	\$6,844.42	\$7,901.59	\$1,057.17

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Expected Refunds

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	133182	\$223.80	\$258.36	\$34.56
	133183	\$309.24	\$357.01	\$47.77
	133186	\$431.04	\$497.62	\$66.58
	133187	\$26.48	\$30.57	\$4.09
	133188	\$26.48	\$30.57	\$4.09
	133189	\$346.40	\$399.91	\$53.51
	133190	\$626.16	\$722.88	\$96.72
	133191	\$524.50	\$605.51	\$81.01
	133192	\$636.45	\$734.75	\$98.30
	133195	\$451.08	\$520.75	\$69.67
	133198	\$1,736.41	\$2,004.62	\$268.21
	133199	\$2,266.11	\$2,616.13	\$350.02
	133204	\$386.71	\$446.44	\$59.73
	133205	\$412.57	\$476.30	\$63.73
	133206	\$816.42	\$942.52	\$126.10
	133207	\$516.30	\$596.05	\$79.75
	133208	\$487.76	\$563.10	\$75.34
	133211	\$527.93	\$609.48	\$81.55
	133212	\$814.37	\$940.15	\$125.78
	133214	\$118.94	\$137.31	\$18.37
	133215	\$806.40	\$930.96	\$124.56
	133216	\$662.49	\$764.81	\$102.32
	133217	\$481.78	\$556.20	\$74.42
	133218	\$617.09	\$712.41	\$95.32
	133219	\$649.54	\$749.87	\$100.33
	133224	\$419.03	\$483.76	\$64.73
	133225	\$892.90	\$1,030.81	\$137.91
	133226	\$725.16	\$837.16	\$112.00
	133227	\$394.07	\$454.94	\$60.87
	133230	\$441.77	\$510.01	\$68.24
	133231	\$572.01	\$660.36	\$88.35
	133233	\$348.22	\$402.00	\$53.78
	133234	\$417.20	\$481.64	\$64.44
	133236	\$1,100.52	\$1,270.50	\$169.98
	133237	\$639.24	\$737.97	\$98.73
	133239	\$555.79	\$641.61	\$85.82
	133242	\$484.23	\$559.03	\$74.80
	133243	\$386.43	\$446.12	\$59.69
	133245	\$461.76	\$533.08	\$71.32
	133247	\$474.76	\$488.25	\$13.49
	133248	\$520.69	\$601.11	\$80.42
	133249	\$641.05	\$740.06	\$99.01
	133253	\$773.99	\$893.54	\$119.55
	133255	\$33.44	\$38.61	\$5.17
	133258	\$11.64	\$13.44	\$1.80
	133259	\$11.64	\$13.44	\$1.80
	133260	\$35.92	\$41.47	\$5.55

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	133261	\$25.76	\$29.74	\$3.98
	133262	\$52.86	\$61.02	\$8.16
	133271	\$36.07	\$41.64	\$5.57
	133272	\$36.07	\$41.64	\$5.57
	133273	\$36.07	\$41.64	\$5.57
	133274	\$36.07	\$41.64	\$5.57
	133279	\$36.07	\$41.64	\$5.57
	133280	\$36.07	\$41.64	\$5.57
	133281	\$36.07	\$41.64	\$5.57
	133282	\$36.07	\$41.64	\$5.57
	133283	\$36.07	\$41.64	\$5.57
	133284	\$36.07	\$41.64	\$5.57
	133285	\$36.07	\$41.64	\$5.57
	133286	\$33.82	\$39.05	\$5.23
	133289	\$12.88	\$14.87	\$1.99
	133290	\$12.88	\$14.87	\$1.99
	133291	\$12.88	\$14.87	\$1.99
	133292	\$12.88	\$14.87	\$1.99
	133293	\$12.88	\$14.87	\$1.99
	133294	\$12.26	\$14.15	\$1.89
	133303	\$72.13	\$83.28	\$11.15
	133304	\$36.07	\$41.64	\$5.57
	133305	\$472.35	\$545.31	\$72.96
	133306	\$652.12	\$752.84	\$100.72
	133307	\$72.13	\$83.28	\$11.15
	133308	\$25.76	\$29.74	\$3.98
	133309	\$35.78	\$41.31	\$5.53
	133310	\$12.50	\$14.43	\$1.93
	133311	\$12.31	\$14.21	\$1.90
	133312	\$12.02	\$13.88	\$1.86
	133322	\$37.26	\$43.01	\$5.75
	133323	\$37.74	\$43.57	\$5.83
	133324	\$38.45	\$44.39	\$5.94
	133325	\$37.64	\$43.46	\$5.82
	133326	\$367.52	\$424.28	\$56.76
	133334	\$33.20	\$38.33	\$5.13
	133335	\$33.20	\$38.33	\$5.13
	133336	\$33.20	\$38.33	\$5.13
	133337	\$33.20	\$38.33	\$5.13
	133338	\$11.83	\$13.66	\$1.83
	133339	\$11.83	\$13.66	\$1.83
	133340	\$11.83	\$13.66	\$1.83
	133341	\$11.83	\$13.66	\$1.83
	133342	\$12.36	\$14.26	\$1.90
	133358	\$316.69	\$322.36	\$5.67
	133359	\$59.68	\$68.90	\$9.22
	133360	\$214.78	\$247.95	\$33.17

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Expected Refunds

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	133361	\$59.68	\$68.90	\$9.22
	133362	\$1,442.01	\$1,664.74	\$222.73
	133365	\$138.30	\$159.67	\$21.37
	133366	\$103.67	\$119.68	\$16.01
	133389	\$1,144.98	\$1,321.83	\$176.85
	133390	\$1,005.68	\$1,161.01	\$155.33
	133393	\$64.64	\$74.63	\$9.99
	133394	\$71.56	\$82.61	\$11.05
	133395	\$158.58	\$183.07	\$24.49
	133398	\$380.04	\$438.74	\$58.70
	133475	\$1.72	\$1.98	\$0.26
	133476	\$807.54	\$932.27	\$124.73
	133478	\$694.48	\$801.75	\$107.27
	133482	\$1,127.13	\$1,301.22	\$174.09
	133485	\$1,017.08	\$1,174.17	\$157.09
	133486	\$97.80	\$112.91	\$15.11
	133487	\$1,067.71	\$1,232.63	\$164.92
	133488	\$924.35	\$1,067.13	\$142.78
	133489	\$1,040.03	\$1,200.67	\$160.64
	133492	\$817.79	\$944.10	\$126.31
	133493	\$1,031.99	\$1,191.39	\$159.40
	133495	\$1,673.06	\$1,931.47	\$258.41
	133496	\$1,296.49	\$1,496.74	\$200.25
	133498	\$1,437.14	\$1,659.12	\$221.98
	133503	\$1,167.40	\$1,347.72	\$180.32
	133507	\$1,000.66	\$1,155.22	\$154.56
	133508	\$954.15	\$1,101.53	\$147.38
	133511	\$760.58	\$878.06	\$117.48
	133512	\$591.69	\$683.09	\$91.40
	133514	\$848.38	\$979.42	\$131.04
	133516	\$875.23	\$1,010.42	\$135.19
	133519	\$681.99	\$787.33	\$105.34
	133522	\$641.18	\$740.22	\$99.04
	133523	\$34.54	\$39.88	\$5.34
	133524	\$41.22	\$47.59	\$6.37
	133528	\$646.36	\$746.20	\$99.84
	133531	\$771.29	\$890.42	\$119.13
	133532	\$889.79	\$1,027.23	\$137.44
	133536	\$502.70	\$580.35	\$77.65
	133538	\$977.24	\$1,128.18	\$150.94
	133540	\$738.61	\$852.69	\$114.08
	133541	\$4.25	\$4.90	\$0.65
	133543	\$4.25	\$4.90	\$0.65
	133549	\$43.41	\$50.12	\$6.71
	133550	\$543.39	\$627.32	\$83.93
	133551	\$226.40	\$261.37	\$34.97
	133555	\$169.98	\$196.24	\$26.26

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	133604	\$928.24	\$1,071.61	\$143.37
	133608	\$714.28	\$824.61	\$110.33
	133609	\$1,146.55	\$1,323.64	\$177.09
	133610	\$661.49	\$763.66	\$102.17
	134217	\$4,117.17	\$4,753.09	\$635.92
	134218	\$47.71	\$55.08	\$7.37
	134219	\$2,603.69	\$3,005.85	\$402.16
	134222	\$4,080.86	\$4,711.18	\$630.32
	134225	\$1,755.54	\$2,026.70	\$271.16
	134227	\$215.02	\$248.23	\$33.21
	134228	\$201.90	\$233.08	\$31.18
	134231	\$56.25	\$64.94	\$8.69
	134232	\$1,957.92	\$2,260.34	\$302.42
	134233	\$70.13	\$80.96	\$10.83
	134236	\$50.62	\$58.44	\$7.82
	134237	\$301.49	\$348.06	\$46.57
	134238	\$244.28	\$282.01	\$37.73
	134239	\$71.27	\$82.27	\$11.00
	134245	\$474.51	\$547.80	\$73.29
	134246	\$524.78	\$605.84	\$81.06
	134247	\$1,328.66	\$1,533.88	\$205.22
	134248	\$140.26	\$161.92	\$21.66
	134250	\$57.82	\$66.75	\$8.93
	134251	\$28.05	\$32.38	\$4.33
	134253	\$131.86	\$152.23	\$20.37
	134255	\$1,386.05	\$1,600.14	\$214.09
	134256	\$1,128.86	\$1,303.22	\$174.36
	134257	\$140.26	\$161.92	\$21.66
	134259	\$939.84	\$1,085.01	\$145.17
	134260	\$365.82	\$422.32	\$56.50
	134261	\$48.33	\$55.79	\$7.46
	134262	\$57.01	\$65.82	\$8.81
	134263	\$78.67	\$90.82	\$12.15
	134264	\$721.20	\$832.59	\$111.39
	134265	\$477.08	\$550.76	\$73.68
	134266	\$111.16	\$128.33	\$17.17
	134269	\$140.26	\$161.92	\$21.66
	134270	\$612.70	\$707.34	\$94.64
	134271	\$1,073.42	\$1,239.22	\$165.80
	134272	\$370.59	\$427.83	\$57.24
	134279	\$273.74	\$316.02	\$42.28
	134281	\$2,578.60	\$2,947.20	\$368.60
	134282	\$611.80	\$706.30	\$94.50
	134283	\$2,504.65	\$2,891.51	\$386.86
	134284	\$1,487.05	\$1,716.73	\$229.68
	134288	\$606.00	\$699.60	\$93.60
	134289	\$11.45	\$13.22	\$1.77

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	134527	\$435.90	\$503.23	\$67.33
	134528	\$799.05	\$922.47	\$123.42
	134529	\$1,240.78	\$1,432.43	\$191.65
	134533	\$379.85	\$438.52	\$58.67
	134534	\$137.41	\$158.63	\$21.22
	134536	\$678.07	\$782.81	\$104.74
	134537	\$556.69	\$642.68	\$85.99
	134538	\$632.21	\$729.86	\$97.65
	134539	\$766.66	\$885.08	\$118.42
	134540	\$268.68	\$310.18	\$41.50
	134542	\$381.66	\$440.61	\$58.95
	134543	\$375.68	\$433.71	\$58.03
	134547	\$519.54	\$599.78	\$80.24
	134548	\$331.66	\$382.89	\$51.23
	134549	\$515.54	\$516.95	\$1.41
	134666	\$159.39	\$184.01	\$24.62
	134667	\$86.49	\$99.85	\$13.36
	134668	\$132.05	\$152.45	\$20.40
	134670	\$550.93	\$636.02	\$85.09
	134671	\$36.59	\$42.24	\$5.65
	134675	\$1,687.89	\$1,948.60	\$260.71
	134676	\$1,426.46	\$1,646.78	\$220.32
	134685	\$895.02	\$1,033.26	\$138.24
	134686	\$1,119.85	\$1,292.82	\$172.97
	134687	\$1,014.88	\$1,171.64	\$156.76
	134688	\$439.91	\$507.86	\$67.95
	134689	\$400.69	\$462.58	\$61.89
	134690	\$574.55	\$663.29	\$88.74
	134692	\$669.98	\$773.46	\$103.48
	134694	\$762.26	\$879.99	\$117.73
	134697	\$30.39	\$35.08	\$4.69
	134698	\$676.73	\$781.25	\$104.52
	134699	\$1,222.98	\$1,411.88	\$188.90
	134700	\$12.26	\$14.15	\$1.89
	134701	\$1.81	\$2.09	\$0.28
	134704	\$379.04	\$437.58	\$58.54
	134708	\$13.17	\$15.20	\$2.03
	134713	\$618.00	\$713.46	\$95.46
	134715	\$2,289.96	\$2,643.67	\$353.71
	134717	\$135.44	\$156.36	\$20.92
	134719	\$193.50	\$223.39	\$29.89
	134724	\$2,361.53	\$2,726.28	\$364.75
	134725	\$434.81	\$501.97	\$67.16
	134726	\$948.81	\$1,095.36	\$146.55
	134727	\$684.79	\$790.57	\$105.78
	134827	\$461.81	\$533.14	\$71.33
	134828	\$481.84	\$556.27	\$74.43

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	134830	\$595.87	\$687.90	\$92.03
	134832	\$728.45	\$840.96	\$112.51
	134833	\$742.95	\$857.70	\$114.75
	134834	\$633.37	\$731.19	\$97.82
	134835	\$682.03	\$787.37	\$105.34
	134836	\$514.57	\$594.05	\$79.48
	134837	\$400.08	\$461.87	\$61.79
	134840	\$429.37	\$495.69	\$66.32
	134843	\$350.40	\$404.52	\$54.12
	134844	\$237.19	\$239.18	\$1.99
	134847	\$175.47	\$202.57	\$27.10
	134852	\$691.90	\$798.77	\$106.87
	134853	\$572.49	\$660.92	\$88.43
	134854	\$437.51	\$505.08	\$67.57
	134855	\$312.58	\$360.86	\$48.28
	134856	\$266.07	\$269.22	\$3.15
	134857	\$575.40	\$664.28	\$88.88
	134858	\$614.43	\$709.33	\$94.90
	134859	\$298.39	\$303.15	\$4.76
	134860	\$258.33	\$261.11	\$2.78
	134861	\$307.62	\$355.14	\$47.52
	134862	\$383.09	\$442.26	\$59.17
	134863	\$314.89	\$363.53	\$48.64
	134864	\$449.86	\$519.34	\$69.48
	134865	\$576.02	\$664.99	\$88.97
	134866	\$229.00	\$264.37	\$35.37
	134867	\$386.86	\$446.61	\$59.75
	134868	\$430.71	\$497.24	\$66.53
	134869	\$921.00	\$1,063.25	\$142.25
	134871	\$379.84	\$388.64	\$8.80
	134872	\$300.63	\$338.01	\$37.38
	134874	\$712.42	\$822.46	\$110.04
	134875	\$684.48	\$790.20	\$105.72
	134877	\$648.82	\$749.04	\$100.22
	134879	\$714.99	\$825.43	\$110.44
	134880	\$588.09	\$678.93	\$90.84
	134881	\$468.97	\$541.40	\$72.43
	134886	\$601.12	\$693.96	\$92.84
	134888	\$739.04	\$853.19	\$114.15
	134889	\$481.27	\$555.61	\$74.34
	134890	\$382.85	\$441.98	\$59.13
	134891	\$260.29	\$300.49	\$40.20
	134892	\$635.80	\$734.00	\$98.20
	134893	\$654.98	\$756.14	\$101.16
	134894	\$757.05	\$873.99	\$116.94
	134895	\$24.62	\$28.42	\$3.80
	134896	\$391.04	\$451.43	\$60.39

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	134898	\$96.18	\$111.03	\$14.85
	134901	\$524.00	\$604.94	\$80.94
	134902	\$942.27	\$1,087.81	\$145.54
	134904	\$332.91	\$384.33	\$51.42
	134908	\$531.45	\$547.75	\$16.30
	134909	\$892.75	\$1,030.64	\$137.89
	134910	\$648.91	\$749.14	\$100.23
	134911	\$1,140.78	\$1,316.99	\$176.21
	134912	\$727.59	\$839.97	\$112.38
	134913	\$546.41	\$630.81	\$84.40
	134914	\$773.18	\$892.61	\$119.43
	134916	\$1,876.72	\$2,166.60	\$289.88
	134917	\$778.16	\$898.35	\$120.19
	134919	\$1,108.49	\$1,279.70	\$171.21
	134921	\$686.45	\$792.47	\$106.02
	134923	\$625.06	\$721.61	\$96.55
	134924	\$653.40	\$754.33	\$100.93
	134925	\$699.63	\$807.70	\$108.07
	134926	\$504.69	\$582.64	\$77.95
	134927	\$1,443.15	\$1,666.06	\$222.91
	134928	\$1,304.23	\$1,505.68	\$201.45
	134930	\$1,078.28	\$1,244.83	\$166.55
	134931	\$1,691.71	\$1,953.01	\$261.30
	134932	\$679.95	\$784.97	\$105.02
	134934	\$984.83	\$1,136.94	\$152.11
	134935	\$711.13	\$820.97	\$109.84
	134937	\$769.37	\$797.44	\$28.07
	134938	\$555.45	\$572.93	\$17.48
	134941	\$856.15	\$988.39	\$132.24
	134943	\$494.63	\$571.03	\$76.40
	134945	\$658.28	\$680.85	\$22.57
	134947	\$708.84	\$818.33	\$109.49
	134949	\$818.19	\$944.56	\$126.37
	134950	\$967.56	\$1,117.00	\$149.44
	134951	\$824.72	\$952.11	\$127.39
	134952	\$940.98	\$1,086.33	\$145.35
	134953	\$573.93	\$662.58	\$88.65
	134955	\$706.07	\$815.13	\$109.06
	134956	\$683.63	\$789.22	\$105.59
	134958	\$720.43	\$831.71	\$111.28
	134959	\$499.42	\$576.56	\$77.14
	134960	\$739.47	\$853.68	\$114.21
	134961	\$773.10	\$892.51	\$119.41
	134963	\$474.42	\$487.89	\$13.47
	134964	\$559.87	\$646.35	\$86.48
	134965	\$561.58	\$648.32	\$86.74
	134966	\$689.47	\$795.96	\$106.49

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Expected Refunds

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	134967	\$867.28	\$1,001.23	\$133.95
	134969	\$834.98	\$963.95	\$128.97
	134970	\$560.38	\$646.93	\$86.55
	134977	\$931.68	\$1,075.59	\$143.91
	134978	\$759.30	\$876.58	\$117.28
	134979	\$745.29	\$860.40	\$115.11
	134980	\$630.10	\$727.42	\$97.32
	134981	\$453.03	\$465.44	\$12.41
	134986	\$481.49	\$555.86	\$74.37
	134987	\$743.45	\$770.24	\$26.79
	134989	\$749.87	\$865.69	\$115.82
	134991	\$772.86	\$892.24	\$119.38
	134992	\$824.48	\$951.83	\$127.35
	134995	\$588.62	\$679.53	\$90.91
	134996	\$616.46	\$711.68	\$95.22
	134997	\$523.87	\$604.78	\$80.91
	134999	\$600.58	\$693.35	\$92.77
	135001	\$549.31	\$634.15	\$84.84
	135002	\$634.70	\$732.74	\$98.04
	135007	\$574.78	\$663.56	\$88.78
	141118	\$21.80	\$25.17	\$3.37
	141121	\$3.34	\$3.86	\$0.52
	141157	\$2.29	\$2.64	\$0.35
	141160	\$38.42	\$44.36	\$5.94
	141161	\$20.78	\$23.99	\$3.21
	141253	\$80.20	\$92.58	\$12.38
	142681	\$1,424.32	\$1,644.31	\$219.99
	142684	\$1,283.33	\$1,481.56	\$198.23
	142685	\$1,581.44	\$1,825.70	\$244.26
	142686	\$136.21	\$157.24	\$21.03
	142687	\$1,651.55	\$1,906.64	\$255.09
	142690	\$1,280.81	\$1,478.64	\$197.83
	142691	\$2,204.19	\$2,544.64	\$340.45
	142693	\$1,140.02	\$1,316.11	\$176.09
	142695	\$1,185.68	\$1,368.81	\$183.13
	142696	\$944.35	\$1,090.21	\$145.86
	142697	\$1,036.71	\$1,196.84	\$160.13
	142698	\$966.44	\$1,115.72	\$149.28
	142700	\$1,016.29	\$1,050.58	\$34.29
	142701	\$2,356.76	\$2,720.77	\$364.01
	142704	\$163.64	\$188.91	\$25.27
	142705	\$2,239.82	\$2,585.78	\$345.96
	142708	\$2,105.34	\$2,140.43	\$35.09
	142709	\$1,583.99	\$1,828.65	\$244.66
	142711	\$1,602.98	\$1,850.57	\$247.59
	142712	\$1,140.20	\$1,316.31	\$176.11
	142713	\$1,268.93	\$1,464.92	\$195.99

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	142721	\$1,202.86	\$1,388.65	\$185.79
	142723	\$1,760.18	\$2,032.05	\$271.87
	142724	\$1,599.87	\$1,753.80	\$153.93
	142726	\$1,425.46	\$1,643.73	\$218.27
	142730	\$1,211.01	\$1,398.06	\$187.05
	142733	\$1,525.31	\$1,760.90	\$235.59
	142734	\$2,120.41	\$2,447.93	\$327.52
	142736	\$1,574.35	\$1,817.52	\$243.17
	142737	\$1,420.26	\$1,480.56	\$60.30
	142738	\$988.45	\$1,141.13	\$152.68
	142744	\$1,343.92	\$1,551.50	\$207.58
	142746	\$1,841.46	\$1,922.61	\$81.15
	142752	\$1,091.08	\$1,259.60	\$168.52
	142753	\$1,617.62	\$1,867.48	\$249.86
	142754	\$1,098.32	\$1,267.97	\$169.65
	142756	\$1,273.79	\$1,470.54	\$196.75
	142757	\$1,839.58	\$2,123.71	\$284.13
	142759	\$1,534.89	\$1,771.96	\$237.07
	142760	\$1,459.28	\$1,684.68	\$225.40
	142761	\$1,369.21	\$1,580.69	\$211.48
	142764	\$1,671.23	\$1,929.36	\$258.13
	142765	\$1,859.78	\$2,147.04	\$287.26
	142766	\$1,185.33	\$1,368.41	\$183.08
	142767	\$1,918.80	\$2,215.17	\$296.37
	142768	\$1,231.82	\$1,422.09	\$190.27
	142770	\$181.62	\$209.68	\$28.06
	142772	\$1,344.23	\$1,551.86	\$207.63
	142773	\$901.84	\$1,041.14	\$139.30
	142776	\$1,802.87	\$2,081.34	\$278.47
	142777	\$138.50	\$159.89	\$21.39
	142778	\$1,607.75	\$1,856.07	\$248.32
	142779	\$1,961.08	\$2,263.98	\$302.90
	142781	\$181.62	\$209.68	\$28.06
	142784	\$1,138.47	\$1,314.31	\$175.84
	142786	\$1,314.87	\$1,517.96	\$203.09
	142788	\$1,216.50	\$1,404.39	\$187.89
	142789	\$1,262.06	\$1,457.00	\$194.94
	142791	\$1,226.61	\$1,416.07	\$189.46
	142792	\$1,622.06	\$1,872.60	\$250.54
	142793	\$1,979.87	\$2,285.67	\$305.80
	142794	\$1,034.19	\$1,193.93	\$159.74
	142795	\$901.67	\$1,040.94	\$139.27
	142797	\$2,041.41	\$2,356.72	\$315.31
	142798	\$1,371.91	\$1,583.81	\$211.90
	142800	\$1,372.78	\$1,584.82	\$212.04
	142801	\$1,988.02	\$2,118.62	\$130.60
	142802	\$1,112.59	\$1,284.44	\$171.85

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	142804	\$1,178.33	\$1,360.33	\$182.00
	142805	\$1,229.33	\$1,419.21	\$189.88
	142806	\$1,578.50	\$1,822.31	\$243.81
	142807	\$2,003.24	\$2,312.66	\$309.42
	142808	\$1,244.60	\$1,436.83	\$192.23
	142809	\$1,380.61	\$1,593.86	\$213.25
	142810	\$2,040.62	\$2,355.81	\$315.19
	142811	\$1,446.73	\$1,670.19	\$223.46
	142813	\$925.25	\$1,068.16	\$142.91
	142815	\$1,055.71	\$1,218.77	\$163.06
	142816	\$1,222.65	\$1,411.50	\$188.85
	142817	\$1,239.06	\$1,430.44	\$191.38
	142819	\$1,361.81	\$1,572.16	\$210.35
	142820	\$1,020.85	\$1,178.52	\$157.67
	142822	\$948.85	\$1,095.41	\$146.56
	142823	\$1,207.00	\$1,393.43	\$186.43
	142825	\$1,862.41	\$2,150.07	\$287.66
	142827	\$2,251.01	\$2,598.69	\$347.68
	142830	\$1,363.76	\$1,574.40	\$210.64
	142831	\$1,299.08	\$1,499.73	\$200.65
	142833	\$1,204.95	\$1,391.06	\$186.11
	142835	\$1,603.84	\$1,851.57	\$247.73
	142839	\$1,175.71	\$1,357.30	\$181.59
	142840	\$1,154.43	\$1,332.74	\$178.31
	142842	\$1,232.56	\$1,422.94	\$190.38
	142844	\$1,101.71	\$1,271.88	\$170.17
	142847	\$2,004.76	\$2,314.41	\$309.65
	142848	\$1,080.10	\$1,246.93	\$166.83
	142849	\$1,180.70	\$1,363.07	\$182.37
	142854	\$1,281.21	\$1,479.10	\$197.89
	142855	\$1,143.31	\$1,319.91	\$176.60
	142856	\$1,455.85	\$1,680.72	\$224.87
	142857	\$1,117.88	\$1,290.55	\$172.67
	142858	\$1,203.59	\$1,389.49	\$185.90
	142860	\$1,044.46	\$1,205.79	\$161.33
	142863	\$1,495.11	\$1,726.04	\$230.93
	142870	\$1,456.51	\$1,681.48	\$224.97
	142871	\$1,343.05	\$1,550.50	\$207.45
	142874	\$906.44	\$1,046.45	\$140.01
	142875	\$1,298.84	\$1,499.45	\$200.61
	142876	\$1,346.69	\$1,554.70	\$208.01
	142877	\$143.12	\$165.23	\$22.11
	142878	\$1,307.97	\$1,510.00	\$202.03
	142879	\$1,401.64	\$1,618.14	\$216.50
	142881	\$1,315.84	\$1,519.08	\$203.24
	142886	\$1,636.70	\$1,889.51	\$252.81
	142888	\$1,364.44	\$1,575.19	\$210.75

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	142894	\$1,555.51	\$1,795.77	\$240.26
	142896	\$257.00	\$296.70	\$39.70
	142897	\$1,299.32	\$1,500.01	\$200.69
	142898	\$308.38	\$356.01	\$47.63
	142900	\$1,463.45	\$1,525.89	\$62.44
	142902	\$1,013.79	\$1,170.37	\$156.58
	142908	\$1,144.03	\$1,320.73	\$176.70
	142909	\$1,850.63	\$2,136.47	\$285.84
	142910	\$1,290.97	\$1,490.37	\$199.40
	142911	\$1,220.23	\$1,408.70	\$188.47
	142912	\$1,473.88	\$1,701.53	\$227.65
	142913	\$1,312.54	\$1,515.27	\$202.73
	142916	\$2,159.90	\$2,493.52	\$333.62
	142920	\$1,545.73	\$1,784.48	\$238.75
	142921	\$1,463.72	\$1,689.80	\$226.08
	142923	\$1,903.65	\$2,197.68	\$294.03
	142926	\$1,905.79	\$1,990.13	\$84.34
	142927	\$1,196.84	\$1,381.70	\$184.86
	142928	\$976.10	\$1,126.86	\$150.76
	142929	\$1,421.69	\$1,641.28	\$219.59
	142930	\$1,199.85	\$1,385.17	\$185.32
	142931	\$1,608.99	\$1,857.51	\$248.52
	142932	\$1,135.97	\$1,311.42	\$175.45
	142933	\$1,379.60	\$1,592.69	\$213.09
	142934	\$1,585.80	\$1,830.74	\$244.94
	142936	\$1,222.27	\$1,411.06	\$188.79
	142937	\$1,286.87	\$1,485.64	\$198.77
	142938	\$1,343.08	\$1,550.53	\$207.45
	142939	\$2,532.80	\$2,924.01	\$391.21
	142942	\$2,267.12	\$2,370.09	\$102.97
	142943	\$1,320.40	\$1,524.35	\$203.95
	142944	\$1,383.09	\$1,596.72	\$213.63
	142946	\$327.04	\$377.55	\$50.51
	142948	\$2,522.42	\$2,912.03	\$389.61
	142950	\$1,879.87	\$2,038.50	\$158.63
	142952	\$1,834.79	\$2,118.18	\$283.39
	142953	\$162.40	\$187.48	\$25.08
	142954	\$1,962.42	\$2,049.56	\$87.14
	142955	\$1,460.62	\$1,686.22	\$225.60
	142956	\$1,324.60	\$1,380.16	\$55.56
	142960	\$1,113.96	\$1,286.02	\$172.06
	142961	\$1,710.32	\$1,974.49	\$264.17
	142962	\$1,866.45	\$2,154.73	\$288.28
	142964	\$2,056.15	\$2,373.74	\$317.59
	142965	\$1,529.98	\$1,766.30	\$236.32
	142966	\$337.10	\$389.17	\$52.07
	142967	\$320.21	\$369.67	\$49.46

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	142968	\$2,658.41	\$3,069.02	\$410.61
	142971	\$1,908.30	\$2,203.06	\$294.76
	142972	\$1,669.77	\$1,927.67	\$257.90
	142975	\$1,586.47	\$1,831.51	\$245.04
	142976	\$1,452.65	\$1,677.03	\$224.38
	142979	\$2,055.15	\$2,372.58	\$317.43
	142980	\$1,620.72	\$1,871.06	\$250.34
	142981	\$1,290.86	\$1,490.25	\$199.39
	142982	\$1,645.91	\$1,900.14	\$254.23
	142983	\$1,118.68	\$1,291.47	\$172.79
	142984	\$1,481.80	\$1,640.45	\$158.65
	142986	\$1,846.28	\$2,131.46	\$285.18
	142988	\$1,474.12	\$1,701.81	\$227.69
	142989	\$1,404.42	\$1,463.93	\$59.51
	142990	\$2,434.82	\$2,810.90	\$376.08
	142995	\$7.54	\$8.70	\$1.16
	143023	\$1.24	\$1.43	\$0.19
	143024	\$1.24	\$1.43	\$0.19
	143025	\$1.24	\$1.43	\$0.19
	143027	\$2.19	\$2.53	\$0.34
	143038	\$2.48	\$2.86	\$0.38
	143040	\$1.24	\$1.43	\$0.19
	143043	\$6.20	\$7.16	\$0.96
	143046	\$1.24	\$1.43	\$0.19
	143065	\$3.72	\$4.30	\$0.58
	143070	\$1.24	\$1.43	\$0.19
	143073	\$0.62	\$0.72	\$0.10
	143074	\$1.24	\$1.43	\$0.19
	143075	\$1.24	\$1.43	\$0.19
	143078	\$2.48	\$2.86	\$0.38
	143085	\$1.24	\$1.43	\$0.19
	143086	\$1.24	\$1.43	\$0.19
	143087	\$3.72	\$4.30	\$0.58
	143091	\$2.48	\$2.86	\$0.38
	143092	\$2.48	\$2.86	\$0.38
	143096	\$2.48	\$2.86	\$0.38
	143103	\$0.86	\$0.99	\$0.13
	143106	\$1.24	\$1.43	\$0.19
	143108	\$1.24	\$1.43	\$0.19
	143109	\$1.24	\$1.43	\$0.19
	143128	\$2.48	\$2.86	\$0.38
	143129	\$1.24	\$1.43	\$0.19
	143130	\$1.24	\$1.43	\$0.19
	143131	\$1.24	\$1.43	\$0.19
	143132	\$1.24	\$1.43	\$0.19
	143136	\$3.72	\$4.30	\$0.58
	143138	\$3.72	\$4.30	\$0.58

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332	143139	\$1.24	\$1.43	\$0.19
	143144	\$1.24	\$1.43	\$0.19
	143146	\$3.72	\$4.30	\$0.58
	143147	\$1.24	\$1.43	\$0.19
	143148	\$1.24	\$1.43	\$0.19
	143152	\$2.48	\$2.86	\$0.38
	143153	\$2.48	\$2.86	\$0.38
	143155	\$2.48	\$2.86	\$0.38
	143166	\$9.92	\$11.46	\$1.54
	143176	\$2.48	\$2.86	\$0.38
	143177	\$2.48	\$2.86	\$0.38
	143178	\$1.24	\$1.43	\$0.19
	143188	\$8.68	\$10.02	\$1.34
	143191	\$1.24	\$1.43	\$0.19
	143194	\$6.20	\$7.16	\$0.96
	143196	\$1.38	\$1.60	\$0.22
	143202	\$1.53	\$1.76	\$0.23
	143203	\$8.83	\$10.19	\$1.36
	143205	\$1.67	\$1.93	\$0.26
	143210	\$1.72	\$1.98	\$0.26
	143211	\$1.72	\$1.98	\$0.26
	143221	\$1.81	\$2.09	\$0.28
	143224	\$3.58	\$4.13	\$0.55
	143225	\$3.91	\$4.52	\$0.61
	143227	\$1.86	\$2.15	\$0.29
	143228	\$4.10	\$4.74	\$0.64
	143233	\$2.48	\$2.86	\$0.38
	143235	\$2.48	\$2.86	\$0.38
	143238	\$2.53	\$2.92	\$0.39
	143244	\$2.62	\$3.03	\$0.41
	143246	\$1.29	\$1.49	\$0.20
	143247	\$2.53	\$2.92	\$0.39
	143253	\$1.24	\$1.43	\$0.19
	143255	\$11.78	\$13.60	\$1.82
	143257	\$2.48	\$2.86	\$0.38
	143260	\$1.24	\$1.43	\$0.19
	143261	\$1.24	\$1.43	\$0.19
	143262	\$1.24	\$1.43	\$0.19
	143263	\$15.93	\$18.40	\$2.47
	143264	\$2.48	\$2.86	\$0.38
	143265	\$1.24	\$1.43	\$0.19
	143268	\$11.16	\$12.89	\$1.73
	143270	\$1.24	\$1.43	\$0.19
	143271	\$1.24	\$1.43	\$0.19
	143272	\$1.24	\$1.43	\$0.19
	143275	\$9.92	\$11.46	\$1.54
	143276	\$2.48	\$2.86	\$0.38

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332	143279	\$2.48	\$2.86	\$0.38
	143291	\$4.34	\$5.01	\$0.67
	143292	\$0.62	\$0.72	\$0.10
	143299	\$8.68	\$10.02	\$1.34
	143307	\$4.82	\$5.56	\$0.74
	143309	\$11.64	\$13.44	\$1.80
	143311	\$2.48	\$2.86	\$0.38
	143312	\$1.24	\$1.43	\$0.19
	143313	\$1.24	\$1.43	\$0.19
	143314	\$1.24	\$1.43	\$0.19
	143315	\$1.24	\$1.43	\$0.19
	143316	\$1.24	\$1.43	\$0.19
	143318	\$8.68	\$10.02	\$1.34
	143321	\$9.92	\$11.46	\$1.54
	143329	\$15.50	\$17.90	\$2.40
	143331	\$1.24	\$1.43	\$0.19
	143333	\$4.25	\$4.90	\$0.65
	143337	\$9.02	\$10.41	\$1.39
	194722	\$112.16	\$129.48	\$17.32
	194723	\$1,811.27	\$1,863.23	\$51.96
	194726	\$409.71	\$473.00	\$63.29
	194728	\$5.72	\$6.61	\$0.89
	194734	\$6.58	\$7.60	\$1.02
	194736	\$6.58	\$7.60	\$1.02
	194737	\$11.83	\$13.66	\$1.83
	194739	\$629.50	\$726.73	\$97.23
	194740	\$248.22	\$286.56	\$38.34
	194741	\$445.92	\$514.80	\$68.88
	194742	\$167.41	\$193.26	\$25.85
	194743	\$296.40	\$342.18	\$45.78
	194745	\$35.07	\$40.48	\$5.41
	194746	\$29.67	\$34.26	\$4.59
	194747	\$413.86	\$477.79	\$63.93
	194748	\$29.96	\$34.59	\$4.63
	194749	\$233.77	\$269.87	\$36.10
	194750	\$337.96	\$390.16	\$52.20
	194751	\$275.75	\$318.34	\$42.59
	194753	\$37.59	\$43.40	\$5.81
	194755	\$238.54	\$275.38	\$36.84
	194756	\$49.95	\$57.66	\$7.71
	194757	\$16.22	\$18.73	\$2.51
	194758	\$47.61	\$54.97	\$7.36
	194760	\$50.14	\$57.89	\$7.75
	194764	\$30.44	\$35.14	\$4.70
	194765	\$167.14	\$192.96	\$25.82
	194766	\$88.26	\$101.89	\$13.63
	194767	\$143.12	\$165.23	\$22.11

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	194768	\$30.01	\$34.64	\$4.63
	194769	\$38.55	\$44.50	\$5.95
	194771	\$488.38	\$563.82	\$75.44
	194772	\$653.59	\$754.55	\$100.96
	194773	\$840.51	\$970.34	\$129.83
	194775	\$746.62	\$861.95	\$115.33
	194779	\$901.86	\$1,041.16	\$139.30
	194781	\$655.61	\$756.88	\$101.27
	194782	\$143.12	\$165.23	\$22.11
	194784	\$513.38	\$592.68	\$79.30
	194785	\$704.02	\$812.76	\$108.74
	194788	\$20.99	\$24.23	\$3.24
	194790	\$184.20	\$212.66	\$28.46
	194792	\$195.29	\$225.45	\$30.16
	194794	\$360.57	\$416.27	\$55.70
	194795	\$164.35	\$189.74	\$25.39
	194797	\$95.61	\$110.37	\$14.76
	194798	\$529.55	\$611.35	\$81.80
	194803	\$527.23	\$608.67	\$81.44
	194805	\$606.22	\$699.86	\$93.64
	194807	\$607.28	\$701.08	\$93.80
	194809	\$844.47	\$974.91	\$130.44
	194810	\$552.44	\$637.77	\$85.33
	194811	\$674.77	\$778.99	\$104.22
	194812	\$60.49	\$69.84	\$9.35
	194815	\$420.13	\$485.02	\$64.89
	194816	\$637.19	\$735.61	\$98.42
	194818	\$523.78	\$604.68	\$80.90
	194820	\$307.10	\$354.54	\$47.44
	194821	\$714.28	\$824.60	\$110.32
	194823	\$548.64	\$633.38	\$84.74
	194824	\$961.21	\$1,109.68	\$148.47
	194826	\$61.07	\$70.50	\$9.43
	194827	\$1,207.19	\$1,393.65	\$186.46
	194828	\$733.22	\$846.47	\$113.25
	194829	\$651.88	\$752.56	\$100.68
	194830	\$415.25	\$479.38	\$64.13
	194831	\$45.80	\$52.87	\$7.07
	194832	\$644.05	\$743.53	\$99.48
	194838	\$426.70	\$492.60	\$65.90
	194840	\$417.87	\$482.41	\$64.54
	194841	\$432.18	\$457.18	\$25.00
	194842	\$421.88	\$487.04	\$65.16
	194844	\$449.83	\$519.32	\$69.49
	194845	\$491.10	\$566.96	\$75.86
	194846	\$529.55	\$611.35	\$81.80
	194847	\$485.81	\$560.84	\$75.03

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332	194849	\$582.03	\$671.93	\$89.90
	194851	\$380.37	\$439.12	\$58.75
	194852	\$430.44	\$496.93	\$66.49
	194853	\$332.97	\$384.39	\$51.42
	194856	\$545.89	\$630.21	\$84.32
	194857	\$166.98	\$192.77	\$25.79
	194859	\$635.62	\$733.80	\$98.18
	194862	\$438.29	\$505.99	\$67.70
	194863	\$539.67	\$623.02	\$83.35
	194864	\$247.47	\$285.70	\$38.23
	194865	\$504.08	\$581.94	\$77.86
	194866	\$487.68	\$563.01	\$75.33
	194867	\$268.78	\$272.07	\$3.29
	194871	\$238.70	\$240.50	\$1.80
	194872	\$400.39	\$462.23	\$61.84
	194873	\$440.10	\$508.08	\$67.98
	194876	\$80.15	\$92.53	\$12.38
	194879	\$337.18	\$389.26	\$52.08
	194880	\$370.20	\$427.38	\$57.18
	194882	\$490.20	\$565.91	\$75.71
	194884	\$356.23	\$411.26	\$55.03
	194885	\$325.92	\$376.27	\$50.35
	194888	\$76.33	\$88.12	\$11.79
	194889	\$383.57	\$442.81	\$59.24
	194890	\$290.13	\$334.95	\$44.82
	194891	\$334.96	\$386.69	\$51.73
	194893	\$423.98	\$489.46	\$65.48
	194894	\$452.35	\$522.22	\$69.87
	194895	\$432.85	\$499.71	\$66.86
	194896	\$306.93	\$354.34	\$47.41
	194897	\$429.37	\$495.69	\$66.32
	194898	\$401.94	\$464.02	\$62.08
	194899	\$589.00	\$679.97	\$90.97
	194900	\$18.27	\$21.09	\$2.82
	194902	\$318.64	\$367.86	\$49.22
	194905	\$309.29	\$357.06	\$47.77
	194906	\$311.20	\$359.26	\$48.06
	194907	\$596.35	\$688.46	\$92.11
	194908	\$641.00	\$740.01	\$99.01
	194910	\$77.86	\$89.88	\$12.02
	194913	\$71.56	\$82.61	\$11.05
	194914	\$205.67	\$237.43	\$31.76
	194915	\$170.03	\$196.29	\$26.26
	194917	\$36.07	\$41.64	\$5.57
	194919	\$67.98	\$78.48	\$10.50
	194920	\$13.12	\$15.15	\$2.03
	194921	\$32.63	\$37.67	\$5.04

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332	194923	\$49.95	\$57.66	\$7.71
	194925	\$1,896.04	\$2,188.90	\$292.86
	194926	\$3.67	\$4.24	\$0.57
	194928	\$22.47	\$25.94	\$3.47
	194931	\$12.83	\$14.82	\$1.99
	194936	\$27.15	\$31.34	\$4.19
	194937	\$1,654.26	\$1,909.77	\$255.51
	194938	\$153.67	\$177.40	\$23.73
	194939	\$1,781.69	\$2,056.88	\$275.19
	194940	\$123.13	\$142.15	\$19.02
	194941	\$939.94	\$1,085.12	\$145.18
	194943	\$511.58	\$590.60	\$79.02
	194945	\$773.39	\$892.84	\$119.45
	194946	\$325.35	\$375.60	\$50.25
	194950	\$715.61	\$826.15	\$110.54
	194952	\$408.07	\$471.10	\$63.03
	194953	\$470.80	\$543.52	\$72.72
	194954	\$437.10	\$504.62	\$67.52
	194955	\$640.07	\$738.93	\$98.86
	194956	\$548.57	\$633.30	\$84.73
	194959	\$578.55	\$667.91	\$89.36
	194961	\$602.88	\$696.00	\$93.12
	194962	\$839.92	\$969.65	\$129.73
	194964	\$681.69	\$786.99	\$105.30
	194965	\$520.97	\$601.43	\$80.46
	194966	\$386.43	\$446.12	\$59.69
	194968	\$415.71	\$479.92	\$64.21
	194969	\$721.34	\$832.76	\$111.42
	194971	\$474.21	\$547.46	\$73.25
	194972	\$353.04	\$407.57	\$54.53
	194974	\$340.36	\$392.93	\$52.57
	194975	\$297.64	\$343.61	\$45.97
	194977	\$357.81	\$413.07	\$55.26
	194978	\$484.76	\$559.63	\$74.87
	194980	\$289.11	\$333.76	\$44.65
	194981	\$496.35	\$573.01	\$76.66
	194982	\$448.45	\$517.72	\$69.27
	194984	\$731.36	\$844.32	\$112.96
	194986	\$553.98	\$639.55	\$85.57
	194988	\$407.28	\$470.19	\$62.91
	194989	\$581.41	\$671.22	\$89.81
	194990	\$514.06	\$593.46	\$79.40
	194991	\$279.39	\$283.20	\$3.81
	194995	\$558.13	\$644.34	\$86.21
	194998	\$225.54	\$260.38	\$34.84
	194999	\$402.35	\$464.50	\$62.15
	195001	\$481.94	\$556.38	\$74.44

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332	195003	\$569.82	\$657.83	\$88.01
	195004	\$453.22	\$523.23	\$70.01
	195005	\$671.44	\$775.15	\$103.71
	195006	\$354.90	\$409.72	\$54.82
	195007	\$245.22	\$283.09	\$37.87
	195011	\$38.79	\$44.78	\$5.99
	195012	\$170.23	\$196.52	\$26.29
	195016	\$501.36	\$578.80	\$77.44
	195017	\$317.54	\$366.59	\$49.05
	195019	\$486.81	\$562.00	\$75.19
	195020	\$303.99	\$345.59	\$41.60
	195021	\$443.87	\$512.43	\$68.56
	195022	\$17.46	\$20.16	\$2.70
	195023	\$17.46	\$20.16	\$2.70
	195027	\$38.79	\$44.78	\$5.99
	195029	\$24.38	\$28.14	\$3.76
	195030	\$31.06	\$35.85	\$4.79
	195032	\$40.12	\$46.32	\$6.20
	195033	\$36.78	\$42.46	\$5.68
	195034	\$1,391.82	\$1,606.80	\$214.98
	195035	\$423.83	\$489.30	\$65.47
	195036	\$642.29	\$741.49	\$99.20
	195037	\$626.59	\$723.37	\$96.78
	195038	\$549.93	\$634.87	\$84.94
	195043	\$589.43	\$680.47	\$91.04
	195045	\$50.71	\$58.55	\$7.84
	195046	\$50.71	\$58.55	\$7.84
	195047	\$50.71	\$58.55	\$7.84
	195048	\$2,081.29	\$2,402.76	\$321.47
	195052	\$15.74	\$18.18	\$2.44
	195053	\$33.87	\$39.10	\$5.23
	195055	\$67.74	\$78.21	\$10.47
	195059	\$814.61	\$940.43	\$125.82
	195060	\$33.01	\$38.11	\$5.10
	195061	\$45.89	\$52.98	\$7.09
	195062	\$33.01	\$38.11	\$5.10
	195063	\$45.89	\$52.98	\$7.09
	195064	\$33.01	\$38.11	\$5.10
	195066	\$33.01	\$38.11	\$5.10
	195067	\$461.81	\$533.14	\$71.33
	195070	\$33.01	\$38.11	\$5.10
	195072	\$553.41	\$638.89	\$85.48
	195073	\$45.89	\$52.98	\$7.09
	195074	\$22.90	\$26.44	\$3.54
	195075	\$22.90	\$26.44	\$3.54
	195076	\$22.90	\$26.44	\$3.54
	195077	\$19.46	\$22.47	\$3.01

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332	195078	\$206.43	\$238.32	\$31.89
	195081	\$226.66	\$261.67	\$35.01
	195084	\$194.74	\$224.82	\$30.08
	195085	\$290.89	\$335.82	\$44.93
	195092	\$257.62	\$297.41	\$39.79
	195094	\$352.03	\$406.41	\$54.38
	195100	\$250.66	\$289.37	\$38.71
	195103	\$305.95	\$353.20	\$47.25
	195104	\$2,480.80	\$2,863.97	\$383.17
	195107	\$52.34	\$60.42	\$8.08
	195108	\$43.80	\$50.56	\$6.76
	195109	\$19.46	\$22.47	\$3.01
	195111	\$47.18	\$54.47	\$7.29
	195119	\$38.93	\$44.94	\$6.01
	195120	\$599.21	\$691.76	\$92.55
	195121	\$966.27	\$1,115.52	\$149.25
	195122	\$214.68	\$247.84	\$33.16
	195123	\$174.91	\$201.93	\$27.02
	195124	\$654.83	\$755.98	\$101.15
	195134	\$382.67	\$441.78	\$59.11
	195135	\$257.62	\$297.41	\$39.79
	195136	\$166.98	\$192.77	\$25.79
	195137	\$486.63	\$561.80	\$75.17
	195138	\$38.93	\$44.94	\$6.01
	195140	\$519.54	\$599.78	\$80.24
	195142	\$19.46	\$22.47	\$3.01
	195143	\$317.83	\$366.92	\$49.09
	195144	\$291.02	\$335.97	\$44.95
	195145	\$253.33	\$292.46	\$39.13
	195146	\$333.95	\$385.53	\$51.58
	195147	\$350.22	\$404.32	\$54.10
	195148	\$286.25	\$330.46	\$44.21
	195149	\$200.37	\$231.32	\$30.95
	195151	\$211.23	\$243.85	\$32.62
	195155	\$38.93	\$44.94	\$6.01
	195156	\$218.36	\$252.08	\$33.72
	195159	\$428.89	\$495.14	\$66.25
	195160	\$318.50	\$367.69	\$49.19
	195162	\$453.22	\$523.23	\$70.01
	195163	\$367.01	\$423.70	\$56.69
	195164	\$271.89	\$313.89	\$42.00
	195165	\$14.74	\$17.02	\$2.28
	195166	\$9.88	\$11.40	\$1.52
	195167	\$5.58	\$6.44	\$0.86
	195168	\$1,335.81	\$1,542.14	\$206.33
	195169	\$294.92	\$340.47	\$45.55
	195170	\$313.06	\$361.41	\$48.35

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	195171	\$307.95	\$355.52	\$47.57
	195172	\$355.04	\$409.88	\$54.84
	195173	\$1,387.91	\$1,602.28	\$214.37
	195174	\$19.46	\$22.47	\$3.01
	195175	\$38.93	\$44.94	\$6.01
	195177	\$199.47	\$230.27	\$30.80
	195179	\$190.21	\$219.59	\$29.38
	195180	\$344.21	\$397.38	\$53.17
	195184	\$38.93	\$44.94	\$6.01
	195187	\$1,392.97	\$1,608.12	\$215.15
	195188	\$1,765.18	\$2,037.83	\$272.65
	195189	\$86.59	\$99.96	\$13.37
	195191	\$544.82	\$628.97	\$84.15
	195192	\$596.35	\$688.46	\$92.11
	195193	\$518.50	\$598.58	\$80.08
	195194	\$1,108.72	\$1,279.98	\$171.26
	195196	\$305.81	\$353.04	\$47.23
	195199	\$604.74	\$698.15	\$93.41
	195200	\$714.61	\$824.99	\$110.38
	195201	\$408.28	\$471.34	\$63.06
	195202	\$477.08	\$550.76	\$73.68
	195203	\$751.68	\$867.78	\$116.10
	195205	\$759.55	\$876.87	\$117.32
	195206	\$619.67	\$715.39	\$95.72
	195207	\$94.89	\$109.55	\$14.66
	195210	\$95.42	\$110.15	\$14.73
	195212	\$750.73	\$866.68	\$115.95
	195213	\$523.11	\$603.91	\$80.80
	195214	\$218.78	\$219.60	\$0.82
	195215	\$450.39	\$519.95	\$69.56
	195216	\$408.23	\$471.29	\$63.06
	195217	\$427.41	\$493.43	\$66.02
	195219	\$303.29	\$350.14	\$46.85
	195220	\$578.71	\$668.09	\$89.38
	195221	\$28.62	\$33.05	\$4.43
	195225	\$999.95	\$1,154.40	\$154.45
	195230	\$563.28	\$650.29	\$87.01
	195231	\$1,669.77	\$1,927.67	\$257.90
	195235	\$659.08	\$760.88	\$101.80
	195236	\$112.69	\$130.09	\$17.40
	195237	\$610.66	\$704.98	\$94.32
	195239	\$413.62	\$477.51	\$63.89
	195241	\$1,371.88	\$1,583.78	\$211.90
	195242	\$1,180.33	\$1,362.65	\$182.32
	195243	\$499.78	\$576.98	\$77.20
	195245	\$457.52	\$528.18	\$70.66
	195247	\$642.96	\$742.26	\$99.30

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332	195250	\$442.30	\$510.61	\$68.31
	195251	\$428.27	\$494.42	\$66.15
	195252	\$538.76	\$621.98	\$83.22
	195253	\$58.01	\$66.97	\$8.96
	195255	\$345.88	\$399.30	\$53.42
	195256	\$407.90	\$470.90	\$63.00
	195258	\$652.93	\$753.78	\$100.85
	195259	\$261.56	\$301.96	\$40.40
	195261	\$316.02	\$364.84	\$48.82
	195262	\$635.47	\$733.62	\$98.15
	195263	\$390.44	\$450.75	\$60.31
	195265	\$244.79	\$282.60	\$37.81
	195266	\$364.30	\$420.57	\$56.27
	195268	\$372.04	\$392.92	\$20.88
	195269	\$106.34	\$122.77	\$16.43
	195270	\$58.01	\$66.97	\$8.96
	195273	\$856.30	\$988.57	\$132.27
	195274	\$842.07	\$972.13	\$130.06
	195278	\$822.67	\$949.74	\$127.07
	195280	\$1,016.93	\$1,174.00	\$157.07
	195282	\$896.90	\$1,035.44	\$138.54
	195284	\$953.77	\$1,101.09	\$147.32
	195285	\$590.48	\$681.69	\$91.21
	195290	\$939.22	\$1,084.29	\$145.07
	195291	\$955.87	\$1,103.51	\$147.64
	195293	\$703.63	\$812.31	\$108.68
	195294	\$745.19	\$860.29	\$115.10
	195296	\$882.83	\$1,019.19	\$136.36
	195298	\$1,025.24	\$1,183.59	\$158.35
	195300	\$744.24	\$859.19	\$114.95
	195302	\$970.32	\$1,120.20	\$149.88
	195303	\$912.97	\$1,053.98	\$141.01
	195304	\$800.06	\$923.63	\$123.57
	195305	\$752.18	\$868.36	\$116.18
	195307	\$692.71	\$799.71	\$107.00
	195308	\$1,164.02	\$1,343.81	\$179.79
	195311	\$606.76	\$700.48	\$93.72
	195313	\$871.93	\$1,006.60	\$134.67
	195314	\$641.48	\$740.56	\$99.08
	195316	\$557.35	\$643.44	\$86.09
	195317	\$701.30	\$809.62	\$108.32
	195318	\$714.86	\$825.28	\$110.42
	195320	\$24.71	\$28.53	\$3.82
	195321	\$12.07	\$13.93	\$1.86
	195322	\$19.99	\$23.08	\$3.09
	195325	\$1,495.30	\$1,726.26	\$230.96
	195331	\$46.61	\$53.81	\$7.20

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332	195337	\$137.79	\$159.08	\$21.29
	195338	\$46.61	\$53.81	\$7.20
	195342	\$685.56	\$791.45	\$105.89
	195346	\$758.36	\$875.49	\$117.13
	195347	\$46.61	\$53.81	\$7.20
	195348	\$46.61	\$53.81	\$7.20
	195350	\$1,221.36	\$1,410.01	\$188.65
	195360	\$33.82	\$39.05	\$5.23
	195362	\$357.81	\$413.07	\$55.26
	195365	\$364.35	\$420.62	\$56.27
	195367	\$33.82	\$39.05	\$5.23
	195368	\$33.82	\$38.90	\$5.08
	195370	\$405.51	\$468.15	\$62.64
	195373	\$33.82	\$39.05	\$5.23
	195377	\$33.82	\$38.70	\$4.88
	195379	\$96.61	\$111.53	\$14.92
	195382	\$72.47	\$83.66	\$11.19
	195385	\$478.21	\$552.07	\$73.86
	195386	\$142.49	\$164.50	\$22.01
	195388	\$745.91	\$861.12	\$115.21
	195389	\$40.74	\$47.04	\$6.30
	195390	\$173.54	\$200.35	\$26.81
	195391	\$40.74	\$47.04	\$6.30
	195392	\$41.51	\$47.92	\$6.41
	195394	\$731.83	\$844.87	\$113.04
	195396	\$329.99	\$380.96	\$50.97
	195397	\$43.46	\$50.17	\$6.71
	195401	\$43.46	\$50.17	\$6.71
	195402	\$147.51	\$170.29	\$22.78
	195404	\$43.46	\$50.17	\$6.71
	195405	\$980.15	\$1,131.54	\$151.39
	195406	\$81.01	\$93.52	\$12.51
	195407	\$411.29	\$474.81	\$63.52
	195409	\$824.96	\$952.38	\$127.42
	195410	\$43.46	\$50.17	\$6.71
	195411	\$824.96	\$952.38	\$127.42
	195412	\$729.54	\$842.23	\$112.69
	195414	\$43.46	\$50.17	\$6.71
	195421	\$314.61	\$363.20	\$48.59
	195423	\$321.01	\$370.59	\$49.58
	195424	\$622.78	\$718.97	\$96.19
	195429	\$429.08	\$495.36	\$66.28
	195430	\$412.95	\$476.74	\$63.79
	195431	\$333.95	\$385.53	\$51.58
	195432	\$406.95	\$469.80	\$62.85
	195434	\$336.24	\$388.18	\$51.94
	195435	\$596.35	\$688.46	\$92.11

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	195437	\$522.36	\$603.05	\$80.69
	195438	\$480.75	\$555.00	\$74.25
	195439	\$878.30	\$1,013.96	\$135.66
	195440	\$446.07	\$514.96	\$68.89
	195441	\$842.80	\$972.98	\$130.18
	195443	\$732.26	\$845.37	\$113.11
	195444	\$293.40	\$302.92	\$9.52
	195445	\$972.52	\$1,122.73	\$150.21
	195447	\$596.35	\$688.46	\$92.11
	195448	\$428.96	\$495.22	\$66.26
	195449	\$702.26	\$810.72	\$108.46
	195450	\$594.91	\$686.80	\$91.89
	195451	\$457.94	\$528.67	\$70.73
	195454	\$716.95	\$827.69	\$110.74
	195455	\$319.17	\$368.47	\$49.30
	195456	\$272.58	\$314.68	\$42.10
	195457	\$275.07	\$317.55	\$42.48
	195459	\$591.57	\$682.95	\$91.38
	195460	\$517.91	\$597.91	\$80.00
	195461	\$411.34	\$474.88	\$63.54
	195462	\$400.55	\$462.42	\$61.87
	195463	\$447.74	\$516.89	\$69.15
	195464	\$429.37	\$495.69	\$66.32
	195465	\$627.98	\$724.97	\$96.99
	195467	\$579.41	\$668.90	\$89.49
	195468	\$208.91	\$241.18	\$32.27
	195469	\$328.54	\$379.29	\$50.75
	195472	\$255.86	\$266.95	\$11.09
	195473	\$537.04	\$620.00	\$82.96
	195476	\$576.64	\$665.71	\$89.07
	195477	\$500.74	\$578.08	\$77.34
	195480	\$602.07	\$695.06	\$92.99
	195481	\$342.64	\$395.56	\$52.92
	195482	\$610.13	\$704.37	\$94.24
	195483	\$444.83	\$513.53	\$68.70
	195484	\$471.35	\$544.15	\$72.80
	195486	\$223.80	\$237.02	\$13.22
	195489	\$399.09	\$460.74	\$61.65
	195492	\$257.36	\$297.11	\$39.75
	195493	\$506.89	\$585.19	\$78.30
	195494	\$356.68	\$411.77	\$55.09
	195495	\$489.05	\$564.59	\$75.54
	195496	\$273.81	\$316.10	\$42.29
	195497	\$644.20	\$743.70	\$99.50
	195498	\$818.52	\$944.95	\$126.43
	195499	\$708.22	\$817.61	\$109.39
	195501	\$481.13	\$555.45	\$74.32

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332	195504	\$1,746.10	\$2,015.80	\$269.70
	195505	\$378.39	\$436.83	\$58.44
	195506	\$603.05	\$696.19	\$93.14
	195507	\$720.21	\$831.46	\$111.25
	195508	\$707.12	\$816.34	\$109.22
	195511	\$725.27	\$837.29	\$112.02
	195513	\$1,227.99	\$1,417.67	\$189.68
	195515	\$816.41	\$942.51	\$126.10
	195517	\$925.12	\$1,068.01	\$142.89
	195518	\$711.60	\$736.81	\$25.21
	195519	\$819.83	\$946.45	\$126.62
	195522	\$933.83	\$1,078.07	\$144.24
	195523	\$952.32	\$1,099.42	\$147.10
	195524	\$715.61	\$826.15	\$110.54
	195525	\$1,106.05	\$1,276.89	\$170.84
	195526	\$808.65	\$933.55	\$124.90
	195529	\$1,057.91	\$1,221.31	\$163.40
	195530	\$793.79	\$916.40	\$122.61
	195531	\$685.27	\$709.61	\$24.34
	195533	\$703.86	\$812.58	\$108.72
	195535	\$606.13	\$699.75	\$93.62
	195536	\$1,959.02	\$2,261.60	\$302.58
	195538	\$780.40	\$900.94	\$120.54
	195542	\$469.40	\$541.90	\$72.50
	195543	\$486.64	\$561.81	\$75.17
	195544	\$457.66	\$528.35	\$70.69
	195545	\$214.25	\$247.35	\$33.10
	195547	\$291.97	\$337.07	\$45.10
	195548	\$246.64	\$276.86	\$30.22
	195549	\$387.24	\$447.05	\$59.81
	195551	\$238.54	\$275.38	\$36.84
	195552	\$1,202.23	\$1,387.93	\$185.70
	195553	\$192.81	\$222.59	\$29.78
	195556	\$1,578.81	\$1,768.96	\$190.15
	195560	\$666.16	\$769.05	\$102.89
	195562	\$568.67	\$656.51	\$87.84
	195563	\$622.15	\$718.25	\$96.10
	195564	\$555.08	\$640.81	\$85.73
	195565	\$589.14	\$680.14	\$91.00
	195566	\$654.72	\$755.85	\$101.13
	195568	\$1,100.23	\$1,270.17	\$169.94
	195570	\$741.05	\$855.51	\$114.46
	195571	\$789.38	\$911.31	\$121.93
	195573	\$1,156.19	\$1,334.78	\$178.59
	195574	\$617.27	\$712.61	\$95.34
	195576	\$300.56	\$346.98	\$46.42
	195577	\$273.33	\$315.54	\$42.21

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332	195578	\$739.47	\$853.68	\$114.21
	195579	\$1,083.92	\$1,251.34	\$167.42
	195580	\$702.40	\$810.89	\$108.49
	195581	\$749.53	\$865.31	\$115.78
	195582	\$410.62	\$474.04	\$63.42
	195583	\$461.74	\$533.06	\$71.32
	195584	\$878.28	\$1,013.93	\$135.65
	195585	\$605.89	\$699.47	\$93.58
	195586	\$548.64	\$633.38	\$84.74
	195588	\$1,025.71	\$1,184.14	\$158.43
	195591	\$969.59	\$1,119.35	\$149.76
	195592	\$815.80	\$941.81	\$126.01
	195594	\$1,026.62	\$1,185.19	\$158.57
	195595	\$677.44	\$782.08	\$104.64
	195596	\$902.16	\$1,041.50	\$139.34
	195598	\$796.94	\$920.03	\$123.09
	195599	\$924.95	\$1,067.82	\$142.87
	195600	\$751.63	\$867.73	\$116.10
	195601	\$657.81	\$759.41	\$101.60
	195602	\$801.19	\$924.94	\$123.75
	195603	\$620.76	\$641.47	\$20.71
	195604	\$381.14	\$440.01	\$58.87
	195605	\$696.01	\$803.51	\$107.50
	195612	\$381.66	\$440.61	\$58.95
	195613	\$1,105.86	\$1,276.67	\$170.81
	195614	\$578.71	\$668.09	\$89.38
	195615	\$93.94	\$108.45	\$14.51
	195616	\$598.16	\$690.55	\$92.39
	195617	\$311.20	\$359.27	\$48.07
	195618	\$166.26	\$191.94	\$25.68
	195619	\$541.48	\$625.12	\$83.64
	195621	\$164.21	\$189.57	\$25.36
	195622	\$410.29	\$473.66	\$63.37
	195623	\$684.03	\$789.69	\$105.66
	195624	\$565.53	\$652.88	\$87.35
	195627	\$1,717.90	\$1,983.25	\$265.35
	195628	\$753.45	\$869.82	\$116.37
	195631	\$64.88	\$74.90	\$10.02
	195636	\$441.30	\$509.46	\$68.16
	195637	\$547.68	\$632.28	\$84.60
	195638	\$240.45	\$277.59	\$37.14
	195639	\$1,192.69	\$1,376.91	\$184.22
	195640	\$769.91	\$888.82	\$118.91
	195641	\$723.01	\$834.68	\$111.67
	195643	\$1,468.92	\$1,695.80	\$226.88
	195644	\$54.77	\$63.23	\$8.46
	195645	\$596.35	\$688.46	\$92.11

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332	195646	\$405.51	\$468.15	\$62.64
	195648	\$519.54	\$599.78	\$80.24
	195649	\$85.87	\$99.14	\$13.27
	195650	\$157.10	\$181.37	\$24.27
	195651	\$20.66	\$23.85	\$3.19
	195652	\$390.25	\$450.52	\$60.27
	195653	\$333.95	\$385.53	\$51.58
	195654	\$596.35	\$688.46	\$92.11
	195655	\$985.11	\$1,137.27	\$152.16
	195656	\$71.90	\$83.00	\$11.10
	195657	\$189.11	\$218.32	\$29.21
	195659	\$1,053.81	\$1,216.58	\$162.77
	195660	\$753.78	\$870.21	\$116.43
	195661	\$303.71	\$350.62	\$46.91
	195662	\$585.23	\$675.63	\$90.40
	195666	\$1,431.23	\$1,652.29	\$221.06
	195667	\$54.01	\$62.35	\$8.34
	195668	\$47.03	\$54.29	\$7.26
	195669	\$100.19	\$115.66	\$15.47
	195671	\$152.09	\$175.58	\$23.49
	195672	\$492.81	\$568.93	\$76.12
	195676	\$378.18	\$436.59	\$58.41
	195679	\$812.94	\$938.50	\$125.56
	195680	\$79.24	\$91.48	\$12.24
	195682	\$434.04	\$501.09	\$67.05
	195683	\$321.93	\$371.66	\$49.73
	195685	\$300.41	\$346.82	\$46.41
	195686	\$387.17	\$446.97	\$59.80
	195690	\$422.21	\$487.42	\$65.21
	195692	\$411.24	\$474.76	\$63.52
	195693	\$119.13	\$137.53	\$18.40
	195695	\$944.61	\$1,090.51	\$145.90
	195696	\$537.76	\$620.82	\$83.06
	195697	\$643.10	\$742.43	\$99.33
	195700	\$5.53	\$6.39	\$0.86
	195701	\$22.57	\$26.05	\$3.48
	195703	\$404.45	\$466.92	\$62.47
	195709	\$96.13	\$110.98	\$14.85
	195711	\$78.77	\$90.93	\$12.16
	195712	\$572.49	\$660.92	\$88.43
	195713	\$532.98	\$615.31	\$82.33
	195715	\$534.33	\$616.86	\$82.53
	195717	\$461.57	\$532.86	\$71.29
	195720	\$422.16	\$487.37	\$65.21
	195721	\$344.93	\$398.20	\$53.27
	195722	\$433.19	\$500.09	\$66.90
	195723	\$5,175.34	\$5,974.72	\$799.38

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	195725	\$550.88	\$635.97	\$85.09
	195727	\$333.95	\$385.53	\$51.58
	195728	\$700.63	\$808.85	\$108.22
	195730	\$305.33	\$352.49	\$47.16
	195731	\$926.48	\$1,069.58	\$143.10
	195732	\$338.68	\$390.99	\$52.31
	195734	\$429.61	\$495.96	\$66.35
	195736	\$499.59	\$576.76	\$77.17
	195737	\$957.87	\$1,105.82	\$147.95
	195738	\$400.74	\$462.64	\$61.90
	195741	\$326.80	\$377.27	\$50.47
	195742	\$978.01	\$1,129.07	\$151.06
	195743	\$596.35	\$688.46	\$92.11
	195745	\$608.13	\$702.06	\$93.93
	195746	\$9.59	\$11.07	\$1.48
	195749	\$642.57	\$741.82	\$99.25
	195750	\$98.99	\$114.28	\$15.29
	195751	\$84.68	\$97.76	\$13.08
	195753	\$228.04	\$263.27	\$35.23
	195754	\$19,083.04	\$22,030.56	\$2,947.52
	195760	\$734.65	\$848.12	\$113.47
	195761	\$221.36	\$255.55	\$34.19
	195762	\$45.08	\$52.05	\$6.97
	195764	\$574.45	\$663.17	\$88.72
	195765	\$696.28	\$803.83	\$107.55
	195768	\$45.08	\$52.05	\$6.97
	195771	\$104.91	\$121.11	\$16.20
	195774	\$682.27	\$787.65	\$105.38
	195775	\$352.99	\$407.51	\$54.52
	195776	\$1,998.47	\$2,307.15	\$308.68
	195778	\$238.54	\$275.38	\$36.84
	195779	\$770.38	\$889.37	\$118.99
	195780	\$413.25	\$477.08	\$63.83
	195782	\$787.18	\$908.76	\$121.58
	195783	\$88.21	\$101.84	\$13.63
	195784	\$20.61	\$23.79	\$3.18
	195785	\$320.21	\$369.67	\$49.46
	195787	\$8.78	\$10.13	\$1.35
	195788	\$812.70	\$938.23	\$125.53
	195792	\$429.27	\$495.58	\$66.31
	195793	\$535.80	\$618.56	\$82.76
	195794	\$339.68	\$392.14	\$52.46
	195798	\$128.81	\$148.71	\$19.90
	195799	\$11.64	\$13.44	\$1.80
	195800	\$381.66	\$440.61	\$58.95
	195801	\$1,386.86	\$1,601.07	\$214.21
	195803	\$845.71	\$976.34	\$130.63

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332	195804	\$36.73	\$42.41	\$5.68
	195805	\$36.73	\$42.41	\$5.68
	195806	\$51.67	\$59.65	\$7.98
	195807	\$45.32	\$52.32	\$7.00
	195810	\$63.88	\$73.75	\$9.87
	195811	\$48.14	\$55.57	\$7.43
	195812	\$32.68	\$37.73	\$5.05
	195813	\$4,000.81	\$4,618.76	\$617.95
	195815	\$307.28	\$354.74	\$47.46
	195816	\$723.53	\$835.29	\$111.76
	195817	\$62.93	\$72.65	\$9.72
	195822	\$2.10	\$2.42	\$0.32
	195824	\$864.46	\$997.98	\$133.52
	195828	\$85.92	\$99.19	\$13.27
	195830	\$842.56	\$972.70	\$130.14
	195833	\$750.11	\$865.97	\$115.86
	195835	\$751.39	\$867.45	\$116.06
	195836	\$478.27	\$552.14	\$73.87
	195837	\$531.84	\$613.99	\$82.15
	195838	\$22.42	\$25.89	\$3.47
	195839	\$557.70	\$643.84	\$86.14
	195841	\$834.88	\$963.84	\$128.96
	195842	\$6.54	\$7.55	\$1.01
	195844	\$1,546.87	\$1,785.80	\$238.93
	195845	\$507.30	\$585.65	\$78.35
	195848	\$447.26	\$516.34	\$69.08
	195850	\$284.09	\$327.97	\$43.88
	195852	\$243.90	\$281.57	\$37.67
	195853	\$259.40	\$299.46	\$40.06
	195854	\$490.00	\$565.69	\$75.69
	195855	\$249.56	\$288.10	\$38.54
	195856	\$140.90	\$162.67	\$21.77
	195858	\$364.95	\$373.00	\$8.05
	195862	\$81.68	\$94.29	\$12.61
	195866	\$55.10	\$63.61	\$8.51
	195867	\$654.12	\$755.15	\$101.03
	195869	\$2,052.19	\$2,369.17	\$316.98
	195870	\$122.75	\$141.71	\$18.96
	195871	\$401.70	\$463.75	\$62.05
	195872	\$88.02	\$101.62	\$13.60
	195875	\$573.49	\$662.07	\$88.58
	195880	\$67.03	\$77.38	\$10.35
	195881	\$658.36	\$760.05	\$101.69
	195882	\$432.04	\$498.78	\$66.74
	195888	\$87.16	\$100.62	\$13.46
	195890	\$5,114.73	\$5,904.74	\$790.01
	195893	\$443.57	\$512.08	\$68.51

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332	195894	\$270.38	\$312.14	\$41.76
	195895	\$720.34	\$831.60	\$111.26
	195896	\$592.67	\$684.21	\$91.54
	195897	\$347.16	\$400.79	\$53.63
	195898	\$503.17	\$580.89	\$77.72
	195900	\$251.46	\$290.30	\$38.84
	195901	\$396.58	\$457.83	\$61.25
	195902	\$266.06	\$307.16	\$41.10
	195906	\$594.91	\$686.80	\$91.89
	195907	\$317.44	\$366.47	\$49.03
	195908	\$524.31	\$605.29	\$80.98
	195909	\$221.64	\$255.87	\$34.23
	195910	\$619.82	\$715.55	\$95.73
	195912	\$458.33	\$529.12	\$70.79
	195913	\$226.56	\$261.56	\$35.00
	195914	\$531.89	\$614.05	\$82.16
	195915	\$238.35	\$275.17	\$36.82
	195916	\$483.71	\$558.42	\$74.71
	195917	\$130.98	\$151.21	\$20.23
	195918	\$534.71	\$617.30	\$82.59
	195919	\$474.28	\$547.53	\$73.25
	195923	\$83.73	\$96.66	\$12.93
	195924	\$340.60	\$393.21	\$52.61
	195925	\$173.50	\$200.30	\$26.80
	195926	\$500.24	\$577.51	\$77.27
	195927	\$15.79	\$18.23	\$2.44
	195928	\$502.84	\$580.51	\$77.67
	195929	\$269.49	\$311.11	\$41.62
	195930	\$657.74	\$759.34	\$101.60
	195932	\$510.47	\$589.32	\$78.85
	195933	\$359.38	\$414.89	\$55.51
	195935	\$967.49	\$1,116.93	\$149.44
	195936	\$381.66	\$440.61	\$58.95
	195937	\$659.27	\$761.10	\$101.83
	195940	\$532.23	\$614.43	\$82.20
	195943	\$406.85	\$469.69	\$62.84
	195944	\$455.09	\$525.38	\$70.29
	195946	\$262.39	\$302.92	\$40.53
	195947	\$343.47	\$396.52	\$53.05
	195948	\$583.80	\$673.97	\$90.17
	195949	\$318.01	\$367.13	\$49.12
	195950	\$428.40	\$494.57	\$66.17
	195951	\$620.01	\$715.77	\$95.76
	195952	\$674.39	\$778.56	\$104.17
	195953	\$601.45	\$694.35	\$92.90
	195954	\$294.06	\$339.47	\$45.41
	195957	\$327.83	\$378.46	\$50.63

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332	195958	\$562.38	\$649.24	\$86.86
	195959	\$446.17	\$515.08	\$68.91
	195960	\$270.91	\$312.75	\$41.84
	195961	\$574.49	\$663.23	\$88.74
	195965	\$616.62	\$711.86	\$95.24
	195966	\$388.44	\$448.43	\$59.99
	195967	\$333.95	\$385.53	\$51.58
	195968	\$396.55	\$457.80	\$61.25
	195969	\$626.64	\$723.43	\$96.79
	195971	\$528.12	\$609.70	\$81.58
	195972	\$374.12	\$431.91	\$57.79
	195974	\$257.87	\$297.70	\$39.83
	195975	\$224.40	\$259.06	\$34.66
	195977	\$346.26	\$399.74	\$53.48
	195978	\$671.77	\$775.53	\$103.76
	195979	\$14.60	\$16.85	\$2.25
	195980	\$238.30	\$275.11	\$36.81
	195981	\$14.60	\$16.85	\$2.25
	195982	\$389.29	\$449.42	\$60.13
	195983	\$355.71	\$410.65	\$54.94
	195984	\$787.18	\$908.76	\$121.58
	195985	\$14.60	\$16.85	\$2.25
	195989	\$282.40	\$326.02	\$43.62
	195991	\$7.11	\$8.21	\$1.10
	195992	\$830.73	\$959.05	\$128.32
	195993	\$543.29	\$627.21	\$83.92
	195994	\$659.99	\$761.93	\$101.94
	195995	\$28.82	\$33.27	\$4.45
	195997	\$477.03	\$550.71	\$73.68
	195998	\$604.57	\$624.49	\$19.92
	195999	\$138.07	\$159.17	\$21.10
	196000	\$656.70	\$757.06	\$100.36
	196001	\$129.48	\$149.48	\$20.00
	196002	\$453.22	\$466.88	\$13.66
	196007	\$30.44	\$35.14	\$4.70
	196008	\$1,534.75	\$1,771.81	\$237.06
	196009	\$38.40	\$44.34	\$5.94
	196010	\$38.40	\$44.34	\$5.94
	196011	\$257.14	\$296.86	\$39.72
	196014	\$32.82	\$37.89	\$5.07
	196015	\$30.34	\$35.03	\$4.69
	196016	\$357.81	\$413.07	\$55.26
	196020	\$710.70	\$820.47	\$109.77
	196022	\$327.08	\$377.60	\$50.52
	196026	\$11.69	\$13.49	\$1.80
	196027	\$456.70	\$527.25	\$70.55
	196028	\$357.81	\$413.07	\$55.26

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332	196031	\$640.19	\$739.07	\$98.88
	196034	\$11.69	\$13.49	\$1.80
	196035	\$457.99	\$528.73	\$70.74
	196036	\$263.81	\$304.56	\$40.75
	196037	\$11.69	\$13.49	\$1.80
	196038	\$459.23	\$530.17	\$70.94
	196039	\$631.89	\$729.49	\$97.60
	196040	\$11.69	\$13.49	\$1.80
	196041	\$11.69	\$13.49	\$1.80
	196042	\$5.61	\$6.47	\$0.86
	196043	\$609.23	\$703.33	\$94.10
	196044	\$11.69	\$13.49	\$1.80
	196047	\$13.79	\$15.92	\$2.13
	196048	\$793.57	\$916.14	\$122.57
	196049	\$243.31	\$280.89	\$37.58
	196051	\$746.91	\$862.28	\$115.37
	196052	\$624.21	\$720.62	\$96.41
	196053	\$44.70	\$51.61	\$6.91
	196054	\$600.30	\$693.02	\$92.72
	196055	\$136.83	\$157.96	\$21.13
	196058	\$591.57	\$682.95	\$91.38
	196059	\$882.40	\$1,018.69	\$136.29
	196060	\$836.08	\$965.21	\$129.13
	196061	\$11.69	\$13.49	\$1.80
	196062	\$52.81	\$60.97	\$8.16
	196065	\$26.72	\$30.84	\$4.12
	196066	\$524.78	\$605.84	\$81.06
	196067	\$13.55	\$15.64	\$2.09
	196068	\$1,162.83	\$1,342.43	\$179.60
	196069	\$50.38	\$58.16	\$7.78
	196070	\$1,414.63	\$1,633.13	\$218.50
	196073	\$410.29	\$473.66	\$63.37
	196075	\$377.94	\$436.32	\$58.38
	196076	\$565.19	\$652.49	\$87.30
	196078	\$333.95	\$385.53	\$51.58
	196079	\$435.71	\$503.01	\$67.30
	196080	\$432.61	\$499.43	\$66.82
	196081	\$485.14	\$560.07	\$74.93
	196084	\$566.15	\$653.59	\$87.44
	196085	\$530.75	\$612.72	\$81.97
	196086	\$417.30	\$481.75	\$64.45
	196087	\$462.53	\$533.97	\$71.44
	196088	\$469.92	\$542.50	\$72.58
	196089	\$613.81	\$708.61	\$94.80
	196092	\$427.46	\$493.48	\$66.02
	196093	\$412.34	\$476.03	\$63.69
	196094	\$522.92	\$603.69	\$80.77

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332	196095	\$1,902.82	\$2,196.72	\$293.90
	196096	\$1,074.61	\$1,240.60	\$165.99
	196097	\$492.87	\$568.99	\$76.12
	196101	\$536.14	\$618.95	\$82.81
	196102	\$577.26	\$666.42	\$89.16
	196104	\$548.64	\$633.38	\$84.74
	196105	\$505.94	\$584.09	\$78.15
	196106	\$14.74	\$17.02	\$2.28
	196107	\$15.46	\$17.84	\$2.38
	196108	\$14.74	\$17.02	\$2.28
	196109	\$14.74	\$17.02	\$2.28
	196111	\$391.20	\$451.63	\$60.43
	196113	\$281.47	\$324.95	\$43.48
	196114	\$14.74	\$17.02	\$2.28
	196115	\$138.45	\$139.77	\$1.32
	196116	\$962.26	\$1,110.89	\$148.63
	196118	\$639.28	\$738.02	\$98.74
	196119	\$11.69	\$13.49	\$1.80
	196122	\$561.08	\$647.74	\$86.66
	196124	\$11.69	\$13.49	\$1.80
	196125	\$505.70	\$583.81	\$78.11
	196127	\$11.69	\$13.49	\$1.80
	196128	\$11.69	\$13.49	\$1.80
	196129	\$60.11	\$69.40	\$9.29
	196130	\$27.57	\$31.83	\$4.26
	196133	\$303.35	\$350.21	\$46.86
	196135	\$303.35	\$350.21	\$46.86
	196136	\$629.12	\$726.29	\$97.17
	196138	\$212.63	\$245.48	\$32.85
	196139	\$11.69	\$13.49	\$1.80
	196142	\$45.32	\$52.32	\$7.00
	196143	\$888.08	\$1,025.25	\$137.17
	196147	\$151.07	\$174.40	\$23.33
	196148	\$250.88	\$289.64	\$38.76
	196150	\$184.15	\$212.59	\$28.44
	196151	\$20.47	\$23.63	\$3.16
	196152	\$301.33	\$347.87	\$46.54
	196153	\$20.47	\$23.63	\$3.16
	196154	\$190.69	\$220.14	\$29.45
	196155	\$43.89	\$49.75	\$5.86
	196164	\$2,836.12	\$3,274.18	\$438.06
	196169	\$68.27	\$78.81	\$10.54
	196170	\$426.70	\$492.60	\$65.90
	196171	\$56.49	\$65.21	\$8.72
	196172	\$105.58	\$121.88	\$16.30
	196174	\$1,066.36	\$1,231.07	\$164.71
	196175	\$149.85	\$172.99	\$23.14

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332	196176	\$87.69	\$101.23	\$13.54
	196177	\$200.13	\$231.05	\$30.92
	196178	\$323.41	\$373.36	\$49.95
	196180	\$570.82	\$658.99	\$88.17
	196182	\$14.60	\$16.85	\$2.25
	196183	\$14.60	\$16.85	\$2.25
	196184	\$286.25	\$330.46	\$44.21
	196187	\$188.87	\$218.04	\$29.17
	196189	\$5.82	\$6.72	\$0.90
	196190	\$17.51	\$20.21	\$2.70
	196191	\$407.79	\$470.78	\$62.99
	196192	\$284.39	\$328.31	\$43.92
	196196	\$215.88	\$249.22	\$33.34
	196197	\$202.71	\$234.02	\$31.31
	196198	\$497.02	\$573.79	\$76.77
	196203	\$1.35	\$1.55	\$0.20
	196204	\$1.35	\$1.55	\$0.20
	196206	\$27.29	\$31.50	\$4.21
	196208	\$119.27	\$137.69	\$18.42
	196209	\$441.30	\$509.46	\$68.16
	196211	\$352.67	\$407.14	\$54.47
	196212	\$11.93	\$13.77	\$1.84
	196213	\$296.31	\$342.08	\$45.77
	196215	\$500.31	\$577.59	\$77.28
	196216	\$73.05	\$84.33	\$11.28
	196217	\$226.46	\$261.44	\$34.98
	196220	\$443.20	\$511.66	\$68.46
	196221	\$388.09	\$448.04	\$59.95
	196222	\$11.69	\$13.49	\$1.80
	196223	\$5.84	\$6.75	\$0.91
	196225	\$480.32	\$554.51	\$74.19
	196228	\$221.22	\$255.39	\$34.17
	196229	\$19.23	\$22.20	\$2.97
	196230	\$34.92	\$40.32	\$5.40
	196237	\$429.37	\$495.69	\$66.32
	196238	\$23.38	\$26.99	\$3.61
	196240	\$536.81	\$619.72	\$82.91
	196243	\$552.17	\$637.45	\$85.28
	196244	\$560.47	\$647.04	\$86.57
	196245	\$499.64	\$576.82	\$77.18
	196246	\$11.69	\$13.49	\$1.80
	196249	\$732.22	\$845.31	\$113.09
	196250	\$32.58	\$37.62	\$5.04
	196252	\$387.58	\$447.44	\$59.86
	196256	\$239.78	\$276.81	\$37.03
	196257	\$48.52	\$56.01	\$7.49
	196258	\$381.66	\$440.61	\$58.95

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332	196262	\$20.47	\$23.63	\$3.16
	196263	\$17.51	\$20.21	\$2.70
	196264	\$70.94	\$81.90	\$10.96
	196265	\$83.82	\$96.77	\$12.95
	196269	\$348.36	\$402.16	\$53.80
	196270	\$14.03	\$16.17	\$2.14
	196272	\$19.27	\$22.25	\$2.98
	196276	\$31.58	\$36.46	\$4.88
	196277	\$572.59	\$661.03	\$88.44
	196278	\$459.39	\$472.11	\$12.72
	196280	\$814.55	\$940.36	\$125.81
	196281	\$29.24	\$33.76	\$4.52
	196282	\$1,028.53	\$1,187.39	\$158.86
	196285	\$255.20	\$294.62	\$39.42
	196286	\$263.11	\$303.75	\$40.64
	196287	\$11.69	\$13.49	\$1.80
	196290	\$447.69	\$516.84	\$69.15
	196291	\$441.44	\$509.62	\$68.18
	196292	\$658.36	\$760.05	\$101.69
	196293	\$81.91	\$94.57	\$12.66
	196294	\$44.27	\$51.11	\$6.84
	196298	\$642.14	\$741.33	\$99.19
	196299	\$14.84	\$17.13	\$2.29
	196300	\$347.36	\$401.01	\$53.65
	196301	\$584.42	\$674.69	\$90.27
	196302	\$452.41	\$522.29	\$69.88
	196303	\$266.92	\$308.15	\$41.23
	196304	\$403.70	\$466.06	\$62.36
	196305	\$344.04	\$397.18	\$53.14
	196306	\$17,890.35	\$20,653.65	\$2,763.30
	196308	\$1,066.17	\$1,230.85	\$164.68
	196309	\$350.60	\$404.76	\$54.16
	196310	\$364.92	\$421.28	\$56.36
	196311	\$573.05	\$661.56	\$88.51
	196312	\$1,038.59	\$1,199.01	\$160.42
	196314	\$190.83	\$220.31	\$29.48
	196317	\$75.23	\$86.86	\$11.63
	196319	\$853.12	\$929.08	\$75.96
	196320	\$763.32	\$881.04	\$117.72
	196321	\$554.41	\$640.04	\$85.63
	196322	\$23.47	\$27.10	\$3.63
	196324	\$343.69	\$396.77	\$53.08
	196326	\$258.58	\$298.51	\$39.93
	196328	\$319.64	\$369.01	\$49.37
	196331	\$47.56	\$54.91	\$7.35
	196332	\$338.77	\$391.10	\$52.33
	196335	\$492.58	\$568.66	\$76.08

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332	196337	\$671.10	\$774.76	\$103.66
	196342	\$891.99	\$1,029.76	\$137.77
	196343	\$822.96	\$950.07	\$127.11
	196347	\$9,064.44	\$10,464.52	\$1,400.08
	196348	\$973.24	\$1,123.56	\$150.32
	196354	\$1,288.11	\$1,487.06	\$198.95
	196358	\$292.45	\$337.62	\$45.17
	196359	\$965.89	\$1,115.08	\$149.19
	196360	\$71.90	\$83.00	\$11.10
	196364	\$582.84	\$672.87	\$90.03
	196365	\$349.36	\$403.32	\$53.96
	196366	\$103.19	\$119.13	\$15.94
	196367	\$2,997.47	\$3,460.45	\$462.98
	196368	\$26.86	\$31.01	\$4.15
	196369	\$280.47	\$323.79	\$43.32
	196371	\$758.93	\$876.16	\$117.23
	196374	\$389.68	\$449.86	\$60.18
	196375	\$836.98	\$966.26	\$129.28
	196377	\$316.64	\$365.54	\$48.90
	196378	\$90.60	\$104.59	\$13.99
	196380	\$1,216.70	\$1,404.63	\$187.93
	196381	\$207.62	\$239.69	\$32.07
	196385	\$693.62	\$800.76	\$107.14
	196387	\$50.14	\$57.89	\$7.75
	196390	\$2,458.13	\$2,837.81	\$379.68
	196393	\$679.40	\$784.34	\$104.94
	196398	\$968.13	\$1,117.67	\$149.54
	196400	\$75.38	\$87.02	\$11.64
	196401	\$239.04	\$275.97	\$36.93
	196404	\$11.21	\$12.94	\$1.73
	196405	\$1,841.51	\$2,125.95	\$284.44
	196406	\$37.21	\$42.96	\$5.75
	196407	\$858.78	\$977.11	\$118.33
	196409	\$57.20	\$66.04	\$8.84
	196410	\$26.86	\$31.01	\$4.15
	196412	\$235.39	\$271.75	\$36.36
	196413	\$595.62	\$687.62	\$92.00
	196416	\$172.75	\$199.43	\$26.68
	196418	\$48.66	\$56.18	\$7.52
	196419	\$552.09	\$637.37	\$85.28
	196420	\$46.32	\$53.48	\$7.16
	196421	\$379.55	\$438.18	\$58.63
	196422	\$118.84	\$137.20	\$18.36
	196423	\$170.55	\$196.90	\$26.35
	196424	\$41.84	\$48.30	\$6.46
	196426	\$311.72	\$359.87	\$48.15
	196427	\$155.53	\$179.55	\$24.02

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332	196428	\$3.10	\$3.58	\$0.48
	196434	\$51.29	\$59.21	\$7.92
	196440	\$7.20	\$8.31	\$1.11
	196441	\$7.20	\$8.31	\$1.11
	196442	\$1.26	\$1.45	\$0.19
	196443	\$1.26	\$1.45	\$0.19
	196445	\$1.26	\$1.45	\$0.19
	196447	\$0.63	\$0.73	\$0.10
	196448	\$0.43	\$0.50	\$0.07
	196449	\$3.61	\$4.16	\$0.55
	196450	\$3.61	\$4.16	\$0.55
	196451	\$2.10	\$2.42	\$0.32
	196452	\$2.10	\$2.42	\$0.32
	196453	\$2.10	\$2.42	\$0.32
	196454	\$2,287.96	\$2,641.35	\$353.39
	196458	\$51.14	\$59.04	\$7.90
	196464	\$2.74	\$3.17	\$0.43
	196465	\$2.74	\$3.17	\$0.43
	196466	\$2.74	\$3.17	\$0.43
	196467	\$2.74	\$3.17	\$0.43
	196469	\$1.38	\$1.59	\$0.21
	196470	\$7.85	\$9.07	\$1.22
	196471	\$7.85	\$9.07	\$1.22
	196473	\$15.69	\$18.11	\$2.42
	196474	\$4.57	\$5.28	\$0.71
	196476	\$4.57	\$5.28	\$0.71
	196478	\$0.94	\$1.08	\$0.14
	196479	\$5.44	\$6.28	\$0.84
	196480	\$14.98	\$17.29	\$2.31
	196482	\$0.88	\$1.01	\$0.13
	196484	\$1.75	\$2.02	\$0.27
	196490	\$0.15	\$0.18	\$0.03
	196492	\$0.51	\$0.59	\$0.08
	196494	\$0.88	\$1.01	\$0.13
	196495	\$0.10	\$0.12	\$0.02
	196497	\$48.28	\$55.74	\$7.46
	196498	\$2.58	\$2.97	\$0.39
	196499	\$16.51	\$19.06	\$2.55
	196502	\$3.86	\$4.46	\$0.60
	196516	\$482.33	\$556.83	\$74.50
	196517	\$477.08	\$550.76	\$73.68
	196520	\$504.41	\$582.32	\$77.91
	196522	\$874.53	\$1,009.61	\$135.08
	196523	\$280.02	\$323.28	\$43.26
	196526	\$238.54	\$275.38	\$36.84
	196527	\$36.73	\$42.41	\$5.68
	196532	\$377.56	\$435.87	\$58.31

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332	196533	\$995.90	\$1,149.72	\$153.82
	196534	\$829.59	\$957.72	\$128.13
	196535	\$547.54	\$632.11	\$84.57
	196538	\$726.16	\$838.32	\$112.16
	196539	\$396.84	\$458.14	\$61.30
	196540	\$439.93	\$507.88	\$67.95
	196543	\$982.92	\$1,134.74	\$151.82
	196544	\$804.40	\$928.64	\$124.24
	196547	\$629.74	\$727.01	\$97.27
	196550	\$567.72	\$655.41	\$87.69
	196553	\$770.42	\$889.41	\$118.99
	196555	\$604.93	\$698.37	\$93.44
	196556	\$960.93	\$1,109.35	\$148.42
	196557	\$466.27	\$538.29	\$72.02
	196559	\$635.75	\$733.95	\$98.20
	196560	\$792.47	\$914.87	\$122.40
	196561	\$590.00	\$681.13	\$91.13
	196562	\$466.27	\$538.29	\$72.02
	196563	\$695.55	\$802.98	\$107.43
	196564	\$473.20	\$546.29	\$73.09
	196566	\$763.32	\$881.22	\$117.90
	196568	\$148.28	\$171.18	\$22.90
	196571	\$249.32	\$287.83	\$38.51
	196572	\$447.26	\$516.34	\$69.08
	196573	\$321.31	\$370.93	\$49.62
	196575	\$437.95	\$505.60	\$67.65
	196576	\$575.78	\$664.72	\$88.94
	196577	\$537.45	\$620.46	\$83.01
	196579	\$448.26	\$517.50	\$69.24
	196580	\$493.63	\$569.88	\$76.25
	196583	\$546.68	\$631.12	\$84.44
	196584	\$739.09	\$853.24	\$114.15
	196585	\$318.19	\$367.34	\$49.15
	196587	\$418.06	\$482.63	\$64.57
	196588	\$333.14	\$384.59	\$51.45
	196589	\$682.03	\$787.37	\$105.34
	196590	\$783.65	\$904.68	\$121.03
	196593	\$305.37	\$352.54	\$47.17
	196597	\$688.75	\$795.14	\$106.39
	196598	\$1,003.67	\$1,158.70	\$155.03
	196600	\$353.23	\$407.79	\$54.56
	196601	\$722.10	\$833.64	\$111.54
	196602	\$529.08	\$610.80	\$81.72
	196604	\$531.94	\$614.10	\$82.16
	196611	\$382.04	\$441.05	\$59.01
	196613	\$33.78	\$38.99	\$5.21
	196614	\$684.33	\$790.03	\$105.70

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332	196615	\$806.02	\$930.52	\$124.50
	196616	\$899.74	\$1,038.71	\$138.97
	196617	\$889.08	\$1,026.40	\$137.32
	196619	\$256.50	\$259.18	\$2.68
	196621	\$514.03	\$593.42	\$79.39
	196624	\$250.46	\$289.15	\$38.69
	196625	\$433.38	\$500.31	\$66.93
	196627	\$662.42	\$764.74	\$102.32
	196630	\$410.59	\$474.01	\$63.42
	196631	\$367.81	\$424.62	\$56.81
	196632	\$444.78	\$513.48	\$68.70
	196634	\$667.91	\$771.07	\$103.16
	196635	\$319.31	\$368.63	\$49.32
	196637	\$686.66	\$792.71	\$106.05
	196640	\$1,371.59	\$1,583.45	\$211.86
	196645	\$1,689.61	\$1,950.59	\$260.98
	196646	\$93.89	\$108.39	\$14.50
	196647	\$811.03	\$936.30	\$125.27
	196648	\$620.20	\$715.99	\$95.79
	196650	\$417.44	\$481.92	\$64.48
	196651	\$172.70	\$199.38	\$26.68
	196653	\$554.55	\$640.21	\$85.66
	196656	\$511.14	\$590.09	\$78.95
	196658	\$517.15	\$597.03	\$79.88
	196660	\$486.75	\$561.93	\$75.18
	196661	\$480.92	\$555.20	\$74.28
	196662	\$399.69	\$461.43	\$61.74
	196664	\$483.34	\$558.00	\$74.66
	196665	\$455.23	\$525.54	\$70.31
	196666	\$602.02	\$695.01	\$92.99
	196667	\$681.93	\$787.26	\$105.33
	196669	\$78.00	\$90.05	\$12.05
	196670	\$78.00	\$90.05	\$12.05
	196671	\$289.32	\$334.01	\$44.69
	196672	\$457.19	\$527.81	\$70.62
	196673	\$462.18	\$533.56	\$71.38
	196674	\$313.22	\$361.60	\$48.38
	196678	\$339.61	\$392.06	\$52.45
	196679	\$541.39	\$625.01	\$83.62
	196683	\$646.10	\$745.90	\$99.80
	196685	\$476.98	\$550.65	\$73.67
	196687	\$116.88	\$134.94	\$18.06
	196689	\$291.06	\$336.02	\$44.96
	196690	\$274.37	\$316.74	\$42.37
	196691	\$357.95	\$413.23	\$55.28
	196692	\$636.32	\$734.61	\$98.29
	196693	\$335.62	\$387.46	\$51.84

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	196696	\$69.03	\$79.70	\$10.67
	196698	\$839.70	\$969.40	\$129.70
	196699	\$769.95	\$888.88	\$118.93
	196700	\$413.43	\$477.29	\$63.86
	196701	\$578.00	\$667.27	\$89.27
	196702	\$444.61	\$513.28	\$68.67
	196703	\$562.52	\$649.41	\$86.89
	196705	\$351.18	\$405.42	\$54.24
	196706	\$83.49	\$96.38	\$12.89
	196708	\$421.35	\$432.20	\$10.85
	196709	\$513.19	\$592.46	\$79.27
	196710	\$290.95	\$335.89	\$44.94
	196712	\$315.13	\$363.80	\$48.67
	196713	\$155.91	\$179.99	\$24.08
	196716	\$2,719.33	\$3,139.35	\$420.02
	196717	\$600.73	\$693.52	\$92.79
	196720	\$631.74	\$729.32	\$97.58
	196721	\$512.76	\$591.96	\$79.20
	196722	\$629.64	\$726.89	\$97.25
	196723	\$428.08	\$494.20	\$66.12
	196725	\$1,550.50	\$1,789.98	\$239.48
	196726	\$758.69	\$875.88	\$117.19
	196727	\$543.87	\$627.87	\$84.00
	196728	\$688.85	\$795.24	\$106.39
	196730	\$559.13	\$645.50	\$86.37
	196731	\$75.14	\$86.75	\$11.61
	196733	\$5,040.31	\$5,818.82	\$778.51
	196736	\$1,761.60	\$2,033.70	\$272.10
	196737	\$37.26	\$43.01	\$5.75
	196738	\$814.08	\$939.82	\$125.74
	196740	\$667.91	\$771.07	\$103.16
	196741	\$743.38	\$858.20	\$114.82
	196742	\$41.74	\$45.42	\$3.68
	196743	\$29.82	\$32.44	\$2.62
	196744	\$582.27	\$672.21	\$89.94
	196748	\$444.59	\$513.26	\$68.67
	196749	\$163.00	\$188.18	\$25.18
	196750	\$211.65	\$237.63	\$25.98
	196751	\$41.74	\$48.19	\$6.45
	196752	\$582.65	\$672.65	\$90.00
	196753	\$701.30	\$809.62	\$108.32
	196754	\$350.65	\$404.81	\$54.16
	196755	\$618.10	\$713.57	\$95.47
	196759	\$686.37	\$792.38	\$106.01
	196760	\$400.17	\$461.98	\$61.81
	196763	\$37.31	\$43.07	\$5.76
	196766	\$43.65	\$50.39	\$6.74

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332	196770	\$655.98	\$757.30	\$101.32
	196772	\$37.26	\$43.01	\$5.75
	196776	\$63.31	\$73.09	\$9.78
	196778	\$18.37	\$21.20	\$2.83
	196784	\$83.49	\$96.38	\$12.89
	196786	\$275.03	\$317.52	\$42.49
	196787	\$41.74	\$48.19	\$6.45
	196790	\$917.37	\$1,059.06	\$141.69
	196791	\$219.45	\$253.35	\$33.90
	196792	\$41.74	\$48.19	\$6.45
	196793	\$41.74	\$48.19	\$6.45
	196794	\$741.95	\$856.55	\$114.60
	196796	\$25.05	\$28.92	\$3.87
	196797	\$153.92	\$177.69	\$23.77
	196798	\$426.32	\$492.16	\$65.84
	196801	\$83.49	\$96.38	\$12.89
	196802	\$757.79	\$874.83	\$117.04
	196809	\$41.74	\$48.19	\$6.45
	196811	\$489.48	\$565.08	\$75.60
	196812	\$298.17	\$344.23	\$46.06
	196814	\$207.62	\$239.69	\$32.07
	196815	\$83.49	\$96.38	\$12.89
	196818	\$538.53	\$621.71	\$83.18
	196819	\$245.93	\$283.92	\$37.99
	196820	\$817.71	\$944.01	\$126.30
	196824	\$179.96	\$207.76	\$27.80
	196825	\$41.74	\$48.19	\$6.45
	196826	\$41.74	\$48.19	\$6.45
	196827	\$257.62	\$297.41	\$39.79
	196828	\$27.57	\$31.83	\$4.26
	196829	\$28.39	\$32.77	\$4.38
	196831	\$27.57	\$31.83	\$4.26
	196832	\$28.39	\$32.77	\$4.38
	196836	\$42.41	\$48.96	\$6.55
	196841	\$41.74	\$48.19	\$6.45
	196842	\$56.34	\$65.05	\$8.71
	196855	\$97.51	\$112.58	\$15.07
	196858	\$41.74	\$48.19	\$6.45
	196859	\$41.74	\$48.19	\$6.45
	196860	\$83.49	\$96.38	\$12.89
	196863	\$429.37	\$495.69	\$66.32
	196864	\$86.87	\$100.28	\$13.41
	196865	\$542.01	\$625.72	\$83.71
	196867	\$46.99	\$54.25	\$7.26
	196871	\$620.20	\$715.99	\$95.79
	196874	\$766.09	\$884.42	\$118.33
	196875	\$41.74	\$48.19	\$6.45

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332	196877	\$683.51	\$789.08	\$105.57
	196878	\$536.71	\$619.61	\$82.90
	196880	\$1,186.01	\$1,369.20	\$183.19
	196884	\$41.74	\$48.19	\$6.45
	196886	\$828.16	\$956.07	\$127.91
	196889	\$33.40	\$38.55	\$5.15
	196891	\$524.64	\$605.68	\$81.04
	196892	\$900.72	\$1,039.84	\$139.12
	196896	\$479.49	\$553.56	\$74.07
	196898	\$414.77	\$478.84	\$64.07
	196899	\$18.18	\$20.98	\$2.80
	196900	\$20.37	\$23.52	\$3.15
	196902	\$27.57	\$31.83	\$4.26
	196905	\$753.78	\$870.21	\$116.43
	196908	\$500.43	\$577.73	\$77.30
	196910	\$652.35	\$753.11	\$100.76
	196911	\$691.76	\$798.61	\$106.85
	196913	\$542.40	\$626.17	\$83.77
	196914	\$679.50	\$784.45	\$104.95
	196917	\$310.10	\$358.00	\$47.90
	196920	\$462.05	\$533.41	\$71.36
	196921	\$70.37	\$81.24	\$10.87
	196922	\$45.42	\$52.43	\$7.01
	196923	\$45.42	\$52.43	\$7.01
	196924	\$754.97	\$871.58	\$116.61
	196925	\$754.97	\$871.58	\$116.61
	196926	\$45.42	\$52.43	\$7.01
	196927	\$45.42	\$52.43	\$7.01
	196928	\$706.07	\$815.13	\$109.06
	196929	\$70.42	\$81.29	\$10.87
	196930	\$35.49	\$40.98	\$5.49
	196931	\$24.14	\$27.87	\$3.73
	196932	\$2.81	\$3.25	\$0.44
	196933	\$2.81	\$3.25	\$0.44
	196934	\$2.81	\$3.25	\$0.44
	196935	\$2.81	\$3.25	\$0.44
	196936	\$2.81	\$3.25	\$0.44
	196937	\$2.81	\$3.25	\$0.44
	196938	\$2.96	\$3.41	\$0.45
	196939	\$8.73	\$10.08	\$1.35
	196940	\$3.96	\$4.57	\$0.61
	196941	\$3.96	\$4.57	\$0.61
	196942	\$3.96	\$4.57	\$0.61
	196943	\$4.29	\$4.96	\$0.67
	196944	\$18.13	\$20.93	\$2.80
	196945	\$15.36	\$17.73	\$2.37
	196948	\$307.95	\$355.52	\$47.57

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332	196950	\$376.89	\$435.10	\$58.21
	196952	\$557.64	\$643.77	\$86.13
	196953	\$548.59	\$633.32	\$84.73
	196954	\$439.16	\$506.99	\$67.83
	196958	\$288.63	\$333.21	\$44.58
	196959	\$257.04	\$296.75	\$39.71
	196961	\$533.51	\$615.92	\$82.41
	196963	\$572.49	\$660.92	\$88.43
	196964	\$415.05	\$479.15	\$64.10
	196965	\$234.69	\$270.94	\$36.25
	196968	\$21.28	\$24.56	\$3.28
	196970	\$628.98	\$726.13	\$97.15
	196973	\$410.01	\$421.28	\$11.27
	196976	\$657.89	\$759.50	\$101.61
	196977	\$270.40	\$273.77	\$3.37
	196979	\$877.96	\$1,013.57	\$135.61
	196980	\$415.06	\$479.16	\$64.10
	196982	\$426.17	\$492.00	\$65.83
	196986	\$296.73	\$342.56	\$45.83
	196987	\$750.73	\$866.68	\$115.95
	196988	\$550.38	\$635.39	\$85.01
	196990	\$736.03	\$849.72	\$113.69
	196993	\$595.15	\$687.08	\$91.93
	196999	\$362.20	\$418.14	\$55.94
	197001	\$353.04	\$407.57	\$54.53
	197002	\$400.62	\$462.50	\$61.88
	197004	\$299.37	\$345.60	\$46.23
	197006	\$2,174.80	\$2,510.71	\$335.91
	197010	\$409.43	\$472.67	\$63.24
	197011	\$407.85	\$470.85	\$63.00
	197012	\$351.41	\$405.69	\$54.28
	197014	\$510.47	\$589.32	\$78.85
	197016	\$2.53	\$2.92	\$0.39
	197017	\$172.70	\$199.38	\$26.68
	197018	\$206.53	\$238.43	\$31.90
	197019	\$834.79	\$963.73	\$128.94
	197020	\$870.33	\$1,004.76	\$134.43
	197021	\$286.25	\$330.46	\$44.21
	197022	\$9.49	\$10.96	\$1.47
	197023	\$18.99	\$21.92	\$2.93
	197024	\$238.54	\$275.38	\$36.84
	197028	\$18.99	\$21.92	\$2.93
	197029	\$314.30	\$362.84	\$48.54
	197030	\$6.97	\$8.04	\$1.07
	197031	\$5.63	\$6.50	\$0.87
	197032	\$790.32	\$912.40	\$122.08
	197034	\$7.11	\$8.21	\$1.10

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332	197035	\$609.23	\$703.33	\$94.10
	197036	\$191.25	\$220.78	\$29.53
	197037	\$19.66	\$22.69	\$3.03
	197038	\$9.83	\$11.35	\$1.52
	197039	\$9.83	\$11.35	\$1.52
	197040	\$5.92	\$6.83	\$0.91
	197041	\$5.96	\$6.88	\$0.92
	197042	\$4.91	\$5.67	\$0.76
	197045	\$20.08	\$23.19	\$3.11
	197046	\$9.73	\$11.24	\$1.51
	197047	\$11.16	\$12.89	\$1.73
	197048	\$11.35	\$13.11	\$1.76
	197049	\$436.67	\$504.11	\$67.44
	197050	\$23.28	\$26.88	\$3.60
	197052	\$8.97	\$10.35	\$1.38
	197053	\$14.46	\$16.69	\$2.23
	197055	\$842.04	\$972.10	\$130.06
	197060	\$41.03	\$47.37	\$6.34
	197065	\$20.71	\$23.90	\$3.19
	197067	\$5.01	\$5.78	\$0.77
	197068	\$7.82	\$9.03	\$1.21
	197069	\$7.82	\$9.03	\$1.21
	197070	\$7.63	\$8.81	\$1.18
	197071	\$7.63	\$8.81	\$1.18
	197072	\$7.44	\$8.59	\$1.15
	197073	\$7.44	\$8.59	\$1.15
	197074	\$357.81	\$413.07	\$55.26
	197076	\$2,909.54	\$3,358.94	\$449.40
	197077	\$357.81	\$413.07	\$55.26
	197078	\$6.87	\$7.93	\$1.06
	197080	\$1,019.32	\$1,176.76	\$157.44
	197093	\$395.40	\$456.47	\$61.07
	197096	\$9.40	\$10.85	\$1.45
	197097	\$115.34	\$133.16	\$17.82
	197098	\$181.39	\$182.10	\$0.71
	197099	\$18.46	\$21.31	\$2.85
	197100	\$264.20	\$305.01	\$40.81
	197101	\$31.68	\$36.57	\$4.89
	197103	\$548.64	\$633.38	\$84.74
	197104	\$969.99	\$1,119.81	\$149.82
	197105	\$204.62	\$236.22	\$31.60
	197107	\$96.46	\$111.36	\$14.90
	197108	\$291.02	\$335.97	\$44.95
	197110	\$356.86	\$411.98	\$55.12
	197112	\$824.54	\$951.90	\$127.36
	197115	\$572.49	\$660.92	\$88.43
	197116	\$432.71	\$499.54	\$66.83

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332	197117	\$310.10	\$357.98	\$47.88
	197118	\$388.82	\$448.87	\$60.05
	197120	\$333.95	\$385.53	\$51.58
	197121	\$592.10	\$683.55	\$91.45
	197122	\$610.66	\$704.98	\$94.32
	197125	\$276.67	\$319.40	\$42.73
	197126	\$442.63	\$511.00	\$68.37
	197127	\$431.75	\$498.44	\$66.69
	197128	\$442.73	\$511.11	\$68.38
	197129	\$18.70	\$21.59	\$2.89
	197130	\$26.24	\$30.29	\$4.05
	197131	\$489.58	\$565.19	\$75.61
	197132	\$917.61	\$1,059.34	\$141.73
	197133	\$24.24	\$27.98	\$3.74
	197134	\$18.70	\$21.59	\$2.89
	197135	\$18.70	\$21.59	\$2.89
	197136	\$18.70	\$21.59	\$2.89
	197137	\$95.42	\$110.15	\$14.73
	197141	\$1,564.95	\$1,806.67	\$241.72
	197143	\$13.98	\$16.14	\$2.16
	197152	\$1.91	\$2.20	\$0.29
	197154	\$1,812.08	\$2,091.97	\$279.89
	197164	\$29.77	\$34.37	\$4.60
	197165	\$156.86	\$181.09	\$24.23
	197166	\$39.22	\$45.27	\$6.05
	197167	\$39.22	\$45.27	\$6.05
	197168	\$517.25	\$597.14	\$79.89
	197170	\$399.46	\$461.15	\$61.69
	197173	\$1,226.42	\$1,415.85	\$189.43
	197175	\$357.81	\$413.07	\$55.26
	197176	\$214.73	\$247.90	\$33.17
	197178	\$552.98	\$638.39	\$85.41
	197179	\$2,438.81	\$2,815.51	\$376.70
	197180	\$108.53	\$125.30	\$16.77
	197181	\$1,862.27	\$2,149.91	\$287.64
	197182	\$378.66	\$437.14	\$58.48
	197183	\$446.07	\$514.96	\$68.89
	197185	\$26.76	\$30.90	\$4.14
	197186	\$2,946.85	\$3,402.01	\$455.16
	197188	\$95.94	\$110.76	\$14.82
	197189	\$90.93	\$104.98	\$14.05
	197193	\$85.97	\$99.25	\$13.28
	197195	\$1,184.87	\$1,367.88	\$183.01
	197196	\$667.91	\$771.07	\$103.16
	197197	\$742.24	\$856.89	\$114.65
	197199	\$719.62	\$830.77	\$111.15
	197200	\$442.36	\$510.69	\$68.33

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332	197201	\$1,226.18	\$1,415.57	\$189.39
	197203	\$397.73	\$459.17	\$61.44
	197204	\$450.12	\$519.65	\$69.53
	197206	\$111.64	\$128.88	\$17.24
	197211	\$247.34	\$285.54	\$38.20
	197212	\$420.78	\$485.77	\$64.99
	197213	\$476.84	\$550.49	\$73.65
	197214	\$304.37	\$351.39	\$47.02
	197217	\$5,781.21	\$6,674.16	\$892.95
	197218	\$2,403.75	\$2,775.02	\$371.27
	197220	\$28.05	\$32.38	\$4.33
	197224	\$103.76	\$119.79	\$16.03
	197225	\$450.93	\$520.58	\$69.65
	197227	\$263.58	\$304.30	\$40.72
	197228	\$744.24	\$859.19	\$114.95
	197229	\$103.76	\$119.79	\$16.03
	197230	\$308.53	\$356.18	\$47.65
	197231	\$250.34	\$289.00	\$38.66
	197232	\$499.80	\$577.00	\$77.20
	197233	\$429.37	\$495.69	\$66.32
	197235	\$115.07	\$132.84	\$17.77
	197236	\$554.89	\$640.59	\$85.70
	197237	\$365.12	\$421.52	\$56.40
	197239	\$313.30	\$361.69	\$48.39
	197240	\$281.47	\$324.95	\$43.48
	197242	\$8.40	\$9.69	\$1.29
	197245	\$41.55	\$47.97	\$6.42
	197246	\$18.99	\$21.92	\$2.93
	197247	\$415.06	\$479.16	\$64.10
	197249	\$374.50	\$432.35	\$57.85
	197250	\$267.16	\$308.43	\$41.27
	197251	\$127.76	\$147.49	\$19.73
	197253	\$545.39	\$629.63	\$84.24
	197254	\$21.90	\$25.28	\$3.38
	197256	\$249.70	\$288.27	\$38.57
	197259	\$814.85	\$939.38	\$124.53
	197260	\$729.93	\$842.67	\$112.74
	197262	\$600.64	\$693.42	\$92.78
	197270	\$710.55	\$820.30	\$109.75
	197272	\$237.47	\$274.15	\$36.68
	197274	\$506.32	\$584.53	\$78.21
	197276	\$415.01	\$479.11	\$64.10
	197279	\$169.43	\$195.60	\$26.17
	197282	\$548.64	\$633.38	\$84.74
	197283	\$934.64	\$1,079.00	\$144.36
	197284	\$353.75	\$408.39	\$54.64
	197289	\$99.35	\$114.70	\$15.35

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197290	\$148.37	\$171.29	\$22.92
	197291	\$578.42	\$667.76	\$89.34
	197292	\$1,192.69	\$1,376.91	\$184.22
	197293	\$47.04	\$54.31	\$7.27
	197294	\$71.75	\$82.83	\$11.08
	197295	\$38.17	\$44.06	\$5.89
	197296	\$8.49	\$9.80	\$1.31
	197298	\$21.04	\$24.29	\$3.25
	197299	\$8.49	\$9.80	\$1.31
	197301	\$138.35	\$159.72	\$21.37
	197302	\$16.94	\$19.55	\$2.61
	197306	\$877.01	\$1,012.47	\$135.46
	197309	\$16.94	\$19.55	\$2.61
	197310	\$47.61	\$54.97	\$7.36
	197312	\$486.19	\$561.28	\$75.09
	197313	\$17.51	\$20.21	\$2.70
	197317	\$243.02	\$280.56	\$37.54
	197318	\$318.96	\$368.22	\$49.26
	197319	\$21.56	\$24.89	\$3.33
	197321	\$495.92	\$572.52	\$76.60
	197322	\$539.14	\$622.42	\$83.28
	197326	\$578.55	\$667.91	\$89.36
	197327	\$149.18	\$172.22	\$23.04
	197328	\$300.18	\$346.54	\$46.36
	197330	\$619.53	\$715.22	\$95.69
	197332	\$776.15	\$896.04	\$119.89
	197334	\$627.45	\$724.36	\$96.91
	197335	\$450.07	\$519.59	\$69.52
	197336	\$500.93	\$578.30	\$77.37
	197339	\$268.09	\$309.50	\$41.41
	197341	\$602.78	\$695.88	\$93.10
	197342	\$795.91	\$918.84	\$122.93
	197343	\$400.36	\$462.20	\$61.84
	197345	\$477.08	\$550.76	\$73.68
	197346	\$462.76	\$534.24	\$71.48
	197347	\$419.76	\$484.60	\$64.84
	197348	\$587.71	\$678.49	\$90.78
	197349	\$599.72	\$692.35	\$92.63
	197350	\$442.38	\$510.71	\$68.33
	197351	\$637.24	\$735.67	\$98.43
	197352	\$288.63	\$333.21	\$44.58
	197354	\$32.87	\$37.95	\$5.08
	197355	\$488.52	\$563.98	\$75.46
	197356	\$503.46	\$581.22	\$77.76
	197357	\$457.13	\$527.74	\$70.61
	197358	\$526.04	\$607.29	\$81.25
	197361	\$246.15	\$248.32	\$2.17

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197362	\$405.51	\$468.15	\$62.64
	197364	\$405.51	\$468.15	\$62.64
	197365	\$768.14	\$886.79	\$118.65
	197366	\$752.06	\$868.22	\$116.16
	197367	\$682.36	\$787.76	\$105.40
	197368	\$401.20	\$463.17	\$61.97
	197370	\$355.07	\$409.92	\$54.85
	197372	\$572.06	\$660.42	\$88.36
	197373	\$670.10	\$773.60	\$103.50
	197374	\$621.73	\$717.76	\$96.03
	197376	\$592.05	\$683.50	\$91.45
	197379	\$467.30	\$539.47	\$72.17
	197380	\$667.72	\$770.85	\$103.13
	197381	\$674.36	\$778.52	\$104.16
	197382	\$409.54	\$472.80	\$63.26
	197383	\$558.99	\$645.33	\$86.34
	197386	\$385.98	\$445.60	\$59.62
	197387	\$580.95	\$670.69	\$89.74
	197390	\$1,080.00	\$1,246.82	\$166.82
	197393	\$461.35	\$532.61	\$71.26
	197394	\$362.58	\$418.58	\$56.00
	197395	\$412.96	\$476.74	\$63.78
	197397	\$334.81	\$386.53	\$51.72
	197398	\$435.19	\$502.41	\$67.22
	197399	\$400.32	\$462.16	\$61.84
	197401	\$719.05	\$830.11	\$111.06
	197402	\$333.95	\$385.53	\$51.58
	197403	\$671.70	\$775.45	\$103.75
	197404	\$487.09	\$562.33	\$75.24
	197405	\$851.77	\$983.33	\$131.56
	197406	\$783.17	\$904.13	\$120.96
	197407	\$541.12	\$624.70	\$83.58
	197410	\$475.64	\$549.11	\$73.47
	197412	\$603.50	\$696.72	\$93.22
	197415	\$772.82	\$892.19	\$119.37
	197416	\$604.03	\$697.32	\$93.29
	197417	\$525.37	\$606.51	\$81.14
	197419	\$534.33	\$550.76	\$16.43
	197422	\$759.89	\$877.26	\$117.37
	197423	\$572.76	\$661.23	\$88.47
	197426	\$433.70	\$500.68	\$66.98
	197427	\$450.56	\$520.15	\$69.59
	197429	\$514.51	\$593.98	\$79.47
	197430	\$1,004.44	\$1,159.58	\$155.14
	197431	\$1,039.07	\$1,199.56	\$160.49
	197434	\$481.32	\$555.67	\$74.35
	197435	\$363.42	\$419.56	\$56.14

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197437	\$528.93	\$610.63	\$81.70
	197439	\$551.69	\$636.90	\$85.21
	197440	\$740.99	\$855.45	\$114.46
	197441	\$726.30	\$838.48	\$112.18
	197443	\$751.89	\$868.02	\$116.13
	197444	\$671.47	\$775.18	\$103.71
	197447	\$1,244.98	\$1,437.27	\$192.29
	197448	\$643.36	\$742.73	\$99.37
	197449	\$657.04	\$758.52	\$101.48
	197452	\$911.84	\$1,052.69	\$140.85
	197454	\$693.58	\$800.71	\$107.13
	197456	\$543.43	\$627.37	\$83.94
	197457	\$572.59	\$661.03	\$88.44
	197458	\$465.91	\$537.87	\$71.96
	197460	\$624.11	\$720.51	\$96.40
	197461	\$393.11	\$453.83	\$60.72
	197462	\$667.91	\$771.07	\$103.16
	197463	\$797.72	\$920.93	\$123.21
	197464	\$648.97	\$749.20	\$100.23
	197465	\$624.83	\$721.34	\$96.51
	197469	\$739.32	\$853.52	\$114.20
	197471	\$644.05	\$743.53	\$99.48
	197473	\$801.87	\$925.73	\$123.86
	197475	\$541.43	\$625.06	\$83.63
	197476	\$787.18	\$908.76	\$121.58
	197477	\$1,019.80	\$1,177.31	\$157.51
	197478	\$689.23	\$795.69	\$106.46
	197480	\$361.89	\$417.78	\$55.89
	197482	\$676.02	\$780.43	\$104.41
	197483	\$676.26	\$780.71	\$104.45
	197484	\$512.09	\$591.19	\$79.10
	197485	\$435.19	\$502.41	\$67.22
	197487	\$629.32	\$726.52	\$97.20
	197488	\$477.79	\$551.59	\$73.80
	197489	\$630.26	\$727.60	\$97.34
	197492	\$718.00	\$828.90	\$110.90
	197493	\$823.29	\$950.45	\$127.16
	197496	\$549.02	\$566.19	\$17.17
	197499	\$444.05	\$512.63	\$68.58
	197500	\$393.98	\$454.84	\$60.86
	197502	\$503.84	\$581.66	\$77.82
	197504	\$539.14	\$622.42	\$83.28
	197505	\$644.17	\$743.66	\$99.49
	197506	\$535.61	\$618.34	\$82.73
	197507	\$528.67	\$610.32	\$81.65
	197509	\$1,431.23	\$1,652.29	\$221.06
	197512	\$861.12	\$994.13	\$133.01

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332	197513	\$565.85	\$653.24	\$87.39
	197514	\$766.89	\$885.35	\$118.46
	197515	\$756.74	\$784.19	\$27.45
	197516	\$521.21	\$601.72	\$80.51
	197517	\$582.56	\$672.54	\$89.98
	197519	\$520.39	\$600.77	\$80.38
	197520	\$620.06	\$715.83	\$95.77
	197521	\$447.49	\$516.61	\$69.12
	197522	\$460.08	\$531.14	\$71.06
	197523	\$533.85	\$616.30	\$82.45
	197524	\$467.74	\$539.99	\$72.25
	197527	\$958.06	\$1,106.04	\$147.98
	197530	\$441.89	\$510.14	\$68.25
	197531	\$663.22	\$765.66	\$102.44
	197532	\$572.82	\$661.30	\$88.48
	197534	\$915.99	\$1,057.47	\$141.48
	197535	\$553.89	\$639.44	\$85.55
	197536	\$552.85	\$638.24	\$85.39
	197537	\$802.87	\$926.88	\$124.01
	197542	\$371.98	\$429.43	\$57.45
	197544	\$400.28	\$410.08	\$9.80
	197545	\$405.51	\$468.15	\$62.64
	197546	\$826.06	\$953.65	\$127.59
	197547	\$597.20	\$621.13	\$23.93
	197548	\$242.97	\$280.50	\$37.53
	197551	\$477.55	\$551.31	\$73.76
	197552	\$591.57	\$682.95	\$91.38
	197553	\$434.19	\$501.25	\$67.06
	197554	\$637.61	\$736.10	\$98.49
	197555	\$475.09	\$548.47	\$73.38
	197556	\$160.98	\$185.85	\$24.87
	197557	\$179.90	\$207.69	\$27.79
	197558	\$649.21	\$749.48	\$100.27
	197559	\$408.36	\$471.44	\$63.08
	197563	\$300.27	\$346.65	\$46.38
	197564	\$394.21	\$455.10	\$60.89
	197566	\$308.20	\$355.80	\$47.60
	197569	\$39.60	\$45.71	\$6.11
	197570	\$758.05	\$790.57	\$32.52
	197571	\$498.70	\$575.73	\$77.03
	197572	\$680.69	\$785.83	\$105.14
	197573	\$449.52	\$518.95	\$69.43
	197574	\$391.90	\$452.44	\$60.54
	197575	\$782.24	\$903.07	\$120.83
	197577	\$457.09	\$527.69	\$70.60
	197578	\$361.06	\$416.82	\$55.76
	197580	\$244.94	\$282.77	\$37.83

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332	197581	\$367.30	\$424.03	\$56.73
	197582	\$454.18	\$524.33	\$70.15
	197583	\$605.49	\$699.01	\$93.52
	197584	\$460.05	\$531.11	\$71.06
	197587	\$592.50	\$684.02	\$91.52
	197590	\$488.88	\$564.39	\$75.51
	197591	\$522.48	\$603.18	\$80.70
	197592	\$472.31	\$545.26	\$72.95
	197594	\$633.26	\$731.07	\$97.81
	197597	\$710.84	\$820.64	\$109.80
	197599	\$558.37	\$644.61	\$86.24
	197602	\$528.12	\$609.70	\$81.58
	197604	\$301.33	\$306.23	\$4.90
	197605	\$488.31	\$563.73	\$75.42
	197607	\$488.38	\$563.82	\$75.44
	197608	\$670.58	\$774.15	\$103.57
	197609	\$620.20	\$715.99	\$95.79
	197611	\$681.23	\$786.45	\$105.22
	197612	\$835.22	\$964.22	\$129.00
	197613	\$266.35	\$307.49	\$41.14
	197614	\$333.95	\$385.53	\$51.58
	197617	\$710.15	\$819.83	\$109.68
	197619	\$456.32	\$461.02	\$4.70
	197620	\$538.71	\$621.92	\$83.21
	197621	\$432.77	\$499.62	\$66.85
	197630	\$559.51	\$645.94	\$86.43
	197631	\$834.88	\$963.84	\$128.96
	197633	\$664.61	\$767.27	\$102.66
	197637	\$2,981.73	\$3,442.28	\$460.55
	197638	\$417.39	\$481.86	\$64.47
	197639	\$543.57	\$627.53	\$83.96
	197640	\$673.32	\$777.32	\$104.00
	197643	\$517.33	\$597.24	\$79.91
	197644	\$497.31	\$574.13	\$76.82
	197645	\$513.01	\$592.25	\$79.24
	197646	\$419.83	\$484.67	\$64.84
	197648	\$577.88	\$667.14	\$89.26
	197649	\$629.74	\$727.01	\$97.27
	197650	\$495.97	\$572.57	\$76.60
	197651	\$694.19	\$801.42	\$107.23
	197652	\$338.57	\$390.86	\$52.29
	197655	\$435.62	\$502.90	\$67.28
	197658	\$546.68	\$631.12	\$84.44
	197660	\$577.26	\$666.42	\$89.16
	197661	\$305.14	\$352.27	\$47.13
	197663	\$434.93	\$502.10	\$67.17
	197665	\$583.84	\$674.02	\$90.18

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197666	\$377.18	\$435.43	\$58.25
	197667	\$791.53	\$913.79	\$122.26
	197669	\$529.60	\$611.40	\$81.80
	197671	\$512.24	\$591.36	\$79.12
	197672	\$395.97	\$457.13	\$61.16
	197673	\$685.17	\$791.00	\$105.83
	197675	\$720.96	\$832.31	\$111.35
	197676	\$437.28	\$448.92	\$11.64
	197678	\$571.06	\$659.26	\$88.20
	197680	\$554.01	\$639.59	\$85.58
	197681	\$480.89	\$555.17	\$74.28
	197685	\$431.91	\$498.62	\$66.71
	197686	\$583.37	\$673.47	\$90.10
	197687	\$520.92	\$601.38	\$80.46
	197688	\$389.44	\$449.59	\$60.15
	197689	\$920.80	\$1,063.03	\$142.23
	197690	\$654.50	\$755.59	\$101.09
	197691	\$807.69	\$932.44	\$124.75
	197696	\$319.86	\$369.27	\$49.41
	197697	\$529.70	\$611.51	\$81.81
	197698	\$391.25	\$451.68	\$60.43
	197699	\$509.90	\$588.66	\$78.76
	197700	\$542.54	\$626.34	\$83.80
	197701	\$310.53	\$358.49	\$47.96
	197706	\$854.73	\$986.75	\$132.02
	197709	\$1,311.48	\$1,514.05	\$202.57
	197711	\$564.48	\$651.66	\$87.18
	197712	\$430.80	\$497.34	\$66.54
	197713	\$562.23	\$649.08	\$86.85
	197714	\$744.95	\$860.02	\$115.07
	197715	\$372.12	\$429.60	\$57.48
	197716	\$442.49	\$510.83	\$68.34
	197718	\$522.47	\$603.17	\$80.70
	197719	\$435.57	\$502.85	\$67.28
	197720	\$452.46	\$522.34	\$69.88
	197721	\$571.48	\$659.75	\$88.27
	197722	\$282.91	\$326.60	\$43.69
	197724	\$545.58	\$629.85	\$84.27
	197725	\$491.66	\$567.60	\$75.94
	197726	\$479.46	\$553.52	\$74.06
	197730	\$377.89	\$436.26	\$58.37
	197732	\$599.40	\$691.98	\$92.58
	197733	\$565.21	\$652.51	\$87.30
	197734	\$576.69	\$665.76	\$89.07
	197735	\$292.21	\$337.34	\$45.13
	197736	\$586.71	\$677.33	\$90.62
	197737	\$372.45	\$429.98	\$57.53

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197738	\$468.20	\$540.52	\$72.32
	197740	\$439.20	\$507.03	\$67.83
	197742	\$771.72	\$890.92	\$119.20
	197743	\$355.95	\$363.56	\$7.61
	197744	\$429.65	\$496.02	\$66.37
	197746	\$748.82	\$864.48	\$115.66
	197748	\$610.27	\$704.53	\$94.26
	197749	\$572.91	\$661.40	\$88.49
	197751	\$632.52	\$730.22	\$97.70
	197753	\$653.72	\$754.70	\$100.98
	197754	\$482.07	\$556.52	\$74.45
	197757	\$472.31	\$545.26	\$72.95
	197758	\$383.61	\$392.58	\$8.97
	197759	\$385.72	\$445.29	\$59.57
	197761	\$547.45	\$632.01	\$84.56
	197762	\$434.43	\$501.53	\$67.10
	197764	\$529.41	\$611.18	\$81.77
	197765	\$690.62	\$797.29	\$106.67
	197769	\$535.61	\$618.34	\$82.73
	197770	\$732.79	\$845.97	\$113.18
	197773	\$3.67	\$4.24	\$0.57
	197774	\$3.67	\$4.24	\$0.57
	197775	\$3.34	\$3.86	\$0.52
	197776	\$3.24	\$3.75	\$0.51
	197777	\$2.86	\$3.30	\$0.44
	197780	\$87.59	\$101.12	\$13.53
	197781	\$3.72	\$4.30	\$0.58
	197782	\$1.34	\$1.54	\$0.20
	197783	\$2.86	\$3.30	\$0.44
	197784	\$0.67	\$0.77	\$0.10
	197785	\$0.33	\$0.39	\$0.06
	197786	\$2.00	\$2.31	\$0.31
	197787	\$4.01	\$4.63	\$0.62
	197788	\$2.67	\$3.08	\$0.41
	197789	\$2.67	\$3.08	\$0.41
	197790	\$0.48	\$0.55	\$0.07
	197791	\$4.01	\$4.63	\$0.62
	197792	\$0.43	\$0.50	\$0.07
	197793	\$5.25	\$6.06	\$0.81
	197795	\$16.22	\$18.73	\$2.51
	197796	\$41.89	\$48.36	\$6.47
	197797	\$4.68	\$5.40	\$0.72
	197798	\$5.96	\$6.88	\$0.92
	197800	\$1.77	\$2.04	\$0.27
	197801	\$4.01	\$4.63	\$0.62
	197803	\$4.68	\$5.40	\$0.72
	197804	\$3.43	\$3.97	\$0.54

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332	197805	\$4.87	\$5.62	\$0.75
	197806	\$4.68	\$5.40	\$0.72
	197807	\$9.73	\$11.24	\$1.51
	197812	\$2.29	\$2.64	\$0.35
	197813	\$2.86	\$3.30	\$0.44
	197814	\$2.86	\$3.30	\$0.44
	197815	\$2.86	\$3.30	\$0.44
	197816	\$4.01	\$4.63	\$0.62
	197817	\$6.82	\$7.88	\$1.06
	197818	\$1.72	\$1.98	\$0.26
	197819	\$4.34	\$5.01	\$0.67
	197820	\$2.86	\$3.30	\$0.44
	197821	\$4.01	\$4.63	\$0.62
	197822	\$4.01	\$4.63	\$0.62
	197823	\$0.95	\$1.10	\$0.15
	197824	\$1.14	\$1.32	\$0.18
	197825	\$2.86	\$3.30	\$0.44
	197826	\$4.01	\$4.63	\$0.62
	197828	\$2.86	\$3.30	\$0.44
	197829	\$0.33	\$0.39	\$0.06
	197830	\$2.86	\$3.30	\$0.44
	197831	\$0.52	\$0.61	\$0.09
	197832	\$7.92	\$9.14	\$1.22
	197833	\$4.06	\$4.68	\$0.62
	197834	\$2.86	\$3.30	\$0.44
	197835	\$0.67	\$0.77	\$0.10
	197836	\$2.00	\$2.31	\$0.31
	197837	\$4.01	\$4.63	\$0.62
	197838	\$4.01	\$4.63	\$0.62
	197839	\$2.86	\$3.30	\$0.44
	197840	\$4.01	\$4.63	\$0.62
	197841	\$4.01	\$4.63	\$0.62
	197842	\$2.53	\$2.92	\$0.39
	197843	\$4.82	\$5.56	\$0.74
	197844	\$4.82	\$5.56	\$0.74
	197845	\$2.86	\$3.30	\$0.44
	197846	\$0.33	\$0.39	\$0.06
	197847	\$2.86	\$3.30	\$0.44
	197848	\$2.86	\$3.30	\$0.44
	197849	\$2.86	\$3.30	\$0.44
	197850	\$3.34	\$3.86	\$0.52
	197851	\$2.86	\$3.30	\$0.44
	197852	\$4.01	\$4.63	\$0.62
	197853	\$0.95	\$1.10	\$0.15
	197854	\$0.81	\$0.94	\$0.13
	197855	\$4.01	\$4.63	\$0.62
	197856	\$4.01	\$4.63	\$0.62

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	197857	\$0.81	\$0.94	\$0.13
	197858	\$4.01	\$4.63	\$0.62
	197859	\$0.33	\$0.39	\$0.06
	197860	\$2.86	\$3.30	\$0.44
	197861	\$2.91	\$3.36	\$0.45
	197862	\$4.01	\$4.63	\$0.62
	197863	\$4.01	\$4.63	\$0.62
	197864	\$6.68	\$7.71	\$1.03
	197865	\$0.33	\$0.39	\$0.06
	197866	\$1.19	\$1.38	\$0.19
	197867	\$0.95	\$1.10	\$0.15
	197868	\$17.75	\$20.49	\$2.74
	197869	\$2.81	\$3.25	\$0.44
	197871	\$514.86	\$594.38	\$79.52
	197872	\$646.92	\$746.84	\$99.92
	197873	\$186.97	\$215.84	\$28.87
	197877	\$462.76	\$534.24	\$71.48
	197878	\$429.37	\$495.69	\$66.32
	197881	\$393.95	\$454.79	\$60.84
	197882	\$1,301.84	\$1,502.92	\$201.08
	197883	\$448.45	\$517.72	\$69.27
	197884	\$45.89	\$52.98	\$7.09
	197885	\$45.89	\$52.98	\$7.09
	197890	\$45.89	\$52.98	\$7.09
	197891	\$686.99	\$793.10	\$106.11
	197892	\$45.89	\$52.98	\$7.09
	197893	\$393.50	\$454.28	\$60.78
	197894	\$506.56	\$584.80	\$78.24
	197896	\$355.61	\$410.54	\$54.93
	197900	\$667.19	\$770.24	\$103.05
	197905	\$698.77	\$806.70	\$107.93
	197909	\$314.87	\$363.50	\$48.63
	197910	\$45.89	\$52.98	\$7.09
	197911	\$45.89	\$52.98	\$7.09
	197912	\$65.41	\$75.51	\$10.10
	197913	\$45.89	\$52.98	\$7.09
	197914	\$45.89	\$52.98	\$7.09
	197915	\$45.89	\$52.98	\$7.09
	197916	\$45.89	\$52.98	\$7.09
	197917	\$45.89	\$52.98	\$7.09
	197918	\$606.79	\$700.52	\$93.73
	197919	\$322.78	\$328.75	\$5.97
	197920	\$548.64	\$633.38	\$84.74
	197921	\$407.38	\$470.30	\$62.92
	197922	\$432.09	\$498.83	\$66.74
	197923	\$357.81	\$413.07	\$55.26
	197924	\$550.40	\$635.42	\$85.02

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332	197927	\$384.67	\$444.08	\$59.41
	197928	\$523.30	\$604.13	\$80.83
	197929	\$221.21	\$255.37	\$34.16
	197930	\$240.03	\$277.10	\$37.07
	197931	\$519.49	\$599.73	\$80.24
	197932	\$497.83	\$574.72	\$76.89
	197933	\$668.72	\$772.01	\$103.29
	197934	\$582.03	\$671.93	\$89.90
	197935	\$314.61	\$363.20	\$48.59
	197936	\$338.72	\$391.04	\$52.32
	197937	\$372.56	\$430.11	\$57.55
	197939	\$521.44	\$601.99	\$80.55
	197940	\$386.43	\$446.12	\$59.69
	197941	\$632.27	\$729.93	\$97.66
	197943	\$504.98	\$582.98	\$78.00
	197946	\$409.90	\$473.22	\$63.32
	197947	\$312.93	\$361.26	\$48.33
	197948	\$554.52	\$640.17	\$85.65
	197949	\$376.89	\$435.10	\$58.21
	197951	\$400.84	\$462.75	\$61.91
	197952	\$541.15	\$624.73	\$83.58
	197953	\$665.09	\$767.82	\$102.73
	197954	\$335.86	\$387.74	\$51.88
	197955	\$477.08	\$550.76	\$73.68
	197958	\$598.30	\$690.71	\$92.41
	197959	\$89.59	\$103.43	\$13.84
	197961	\$395.97	\$457.13	\$61.16
	197962	\$284.48	\$328.42	\$43.94
	197963	\$589.19	\$680.19	\$91.00
	197964	\$428.89	\$495.14	\$66.25
	197966	\$812.56	\$938.06	\$125.50
	197967	\$517.82	\$597.80	\$79.98
	197970	\$361.66	\$417.52	\$55.86
	197971	\$417.01	\$481.42	\$64.41
	197972	\$634.46	\$732.46	\$98.00
	197973	\$686.04	\$792.00	\$105.96
	197974	\$391.30	\$451.74	\$60.44
	197975	\$241.18	\$278.43	\$37.25
	197977	\$278.70	\$321.75	\$43.05
	197978	\$572.59	\$661.03	\$88.44
	197979	\$486.52	\$561.67	\$75.15
	197980	\$251.40	\$290.23	\$38.83
	197983	\$522.02	\$602.65	\$80.63
	197984	\$486.62	\$561.78	\$75.16
	197985	\$213.93	\$246.97	\$33.04
	197987	\$539.10	\$622.36	\$83.26
	197989	\$511.04	\$589.98	\$78.94

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332	197990	\$302.37	\$349.07	\$46.70
	197991	\$136.59	\$157.68	\$21.09
	197993	\$448.45	\$517.72	\$69.27
	197994	\$501.58	\$579.06	\$77.48
	197996	\$649.83	\$750.21	\$100.38
	197997	\$164.59	\$190.01	\$25.42
	197998	\$288.63	\$333.21	\$44.58
	197999	\$875.96	\$1,011.26	\$135.30
	198000	\$310.10	\$358.00	\$47.90
	198001	\$310.10	\$358.00	\$47.90
	198002	\$605.89	\$699.47	\$93.58
	198003	\$464.05	\$535.73	\$71.68
	198005	\$212.55	\$245.38	\$32.83
	198006	\$284.41	\$328.34	\$43.93
	198007	\$481.13	\$555.45	\$74.32
	198008	\$310.10	\$358.00	\$47.90
	198011	\$421.88	\$487.04	\$65.16
	198012	\$415.06	\$479.16	\$64.10
	198013	\$500.04	\$577.27	\$77.23
	198014	\$244.41	\$282.16	\$37.75
	198015	\$225.17	\$231.30	\$6.13
	198017	\$346.36	\$399.85	\$53.49
	198020	\$343.78	\$396.88	\$53.10
	198021	\$223.33	\$257.82	\$34.49
	198023	\$650.25	\$750.69	\$100.44
	198024	\$563.52	\$650.56	\$87.04
	198025	\$408.57	\$471.67	\$63.10
	198026	\$510.47	\$589.32	\$78.85
	198029	\$486.62	\$561.78	\$75.16
	198030	\$481.85	\$556.27	\$74.42
	198031	\$565.76	\$653.15	\$87.39
	198032	\$422.12	\$487.32	\$65.20
	198033	\$282.52	\$326.16	\$43.64
	198034	\$333.95	\$385.53	\$51.58
	198036	\$255.32	\$294.76	\$39.44
	198037	\$474.69	\$548.01	\$73.32
	198038	\$297.97	\$344.00	\$46.03
	198039	\$316.78	\$365.71	\$48.93
	198040	\$226.34	\$261.30	\$34.96
	198041	\$451.27	\$520.97	\$69.70
	198043	\$180.85	\$208.79	\$27.94
	198044	\$82.30	\$95.01	\$12.71
	198046	\$303.70	\$350.61	\$46.91
	198047	\$233.50	\$269.57	\$36.07
	198049	\$403.03	\$465.29	\$62.26
	198052	\$563.52	\$650.56	\$87.04
	198053	\$457.71	\$528.40	\$70.69

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332	198054	\$620.20	\$715.99	\$95.79
	198055	\$489.77	\$565.41	\$75.64
	198057	\$356.90	\$412.03	\$55.13
	198058	\$346.32	\$399.81	\$53.49
	198060	\$382.57	\$441.66	\$59.09
	198063	\$73.14	\$84.43	\$11.29
	198064	\$305.60	\$352.80	\$47.20
	198066	\$243.26	\$280.83	\$37.57
	198068	\$443.49	\$511.99	\$68.50
	198069	\$258.27	\$298.16	\$39.89
	198070	\$299.95	\$346.28	\$46.33
	198071	\$262.39	\$302.92	\$40.53
	198072	\$425.73	\$491.49	\$65.76
	198073	\$323.97	\$374.01	\$50.04
	198075	\$224.90	\$259.64	\$34.74
	198077	\$445.91	\$514.78	\$68.87
	198078	\$297.29	\$343.21	\$45.92
	198079	\$386.72	\$446.45	\$59.73
	198080	\$386.34	\$446.01	\$59.67
	198081	\$505.70	\$583.81	\$78.11
	198082	\$314.87	\$363.50	\$48.63
	198084	\$440.68	\$508.74	\$68.06
	198086	\$476.26	\$549.83	\$73.57
	198087	\$256.77	\$296.43	\$39.66
	198088	\$395.97	\$457.13	\$61.16
	198089	\$192.34	\$222.05	\$29.71
	198090	\$515.24	\$594.83	\$79.59
	198091	\$338.72	\$391.04	\$52.32
	198093	\$225.02	\$259.77	\$34.75
	198094	\$275.97	\$318.59	\$42.62
	198096	\$319.21	\$368.52	\$49.31
	198098	\$1,498.97	\$1,730.50	\$231.53
	198099	\$26.72	\$30.84	\$4.12
	198100	\$26.72	\$30.84	\$4.12
	198101	\$1,008.54	\$1,164.32	\$155.78
	198102	\$1,001.86	\$1,156.60	\$154.74
	198103	\$293.88	\$339.27	\$45.39
	198105	\$2,504.65	\$2,891.51	\$386.86
	198108	\$491.39	\$567.29	\$75.90
	198109	\$305.33	\$352.49	\$47.16
	198110	\$17.79	\$20.54	\$2.75
	198111	\$647.44	\$747.44	\$100.00
	198112	\$878.25	\$1,013.90	\$135.65
	198113	\$399.03	\$460.66	\$61.63
	198114	\$415.06	\$479.16	\$64.10
	198115	\$233.77	\$269.87	\$36.10
	198116	\$273.39	\$315.62	\$42.23

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332	198117	\$276.70	\$319.44	\$42.74
	198118	\$191.01	\$220.51	\$29.50
	198121	\$863.62	\$896.36	\$32.74
	198122	\$1,093.08	\$1,261.91	\$168.83
	198123	\$1,168.79	\$1,349.32	\$180.53
	198125	\$32.78	\$37.84	\$5.06
	198126	\$240.60	\$277.77	\$37.17
	198127	\$701.21	\$809.51	\$108.30
	198128	\$756.18	\$827.98	\$71.80
	198129	\$28.86	\$33.32	\$4.46
	198130	\$667.91	\$771.07	\$103.16
	198131	\$277.43	\$320.29	\$42.86
	198132	\$538.67	\$621.87	\$83.20
	198133	\$30.39	\$35.08	\$4.69
	198134	\$567.72	\$655.41	\$87.69
	198135	\$593.72	\$685.43	\$91.71
	198136	\$238.59	\$275.44	\$36.85
	198137	\$172.99	\$199.71	\$26.72
	198138	\$304.04	\$351.00	\$46.96
	198139	\$699.68	\$807.75	\$108.07
	198142	\$29.01	\$33.49	\$4.48
	198143	\$41.84	\$48.30	\$6.46
	198144	\$886.12	\$1,022.99	\$136.87
	198146	\$295.37	\$340.99	\$45.62
	198152	\$654.21	\$755.26	\$101.05
	198157	\$41.12	\$47.48	\$6.36
	198159	\$139.25	\$160.76	\$21.51
	198164	\$60.30	\$69.62	\$9.32
	198167	\$334.72	\$386.42	\$51.70
	198168	\$605.89	\$699.47	\$93.58
	198169	\$656.98	\$758.46	\$101.48
	198170	\$605.81	\$699.38	\$93.57
	198172	\$765.66	\$883.92	\$118.26
	198173	\$610.18	\$704.43	\$94.25
	198176	\$936.64	\$1,081.31	\$144.67
	198177	\$836.74	\$965.98	\$129.24
	198178	\$568.24	\$656.00	\$87.76
	198179	\$758.50	\$875.66	\$117.16
	198180	\$565.10	\$652.38	\$87.28
	198181	\$486.62	\$561.78	\$75.16
	198183	\$615.62	\$710.71	\$95.09
	198184	\$694.43	\$801.69	\$107.26
	198185	\$321.98	\$371.71	\$49.73
	198194	\$191.18	\$191.85	\$0.67
	198195	\$393.06	\$453.77	\$60.71
	198196	\$718.14	\$829.07	\$110.93
	198199	\$16.32	\$18.84	\$2.52

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332	198200	\$1,245.60	\$1,437.99	\$192.39
	198206	\$27.29	\$31.50	\$4.21
	198208	\$705.12	\$814.03	\$108.91
	198213	\$26.53	\$30.62	\$4.09
	198219	\$1,238.49	\$1,429.78	\$191.29
	198221	\$645.99	\$745.77	\$99.78
	198225	\$781.88	\$902.65	\$120.77
	198226	\$481.14	\$555.46	\$74.32
	198229	\$13.26	\$15.31	\$2.05
	198230	\$26.53	\$30.62	\$4.09
	198232	\$13.26	\$15.31	\$2.05
	198235	\$813.65	\$939.33	\$125.68
	198236	\$562.95	\$649.90	\$86.95
	198238	\$948.56	\$1,095.07	\$146.51
	198239	\$23.62	\$27.26	\$3.64
	198240	\$561.50	\$648.23	\$86.73
	198241	\$270.98	\$312.83	\$41.85
	198242	\$549.69	\$634.59	\$84.90
	198243	\$387.17	\$446.97	\$59.80
	198244	\$797.89	\$921.13	\$123.24
	198246	\$253.31	\$255.84	\$2.53
	198247	\$536.22	\$619.04	\$82.82
	198248	\$623.61	\$719.94	\$96.33
	198249	\$34.35	\$39.66	\$5.31
	198250	\$668.77	\$772.06	\$103.29
	198253	\$575.74	\$664.66	\$88.92
	198255	\$509.04	\$587.66	\$78.62
	198256	\$330.25	\$381.26	\$51.01
	198257	\$467.06	\$539.17	\$72.11
	198262	\$24.57	\$28.36	\$3.79
	198263	\$342.25	\$395.12	\$52.87
	198264	\$792.85	\$915.31	\$122.46
	198266	\$283.91	\$327.76	\$43.85
	198267	\$898.86	\$1,037.69	\$138.83
	198268	\$673.15	\$777.13	\$103.98
	198269	\$393.41	\$454.18	\$60.77
	198275	\$454.94	\$525.21	\$70.27
	198276	\$293.94	\$339.34	\$45.40
	198277	\$538.81	\$622.03	\$83.22
	198278	\$389.06	\$449.15	\$60.09
	198281	\$440.57	\$508.61	\$68.04
	198282	\$277.09	\$319.88	\$42.79
	198283	\$351.56	\$405.86	\$54.30
	198284	\$522.06	\$602.70	\$80.64
	198286	\$682.66	\$788.10	\$105.44
	198287	\$424.06	\$489.56	\$65.50
	198288	\$519.06	\$599.23	\$80.17

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332	198290	\$434.79	\$501.95	\$67.16
	198291	\$555.98	\$641.86	\$85.88
	198292	\$759.79	\$877.15	\$117.36
	198293	\$503.22	\$580.95	\$77.73
	198294	\$358.71	\$414.11	\$55.40
	198295	\$410.71	\$474.15	\$63.44
	198296	\$433.90	\$500.92	\$67.02
	198297	\$529.18	\$610.91	\$81.73
	198298	\$449.40	\$518.81	\$69.41
	198299	\$439.30	\$507.15	\$67.85
	198300	\$719.00	\$830.06	\$111.06
	198304	\$825.44	\$952.93	\$127.49
	198306	\$597.97	\$690.33	\$92.36
	198308	\$471.69	\$544.54	\$72.85
	198310	\$244.93	\$282.76	\$37.83
	198312	\$203.20	\$234.58	\$31.38
	198317	\$390.68	\$451.02	\$60.34
	198318	\$735.60	\$849.22	\$113.62
	198319	\$568.14	\$655.89	\$87.75
	198321	\$508.52	\$587.06	\$78.54
	198322	\$425.84	\$491.61	\$65.77
	198323	\$609.80	\$703.99	\$94.19
	198326	\$533.28	\$615.64	\$82.36
	198327	\$497.35	\$574.17	\$76.82
	198328	\$75.14	\$86.75	\$11.61
	198329	\$75.14	\$86.75	\$11.61
	198330	\$764.42	\$882.49	\$118.07
	198334	\$784.50	\$905.68	\$121.18
	198335	\$31.01	\$35.80	\$4.79
	198336	\$839.89	\$969.62	\$129.73
	198337	\$284.34	\$328.26	\$43.92
	198338	\$1,010.07	\$1,010.44	\$0.37
	198340	\$322.50	\$372.32	\$49.82
	198345	\$800.20	\$923.80	\$123.60
	198347	\$1,105.58	\$1,276.34	\$170.76
	198348	\$793.85	\$916.47	\$122.62
	198349	\$840.49	\$970.31	\$129.82
	198350	\$927.82	\$1,071.13	\$143.31
	198351	\$746.56	\$861.87	\$115.31
	198352	\$586.13	\$676.66	\$90.53
	198353	\$661.70	\$763.90	\$102.20
	198354	\$700.51	\$725.18	\$24.67
	198355	\$591.12	\$682.42	\$91.30
	198356	\$478.50	\$552.41	\$73.91
	198357	\$516.96	\$596.81	\$79.85
	198358	\$498.59	\$575.60	\$77.01
	198359	\$623.16	\$719.41	\$96.25

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332	198360	\$501.98	\$579.51	\$77.53
	198361	\$497.77	\$574.66	\$76.89
	198362	\$679.45	\$784.40	\$104.95
	198365	\$392.35	\$452.95	\$60.60
	198367	\$599.44	\$692.02	\$92.58
	198368	\$665.95	\$768.81	\$102.86
	198369	\$604.34	\$697.69	\$93.35
	198370	\$638.71	\$737.36	\$98.65
	198373	\$853.31	\$985.11	\$131.80
	198375	\$776.20	\$896.09	\$119.89
	198376	\$671.06	\$774.70	\$103.64
	198378	\$799.35	\$922.82	\$123.47
	198379	\$641.45	\$740.53	\$99.08
	198380	\$738.75	\$852.86	\$114.11
	198382	\$729.83	\$842.56	\$112.73
	198383	\$619.12	\$714.74	\$95.62
	198384	\$585.90	\$676.39	\$90.49
	198386	\$657.74	\$759.34	\$101.60
	198389	\$514.86	\$594.38	\$79.52
	198390	\$616.19	\$711.37	\$95.18
	198391	\$651.35	\$751.96	\$100.61
	198392	\$764.51	\$882.60	\$118.09
	198395	\$476.31	\$490.88	\$14.57
	198398	\$921.28	\$1,063.58	\$142.30
	198400	\$524.78	\$605.84	\$81.06
	198403	\$729.50	\$842.17	\$112.67
	198406	\$718.76	\$829.78	\$111.02
	198408	\$659.91	\$682.56	\$22.65
	198409	\$425.56	\$491.29	\$65.73
	198410	\$1,065.36	\$1,229.91	\$164.55
	198413	\$1,326.70	\$1,531.62	\$204.92
	198414	\$499.80	\$577.00	\$77.20
	198415	\$382.42	\$441.49	\$59.07
	198416	\$216.49	\$228.07	\$11.58
	198419	\$401.55	\$463.58	\$62.03
	198423	\$31.73	\$36.63	\$4.90
	198424	\$286.25	\$330.46	\$44.21
	198425	\$15.36	\$17.73	\$2.37
	198428	\$15.36	\$17.73	\$2.37
	198429	\$264.01	\$300.69	\$36.68
	198431	\$418.49	\$483.13	\$64.64
	198433	\$636.66	\$734.99	\$98.33
	198436	\$501.12	\$578.52	\$77.40
	198437	\$305.33	\$352.49	\$47.16
	198439	\$216.24	\$249.64	\$33.40
	198440	\$473.40	\$546.52	\$73.12
	198442	\$405.42	\$468.04	\$62.62

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	198443	\$310.10	\$358.00	\$47.90
	198444	\$285.05	\$329.08	\$44.03
	198446	\$14.69	\$16.96	\$2.27
	198448	\$387.24	\$447.06	\$59.82
	198449	\$133.87	\$154.54	\$20.67
	198452	\$388.58	\$448.60	\$60.02
	198453	\$226.19	\$261.13	\$34.94
	198454	\$16.03	\$18.51	\$2.48
	198456	\$16.03	\$18.51	\$2.48
	198458	\$342.76	\$395.70	\$52.94
	198459	\$476.50	\$550.07	\$73.57
	198461	\$10.97	\$12.67	\$1.70
	198463	\$397.40	\$458.79	\$61.39
	198465	\$445.26	\$514.03	\$68.77
	198467	\$207.53	\$239.58	\$32.05
	198468	\$219.59	\$253.51	\$33.92
	198469	\$250.06	\$288.68	\$38.62
	198471	\$411.76	\$475.36	\$63.60
	198472	\$373.41	\$431.08	\$57.67
	198473	\$419.30	\$484.07	\$64.77
	198474	\$369.02	\$426.02	\$57.00
	198475	\$324.55	\$374.68	\$50.13
	198476	\$351.75	\$363.04	\$11.29
	198477	\$552.50	\$637.84	\$85.34
	198481	\$351.61	\$405.91	\$54.30
	198482	\$402.99	\$465.23	\$62.24
	198484	\$312.96	\$361.30	\$48.34
	198485	\$219.14	\$252.98	\$33.84
	198486	\$441.20	\$509.35	\$68.15
	198487	\$13.98	\$16.14	\$2.16
	198490	\$324.41	\$374.52	\$50.11
	198492	\$216.99	\$250.51	\$33.52
	198494	\$424.60	\$490.18	\$65.58
	198497	\$15.22	\$17.57	\$2.35
	198499	\$15.12	\$17.46	\$2.34
	198500	\$605.98	\$699.58	\$93.60
	198501	\$188.61	\$217.74	\$29.13
	198504	\$519.54	\$599.78	\$80.24
	198508	\$409.57	\$472.83	\$63.26
	198509	\$3.86	\$4.46	\$0.60
	198510	\$523.54	\$604.41	\$80.87
	198513	\$637.95	\$736.48	\$98.53
	198514	\$562.95	\$649.90	\$86.95
	198515	\$453.22	\$523.23	\$70.01
	198516	\$548.64	\$633.38	\$84.74
	198517	\$517.63	\$597.58	\$79.95
	198518	\$571.06	\$659.26	\$88.20

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	198519	\$764.90	\$883.04	\$118.14
	198520	\$594.68	\$686.53	\$91.85
	198522	\$239.33	\$276.30	\$36.97
	198523	\$396.53	\$457.77	\$61.24
	198524	\$799.67	\$923.19	\$123.52
	198525	\$403.85	\$466.23	\$62.38
	198526	\$713.37	\$823.56	\$110.19
	198528	\$660.32	\$762.31	\$101.99
	198530	\$572.54	\$660.97	\$88.43
	198534	\$193.06	\$222.88	\$29.82
	198536	\$361.77	\$417.65	\$55.88
	198537	\$396.02	\$457.19	\$61.17
	198540	\$272.53	\$314.63	\$42.10
	198542	\$226.18	\$261.12	\$34.94
	198543	\$347.72	\$401.43	\$53.71
	198544	\$548.64	\$633.38	\$84.74
	198548	\$733.60	\$846.91	\$113.31
	198550	\$736.32	\$850.05	\$113.73
	198551	\$404.81	\$467.33	\$62.52
	198552	\$268.28	\$309.72	\$41.44
	198553	\$472.31	\$545.26	\$72.95
	198555	\$458.79	\$529.66	\$70.87
	198556	\$286.25	\$330.46	\$44.21
	198557	\$397.93	\$459.39	\$61.46
	198558	\$430.47	\$496.95	\$66.48
	198559	\$229.00	\$264.37	\$35.37
	198560	\$421.98	\$487.16	\$65.18
	198562	\$530.70	\$612.67	\$81.97
	198563	\$357.81	\$413.07	\$55.26
	198565	\$470.11	\$542.72	\$72.61
	198566	\$320.21	\$369.67	\$49.46
	198567	\$276.28	\$318.95	\$42.67
	198569	\$314.87	\$363.50	\$48.63
	198570	\$298.02	\$344.06	\$46.04
	198571	\$385.49	\$445.03	\$59.54
	198573	\$893.66	\$1,031.69	\$138.03
	198575	\$1,558.08	\$1,798.74	\$240.66
	198577	\$2,580.89	\$2,979.52	\$398.63
	198579	\$429.37	\$495.69	\$66.32
	198580	\$51.72	\$59.70	\$7.98
	198582	\$48.33	\$55.79	\$7.46
	198583	\$355.56	\$410.48	\$54.92
	198590	\$1,072.37	\$1,238.01	\$165.64
	198592	\$292.09	\$337.21	\$45.12
	198593	\$603.74	\$696.99	\$93.25
	198594	\$760.89	\$878.41	\$117.52
	198597	\$461.09	\$532.31	\$71.22

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332	198598	\$400.74	\$462.64	\$61.90
	198599	\$231.38	\$267.12	\$35.74
	198600	\$521.77	\$602.37	\$80.60
	198601	\$260.54	\$300.78	\$40.24
	198602	\$386.43	\$446.12	\$59.69
	198603	\$259.05	\$299.06	\$40.01
	198604	\$556.51	\$642.47	\$85.96
	198605	\$400.51	\$462.37	\$61.86
	198606	\$344.93	\$398.20	\$53.27
	198607	\$227.09	\$262.16	\$35.07
	198608	\$221.00	\$255.13	\$34.13
	198609	\$267.78	\$309.14	\$41.36
	198610	\$572.49	\$660.92	\$88.43
	198611	\$529.27	\$611.02	\$81.75
	198613	\$448.01	\$517.21	\$69.20
	198614	\$434.55	\$446.05	\$11.50
	198615	\$383.90	\$443.20	\$59.30
	198616	\$201.67	\$232.82	\$31.15
	198617	\$560.56	\$647.15	\$86.59
	198618	\$26.43	\$30.51	\$4.08
	198619	\$456.13	\$526.59	\$70.46
	198620	\$570.25	\$658.33	\$88.08
	198621	\$26.43	\$30.51	\$4.08
	198622	\$895.28	\$1,033.56	\$138.28
	198628	\$844.59	\$975.04	\$130.45
	198629	\$348.86	\$402.75	\$53.89
	198631	\$652.40	\$753.17	\$100.77
	198633	\$231.52	\$267.28	\$35.76
	198634	\$484.84	\$559.73	\$74.89
	198635	\$326.07	\$376.43	\$50.36
	198636	\$393.00	\$453.70	\$60.70
	198637	\$498.79	\$575.83	\$77.04
	198638	\$416.68	\$481.04	\$64.36
	198639	\$906.44	\$1,046.45	\$140.01
	198642	\$385.63	\$445.19	\$59.56
	198643	\$450.29	\$519.84	\$69.55
	198644	\$696.48	\$804.06	\$107.58
	198645	\$592.86	\$684.43	\$91.57
	198646	\$811.17	\$936.46	\$125.29
	198647	\$686.99	\$793.10	\$106.11
	198650	\$1,309.38	\$1,511.63	\$202.25
	198653	\$672.39	\$776.25	\$103.86
	198654	\$573.33	\$661.89	\$88.56
	198660	\$663.23	\$765.67	\$102.44
	198661	\$143.12	\$165.23	\$22.11
	198662	\$428.17	\$494.31	\$66.14
	198666	\$27.53	\$31.78	\$4.25

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332	198667	\$519.97	\$600.28	\$80.31
	198668	\$443.68	\$512.21	\$68.53
	198669	\$639.28	\$738.02	\$98.74
	198670	\$24.33	\$28.09	\$3.76
	198671	\$579.46	\$668.96	\$89.50
	198672	\$23.14	\$26.71	\$3.57
	198673	\$447.67	\$516.81	\$69.14
	198674	\$285.26	\$329.32	\$44.06
	198676	\$17.46	\$20.16	\$2.70
	198677	\$319.16	\$368.46	\$49.30
	198678	\$463.00	\$534.52	\$71.52
	198680	\$730.21	\$843.00	\$112.79
	198683	\$784.98	\$906.23	\$121.25
	198687	\$226.38	\$261.34	\$34.96
	198688	\$274.30	\$316.67	\$42.37
	198689	\$22.28	\$25.72	\$3.44
	198690	\$395.97	\$457.13	\$61.16
	198691	\$22.90	\$26.44	\$3.54
	198692	\$221.98	\$256.26	\$34.28
	198693	\$278.70	\$321.75	\$43.05
	198694	\$731.12	\$844.05	\$112.93
	198695	\$667.86	\$771.01	\$103.15
	198697	\$333.95	\$385.53	\$51.58
	198698	\$188.38	\$217.48	\$29.10
	198699	\$477.08	\$550.76	\$73.68
	198700	\$143.12	\$165.23	\$22.11
	198701	\$4,896.99	\$5,653.37	\$756.38
	198702	\$693.93	\$801.11	\$107.18
	198704	\$65.55	\$75.67	\$10.12
	198707	\$511.71	\$590.75	\$79.04
	198708	\$623.85	\$720.21	\$96.36
	198709	\$540.48	\$623.96	\$83.48
	198711	\$346.31	\$399.80	\$53.49
	198713	\$348.07	\$401.84	\$53.77
	198715	\$655.83	\$757.12	\$101.29
	198718	\$761.89	\$879.57	\$117.68
	198722	\$877.53	\$1,013.08	\$135.55
	198723	\$75.66	\$87.35	\$11.69
	198725	\$543.06	\$626.93	\$83.87
	198727	\$24.28	\$28.03	\$3.75
	198728	\$195.06	\$225.19	\$30.13
	198729	\$906.44	\$1,046.45	\$140.01
	198731	\$482.13	\$556.60	\$74.47
	198732	\$435.19	\$502.41	\$67.22
	198733	\$419.40	\$484.18	\$64.78
	198734	\$440.53	\$508.58	\$68.05
	198735	\$278.14	\$321.10	\$42.96

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332	198736	\$475.02	\$548.40	\$73.38
	198737	\$234.46	\$241.06	\$6.60
	198738	\$174.28	\$201.19	\$26.91
	198741	\$143.12	\$165.23	\$22.11
	198746	\$278.64	\$321.67	\$43.03
	198747	\$439.10	\$506.92	\$67.82
	198748	\$48.80	\$56.34	\$7.54
	198749	\$619.39	\$715.06	\$95.67
	198750	\$48.33	\$55.79	\$7.46
	198751	\$529.94	\$611.79	\$81.85
	198752	\$48.33	\$55.79	\$7.46
	198754	\$357.81	\$413.07	\$55.26
	198755	\$604.69	\$698.09	\$93.40
	198756	\$1,598.01	\$1,844.84	\$246.83
	198757	\$167.29	\$193.13	\$25.84
	198758	\$1,092.36	\$1,261.08	\$168.72
	198760	\$829.83	\$958.00	\$128.17
	198761	\$760.08	\$877.48	\$117.40
	198764	\$850.91	\$982.34	\$131.43
	198765	\$48.33	\$55.79	\$7.46
	198767	\$540.43	\$623.91	\$83.48
	198768	\$238.54	\$275.38	\$36.84
	198770	\$18.32	\$21.15	\$2.83
	198771	\$319.64	\$369.01	\$49.37
	198772	\$18.65	\$21.53	\$2.88
	198773	\$25.00	\$28.86	\$3.86
	198775	\$301.61	\$348.19	\$46.58
	198777	\$387.39	\$447.22	\$59.83
	198780	\$14.31	\$16.52	\$2.21
	198781	\$306.52	\$353.87	\$47.35
	198782	\$38.12	\$44.01	\$5.89
	198784	\$1,031.49	\$1,190.81	\$159.32
	198787	\$254.62	\$293.94	\$39.32
	198791	\$352.18	\$406.57	\$54.39
	198792	\$706.55	\$815.68	\$109.13
	198793	\$499.45	\$576.59	\$77.14
	198794	\$424.06	\$489.56	\$65.50
	198796	\$28.91	\$33.38	\$4.47
	198799	\$1,030.44	\$1,189.60	\$159.16
	198805	\$362.05	\$417.97	\$55.92
	198806	\$992.46	\$1,145.75	\$153.29
	198809	\$644.05	\$743.53	\$99.48
	198815	\$45.89	\$52.98	\$7.09
	198816	\$816.52	\$942.63	\$126.11
	198820	\$748.25	\$863.82	\$115.57
	198822	\$45.89	\$52.98	\$7.09
	198823	\$450.22	\$519.76	\$69.54

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332	198825	\$45.89	\$52.98	\$7.09
	198826	\$45.89	\$52.98	\$7.09
	198828	\$854.59	\$986.58	\$131.99
	198829	\$248.08	\$286.40	\$38.32
	198830	\$91.79	\$105.97	\$14.18
	198831	\$12.67	\$14.63	\$1.96
	198835	\$45.89	\$52.98	\$7.09
	198836	\$91.79	\$105.97	\$14.18
	198837	\$183.58	\$211.93	\$28.35
	198840	\$5.28	\$6.10	\$0.82
	198841	\$5.28	\$6.10	\$0.82
	198842	\$45.89	\$52.98	\$7.09
	198844	\$5.28	\$6.10	\$0.82
	198845	\$45.89	\$52.98	\$7.09
	198846	\$153.28	\$176.96	\$23.68
	198847	\$45.89	\$52.98	\$7.09
	198848	\$5.28	\$6.10	\$0.82
	198849	\$45.89	\$52.98	\$7.09
	198851	\$901.67	\$1,040.94	\$139.27
	198853	\$45.89	\$52.98	\$7.09
	198854	\$45.89	\$52.98	\$7.09
	198855	\$776.01	\$895.87	\$119.86
	198856	\$292.92	\$338.17	\$45.25
	198857	\$45.89	\$52.98	\$7.09
	198858	\$45.89	\$52.98	\$7.09
	198859	\$206.10	\$237.93	\$31.83
	198860	\$286.25	\$330.46	\$44.21
	198861	\$45.89	\$52.98	\$7.09
	198862	\$45.89	\$52.98	\$7.09
	198863	\$45.89	\$52.98	\$7.09
	198865	\$45.89	\$52.98	\$7.09
	198870	\$91.79	\$105.97	\$14.18
	198872	\$314.01	\$362.51	\$48.50
	198874	\$428.89	\$495.14	\$66.25
	198875	\$556.37	\$642.30	\$85.93
	198876	\$45.89	\$52.98	\$7.09
	198877	\$45.89	\$52.98	\$7.09
	198879	\$45.89	\$52.98	\$7.09
	198880	\$357.81	\$413.07	\$55.26
	198882	\$45.89	\$52.98	\$7.09
	198885	\$45.89	\$52.98	\$7.09
	198886	\$45.89	\$52.98	\$7.09
	198887	\$45.89	\$52.98	\$7.09
	198888	\$467.53	\$539.75	\$72.22
	198889	\$98.91	\$105.99	\$7.08
	198892	\$455.19	\$525.50	\$70.31
	198894	\$446.26	\$515.18	\$68.92

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332	198895	\$671.68	\$775.42	\$103.74
	198897	\$553.89	\$639.45	\$85.56
	198899	\$521.55	\$602.11	\$80.56
	198901	\$591.54	\$682.91	\$91.37
	198903	\$386.26	\$445.92	\$59.66
	198905	\$642.29	\$741.49	\$99.20
	198908	\$689.23	\$795.69	\$106.46
	198909	\$406.39	\$469.16	\$62.77
	198910	\$592.53	\$684.05	\$91.52
	198911	\$484.04	\$558.80	\$74.76
	198913	\$469.95	\$542.54	\$72.59
	198917	\$658.67	\$760.41	\$101.74
	198919	\$729.26	\$841.90	\$112.64
	198920	\$23.95	\$27.65	\$3.70
	198924	\$590.95	\$682.23	\$91.28
	198925	\$690.66	\$797.34	\$106.68
	198926	\$577.41	\$666.59	\$89.18
	198927	\$549.90	\$634.84	\$84.94
	198928	\$845.33	\$975.90	\$130.57
	198929	\$575.11	\$663.93	\$88.82
	198931	\$763.99	\$881.99	\$118.00
	198932	\$558.73	\$645.03	\$86.30
	198933	\$832.45	\$961.03	\$128.58
	198935	\$23.95	\$27.65	\$3.70
	198936	\$585.47	\$675.90	\$90.43
	198939	\$518.53	\$598.63	\$80.10
	198940	\$774.15	\$893.72	\$119.57
	198941	\$527.36	\$608.81	\$81.45
	198942	\$323.33	\$373.27	\$49.94
	198944	\$613.59	\$708.36	\$94.77
	198945	\$262.53	\$303.09	\$40.56
	198946	\$1,106.17	\$1,277.03	\$170.86
	198947	\$449.86	\$519.35	\$69.49
	198948	\$712.99	\$823.12	\$110.13
	198949	\$4,007.44	\$4,626.42	\$618.98
	198951	\$593.67	\$685.37	\$91.70
	198953	\$925.01	\$960.79	\$35.78
	198954	\$859.69	\$992.48	\$132.79
	198955	\$9.45	\$10.91	\$1.46
	198956	\$521.01	\$601.48	\$80.47
	198957	\$327.23	\$377.77	\$50.54
	198959	\$566.53	\$654.03	\$87.50
	198962	\$42.56	\$49.13	\$6.57
	198964	\$39.84	\$45.99	\$6.15
	198965	\$39.84	\$45.99	\$6.15
	198966	\$39.84	\$45.99	\$6.15
	198967	\$39.84	\$45.99	\$6.15

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332	198968	\$39.84	\$45.99	\$6.15
	198969	\$39.84	\$45.99	\$6.15
	198970	\$39.84	\$45.99	\$6.15
	198971	\$39.84	\$45.99	\$6.15
	198972	\$5.72	\$6.61	\$0.89
	198973	\$5.72	\$6.61	\$0.89
	198974	\$5.72	\$6.61	\$0.89
	198975	\$5.72	\$6.61	\$0.89
	198976	\$5.72	\$6.61	\$0.89
	198977	\$39.84	\$45.99	\$6.15
	198978	\$535.57	\$618.29	\$82.72
	198980	\$494.49	\$570.87	\$76.38
	198981	\$387.58	\$447.44	\$59.86
	198982	\$711.99	\$821.96	\$109.97
	198983	\$911.84	\$1,052.68	\$140.84
	198984	\$396.53	\$457.77	\$61.24
	198985	\$407.48	\$470.41	\$62.93
	198986	\$488.91	\$564.42	\$75.51
	198987	\$472.31	\$545.26	\$72.95
	198988	\$303.23	\$350.07	\$46.84
	198989	\$685.65	\$791.56	\$105.91
	198990	\$365.49	\$421.94	\$56.45
	198992	\$374.33	\$432.15	\$57.82
	198993	\$502.55	\$580.17	\$77.62
	198995	\$658.36	\$760.05	\$101.69
	198996	\$512.71	\$591.91	\$79.20
	198998	\$234.67	\$270.92	\$36.25
	198999	\$713.22	\$823.38	\$110.16
	199001	\$541.48	\$625.12	\$83.64
	199002	\$327.36	\$377.92	\$50.56
	199003	\$21.99	\$25.39	\$3.40
	199004	\$394.33	\$455.23	\$60.90
	199005	\$22.09	\$25.50	\$3.41
	199006	\$587.42	\$678.16	\$90.74
	199007	\$447.28	\$516.37	\$69.09
	199008	\$555.51	\$641.31	\$85.80
	199009	\$22.95	\$26.49	\$3.54
	199013	\$640.28	\$739.18	\$98.90
	199014	\$739.47	\$853.63	\$114.16
	199016	\$426.46	\$492.33	\$65.87
	199017	\$730.74	\$843.61	\$112.87
	199020	\$256.09	\$295.64	\$39.55
	199021	\$242.59	\$280.06	\$37.47
	199023	\$678.80	\$783.65	\$104.85
	199027	\$429.37	\$495.69	\$66.32
	199029	\$318.83	\$368.08	\$49.25
	199031	\$808.79	\$933.71	\$124.92

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199032	\$662.71	\$765.07	\$102.36
	199033	\$516.81	\$596.63	\$79.82
	199035	\$545.84	\$630.15	\$84.31
	199037	\$357.81	\$413.07	\$55.26
	199038	\$269.79	\$311.46	\$41.67
	199039	\$498.64	\$575.66	\$77.02
	199040	\$374.70	\$432.57	\$57.87
	199041	\$415.25	\$479.38	\$64.13
	199042	\$536.28	\$619.11	\$82.83
	199045	\$423.09	\$488.44	\$65.35
	199046	\$338.41	\$345.15	\$6.74
	199047	\$465.44	\$537.34	\$71.90
	199049	\$431.85	\$498.55	\$66.70
	199051	\$463.54	\$535.14	\$71.60
	199052	\$624.97	\$721.50	\$96.53
	199053	\$474.69	\$548.01	\$73.32
	199056	\$585.80	\$676.28	\$90.48
	199057	\$71.56	\$82.61	\$11.05
	199058	\$696.53	\$804.12	\$107.59
	199059	\$441.96	\$510.22	\$68.26
	199066	\$374.12	\$431.91	\$57.79
	199068	\$595.30	\$687.24	\$91.94
	199069	\$450.96	\$520.61	\$69.65
	199070	\$485.52	\$560.51	\$74.99
	199071	\$689.85	\$796.40	\$106.55
	199073	\$618.10	\$713.57	\$95.47
	199075	\$413.48	\$477.35	\$63.87
	199076	\$511.40	\$590.39	\$78.99
	199077	\$398.54	\$460.10	\$61.56
	199080	\$335.11	\$341.68	\$6.57
	199081	\$101.57	\$117.26	\$15.69
	199082	\$712.18	\$822.18	\$110.00
	199085	\$457.52	\$528.18	\$70.66
	199087	\$531.72	\$613.84	\$82.12
	199089	\$757.07	\$874.01	\$116.94
	199090	\$506.94	\$585.24	\$78.30
	199092	\$466.89	\$539.01	\$72.12
	199094	\$84.16	\$97.15	\$12.99
	199096	\$463.95	\$535.61	\$71.66
	199098	\$592.34	\$683.83	\$91.49
	199100	\$363.21	\$419.31	\$56.10
	199102	\$657.03	\$758.51	\$101.48
	199103	\$516.82	\$596.64	\$79.82
	199104	\$597.70	\$690.01	\$92.31
	199105	\$584.19	\$674.42	\$90.23
	199106	\$528.65	\$610.30	\$81.65
	199107	\$494.27	\$570.62	\$76.35

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199108	\$481.08	\$555.39	\$74.31
	199109	\$370.95	\$428.25	\$57.30
	199110	\$457.72	\$470.36	\$12.64
	199111	\$605.74	\$699.31	\$93.57
	199112	\$634.94	\$733.01	\$98.07
	199114	\$463.14	\$534.67	\$71.53
	199115	\$640.03	\$738.88	\$98.85
	199117	\$426.98	\$492.93	\$65.95
	199118	\$480.03	\$554.18	\$74.15
	199122	\$301.45	\$348.02	\$46.57
	199124	\$592.39	\$683.88	\$91.49
	199125	\$340.36	\$392.93	\$52.57
	199127	\$622.49	\$718.64	\$96.15
	199128	\$333.95	\$385.53	\$51.58
	199130	\$555.17	\$640.92	\$85.75
	199132	\$338.48	\$390.76	\$52.28
	199133	\$478.92	\$552.89	\$73.97
	199134	\$811.17	\$936.46	\$125.29
	199135	\$643.00	\$742.32	\$99.32
	199136	\$381.14	\$440.01	\$58.87
	199141	\$846.81	\$977.61	\$130.80
	199142	\$645.63	\$745.35	\$99.72
	199144	\$190.68	\$220.13	\$29.45
	199145	\$10.59	\$12.23	\$1.64
	199146	\$37.83	\$43.68	\$5.85
	199150	\$121.03	\$139.73	\$18.70
	199151	\$117.69	\$135.87	\$18.18
	199154	\$1,086.25	\$1,254.03	\$167.78
	199155	\$1,008.69	\$1,164.49	\$155.80
	199157	\$763.66	\$881.61	\$117.95
	199162	\$19.89	\$22.97	\$3.08
	199163	\$367.01	\$423.70	\$56.69
	199164	\$21.18	\$24.45	\$3.27
	199165	\$112.17	\$129.49	\$17.32
	199168	\$18.94	\$21.87	\$2.93
	199169	\$539.63	\$622.97	\$83.34
	199171	\$516.67	\$596.48	\$79.81
	199172	\$478.78	\$552.73	\$73.95
	199173	\$507.76	\$586.19	\$78.43
	199174	\$499.83	\$577.04	\$77.21
	199175	\$372.51	\$430.05	\$57.54
	199178	\$79.00	\$91.21	\$12.21
	199179	\$41.12	\$47.48	\$6.36
	199180	\$41.12	\$47.48	\$6.36
	199182	\$41.12	\$47.48	\$6.36
	199183	\$10.90	\$12.58	\$1.68
	199184	\$62.74	\$72.43	\$9.69

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332	199189	\$41.12	\$47.48	\$6.36
	199191	\$286.25	\$330.46	\$44.21
	199192	\$544.39	\$628.48	\$84.09
	199193	\$460.05	\$531.11	\$71.06
	199194	\$620.20	\$715.99	\$95.79
	199195	\$484.76	\$559.63	\$74.87
	199196	\$357.81	\$413.07	\$55.26
	199198	\$507.66	\$586.07	\$78.41
	199199	\$343.49	\$396.55	\$53.06
	199200	\$596.35	\$688.46	\$92.11
	199201	\$580.12	\$669.73	\$89.61
	199202	\$541.79	\$625.47	\$83.68
	199203	\$444.63	\$513.31	\$68.68
	199204	\$548.64	\$633.38	\$84.74
	199205	\$611.56	\$706.02	\$94.46
	199207	\$457.99	\$528.73	\$70.74
	199209	\$487.19	\$562.44	\$75.25
	199210	\$338.72	\$391.04	\$52.32
	199211	\$357.81	\$413.07	\$55.26
	199212	\$331.46	\$382.66	\$51.20
	199213	\$490.00	\$565.69	\$75.69
	199214	\$324.41	\$374.52	\$50.11
	199217	\$774.15	\$893.72	\$119.57
	199219	\$691.76	\$798.61	\$106.85
	199220	\$737.99	\$851.98	\$113.99
	199221	\$488.05	\$563.43	\$75.38
	199222	\$391.20	\$451.63	\$60.43
	199229	\$612.45	\$707.05	\$94.60
	199231	\$536.50	\$619.37	\$82.87
	199233	\$762.84	\$880.67	\$117.83
	199234	\$744.81	\$859.85	\$115.04
	199239	\$535.93	\$618.71	\$82.78
	199240	\$522.72	\$603.46	\$80.74
	199241	\$491.04	\$566.88	\$75.84
	199243	\$458.24	\$529.02	\$70.78
	199244	\$839.27	\$968.90	\$129.63
	199245	\$608.44	\$702.42	\$93.98
	199246	\$894.90	\$1,033.12	\$138.22
	199247	\$608.13	\$702.06	\$93.93
	199248	\$853.58	\$985.43	\$131.85
	199250	\$2,371.16	\$2,737.41	\$366.25
	199251	\$512.62	\$591.80	\$79.18
	199252	\$726.06	\$838.21	\$112.15
	199253	\$329.18	\$380.03	\$50.85
	199257	\$395.59	\$456.69	\$61.10
	199258	\$509.09	\$587.72	\$78.63
	199260	\$429.37	\$495.69	\$66.32

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332	199261	\$317.26	\$366.26	\$49.00
	199262	\$17.51	\$20.21	\$2.70
	199263	\$424.07	\$489.57	\$65.50
	199265	\$544.20	\$628.26	\$84.06
	199266	\$833.50	\$962.24	\$128.74
	199267	\$231.83	\$267.64	\$35.81
	199268	\$577.31	\$666.48	\$89.17
	199269	\$523.40	\$604.24	\$80.84
	199270	\$640.14	\$739.02	\$98.88
	199271	\$45.89	\$52.98	\$7.09
	199272	\$548.54	\$633.27	\$84.73
	199273	\$395.97	\$457.13	\$61.16
	199275	\$209.91	\$242.34	\$32.43
	199277	\$458.61	\$529.45	\$70.84
	199279	\$699.06	\$807.03	\$107.97
	199280	\$703.54	\$812.21	\$108.67
	199282	\$262.39	\$302.92	\$40.53
	199283	\$45.89	\$52.98	\$7.09
	199284	\$153.60	\$177.33	\$23.73
	199285	\$514.86	\$594.38	\$79.52
	199288	\$276.70	\$319.44	\$42.74
	199289	\$710.56	\$820.31	\$109.75
	199290	\$658.14	\$759.79	\$101.65
	199291	\$792.90	\$915.37	\$122.47
	199292	\$738.79	\$852.90	\$114.11
	199294	\$610.21	\$704.47	\$94.26
	199295	\$29.20	\$33.71	\$4.51
	199296	\$582.24	\$672.17	\$89.93
	199298	\$588.19	\$679.04	\$90.85
	199301	\$577.77	\$667.01	\$89.24
	199302	\$621.12	\$717.06	\$95.94
	199306	\$507.30	\$585.65	\$78.35
	199307	\$636.99	\$735.38	\$98.39
	199309	\$574.26	\$662.95	\$88.69
	199310	\$524.74	\$605.79	\$81.05
	199312	\$737.13	\$850.99	\$113.86
	199313	\$563.35	\$650.36	\$87.01
	199314	\$639.80	\$738.62	\$98.82
	199316	\$705.17	\$814.08	\$108.91
	199317	\$410.24	\$473.61	\$63.37
	199320	\$517.33	\$597.23	\$79.90
	199321	\$541.41	\$625.04	\$83.63
	199322	\$334.69	\$386.39	\$51.70
	199323	\$656.31	\$757.69	\$101.38
	199324	\$571.06	\$659.26	\$88.20
	199325	\$392.67	\$453.32	\$60.65
	199326	\$479.41	\$553.46	\$74.05

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199327	\$577.36	\$666.53	\$89.17
	199329	\$423.43	\$488.83	\$65.40
	199330	\$518.60	\$598.70	\$80.10
	199331	\$524.78	\$605.84	\$81.06
	199332	\$656.95	\$758.42	\$101.47
	199333	\$466.57	\$538.64	\$72.07
	199334	\$515.24	\$594.83	\$79.59
	199337	\$555.22	\$640.98	\$85.76
	199339	\$871.95	\$1,006.63	\$134.68
	199341	\$1,296.22	\$1,496.43	\$200.21
	199347	\$587.82	\$678.61	\$90.79
	199348	\$779.30	\$899.67	\$120.37
	199349	\$420.40	\$485.33	\$64.93
	199350	\$667.91	\$771.07	\$103.16
	199351	\$620.20	\$715.99	\$95.79
	199354	\$675.01	\$779.28	\$104.27
	199355	\$531.60	\$547.90	\$16.30
	199357	\$673.35	\$777.35	\$104.00
	199358	\$606.75	\$700.46	\$93.71
	199359	\$536.38	\$619.23	\$82.85
	199360	\$621.77	\$717.81	\$96.04
	199364	\$674.11	\$778.23	\$104.12
	199366	\$631.70	\$729.27	\$97.57
	199367	\$224.23	\$258.86	\$34.63
	199368	\$599.49	\$692.09	\$92.60
	199369	\$508.92	\$587.52	\$78.60
	199370	\$453.01	\$522.98	\$69.97
	199371	\$790.23	\$912.29	\$122.06
	199372	\$615.62	\$710.71	\$95.09
	199373	\$416.67	\$481.03	\$64.36
	199376	\$763.70	\$881.66	\$117.96
	199379	\$659.23	\$761.06	\$101.83
	199382	\$809.69	\$934.76	\$125.07
	199383	\$684.41	\$790.13	\$105.72
	199384	\$489.67	\$565.30	\$75.63
	199386	\$633.56	\$731.41	\$97.85
	199387	\$494.93	\$571.38	\$76.45
	199388	\$449.41	\$518.82	\$69.41
	199389	\$622.39	\$718.53	\$96.14
	199390	\$613.04	\$707.73	\$94.69
	199391	\$674.35	\$778.50	\$104.15
	199392	\$565.14	\$652.43	\$87.29
	199393	\$681.80	\$705.55	\$23.75
	199394	\$761.13	\$878.69	\$117.56
	199395	\$705.07	\$813.97	\$108.90
	199397	\$557.89	\$644.06	\$86.17
	199399	\$447.94	\$517.13	\$69.19

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199401	\$448.36	\$517.61	\$69.25
	199402	\$601.12	\$693.96	\$92.84
	199403	\$579.37	\$668.86	\$89.49
	199404	\$555.79	\$641.64	\$85.85
	199405	\$497.14	\$573.92	\$76.78
	199406	\$505.66	\$583.77	\$78.11
	199407	\$452.93	\$522.88	\$69.95
	199408	\$451.82	\$521.61	\$69.79
	199411	\$678.02	\$782.75	\$104.73
	199416	\$515.67	\$595.32	\$79.65
	199417	\$685.84	\$791.78	\$105.94
	199419	\$685.21	\$791.05	\$105.84
	199421	\$578.31	\$667.64	\$89.33
	199422	\$716.76	\$827.47	\$110.71
	199423	\$564.16	\$651.29	\$87.13
	199426	\$649.06	\$749.31	\$100.25
	199427	\$466.79	\$538.88	\$72.09
	199428	\$461.49	\$532.78	\$71.29
	199430	\$694.85	\$802.18	\$107.33
	199436	\$493.93	\$570.22	\$76.29
	199444	\$430.94	\$497.51	\$66.57
	199445	\$36.88	\$42.57	\$5.69
	199449	\$461.28	\$532.53	\$71.25
	199450	\$776.62	\$810.06	\$33.44
	199453	\$502.36	\$579.95	\$77.59
	199454	\$433.23	\$500.15	\$66.92
	199456	\$441.29	\$444.72	\$3.43
	199457	\$454.60	\$524.81	\$70.21
	199459	\$18.27	\$21.09	\$2.82
	199464	\$543.10	\$626.99	\$83.89
	199466	\$790.56	\$912.67	\$122.11
	199468	\$131.63	\$148.12	\$16.49
	199470	\$372.12	\$429.60	\$57.48
	199472	\$824.91	\$952.33	\$127.42
	199473	\$434.95	\$502.13	\$67.18
	199477	\$530.10	\$611.98	\$81.88
	199478	\$543.62	\$627.59	\$83.97
	199484	\$406.96	\$469.82	\$62.86
	199485	\$477.60	\$551.37	\$73.77
	199486	\$59.23	\$68.38	\$9.15
	199497	\$600.67	\$693.44	\$92.77
	199500	\$398.75	\$460.34	\$61.59
	199501	\$632.22	\$729.87	\$97.65
	199502	\$555.87	\$641.72	\$85.85
	199503	\$750.35	\$866.24	\$115.89
	199504	\$872.81	\$1,007.62	\$134.81
	199505	\$468.62	\$541.00	\$72.38

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332	199506	\$562.95	\$649.90	\$86.95
	199510	\$890.32	\$1,027.84	\$137.52
	199511	\$24.03	\$27.74	\$3.71
	199513	\$593.08	\$684.68	\$91.60
	199514	\$104.19	\$120.29	\$16.10
	199516	\$442.68	\$511.05	\$68.37
	199518	\$62.02	\$71.60	\$9.58
	199520	\$345.46	\$352.54	\$7.08
	199521	\$609.66	\$703.82	\$94.16
	199522	\$872.91	\$1,007.73	\$134.82
	199525	\$820.90	\$947.70	\$126.80
	199526	\$358.89	\$414.33	\$55.44
	199527	\$423.88	\$489.32	\$65.44
	199528	\$265.81	\$306.87	\$41.06
	199531	\$474.12	\$547.35	\$73.23
	199537	\$596.35	\$688.46	\$92.11
	199539	\$367.35	\$424.09	\$56.74
	199542	\$371.74	\$429.16	\$57.42
	199543	\$744.14	\$859.08	\$114.94
	199544	\$489.67	\$565.30	\$75.63
	199545	\$572.49	\$660.92	\$88.43
	199546	\$452.79	\$522.73	\$69.94
	199548	\$490.93	\$566.76	\$75.83
	199549	\$25.09	\$28.97	\$3.88
	199550	\$309.72	\$357.56	\$47.84
	199551	\$420.21	\$485.11	\$64.90
	199552	\$511.85	\$590.91	\$79.06
	199553	\$252.03	\$290.96	\$38.93
	199559	\$15.50	\$17.90	\$2.40
	199560	\$75.90	\$87.63	\$11.73
	199561	\$145.51	\$167.98	\$22.47
	199562	\$240.88	\$278.08	\$37.20
	199563	\$355.25	\$410.12	\$54.87
	199567	\$443.68	\$512.21	\$68.53
	199568	\$246.74	\$284.86	\$38.12
	199569	\$271.93	\$313.94	\$42.01
	199571	\$26.67	\$30.79	\$4.12
	199572	\$194.07	\$224.05	\$29.98
	199577	\$245.69	\$283.64	\$37.95
	199580	\$1,081.67	\$1,248.75	\$167.08
	199581	\$563.38	\$650.40	\$87.02
	199582	\$453.67	\$523.74	\$70.07
	199583	\$535.76	\$618.51	\$82.75
	199585	\$442.20	\$510.50	\$68.30
	199587	\$422.59	\$487.86	\$65.27
	199588	\$406.42	\$469.20	\$62.78
	199591	\$369.73	\$426.84	\$57.11

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	199592	\$24.14	\$27.87	\$3.73
	199593	\$40.22	\$46.43	\$6.21
	199595	\$346.85	\$360.66	\$13.81
	199596	\$282.86	\$326.55	\$43.69
	199597	\$26.24	\$30.29	\$4.05
	199598	\$13.12	\$15.15	\$2.03
	199599	\$338.82	\$391.15	\$52.33
	199605	\$496.83	\$573.57	\$76.74
	199606	\$141.07	\$162.86	\$21.79
	199607	\$288.34	\$332.88	\$44.54
	199609	\$361.02	\$416.78	\$55.76
	199610	\$8.91	\$10.29	\$1.38
	199611	\$859.26	\$991.98	\$132.72
	199612	\$372.29	\$429.79	\$57.50
	199618	\$300.56	\$346.98	\$46.42
	199619	\$499.10	\$576.19	\$77.09
	199620	\$251.17	\$289.96	\$38.79
	199621	\$356.00	\$410.99	\$54.99
	199623	\$27.43	\$31.67	\$4.24
	199626	\$349.53	\$403.52	\$53.99
	199627	\$34.97	\$40.37	\$5.40
	199628	\$194.07	\$224.05	\$29.98
	199629	\$208.51	\$240.71	\$32.20
	199630	\$491.58	\$567.51	\$75.93
	199631	\$569.53	\$657.50	\$87.97
	199632	\$355.42	\$410.32	\$54.90
	199633	\$460.09	\$531.16	\$71.07
	199634	\$196.50	\$226.85	\$30.35
	199635	\$508.61	\$587.17	\$78.56
	199636	\$266.47	\$307.62	\$41.15
	199637	\$422.21	\$487.43	\$65.22
	199638	\$62.43	\$72.07	\$9.64
	199639	\$467.40	\$503.15	\$35.75
	199640	\$584.70	\$675.02	\$90.32
	199643	\$708.70	\$818.16	\$109.46
	199645	\$101.43	\$117.09	\$15.66
	199648	\$38.64	\$44.61	\$5.97
	199651	\$4.96	\$5.73	\$0.77
	199652	\$6.12	\$7.06	\$0.94
	199654	\$471.88	\$544.76	\$72.88
	199655	\$388.20	\$448.16	\$59.96
	199656	\$359.28	\$414.77	\$55.49
	199657	\$1,290.40	\$1,489.71	\$199.31
	199659	\$481.85	\$556.27	\$74.42
	199660	\$576.93	\$666.04	\$89.11
	199661	\$301.95	\$348.59	\$46.64
	199662	\$500.85	\$578.21	\$77.36

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332	199663	\$477.08	\$550.76	\$73.68
	199664	\$466.39	\$538.43	\$72.04
	199665	\$387.29	\$447.11	\$59.82
	199666	\$377.12	\$435.37	\$58.25
	199667	\$460.57	\$531.71	\$71.14
	199668	\$450.46	\$520.04	\$69.58
	199669	\$472.50	\$545.48	\$72.98
	199670	\$333.18	\$384.64	\$51.46
	199671	\$322.17	\$371.93	\$49.76
	199672	\$296.98	\$342.86	\$45.88
	199674	\$491.39	\$567.29	\$75.90
	199678	\$592.72	\$684.27	\$91.55
	199679	\$222.31	\$256.65	\$34.34
	199680	\$698.92	\$806.87	\$107.95
	199681	\$381.66	\$440.61	\$58.95
	199682	\$391.20	\$451.63	\$60.43
	199683	\$39.50	\$45.60	\$6.10
	199684	\$404.47	\$466.94	\$62.47
	199685	\$640.50	\$739.43	\$98.93
	199686	\$39.50	\$45.60	\$6.10
	199687	\$429.37	\$495.69	\$66.32
	199691	\$386.43	\$446.12	\$59.69
	199692	\$548.64	\$633.38	\$84.74
	199693	\$481.23	\$555.56	\$74.33
	199695	\$292.73	\$337.94	\$45.21
	199697	\$730.93	\$843.83	\$112.90
	199698	\$584.37	\$674.63	\$90.26
	199699	\$59.25	\$68.40	\$9.15
	199701	\$286.25	\$330.46	\$44.21
	199708	\$31.68	\$36.57	\$4.89
	199714	\$262.39	\$302.92	\$40.53
	199715	\$402.56	\$464.73	\$62.17
	199717	\$410.29	\$473.66	\$63.37
	199718	\$330.76	\$381.84	\$51.08
	199719	\$338.72	\$391.04	\$52.32
	199721	\$267.16	\$308.43	\$41.27
	199722	\$496.25	\$572.90	\$76.65
	199724	\$391.58	\$452.07	\$60.49
	199725	\$16.08	\$18.56	\$2.48
	199726	\$136.09	\$157.11	\$21.02
	199732	\$532.46	\$614.71	\$82.25
	199733	\$281.62	\$325.12	\$43.50
	199734	\$8.78	\$10.13	\$1.35
	199736	\$8.78	\$10.13	\$1.35
	199739	\$326.32	\$376.72	\$50.40
	199741	\$424.55	\$490.12	\$65.57
	199743	\$8.78	\$10.13	\$1.35

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332	199745	\$8.78	\$10.13	\$1.35
	199746	\$247.41	\$285.63	\$38.22
	199747	\$212.39	\$245.20	\$32.81
	199748	\$28.29	\$32.66	\$4.37
	199749	\$440.25	\$508.25	\$68.00
	199750	\$3.34	\$3.86	\$0.52
	199751	\$357.28	\$412.47	\$55.19
	199752	\$9.68	\$11.18	\$1.50
	199753	\$47.76	\$55.13	\$7.37
	199759	\$30.15	\$34.81	\$4.66
	199761	\$653.07	\$753.94	\$100.87
	199762	\$75.57	\$87.24	\$11.67
	199770	\$2.91	\$3.36	\$0.45
	199774	\$556.37	\$642.30	\$85.93
	199776	\$727.25	\$839.58	\$112.33
	199777	\$143.12	\$165.23	\$22.11
	199778	\$530.82	\$612.81	\$81.99
	199780	\$180.33	\$208.19	\$27.86
	199784	\$522.97	\$603.75	\$80.78
	199791	\$222.79	\$257.21	\$34.42
	199796	\$329.52	\$380.41	\$50.89
	199798	\$858.74	\$991.38	\$132.64
	199801	\$524.78	\$605.84	\$81.06
	199804	\$8.16	\$9.42	\$1.26
	199805	\$579.89	\$669.45	\$89.56
	199806	\$507.75	\$586.18	\$78.43
	199809	\$473.93	\$547.13	\$73.20
	199810	\$451.84	\$521.63	\$69.79
	199811	\$489.91	\$565.58	\$75.67
	199812	\$662.13	\$764.41	\$102.28
	199814	\$419.49	\$484.29	\$64.80
	199817	\$331.73	\$382.97	\$51.24
	199818	\$54.01	\$62.35	\$8.34
	199819	\$76.28	\$88.07	\$11.79
	199820	\$631.17	\$728.66	\$97.49
	199822	\$426.03	\$491.83	\$65.80
	199823	\$323.46	\$373.42	\$49.96
	199825	\$452.75	\$522.68	\$69.93
	199826	\$45.89	\$52.98	\$7.09
	199828	\$45.89	\$52.98	\$7.09
	199830	\$45.89	\$52.98	\$7.09
	199832	\$45.89	\$52.98	\$7.09
	199834	\$33.01	\$38.11	\$5.10
	199836	\$406.07	\$468.79	\$62.72
	199838	\$495.99	\$572.60	\$76.61
	199839	\$595.15	\$687.08	\$91.93
	199840	\$17.08	\$19.72	\$2.64

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332	199841	\$287.90	\$332.37	\$44.47
	199842	\$808.26	\$933.10	\$124.84
	199843	\$619.01	\$714.62	\$95.61
	199845	\$1,211.77	\$1,398.94	\$187.17
	199846	\$152.40	\$175.94	\$23.54
	199847	\$532.75	\$615.04	\$82.29
	199848	\$641.67	\$740.78	\$99.11
	199849	\$430.56	\$497.06	\$66.50
	199850	\$544.68	\$628.81	\$84.13
	199851	\$649.84	\$750.21	\$100.37
	199852	\$283.84	\$327.68	\$43.84
	199853	\$86.02	\$99.30	\$13.28
	199854	\$55.58	\$64.16	\$8.58
	199855	\$81.44	\$94.02	\$12.58
	199857	\$45.61	\$52.65	\$7.04
	199858	\$329.71	\$380.63	\$50.92
	199860	\$483.85	\$558.58	\$74.73
	199863	\$591.86	\$683.28	\$91.42
	199864	\$297.76	\$343.75	\$45.99
	199868	\$26.72	\$30.84	\$4.12
	199871	\$584.42	\$674.69	\$90.27
	199872	\$372.12	\$429.60	\$57.48
	199873	\$104.33	\$120.44	\$16.11
	199874	\$262.39	\$302.92	\$40.53
	199875	\$6.06	\$6.99	\$0.93
	199876	\$661.66	\$763.85	\$102.19
	199877	\$95.56	\$110.32	\$14.76
	199878	\$197.51	\$228.02	\$30.51
	199880	\$728.50	\$841.02	\$112.52
	199881	\$185.53	\$214.19	\$28.66
	199887	\$202.76	\$234.07	\$31.31
	199889	\$171.89	\$198.44	\$26.55
	199890	\$491.01	\$566.85	\$75.84
	199893	\$27.00	\$31.17	\$4.17
	199894	\$43.27	\$49.95	\$6.68
	199895	\$531.24	\$613.29	\$82.05
	199897	\$440.30	\$508.31	\$68.01
	199899	\$787.41	\$909.04	\$121.63
	199900	\$776.54	\$896.48	\$119.94
	199901	\$27.00	\$31.17	\$4.17
	199902	\$402.64	\$464.83	\$62.19
	199903	\$475.35	\$548.78	\$73.43
	199904	\$508.90	\$587.50	\$78.60
	199905	\$190.83	\$211.93	\$21.10
	199906	\$378.37	\$436.81	\$58.44
	199907	\$347.91	\$401.65	\$53.74
	199908	\$728.54	\$841.07	\$112.53

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332	199909	\$238.54	\$275.38	\$36.84
	199910	\$291.94	\$337.03	\$45.09
	199912	\$424.75	\$490.36	\$65.61
	199914	\$783.98	\$905.07	\$121.09
	199915	\$745.48	\$860.62	\$115.14
	199919	\$4.39	\$5.07	\$0.68
	199922	\$730.16	\$842.94	\$112.78
	199926	\$357.47	\$412.69	\$55.22
	199928	\$1,071.61	\$1,237.13	\$165.52
	199929	\$269.56	\$311.19	\$41.63
	199931	\$763.32	\$881.22	\$117.90
	199932	\$273.17	\$315.36	\$42.19
	199933	\$177.85	\$205.32	\$27.47
	199941	\$72.75	\$83.99	\$11.24
	199942	\$806.02	\$930.52	\$124.50
	199943	\$72.75	\$83.99	\$11.24
	199945	\$369.74	\$426.85	\$57.11
	199947	\$102.75	\$118.62	\$15.87
	199948	\$9.40	\$10.86	\$1.46
	199950	\$527.12	\$608.54	\$81.42
	199952	\$859.07	\$991.76	\$132.69
	199953	\$46.61	\$53.81	\$7.20
	199954	\$230.84	\$266.49	\$35.65
	199955	\$93.22	\$107.62	\$14.40
	199957	\$135.82	\$156.80	\$20.98
	199958	\$46.61	\$53.81	\$7.20
	199959	\$729.59	\$842.28	\$112.69
	199961	\$573.11	\$661.63	\$88.52
	199965	\$329.60	\$380.51	\$50.91
	199966	\$46.61	\$53.81	\$7.20
	199967	\$249.46	\$287.99	\$38.53
	199968	\$305.33	\$352.49	\$47.16
	199969	\$451.84	\$521.63	\$69.79
	199970	\$93.22	\$107.62	\$14.40
	199972	\$698.68	\$806.59	\$107.91
	199976	\$22.35	\$25.80	\$3.45
	199978	\$46.61	\$53.81	\$7.20
	199979	\$46.61	\$53.81	\$7.20
	199981	\$891.61	\$1,029.32	\$137.71
	199982	\$46.61	\$53.81	\$7.20
	199983	\$46.61	\$53.81	\$7.20
	199984	\$166.98	\$192.77	\$25.79
	199986	\$258.62	\$298.57	\$39.95
	199988	\$289.97	\$334.75	\$44.78
	199998	\$367.35	\$424.09	\$56.74
	199999	\$197.61	\$228.13	\$30.52
	200000	\$493.06	\$569.21	\$76.15

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332	200001	\$41.22	\$47.59	\$6.37
	200002	\$266.17	\$307.28	\$41.11
	200007	\$318.23	\$367.38	\$49.15
	200011	\$34.35	\$39.66	\$5.31
	200012	\$199.26	\$230.04	\$30.78
	200013	\$561.90	\$648.69	\$86.79
	200014	\$433.19	\$500.09	\$66.90
	200015	\$345.78	\$399.19	\$53.41
	200016	\$34.35	\$39.66	\$5.31
	200018	\$27.43	\$31.67	\$4.24
	200019	\$192.81	\$222.59	\$29.78
	200022	\$324.55	\$374.68	\$50.13
	200023	\$225.99	\$260.90	\$34.91
	200025	\$767.47	\$886.01	\$118.54
	200026	\$386.29	\$445.95	\$59.66
	200027	\$440.53	\$508.58	\$68.05
	200031	\$381.66	\$440.61	\$58.95
	200033	\$297.46	\$343.41	\$45.95
	200034	\$228.47	\$263.76	\$35.29
	200037	\$32.35	\$37.35	\$5.00
	200038	\$427.36	\$493.36	\$66.00
	200039	\$826.49	\$954.14	\$127.65
	200040	\$514.77	\$594.27	\$79.50
	200041	\$650.25	\$750.69	\$100.44
	200042	\$632.79	\$730.53	\$97.74
	200043	\$383.71	\$442.97	\$59.26
	200044	\$388.15	\$448.10	\$59.95
	200046	\$693.53	\$800.65	\$107.12
	200047	\$452.36	\$522.23	\$69.87
	200048	\$603.88	\$697.16	\$93.28
	200050	\$229.04	\$264.42	\$35.38
	200054	\$538.00	\$621.10	\$83.10
	200056	\$423.83	\$489.30	\$65.47
	200057	\$361.37	\$417.18	\$55.81
	200059	\$429.75	\$496.13	\$66.38
	200061	\$420.97	\$485.99	\$65.02
	200062	\$760.98	\$878.52	\$117.54
	200064	\$719.79	\$830.97	\$111.18
	200066	\$460.04	\$531.10	\$71.06
	200068	\$338.07	\$390.28	\$52.21
	200069	\$398.84	\$460.44	\$61.60
	200071	\$569.78	\$657.78	\$88.00
	200072	\$375.03	\$432.96	\$57.93
	200073	\$601.77	\$694.72	\$92.95
	200075	\$954.51	\$1,101.94	\$147.43
	200077	\$394.97	\$455.98	\$61.01
	200078	\$470.82	\$543.54	\$72.72

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332	200079	\$410.24	\$473.60	\$63.36
	200080	\$17.03	\$19.66	\$2.63
	200081	\$17.03	\$19.66	\$2.63
	200084	\$429.37	\$495.69	\$66.32
	200085	\$34.06	\$39.32	\$5.26
	200086	\$458.81	\$529.68	\$70.87
	200087	\$152.76	\$176.35	\$23.59
	200088	\$316.45	\$365.33	\$48.88
	200089	\$137.49	\$158.73	\$21.24
	200090	\$423.25	\$488.62	\$65.37
	200091	\$332.57	\$383.94	\$51.37
	200092	\$586.48	\$677.07	\$90.59
	200093	\$466.82	\$538.92	\$72.10
	200094	\$392.97	\$453.66	\$60.69
	200095	\$468.54	\$540.91	\$72.37
	200096	\$369.02	\$426.02	\$57.00
	200097	\$14.84	\$17.13	\$2.29
	200098	\$14.84	\$17.13	\$2.29
	200099	\$14.84	\$17.13	\$2.29
	200101	\$546.25	\$630.62	\$84.37
	200102	\$403.85	\$466.23	\$62.38
	200103	\$127.00	\$146.61	\$19.61
	200104	\$648.82	\$749.04	\$100.22
	200108	\$386.45	\$446.14	\$59.69
	200109	\$381.66	\$440.61	\$58.95
	200110	\$290.59	\$335.48	\$44.89
	200111	\$350.27	\$404.37	\$54.10
	200113	\$487.86	\$563.21	\$75.35
	200116	\$1,815.70	\$2,096.15	\$280.45
	200117	\$565.81	\$653.21	\$87.40
	200118	\$347.26	\$400.90	\$53.64
	200119	\$366.39	\$422.98	\$56.59
	200120	\$291.97	\$337.07	\$45.10
	200121	\$292.39	\$337.55	\$45.16
	200123	\$262.39	\$302.92	\$40.53
	200124	\$157.44	\$181.75	\$24.31
	200125	\$737.08	\$850.93	\$113.85
	200126	\$804.83	\$929.14	\$124.31
	200127	\$551.17	\$636.30	\$85.13
	200128	\$622.54	\$718.69	\$96.15
	200129	\$398.37	\$459.90	\$61.53
	200132	\$545.11	\$629.30	\$84.19
	200133	\$470.64	\$543.33	\$72.69
	200135	\$572.49	\$660.92	\$88.43
	200137	\$582.32	\$672.26	\$89.94
	200138	\$361.54	\$417.38	\$55.84
	200140	\$519.25	\$599.45	\$80.20

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332	200141	\$756.83	\$873.73	\$116.90
	200142	\$430.32	\$496.79	\$66.47
	200144	\$786.22	\$907.66	\$121.44
	200146	\$516.72	\$596.53	\$79.81
	200147	\$764.51	\$882.60	\$118.09
	200149	\$680.31	\$785.39	\$105.08
	200150	\$16.79	\$19.39	\$2.60
	200151	\$550.78	\$635.86	\$85.08
	200152	\$223.26	\$257.75	\$34.49
	200153	\$640.33	\$739.24	\$98.91
	200157	\$17.99	\$20.76	\$2.77
	200158	\$15.36	\$17.73	\$2.37
	200159	\$10.02	\$11.57	\$1.55
	200160	\$268.78	\$310.29	\$41.51
	200161	\$280.30	\$323.60	\$43.30
	200164	\$315.92	\$364.72	\$48.80
	200167	\$534.95	\$617.57	\$82.62
	200168	\$635.89	\$734.11	\$98.22
	200169	\$317.54	\$366.59	\$49.05
	200172	\$241.62	\$278.95	\$37.33
	200175	\$17.99	\$20.76	\$2.77
	200176	\$15.36	\$17.73	\$2.37
	200180	\$333.95	\$385.53	\$51.58
	200181	\$27.96	\$32.27	\$4.31
	200186	\$28.96	\$33.43	\$4.47
	200188	\$30.49	\$35.19	\$4.70
	200189	\$41.12	\$47.48	\$6.36
	200190	\$41.12	\$47.48	\$6.36
	200192	\$107.19	\$123.75	\$16.56
	200196	\$203.58	\$235.02	\$31.44
	200197	\$41.12	\$47.48	\$6.36
	200208	\$954.15	\$1,101.53	\$147.38
	200209	\$407.90	\$470.90	\$63.00
	200210	\$12.83	\$14.82	\$1.99
	200211	\$515.24	\$594.83	\$79.59
	200212	\$460.78	\$531.96	\$71.18
	200213	\$881.87	\$1,018.09	\$136.22
	200214	\$548.64	\$633.38	\$84.74
	200215	\$524.78	\$605.84	\$81.06
	200220	\$431.51	\$442.86	\$11.35
	200221	\$370.95	\$428.25	\$57.30
	200222	\$681.88	\$787.21	\$105.33
	200223	\$629.74	\$727.01	\$97.27
	200224	\$23.85	\$27.54	\$3.69
	200225	\$669.34	\$772.72	\$103.38
	200226	\$600.57	\$693.33	\$92.76
	200229	\$565.62	\$652.99	\$87.37

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	200230	\$721.11	\$832.49	\$111.38
	200231	\$654.88	\$756.03	\$101.15
	200233	\$534.47	\$617.03	\$82.56
	200234	\$509.22	\$587.87	\$78.65
	200239	\$1,097.42	\$1,266.92	\$169.50
	200240	\$616.05	\$711.20	\$95.15
	200241	\$804.64	\$928.92	\$124.28
	200244	\$653.59	\$754.55	\$100.96
	200246	\$540.31	\$623.77	\$83.46
	200249	\$681.26	\$786.49	\$105.23
	200252	\$1,503.08	\$1,735.24	\$232.16
	200253	\$543.87	\$627.87	\$84.00
	200257	\$915.13	\$1,056.48	\$141.35
	200258	\$1,035.56	\$1,195.50	\$159.94
	200259	\$486.62	\$561.78	\$75.16
	200260	\$480.42	\$554.62	\$74.20
	200261	\$910.50	\$1,051.13	\$140.63
	200263	\$50.24	\$58.00	\$7.76
	200264	\$726.11	\$838.26	\$112.15
	200265	\$613.23	\$707.95	\$94.72
	200267	\$1,012.55	\$1,168.94	\$156.39
	200268	\$906.25	\$1,046.23	\$139.98
	200269	\$640.67	\$739.62	\$98.95
	200270	\$197.89	\$228.45	\$30.56
	200272	\$517.10	\$596.97	\$79.87
	20401515	\$344.65	\$397.89	\$53.24
	20403714	\$98.99	\$114.28	\$15.29
	205301	\$3,211.91	\$3,708.02	\$496.11
	205307	\$1,360.57	\$1,570.72	\$210.15
	205308	\$41.55	\$47.97	\$6.42
	205316	\$10.88	\$12.56	\$1.68
	205317	\$41.55	\$47.97	\$6.42
	205318	\$41.55	\$47.97	\$6.42
	205319	\$41.55	\$47.97	\$6.42
	205320	\$42.75	\$49.35	\$6.60
	205358	\$41.55	\$47.97	\$6.42
	205359	\$41.55	\$47.97	\$6.42
	205360	\$32.58	\$37.62	\$5.04
	205361	\$124.71	\$143.97	\$19.26
	205362	\$41.55	\$47.97	\$6.42
	205364	\$1,280.66	\$1,478.47	\$197.81
	205365	\$2,146.84	\$2,478.44	\$331.60
	205518	\$1,738.51	\$2,007.04	\$268.53
	205521	\$1,283.04	\$1,481.22	\$198.18
	205522	\$2,081.15	\$2,402.60	\$321.45
	205523	\$3,835.74	\$4,428.20	\$592.46
	205524	\$1,153.53	\$1,331.70	\$178.17

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	205525	\$146.51	\$169.14	\$22.63
	205526	\$1,598.40	\$1,845.28	\$246.88
	205528	\$1,013.36	\$1,169.88	\$156.52
	205529	\$982.60	\$1,021.23	\$38.63
	205530	\$1,286.82	\$1,485.58	\$198.76
	205532	\$1,491.43	\$1,721.80	\$230.37
	205533	\$1,794.52	\$2,071.70	\$277.18
	205534	\$1,224.58	\$1,413.73	\$189.15
	205535	\$145.84	\$168.37	\$22.53
	205536	\$1,056.39	\$1,219.56	\$163.17
	205539	\$1,514.48	\$1,748.40	\$233.92
	205540	\$1,834.94	\$2,118.37	\$283.43
	205542	\$1,060.43	\$1,224.22	\$163.79
	205543	\$1,469.39	\$1,696.35	\$226.96
	205545	\$1,239.01	\$1,430.39	\$191.38
	205547	\$1,097.85	\$1,267.42	\$169.57
	205548	\$1,407.37	\$1,624.75	\$217.38
	205554	\$1,002.65	\$1,157.52	\$154.87
	205555	\$906.30	\$1,046.29	\$139.99
	205556	\$1,324.19	\$1,528.72	\$204.53
	205558	\$1,374.51	\$1,586.82	\$212.31
	205559	\$2,020.42	\$2,332.49	\$312.07
	205561	\$2,242.26	\$2,588.59	\$346.33
	205562	\$1,011.42	\$1,167.64	\$156.22
	228661	\$3,760.50	\$4,341.34	\$580.84
	228664	\$13,420.00	\$15,492.83	\$2,072.83
	232987	\$15.22	\$17.57	\$2.35
	234084	\$21,678.05	\$25,026.39	\$3,348.34
	238251	\$12,741.27	\$14,709.25	\$1,967.98
	238278	\$2,087.21	\$2,409.59	\$322.38
	238292	\$19.04	\$21.98	\$2.94
	238395	\$11.31	\$13.05	\$1.74
	238438	\$225.37	\$260.18	\$34.81
	238567	\$135.76	\$156.73	\$20.97
	238568	\$136.03	\$157.04	\$21.01
	238570	\$5,202.61	\$6,006.19	\$803.58
	238591	\$110.46	\$127.53	\$17.07
	238613	\$34.68	\$40.04	\$5.36
	238618	\$131.10	\$151.35	\$20.25
	238621	\$470.11	\$542.72	\$72.61
	238640	\$1,926.74	\$2,224.34	\$297.60
	238658	\$62.98	\$72.70	\$9.72
	238790	\$10.02	\$11.57	\$1.55
	238820	\$54.67	\$63.12	\$8.45
	238836	\$7.56	\$8.72	\$1.16
	238937	\$301.81	\$348.41	\$46.60
	238938	\$574.11	\$662.79	\$88.68

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332	238962	\$28.62	\$33.05	\$4.43
	238975	\$620.72	\$716.60	\$95.88
	238998	\$13.60	\$15.70	\$2.10
	239016	\$58.51	\$67.55	\$9.04
	239078	\$18,484.88	\$21,340.01	\$2,855.13
	239117	\$75.76	\$87.46	\$11.70
	239123	\$991.79	\$1,144.98	\$153.19
	239166	\$4.39	\$5.07	\$0.68
	239513	\$3,880.77	\$4,480.19	\$599.42
	239519	\$450.21	\$519.75	\$69.54
	239525	\$23.38	\$26.99	\$3.61
	240132	\$307.86	\$355.41	\$47.55
	240209	\$62.26	\$71.87	\$9.61
	240304	\$1,072.97	\$1,238.70	\$165.73
	241018	\$820.28	\$946.98	\$126.70
	241212	\$59.97	\$69.23	\$9.26
	273138	\$3,674.76	\$4,242.35	\$567.59
	273143	\$9,655.25	\$11,146.58	\$1,491.33
	273144	\$1,138.46	\$1,314.30	\$175.84
	274264	\$5,859.64	\$6,764.70	\$905.06
	274265	\$155.37	\$179.37	\$24.00
	274283	\$452.51	\$522.40	\$69.89
	274284	\$630.60	\$728.00	\$97.40
	274287	\$289.59	\$334.31	\$44.72
	274303	\$261.39	\$301.76	\$40.37
	274306	\$547.54	\$632.11	\$84.57
	274326	\$179.00	\$206.65	\$27.65
	274328	\$110.49	\$127.56	\$17.07
	274355	\$170.17	\$196.46	\$26.29
	274396	\$74.14	\$85.59	\$11.45
	274398	\$167.56	\$193.44	\$25.88
	274408	\$160.87	\$185.72	\$24.85
	274414	\$32.15	\$37.12	\$4.97
	274416	\$7.63	\$8.81	\$1.18
	274419	\$9.30	\$10.74	\$1.44
	274464	\$711.13	\$820.97	\$109.84
	274473	\$1,373.55	\$1,585.70	\$212.15
	274487	\$220.74	\$254.84	\$34.10
	274523	\$191.69	\$221.30	\$29.61
	274530	\$166.59	\$192.33	\$25.74
	274661	\$60.40	\$69.73	\$9.33
	274662	\$7.01	\$8.10	\$1.09
	274669	\$75.76	\$87.46	\$11.70
	274671	\$8.78	\$10.13	\$1.35
	274672	\$75.76	\$87.46	\$11.70
	274673	\$8.78	\$10.13	\$1.35
	274679	\$112.02	\$129.32	\$17.30

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332	274681	\$13.02	\$15.04	\$2.02
	274719	\$210.25	\$242.72	\$32.47
	274738	\$974.09	\$1,124.55	\$150.46
	274764	\$208.72	\$240.96	\$32.24
	274833	\$372.02	\$429.49	\$57.47
	274841	\$235.10	\$271.42	\$36.32
	274844	\$333.57	\$385.09	\$51.52
	274966	\$569.63	\$657.61	\$87.98
	274968	\$86.73	\$100.13	\$13.40
	274969	\$53.86	\$62.18	\$8.32
	274970	\$186.87	\$215.73	\$28.86
	274972	\$248.17	\$286.51	\$38.34
	274973	\$20.04	\$23.13	\$3.09
	274974	\$75.00	\$86.58	\$11.58
	274975	\$102.52	\$118.36	\$15.84
	274976	\$105.39	\$121.66	\$16.27
	274978	\$58.87	\$67.96	\$9.09
	275002	\$149.99	\$173.16	\$23.17
	275003	\$18.80	\$21.70	\$2.90
	275041	\$678.21	\$782.97	\$104.76
	275059	\$252.66	\$291.68	\$39.02
	275062	\$274.65	\$317.07	\$42.42
	275113	\$61.64	\$71.16	\$9.52
	275114	\$35.78	\$41.31	\$5.53
	276655	\$46.42	\$53.59	\$7.17
	276807	\$14.12	\$16.30	\$2.18
	278295	\$11.93	\$13.77	\$1.84
	278398	\$12.31	\$14.21	\$1.90
	278415	\$17.79	\$20.54	\$2.75
	278908	\$20.37	\$23.52	\$3.15
	278917	\$20.71	\$23.90	\$3.19
	279647	\$14.93	\$17.24	\$2.31
	279768	\$12.50	\$14.43	\$1.93
	279908	\$51.81	\$59.81	\$8.00
	280225	\$15.22	\$17.57	\$2.35
	280295	\$24.95	\$28.80	\$3.85
	280529	\$47.37	\$54.69	\$7.32
	280561	\$18.18	\$20.98	\$2.80
	280610	\$24.09	\$27.81	\$3.72
	280623	\$4.77	\$5.51	\$0.74
	286721	\$12.02	\$13.88	\$1.86
	286807	\$29.77	\$34.37	\$4.60
	287566	\$56.67	\$65.43	\$8.76
	287988	\$14,329.03	\$16,542.25	\$2,213.22
	287991	\$16.27	\$18.78	\$2.51
	288060	\$23.66	\$27.32	\$3.66
	288664	\$10.88	\$12.56	\$1.68

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332	289158	\$1,358.33	\$1,568.14	\$209.81
	289815	\$14.60	\$16.85	\$2.25
	289838	\$113.26	\$130.75	\$17.49
	289944	\$1,097.27	\$1,266.76	\$169.49
	289996	\$838.94	\$968.52	\$129.58
	289998	\$583.94	\$674.14	\$90.20
	290000	\$2,225.08	\$2,568.76	\$343.68
	290354	\$613.52	\$708.28	\$94.76
	290365	\$3,357.73	\$3,876.35	\$518.62
	290444	\$772.05	\$891.30	\$119.25
	290492	\$400.27	\$462.09	\$61.82
	290551	\$107.77	\$124.42	\$16.65
	290552	\$594.63	\$686.47	\$91.84
	290576	\$5,821.76	\$6,720.97	\$899.21
	290616	\$750.12	\$865.98	\$115.86
	290669	\$5,831.82	\$6,732.59	\$900.77
	290702	\$0.81	\$0.94	\$0.13
	290755	\$5,367.11	\$6,196.10	\$828.99
	290829	\$875.96	\$1,011.26	\$135.30
	291183	\$613.33	\$708.06	\$94.73
	291418	\$76.88	\$88.76	\$11.88
	292483	\$37.26	\$43.01	\$5.75
	292673	\$25.76	\$29.74	\$3.98
	292901	\$8.35	\$9.64	\$1.29
	292957	\$7.56	\$8.72	\$1.16
	292991	\$12.83	\$14.82	\$1.99
	293381	\$14,086.10	\$16,261.80	\$2,175.70
	293651	\$82.25	\$94.95	\$12.70
	293985	\$75.38	\$87.02	\$11.64
	294023	\$116.88	\$134.94	\$18.06
	294031	\$782.26	\$903.09	\$120.83
	294032	\$704.88	\$813.75	\$108.87
	294068	\$23.00	\$26.55	\$3.55
	294235	\$258.10	\$297.96	\$39.86
	294346	\$615.28	\$710.32	\$95.04
	294348	\$348.27	\$402.06	\$53.79
	294397	\$0.43	\$0.50	\$0.07
	294407	\$43.37	\$50.06	\$6.69
	294617	\$81,896.73	\$94,546.30	\$12,649.57
	294746	\$327.27	\$377.82	\$50.55
	294849	\$38.07	\$43.95	\$5.88
	294890	\$20,991.34	\$24,233.62	\$3,242.28
	294984	\$1,828.54	\$2,110.97	\$282.43
	295070	\$18.61	\$21.48	\$2.87
	295202	\$739.47	\$853.63	\$114.16
	295665	\$748.29	\$863.86	\$115.57
	295710	\$0.83	\$0.96	\$0.13

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332	295711	\$0.73	\$0.84	\$0.11
	295712	\$3.42	\$3.95	\$0.53
	295713	\$1.43	\$1.65	\$0.22
	295714	\$1.43	\$1.65	\$0.22
	295715	\$1.43	\$1.65	\$0.22
	295716	\$7.47	\$8.62	\$1.15
	295717	\$3.11	\$3.59	\$0.48
	295719	\$3.12	\$3.60	\$0.48
	295721	\$3.11	\$3.59	\$0.48
	296153	\$11.93	\$13.77	\$1.84
	296548	\$816.18	\$942.25	\$126.07
	297365	\$22.42	\$25.89	\$3.47
	297371	\$13.74	\$15.86	\$2.12
	297534	\$9.54	\$11.02	\$1.48
	297887	\$56.87	\$65.65	\$8.78
	297942	\$811.03	\$936.30	\$125.27
	298504	\$133.87	\$154.54	\$20.67
	298769	\$750.65	\$866.59	\$115.94
	298838	\$341.01	\$393.69	\$52.68
	299661	\$57.20	\$66.04	\$8.84
	299676	\$1,481.30	\$1,710.10	\$228.80
	299700	\$42.94	\$49.57	\$6.63
	300512	\$830.18	\$958.41	\$128.23
	300749	\$13.88	\$16.03	\$2.15
	300995	\$332.81	\$384.21	\$51.40
	301025	\$70.61	\$81.51	\$10.90
	301458	\$105.20	\$121.44	\$16.24
	301727	\$45.08	\$52.05	\$6.97
	301749	\$1,717.38	\$1,982.64	\$265.26
	301857	\$1,038.59	\$1,199.01	\$160.42
	301859	\$2,859.83	\$3,301.55	\$441.72
	301899	\$21.52	\$24.84	\$3.32
	301905	\$262.68	\$303.25	\$40.57
	302640	\$1.24	\$1.43	\$0.19
	302641	\$1.24	\$1.43	\$0.19
	302643	\$2.48	\$2.86	\$0.38
	302646	\$1.24	\$1.43	\$0.19
	302647	\$2.48	\$2.86	\$0.38
	302648	\$4.34	\$5.01	\$0.67
	302892	\$110.54	\$127.61	\$17.07
	302896	\$1.24	\$1.43	\$0.19
	302970	\$2.77	\$3.19	\$0.42
	302971	\$4.77	\$5.51	\$0.74
	302972	\$5.39	\$6.22	\$0.83
	303033	\$587.86	\$678.67	\$90.81
	303723	\$16.98	\$19.61	\$2.63
	303729	\$24.33	\$28.09	\$3.76

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332	303757	\$2.29	\$2.64	\$0.35
	303781	\$2.00	\$2.31	\$0.31
	303827	\$1.67	\$1.93	\$0.26
	303829	\$4.06	\$4.68	\$0.62
	303830	\$1.67	\$1.93	\$0.26
	303831	\$0.14	\$0.17	\$0.03
	303832	\$1.34	\$1.54	\$0.20
	303833	\$0.33	\$0.39	\$0.06
	303834	\$333.95	\$385.53	\$51.58
	303868	\$79.58	\$91.87	\$12.29
	303874	\$39.50	\$45.60	\$6.10
	303891	\$13.79	\$15.92	\$2.13
	303900	\$38.17	\$44.06	\$5.89
	303903	\$22.80	\$26.33	\$3.53
	303904	\$9.06	\$10.46	\$1.40
	303972	\$544.49	\$628.59	\$84.10
	304706	\$25.62	\$29.58	\$3.96
	304820	\$618.54	\$714.08	\$95.54
	304858	\$5,923.28	\$6,838.18	\$914.90
	304888	\$10.16	\$11.73	\$1.57
	305169	\$820.95	\$947.75	\$126.80
	305324	\$62.98	\$72.70	\$9.72
	305667	\$1,171.89	\$1,352.90	\$181.01
	307218	\$5.49	\$6.33	\$0.84
	307225	\$15.36	\$17.73	\$2.37
	307247	\$38.83	\$44.83	\$6.00
	307556	\$718.80	\$829.82	\$111.02
	308105	\$115.36	\$133.17	\$17.81
	308396	\$576.93	\$666.04	\$89.11
	308924	\$415.63	\$479.83	\$64.20
	308982	\$941.18	\$1,086.55	\$145.37
	309193	\$1,231.71	\$1,421.96	\$190.25
	309422	\$4,863.65	\$5,614.87	\$751.22
	309629	\$422.31	\$487.54	\$65.23
	309745	\$33,810.95	\$39,033.31	\$5,222.36
	311751	\$37.07	\$42.79	\$5.72
	311804	\$883.26	\$1,019.69	\$136.43
	311826	\$709.09	\$818.61	\$109.52
	312317	\$444.40	\$513.04	\$68.64
	312862	\$452.41	\$522.29	\$69.88
	313276	\$332.24	\$383.55	\$51.31
	313277	\$34.97	\$40.37	\$5.40
	313283	\$1,039.79	\$1,200.39	\$160.60
	350769	\$1,198.11	\$1,383.17	\$185.06
	350859	\$239.60	\$276.60	\$37.00
	352044	\$543.87	\$627.87	\$84.00
	353179	\$39.31	\$45.38	\$6.07

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332	354038	\$17.82	\$20.58	\$2.76
	354039	\$8.91	\$10.29	\$1.38
	354041	\$1.78	\$2.06	\$0.28
	354440	\$3.05	\$3.52	\$0.47
	354443	\$1,346.26	\$1,554.20	\$207.94
	354448	\$699.35	\$807.36	\$108.01
	354600	\$4,866.18	\$5,617.79	\$751.61
	354689	\$5.82	\$6.72	\$0.90
	354947	\$280.47	\$323.79	\$43.32
	355195	\$28.67	\$33.10	\$4.43
	355567	\$32.06	\$37.01	\$4.95
	356792	\$701.11	\$809.40	\$108.29
	358152	\$1.62	\$1.87	\$0.25
	358155	\$16.55	\$19.11	\$2.56
	358325	\$40.36	\$46.59	\$6.23
	358489	\$31.87	\$36.79	\$4.92
	358506	\$543.34	\$627.27	\$83.93
	358513	\$949.43	\$1,096.08	\$146.65
	358541	\$8.25	\$9.53	\$1.28
	358701	\$44.42	\$51.28	\$6.86
	358814	\$18.80	\$21.70	\$2.90
	359167	\$123.53	\$142.62	\$19.09
	359743	\$50.57	\$58.38	\$7.81
	359809	\$2,207.43	\$2,548.39	\$340.96
	360173	\$1,346.69	\$1,554.70	\$208.01
	360659	\$74.89	\$86.45	\$11.56
	360674	\$19.18	\$22.14	\$2.96
	360945	\$11.64	\$13.44	\$1.80
	360991	\$754.21	\$870.70	\$116.49
	362242	\$16.41	\$18.95	\$2.54
	363293	\$1,240.40	\$1,431.99	\$191.59
	363493	\$3,117.21	\$3,598.69	\$481.48
	363690	\$5,534.08	\$6,388.86	\$854.78
	363747	\$531.99	\$614.16	\$82.17
	363751	\$624.06	\$720.45	\$96.39
	363968	\$40.89	\$47.20	\$6.31
	364099	\$9.54	\$11.02	\$1.48
	364353	\$528.41	\$610.03	\$81.62
	364736	\$431.37	\$498.00	\$66.63
	364760	\$3,007.96	\$3,472.57	\$464.61
	364938	\$39,597.31	\$45,713.41	\$6,116.10
	364983	\$622.20	\$718.31	\$96.11
	364993	\$2,732.88	\$3,155.00	\$422.12
	364994	\$796.72	\$919.78	\$123.06
	365015	\$201.67	\$232.82	\$31.15
	366723	\$999.13	\$1,153.46	\$154.33
	366813	\$206.81	\$238.76	\$31.95

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	366839	\$33.73	\$38.94	\$5.21
	366938	\$14.31	\$16.52	\$2.21
	367518	\$282.19	\$325.78	\$43.59
	367573	\$57.25	\$66.09	\$8.84
	367830	\$97.82	\$112.93	\$15.11
	368123	\$800.77	\$924.46	\$123.69
	368131	\$18.42	\$21.26	\$2.84
	368642	\$518.49	\$597.29	\$78.80
	368733	\$29.76	\$34.36	\$4.60
	368734	\$29.75	\$34.35	\$4.60
	368735	\$29.75	\$34.35	\$4.60
	368827	\$5.84	\$6.75	\$0.91
	368860	\$8.54	\$9.86	\$1.32
	369515	\$13.74	\$15.86	\$2.12
	370241	\$44.08	\$50.89	\$6.81
	372166	\$1,785.79	\$2,061.62	\$275.83
	372167	\$29,101.64	\$33,596.60	\$4,494.96
	372184	\$400.74	\$462.64	\$61.90
	372186	\$442.59	\$510.95	\$68.36
	372269	\$1,038.71	\$1,199.15	\$160.44
	372543	\$4.77	\$5.51	\$0.74
	372793	\$630.12	\$727.45	\$97.33
	374856	\$408.47	\$471.56	\$63.09
	375087	\$848.38	\$979.42	\$131.04
	375152	\$132.25	\$152.67	\$20.42
	375738	\$504.08	\$581.94	\$77.86
	375739	\$593.77	\$685.48	\$91.71
	375979	\$19.23	\$22.20	\$2.97
	375987	\$780.97	\$901.60	\$120.63
	376062	\$1,519.07	\$1,753.70	\$234.63
	376117	\$24.90	\$28.75	\$3.85
	376119	\$2.19	\$2.53	\$0.34
	376242	\$11,093.40	\$12,806.86	\$1,713.46
	376294	\$13,263.33	\$15,311.96	\$2,048.63
	376311	\$853.22	\$985.00	\$131.78
	376416	\$5,647.63	\$6,519.94	\$872.31
	376546	\$2,429.27	\$2,804.49	\$375.22
	377778	\$1,943.32	\$2,243.48	\$300.16
	378328	\$2,332.42	\$2,692.69	\$360.27
	380688	\$500.23	\$500.81	\$0.58
	380699	\$839.84	\$969.56	\$129.72
	380703	\$553.09	\$638.52	\$85.43
	380758	\$95.61	\$110.37	\$14.76
	380759	\$67.94	\$78.43	\$10.49
	380796	\$14,789.36	\$17,073.68	\$2,284.32
	380908	\$90.12	\$104.04	\$13.92
	380909	\$43.32	\$50.01	\$6.69

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332	381001	\$214.11	\$247.18	\$33.07
	381002	\$58.39	\$67.41	\$9.02
	381291	\$667.91	\$771.07	\$103.16
	381350	\$564.04	\$651.16	\$87.12
	381351	\$422.78	\$488.09	\$65.31
	381353	\$19.75	\$22.80	\$3.05
	381372	\$435.36	\$502.60	\$67.24
	381398	\$473.16	\$546.25	\$73.09
	381461	\$219.60	\$220.46	\$0.86
	381479	\$1,410.52	\$1,628.39	\$217.87
	381881	\$4,254.75	\$4,911.93	\$657.18
	383656	\$377.41	\$435.71	\$58.30
	383854	\$930.92	\$1,074.71	\$143.79
	383855	\$818.81	\$945.28	\$126.47
	383860	\$1,703.07	\$1,966.12	\$263.05
	384382	\$562.95	\$649.90	\$86.95
	384928	\$22.14	\$25.56	\$3.42
	385497	\$355.49	\$410.40	\$54.91
	385517	\$33.82	\$39.05	\$5.23
	385533	\$3,809.98	\$4,398.46	\$588.48
	385536	\$78.72	\$90.87	\$12.15
	385996	\$457.34	\$469.97	\$12.63
	388996	\$34.25	\$39.54	\$5.29
	388998	\$449.45	\$518.87	\$69.42
	389009	\$41.12	\$47.48	\$6.36
	389011	\$41.12	\$47.48	\$6.36
	389017	\$2,024.09	\$2,336.73	\$312.64
	389039	\$849.20	\$980.36	\$131.16
	389045	\$1,264.49	\$1,459.80	\$195.31
	389073	\$285.63	\$329.75	\$44.12
	389094	\$268.58	\$310.07	\$41.49
	389095	\$493.63	\$569.88	\$76.25
	389108	\$660.75	\$762.81	\$102.06
	389109	\$654.88	\$756.03	\$101.15
	389110	\$586.76	\$677.39	\$90.63
	389111	\$16.36	\$18.89	\$2.53
	389113	\$549.08	\$633.89	\$84.81
	389115	\$569.06	\$656.95	\$87.89
	389129	\$751.89	\$868.02	\$116.13
	389200	\$3.82	\$4.41	\$0.59
	389321	\$385.82	\$445.41	\$59.59
	389346	\$2,261.58	\$2,610.90	\$349.32
	390025	\$1,290.01	\$1,489.27	\$199.26
	390120	\$2,649.49	\$3,058.72	\$409.23
	390127	\$4,770.76	\$5,507.64	\$736.88
	390579	\$321.88	\$371.60	\$49.72
	390661	\$19.89	\$22.97	\$3.08

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332	390677	\$24.14	\$27.87	\$3.73
	390681	\$21.85	\$25.22	\$3.37
	390721	\$466.58	\$538.65	\$72.07
	390907	\$2,480.80	\$2,863.97	\$383.17
	391140	\$339.68	\$392.14	\$52.46
	391141	\$439.39	\$507.25	\$67.86
	391238	\$43.80	\$50.56	\$6.76
	391818	\$575.26	\$664.11	\$88.85
	391928	\$14.60	\$16.85	\$2.25
	392259	\$26.91	\$31.06	\$4.15
	392460	\$187.63	\$216.62	\$28.99
	394982	\$1,438.15	\$1,660.28	\$222.13
	395899	\$12.02	\$13.88	\$1.86
	396362	\$319.45	\$368.79	\$49.34
	396363	\$76.38	\$88.18	\$11.80
	396406	\$198.89	\$229.61	\$30.72
	396444	\$38.88	\$44.89	\$6.01
	396450	\$22.28	\$25.72	\$3.44
	396988	\$607.45	\$701.28	\$93.83
	397178	\$1,598.16	\$1,845.00	\$246.84
	397300	\$4,270.40	\$4,930.00	\$659.60
	397642	\$312.86	\$361.18	\$48.32
	397664	\$34.44	\$39.77	\$5.33
	397771	\$79.34	\$91.59	\$12.25
	398090	\$257.29	\$297.03	\$39.74
	398343	\$136.92	\$158.07	\$21.15
	398688	\$48.66	\$56.18	\$7.52
	398689	\$7.30	\$8.43	\$1.13
	398810	\$1,160.86	\$1,208.32	\$47.46
	398811	\$1,184.10	\$1,367.00	\$182.90
	398812	\$1,235.18	\$1,425.97	\$190.79
	398815	\$1,130.33	\$1,304.92	\$174.59
	398817	\$1,049.57	\$1,211.68	\$162.11
	398820	\$1,283.62	\$1,481.89	\$198.27
	398821	\$1,388.29	\$1,602.72	\$214.43
	398823	\$1,408.47	\$1,626.02	\$217.55
	398824	\$1,144.98	\$1,321.83	\$176.85
	398825	\$1,040.26	\$1,200.94	\$160.68
	398826	\$1,342.49	\$1,549.85	\$207.36
	398829	\$1,377.56	\$1,590.33	\$212.77
	398834	\$1,526.64	\$1,762.44	\$235.80
	398835	\$1,270.61	\$1,466.86	\$196.25
	398837	\$1,195.14	\$1,379.74	\$184.60
	398838	\$1,130.70	\$1,305.34	\$174.64
	398839	\$1,260.16	\$1,454.80	\$194.64
	398840	\$1,188.05	\$1,203.86	\$15.81
	398846	\$1,271.66	\$1,468.07	\$196.41

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332	398847	\$1,162.24	\$1,341.75	\$179.51
	398848	\$660.15	\$762.12	\$101.97
	398852	\$1,116.82	\$1,289.32	\$172.50
	398853	\$1,066.89	\$1,231.67	\$164.78
	398855	\$1,076.75	\$1,243.06	\$166.31
	398857	\$1,020.94	\$1,178.63	\$157.69
	398858	\$1,142.12	\$1,318.53	\$176.41
	398860	\$1,160.15	\$1,339.35	\$179.20
	398862	\$1,056.34	\$1,219.50	\$163.16
	398863	\$1,040.96	\$1,201.75	\$160.79
	398864	\$1,019.08	\$1,176.48	\$157.40
	398865	\$1,143.71	\$1,320.37	\$176.66
	398866	\$1,101.63	\$1,271.78	\$170.15
	398867	\$1,035.02	\$1,194.88	\$159.86
	398868	\$1,138.57	\$1,314.43	\$175.86
	398876	\$58.39	\$67.41	\$9.02
	400341	\$4,169.64	\$4,813.68	\$644.04
	400840	\$2,920.66	\$3,371.78	\$451.12
	401694	\$593.53	\$685.21	\$91.68
	401750	\$225.85	\$260.73	\$34.88
	402830	\$26.10	\$30.13	\$4.03
	402838	\$16.41	\$18.95	\$2.54
	402839	\$17.56	\$20.27	\$2.71
	402843	\$21.13	\$24.40	\$3.27
	402967	\$16.65	\$19.22	\$2.57
	403137	\$16.41	\$18.95	\$2.54
	403141	\$13.98	\$16.14	\$2.16
	403393	\$48.33	\$55.79	\$7.46
	403517	\$106.53	\$122.99	\$16.46
	403882	\$17.75	\$20.49	\$2.74
	403888	\$5.25	\$6.06	\$0.81
	403889	\$479.46	\$553.52	\$74.06
	403890	\$304.31	\$351.32	\$47.01
	404044	\$322.32	\$372.11	\$49.79
	404231	\$2,700.01	\$3,117.05	\$417.04
	404286	\$959.45	\$1,107.64	\$148.19
	404334	\$59.92	\$69.18	\$9.26
	404371	\$1.77	\$2.04	\$0.27
	404455	\$93.08	\$107.45	\$14.37
	404709	\$155.96	\$180.04	\$24.08
	404897	\$860.17	\$993.03	\$132.86
	404963	\$1,803.30	\$2,081.83	\$278.53
	404968	\$1,116.60	\$1,289.06	\$172.46
	404969	\$58.54	\$67.58	\$9.04
	405365	\$396.11	\$457.29	\$61.18
	406232	\$17.56	\$20.27	\$2.71
	406311	\$18.70	\$21.59	\$2.89

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332	407283	\$143.26	\$165.40	\$22.14
	407294	\$617.29	\$712.63	\$95.34
	407455	\$1,267.61	\$1,463.40	\$195.79
	407457	\$850.77	\$982.18	\$131.41
	407458	\$1,435.29	\$1,656.98	\$221.69
	407459	\$81.82	\$94.46	\$12.64
	407460	\$81.68	\$94.29	\$12.61
	407461	\$81.48	\$94.07	\$12.59
	407462	\$81.39	\$93.96	\$12.57
	407465	\$82.68	\$95.45	\$12.77
	407466	\$82.53	\$95.28	\$12.75
	407468	\$1,378.40	\$1,591.30	\$212.90
	407469	\$1,711.94	\$1,976.36	\$264.42
	407471	\$1,335.78	\$1,542.11	\$206.33
	407473	\$1,189.95	\$1,373.74	\$183.79
	407475	\$1,018.68	\$1,059.09	\$40.41
	407476	\$1,416.92	\$1,635.77	\$218.85
	407477	\$1,266.11	\$1,461.67	\$195.56
	407479	\$1,031.12	\$1,190.39	\$159.27
	407480	\$1,267.76	\$1,463.57	\$195.81
	407481	\$83.01	\$95.83	\$12.82
	407482	\$1,188.87	\$1,372.50	\$183.63
	407484	\$1,094.13	\$1,263.12	\$168.99
	407486	\$1,210.76	\$1,397.77	\$187.01
	407487	\$1,322.88	\$1,527.21	\$204.33
	407489	\$1,139.55	\$1,315.57	\$176.02
	407492	\$1,042.98	\$1,204.08	\$161.10
	407493	\$1,307.71	\$1,509.70	\$201.99
	407494	\$1,082.96	\$1,250.23	\$167.27
	407497	\$1,075.81	\$1,241.97	\$166.16
	407499	\$1,310.10	\$1,512.45	\$202.35
	407500	\$1,189.95	\$1,373.74	\$183.79
	407501	\$1,079.22	\$1,245.91	\$166.69
	407502	\$1,178.85	\$1,360.94	\$182.09
	407503	\$1,169.48	\$1,350.12	\$180.64
	407504	\$881.06	\$1,017.15	\$136.09
	407505	\$1,134.77	\$1,310.05	\$175.28
	407508	\$1,070.39	\$1,085.50	\$15.11
	407509	\$1,345.01	\$1,394.48	\$49.47
	407510	\$1,221.31	\$1,409.96	\$188.65
	407511	\$1,097.27	\$1,266.76	\$169.49
	407512	\$1,652.21	\$1,907.41	\$255.20
	407515	\$1,164.97	\$1,167.45	\$2.48
	407516	\$1,191.97	\$1,376.08	\$184.11
	407518	\$1,203.14	\$1,388.97	\$185.83
	407519	\$1,379.70	\$1,437.99	\$58.29
	407520	\$1,221.52	\$1,410.19	\$188.67

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332	407521	\$1,261.87	\$1,456.77	\$194.90
	407522	\$1,349.98	\$1,558.50	\$208.52
	407523	\$1,185.30	\$1,368.37	\$183.07
	407524	\$181.53	\$209.57	\$28.04
	407525	\$1,345.50	\$1,553.32	\$207.82
	407526	\$1,062.31	\$1,226.39	\$164.08
	407527	\$1,164.49	\$1,344.36	\$179.87
	407528	\$945.56	\$1,091.61	\$146.05
	407529	\$1,327.61	\$1,433.69	\$106.08
	407533	\$996.23	\$1,150.11	\$153.88
	407535	\$1,135.92	\$1,200.67	\$64.75
	407937	\$38.17	\$44.06	\$5.89
	408215	\$1,042.22	\$1,203.20	\$160.98
	408549	\$13.12	\$15.15	\$2.03
	408552	\$17.13	\$19.77	\$2.64
	408572	\$14.31	\$16.52	\$2.21
	408636	\$13.74	\$15.86	\$2.12
	408639	\$15.31	\$17.68	\$2.37
	409796	\$60.30	\$69.62	\$9.32
	410415	\$116.07	\$134.00	\$17.93
	410743	\$176.61	\$203.89	\$27.28
	410984	\$0.48	\$0.55	\$0.07
	411069	\$174.47	\$201.41	\$26.94
	411071	\$143.89	\$166.11	\$22.22
	411073	\$435.28	\$502.52	\$67.24
	411252	\$157.63	\$181.97	\$24.34
	411289	\$4.06	\$4.68	\$0.62
	411529	\$66,790.64	\$77,106.96	\$10,316.32
	411530	\$8,348.83	\$9,638.37	\$1,289.54
	411574	\$14,312.28	\$16,522.92	\$2,210.64
	411735	\$0.38	\$0.44	\$0.06
	412055	\$89.88	\$103.76	\$13.88
	412965	\$2,981.73	\$3,442.28	\$460.55
	412966	\$7,781.11	\$8,982.96	\$1,201.85
	412967	\$6,833.78	\$7,889.31	\$1,055.53
	413616	\$2,863.74	\$3,306.07	\$442.33
	413626	\$357.06	\$412.21	\$55.15
	413793	\$4,648.03	\$5,365.96	\$717.93
	414582	\$201.80	\$232.97	\$31.17
	414993	\$275.75	\$318.34	\$42.59
	414998	\$4.77	\$5.51	\$0.74
	415295	\$368.40	\$425.30	\$56.90
	415814	\$381.66	\$440.61	\$58.95
	416001	\$549.73	\$634.65	\$84.92
	416002	\$549.73	\$634.65	\$84.92
	416005	\$569.68	\$657.67	\$87.99
	416006	\$569.68	\$657.67	\$87.99

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332	416033	\$2,398.74	\$2,769.24	\$370.50
	416037	\$581.28	\$671.06	\$89.78
	416066	\$3,268.16	\$3,772.95	\$504.79
	416245	\$536.76	\$619.66	\$82.90
	416341	\$286.25	\$330.46	\$44.21
	416472	\$453.27	\$523.28	\$70.01
	416729	\$116.50	\$134.50	\$18.00
	416762	\$731.50	\$844.49	\$112.99
	416886	\$392.25	\$452.84	\$60.59
	417062	\$188.64	\$217.77	\$29.13
	417271	\$17.84	\$20.60	\$2.76
	417377	\$727.61	\$840.00	\$112.39
	417378	\$972.33	\$1,122.51	\$150.18
	417379	\$846.00	\$976.68	\$130.68
	417380	\$929.06	\$1,072.56	\$143.50
	417381	\$771.29	\$890.42	\$119.13
	417382	\$1,092.93	\$1,261.75	\$168.82
	417383	\$754.59	\$871.14	\$116.55
	417385	\$812.27	\$937.73	\$125.46
	417386	\$833.83	\$962.62	\$128.79
	417387	\$751.87	\$868.00	\$116.13
	417388	\$518.85	\$598.99	\$80.14
	417389	\$525.07	\$606.18	\$81.11
	417390	\$584.50	\$674.79	\$90.29
	417392	\$496.60	\$573.31	\$76.71
	417393	\$524.55	\$605.57	\$81.02
	417394	\$580.41	\$670.06	\$89.65
	417396	\$652.78	\$753.61	\$100.83
	417397	\$612.28	\$706.85	\$94.57
	417398	\$954.10	\$1,101.47	\$147.37
	417399	\$776.78	\$896.75	\$119.97
	417400	\$857.16	\$989.56	\$132.40
	417444	\$3.82	\$4.41	\$0.59
	418875	\$9.54	\$11.02	\$1.48
	418955	\$25.71	\$29.69	\$3.98
	419179	\$42.94	\$49.57	\$6.63
	419190	\$29,389.55	\$33,928.99	\$4,539.44
	419191	\$205.43	\$237.16	\$31.73
	419201	\$492.82	\$568.94	\$76.12
	419203	\$3,209.15	\$3,704.82	\$495.67
	420154	\$76.76	\$88.62	\$11.86
	421315	\$1,228.73	\$1,418.51	\$189.78
	421317	\$1,133.01	\$1,308.01	\$175.00
	421318	\$1,045.83	\$1,207.36	\$161.53
	421319	\$943.23	\$1,088.92	\$145.69
	421321	\$951.04	\$1,097.94	\$146.90
	421322	\$1,140.96	\$1,317.19	\$176.23

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332	421323	\$853.73	\$917.41	\$63.68
	421324	\$1,077.09	\$1,243.46	\$166.37
	421325	\$1,025.79	\$1,184.24	\$158.45
	421326	\$942.90	\$1,088.54	\$145.64
	421327	\$1,093.91	\$1,262.87	\$168.96
	421328	\$1,040.03	\$1,200.67	\$160.64
	421330	\$763.32	\$881.22	\$117.90
	421331	\$1,014.19	\$1,170.84	\$156.65
	421332	\$925.61	\$1,068.58	\$142.97
	421333	\$1,272.98	\$1,469.60	\$196.62
	421336	\$1,032.11	\$1,191.52	\$159.41
	421337	\$1,121.13	\$1,294.30	\$173.17
	421338	\$1,509.56	\$1,742.73	\$233.17
	421340	\$1,338.91	\$1,545.72	\$206.81
	421341	\$1,187.92	\$1,371.40	\$183.48
	421342	\$1,221.98	\$1,410.73	\$188.75
	421346	\$1,357.70	\$1,567.40	\$209.70
	421347	\$1,241.11	\$1,432.81	\$191.70
	421350	\$142.98	\$165.06	\$22.08
	421351	\$1,008.42	\$1,164.18	\$155.76
	421352	\$1,171.50	\$1,352.45	\$180.95
	421353	\$1,058.01	\$1,221.42	\$163.41
	421354	\$1,349.17	\$1,557.56	\$208.39
	421355	\$928.24	\$1,071.61	\$143.37
	421356	\$1,068.65	\$1,233.71	\$165.06
	421357	\$1,217.76	\$1,405.85	\$188.09
	421358	\$1,051.37	\$1,213.76	\$162.39
	421361	\$964.83	\$1,113.86	\$149.03
	421362	\$1,141.30	\$1,317.59	\$176.29
	421363	\$1,304.04	\$1,505.46	\$201.42
	421572	\$74.28	\$85.75	\$11.47
	421579	\$39.17	\$45.22	\$6.05
	421580	\$34.83	\$40.21	\$5.38
	422200	\$859.74	\$992.53	\$132.79
	422201	\$405.75	\$468.42	\$62.67
	422402	\$106.96	\$123.48	\$16.52
	422418	\$747.67	\$863.16	\$115.49
	422827	\$72.45	\$83.64	\$11.19
	423157	\$51.19	\$59.10	\$7.91
	423163	\$7.25	\$8.37	\$1.12
	423405	\$542.91	\$626.77	\$83.86
	423563	\$379.28	\$437.86	\$58.58
	424510	\$312.48	\$360.75	\$48.27
	424511	\$308.67	\$356.34	\$47.67
	424512	\$757.60	\$874.61	\$117.01
	424513	\$814.85	\$940.70	\$125.85
	424514	\$720.38	\$831.65	\$111.27

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332	424515	\$745.77	\$860.97	\$115.20
	424572	\$13.17	\$15.20	\$2.03
	424576	\$213.83	\$246.85	\$33.02
	424577	\$13.17	\$15.20	\$2.03
	424751	\$5,724.91	\$6,609.17	\$884.26
	424753	\$6,395.82	\$7,383.71	\$987.89
	424754	\$395.59	\$441.68	\$46.09
	424756	\$491.01	\$566.85	\$75.84
	424757	\$576.74	\$665.82	\$89.08
	424761	\$35.54	\$41.03	\$5.49
	424762	\$504.18	\$582.05	\$77.87
	424764	\$407.14	\$470.03	\$62.89
	426515	\$61.29	\$70.76	\$9.47
	426944	\$9.97	\$11.51	\$1.54
	426946	\$6.11	\$7.05	\$0.94
	426949	\$3,929.87	\$4,536.86	\$606.99
	427016	\$444.44	\$513.09	\$68.65
	427547	\$262.77	\$303.36	\$40.59
	427548	\$98.99	\$114.28	\$15.29
	427549	\$49.62	\$57.28	\$7.66
	427553	\$793.28	\$915.81	\$122.53
	428249	\$87.16	\$100.62	\$13.46
	428253	\$29.10	\$33.60	\$4.50
	428273	\$734.02	\$847.39	\$113.37
	428281	\$37.79	\$43.63	\$5.84
	428581	\$644.05	\$743.53	\$99.48
	429487	\$329.18	\$380.03	\$50.85
	429794	\$2,128.71	\$2,457.51	\$328.80
	429799	\$31.63	\$36.52	\$4.89
	430231	\$50.09	\$57.83	\$7.74
	430253	\$19.56	\$22.58	\$3.02
	430423	\$0.48	\$0.55	\$0.07
	430424	\$923.46	\$1,066.10	\$142.64
	430425	\$752.08	\$868.24	\$116.16
	430426	\$1,069.84	\$1,235.09	\$165.25
	430427	\$771.05	\$890.14	\$119.09
	430428	\$1,017.92	\$1,175.15	\$157.23
	430429	\$1,202.10	\$1,387.77	\$185.67
	430430	\$752.21	\$868.40	\$116.19
	430431	\$925.53	\$1,068.48	\$142.95
	430433	\$734.70	\$848.18	\$113.48
	430434	\$1,154.04	\$1,332.29	\$178.25
	430435	\$1,125.90	\$1,299.80	\$173.90
	430436	\$1,006.63	\$1,162.11	\$155.48
	430437	\$1,106.82	\$1,277.77	\$170.95
	430438	\$773.77	\$893.28	\$119.51
	430439	\$1,139.35	\$1,315.33	\$175.98

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332	430440	\$729.93	\$842.67	\$112.74
	430442	\$1,170.17	\$1,350.91	\$180.74
	430443	\$992.30	\$1,145.57	\$153.27
	430444	\$1,516.10	\$1,750.27	\$234.17
	430445	\$1,117.46	\$1,290.05	\$172.59
	430446	\$1,137.35	\$1,313.02	\$175.67
	430448	\$1,007.22	\$1,162.79	\$155.57
	430449	\$786.94	\$908.49	\$121.55
	430450	\$1,172.32	\$1,353.39	\$181.07
	430451	\$1,069.22	\$1,234.37	\$165.15
	430452	\$936.55	\$1,081.20	\$144.65
	430453	\$1,069.27	\$1,234.43	\$165.16
	430454	\$739.47	\$853.68	\$114.21
	430455	\$927.27	\$1,070.50	\$143.23
	430456	\$1,128.76	\$1,303.11	\$174.35
	430457	\$951.67	\$1,098.66	\$146.99
	430458	\$936.02	\$1,080.59	\$144.57
	430460	\$913.79	\$1,054.93	\$141.14
	430461	\$1,057.25	\$1,220.55	\$163.30
	430462	\$860.84	\$993.80	\$132.96
	430463	\$985.54	\$1,137.77	\$152.23
	430464	\$873.24	\$1,008.12	\$134.88
	430465	\$918.13	\$1,059.95	\$141.82
	430466	\$744.24	\$859.19	\$114.95
	430467	\$991.84	\$1,145.04	\$153.20
	430468	\$1,136.87	\$1,312.47	\$175.60
	430469	\$757.17	\$874.12	\$116.95
	430470	\$1,164.07	\$1,343.86	\$179.79
	430471	\$1,006.77	\$1,162.28	\$155.51
	430472	\$1,451.65	\$1,675.86	\$224.21
	430473	\$858.74	\$991.38	\$132.64
	430475	\$1,194.41	\$1,292.79	\$98.38
	430476	\$787.75	\$909.42	\$121.67
	430477	\$686.37	\$792.38	\$106.01
	430478	\$1,124.66	\$1,298.37	\$173.71
	430479	\$1,101.52	\$1,271.66	\$170.14
	430480	\$811.03	\$936.30	\$125.27
	430481	\$1,106.82	\$1,277.77	\$170.95
	430482	\$864.18	\$997.65	\$133.47
	430483	\$772.43	\$891.74	\$119.31
	430484	\$847.58	\$978.50	\$130.92
	430485	\$858.26	\$990.82	\$132.56
	430486	\$911.22	\$1,051.96	\$140.74
	430487	\$803.01	\$927.05	\$124.04
	430488	\$941.70	\$1,087.15	\$145.45
	430489	\$834.88	\$963.84	\$128.96
	430490	\$1,025.71	\$1,184.14	\$158.43

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332	430491	\$788.27	\$910.03	\$121.76
	430492	\$1,092.12	\$1,260.81	\$168.69
	430494	\$1,051.05	\$1,213.39	\$162.34
	430495	\$676.02	\$780.43	\$104.41
	430496	\$982.78	\$1,134.57	\$151.79
	430497	\$753.78	\$870.21	\$116.43
	430498	\$1,058.68	\$1,222.20	\$163.52
	430499	\$1,012.93	\$1,169.38	\$156.45
	430501	\$1,081.58	\$1,248.64	\$167.06
	430502	\$1,011.64	\$1,167.90	\$156.26
	430503	\$724.71	\$836.65	\$111.94
	430504	\$896.90	\$1,035.44	\$138.54
	430505	\$1,065.36	\$1,229.91	\$164.55
	430507	\$968.03	\$1,117.56	\$149.53
	430508	\$910.64	\$1,051.30	\$140.66
	430509	\$786.70	\$908.21	\$121.51
	430510	\$926.96	\$1,070.13	\$143.17
	430511	\$934.35	\$1,078.67	\$144.32
	430513	\$644.34	\$743.86	\$99.52
	430514	\$920.71	\$1,062.92	\$142.21
	430515	\$819.04	\$945.55	\$126.51
	430516	\$1,036.45	\$1,196.53	\$160.08
	430517	\$793.74	\$916.33	\$122.59
	430826	\$86.35	\$99.69	\$13.34
	430966	\$36.02	\$41.58	\$5.56
	431375	\$147.47	\$170.24	\$22.77
	431391	\$286.25	\$330.46	\$44.21
	431405	\$25.67	\$29.63	\$3.96
	431418	\$84.16	\$97.15	\$12.99
	431423	\$561.90	\$648.70	\$86.80
	431436	\$186.87	\$215.73	\$28.86
	431723	\$686.99	\$793.10	\$106.11
	431724	\$686.99	\$793.10	\$106.11
	431795	\$15.61	\$18.02	\$2.41
	431797	\$15.61	\$18.02	\$2.41
	431798	\$15.61	\$18.02	\$2.41
	431799	\$15.61	\$18.02	\$2.41
	431800	\$15.61	\$18.02	\$2.41
	431923	\$1,343.54	\$1,551.06	\$207.52
	432142	\$194.60	\$224.66	\$30.06
	432356	\$656.31	\$757.69	\$101.38
	432798	\$562.95	\$649.90	\$86.95
	433325	\$767.13	\$885.62	\$118.49
	433357	\$0.62	\$0.72	\$0.10
	433358	\$0.72	\$0.83	\$0.11
	433366	\$1,113.22	\$1,285.17	\$171.95
	433368	\$1,185.82	\$1,368.98	\$183.16

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332	433369	\$1,049.57	\$1,211.68	\$162.11
	433370	\$1,408.38	\$1,625.91	\$217.53
	433371	\$1,159.67	\$1,338.79	\$179.12
	433372	\$1,101.52	\$1,271.66	\$170.14
	433373	\$1,468.66	\$1,695.50	\$226.84
	433374	\$1,338.43	\$1,545.16	\$206.73
	433375	\$1,328.23	\$1,533.38	\$205.15
	433376	\$1,088.59	\$1,256.73	\$168.14
	433379	\$1,121.13	\$1,294.30	\$173.17
	433380	\$1,361.39	\$1,571.67	\$210.28
	433381	\$1,052.29	\$1,214.82	\$162.53
	433383	\$1,498.47	\$1,729.92	\$231.45
	433387	\$1,047.56	\$1,209.37	\$161.81
	433388	\$1,033.38	\$1,192.99	\$159.61
	433389	\$972.80	\$1,123.06	\$150.26
	433390	\$1,210.22	\$1,397.15	\$186.93
	433392	\$1,086.85	\$1,254.72	\$167.87
	433394	\$1,090.60	\$1,134.57	\$43.97
	433395	\$1,071.04	\$1,236.47	\$165.43
	433396	\$1,371.26	\$1,583.06	\$211.80
	433397	\$992.27	\$1,145.53	\$153.26
	433398	\$1,082.96	\$1,250.23	\$167.27
	433400	\$982.44	\$1,134.19	\$151.75
	433401	\$1,049.57	\$1,211.68	\$162.11
	433402	\$1,049.57	\$1,211.68	\$162.11
	433403	\$1,178.41	\$1,360.43	\$182.02
	433404	\$1,374.69	\$1,587.03	\$212.34
	433406	\$1,048.18	\$1,210.08	\$161.90
	433408	\$1,481.15	\$1,709.92	\$228.77
	433409	\$1,183.39	\$1,366.17	\$182.78
	433411	\$1,244.90	\$1,437.18	\$192.28
	433412	\$1,466.35	\$1,533.93	\$67.58
	433413	\$1,338.87	\$1,545.66	\$206.79
	433415	\$1,049.57	\$1,211.68	\$162.11
	433417	\$1,188.81	\$1,372.43	\$183.62
	433418	\$1,288.11	\$1,487.06	\$198.95
	433420	\$1,346.07	\$1,553.98	\$207.91
	433422	\$1,043.41	\$1,204.58	\$161.17
	433423	\$1,079.22	\$1,245.91	\$166.69
	433442	\$1,137.21	\$1,312.86	\$175.65
	433444	\$1,015.98	\$1,172.91	\$156.93
	433446	\$1,120.51	\$1,293.58	\$173.07
	433451	\$1,318.29	\$1,521.92	\$203.63
	433452	\$1,002.58	\$1,157.43	\$154.85
	433453	\$993.56	\$1,147.02	\$153.46
	433456	\$1,154.41	\$1,332.72	\$178.31
	433457	\$1,507.55	\$1,740.40	\$232.85

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	433458	\$1,121.13	\$1,294.30	\$173.17
	433460	\$1,200.04	\$1,385.39	\$185.35
	433461	\$1,347.91	\$1,556.10	\$208.19
	433465	\$1,168.84	\$1,349.37	\$180.53
	433466	\$997.18	\$1,151.21	\$154.03
	433508	\$0.52	\$0.61	\$0.09
	433513	\$0.48	\$0.55	\$0.07
	433516	\$822.53	\$854.35	\$31.82
	433518	\$1,123.17	\$1,296.65	\$173.48
	433520	\$1,022.16	\$1,180.04	\$157.88
	433521	\$1,201.59	\$1,387.18	\$185.59
	433524	\$1,075.92	\$1,242.11	\$166.19
	433525	\$1,032.49	\$1,191.96	\$159.47
	433526	\$909.23	\$944.23	\$35.00
	433527	\$793.53	\$916.09	\$122.56
	433528	\$1,035.54	\$1,195.49	\$159.95
	433529	\$1,005.68	\$1,161.01	\$155.33
	433530	\$914.85	\$1,056.15	\$141.30
	433532	\$1,114.28	\$1,286.39	\$172.11
	433537	\$1,131.96	\$1,306.80	\$174.84
	433538	\$973.62	\$1,124.00	\$150.38
	433539	\$991.70	\$1,071.42	\$79.72
	433540	\$180.54	\$208.42	\$27.88
	433541	\$1,059.96	\$1,223.68	\$163.72
	433542	\$1,179.17	\$1,361.31	\$182.14
	433544	\$1,075.07	\$1,241.12	\$166.05
	433545	\$1,130.67	\$1,305.31	\$174.64
	433546	\$1,132.25	\$1,307.13	\$174.88
	433549	\$1,060.40	\$1,224.18	\$163.78
	433551	\$858.82	\$991.47	\$132.65
	433552	\$1,240.26	\$1,431.83	\$191.57
	433553	\$1,197.24	\$1,382.16	\$184.92
	433554	\$824.33	\$951.66	\$127.33
	433555	\$999.47	\$1,153.85	\$154.38
	433557	\$1,252.96	\$1,446.49	\$193.53
	433558	\$1,185.44	\$1,368.54	\$183.10
	433559	\$1,536.09	\$1,773.35	\$237.26
	433560	\$1,218.67	\$1,406.90	\$188.23
	433561	\$1,309.09	\$1,511.29	\$202.20
	433562	\$1,069.41	\$1,234.59	\$165.18
	433564	\$978.01	\$1,129.07	\$151.06
	433565	\$1,208.77	\$1,395.47	\$186.70
	433566	\$1,025.71	\$1,184.14	\$158.43
	433567	\$876.39	\$1,011.75	\$135.36
	433568	\$1,097.27	\$1,266.76	\$169.49
	433569	\$984.35	\$1,136.39	\$152.04
	433571	\$876.39	\$1,011.75	\$135.36

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332	433572	\$994.10	\$1,147.64	\$153.54
	433574	\$1,039.07	\$1,199.56	\$160.49
	433575	\$885.63	\$1,022.43	\$136.80
	433576	\$1,116.21	\$1,288.62	\$172.41
	433577	\$955.30	\$1,102.85	\$147.55
	433579	\$975.13	\$1,125.75	\$150.62
	433580	\$1,282.23	\$1,480.28	\$198.05
	433581	\$1,029.77	\$1,188.82	\$159.05
	433582	\$1,211.87	\$1,399.05	\$187.18
	433583	\$1,215.83	\$1,403.62	\$187.79
	433584	\$1,059.11	\$1,222.70	\$163.59
	433585	\$1,082.00	\$1,249.12	\$167.12
	433588	\$1,010.78	\$1,166.90	\$156.12
	433589	\$978.39	\$1,129.51	\$151.12
	433590	\$1,034.84	\$1,194.68	\$159.84
	433593	\$934.60	\$970.85	\$36.25
	433594	\$1,111.86	\$1,283.60	\$171.74
	434191	\$1,111.48	\$1,283.16	\$171.68
	434297	\$584.07	\$674.29	\$90.22
	434318	\$1,258.67	\$1,453.09	\$194.42
	434350	\$77.52	\$89.50	\$11.98
	434353	\$388.63	\$448.65	\$60.02
	434354	\$389.53	\$449.70	\$60.17
	434393	\$43.65	\$50.39	\$6.74
	434394	\$259.34	\$299.40	\$40.06
	434512	\$108.01	\$124.69	\$16.68
	434513	\$100.85	\$116.43	\$15.58
	434514	\$86.54	\$99.91	\$13.37
	434515	\$86.54	\$99.91	\$13.37
	434516	\$100.85	\$116.43	\$15.58
	434517	\$765.97	\$884.28	\$118.31
	434518	\$661.91	\$764.15	\$102.24
	434869	\$844.53	\$974.98	\$130.45
	434870	\$1,154.52	\$1,332.85	\$178.33
	434871	\$917.95	\$1,059.74	\$141.79
	434891	\$1,486.85	\$1,716.51	\$229.66
	435391	\$9.16	\$10.57	\$1.41
	435392	\$143.37	\$165.52	\$22.15
	435395	\$110.00	\$126.98	\$16.98
	435397	\$777.73	\$897.85	\$120.12
	435934	\$58.01	\$66.97	\$8.96
	435943	\$857.50	\$989.94	\$132.44
	436223	\$190.26	\$219.64	\$29.38
	436297	\$15.74	\$18.17	\$2.43
	436487	\$257.72	\$297.52	\$39.80
	436500	\$512.33	\$591.47	\$79.14
	436720	\$130.72	\$150.91	\$20.19

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	437113	\$15.93	\$18.40	\$2.47
	437353	\$551.74	\$636.96	\$85.22
	437803	\$330.14	\$381.13	\$50.99
	438079	\$119.60	\$138.08	\$18.48
	438456	\$66.70	\$77.00	\$10.30
	438504	\$5.25	\$6.06	\$0.81
	438505	\$5.25	\$6.06	\$0.81
	438506	\$5.25	\$6.06	\$0.81
	438507	\$5.25	\$6.06	\$0.81
	438508	\$5.25	\$6.06	\$0.81
	438654	\$53.86	\$62.18	\$8.32
	438778	\$2.48	\$2.86	\$0.38
	438909	\$49.85	\$57.55	\$7.70
	438989	\$183.39	\$211.71	\$28.32
	439020	\$3.72	\$4.30	\$0.58
	439021	\$2.05	\$2.37	\$0.32
	439068	\$65.93	\$76.12	\$10.19
	439230	\$36.50	\$42.13	\$5.63
	439335	\$3.48	\$4.02	\$0.54
	439370	\$9.21	\$10.63	\$1.42
	439371	\$4.39	\$5.07	\$0.68
	439388	\$10.97	\$12.67	\$1.70
	439390	\$4.63	\$5.34	\$0.71
	439538	\$2.43	\$2.81	\$0.38
	439545	\$14.55	\$16.80	\$2.25
	439570	\$33.01	\$38.11	\$5.10
	439571	\$42.60	\$49.18	\$6.58
	439657	\$35.97	\$41.53	\$5.56
	439664	\$56.82	\$65.60	\$8.78
	439673	\$76.82	\$88.69	\$11.87
	439877	\$19.51	\$22.53	\$3.02
	440069	\$71.85	\$82.95	\$11.10
	440116	\$11.12	\$12.83	\$1.71
	440551	\$4.68	\$5.40	\$0.72
	440618	\$4,638.75	\$5,355.24	\$716.49
	440640	\$926.48	\$1,069.58	\$143.10
	440718	\$33.97	\$39.21	\$5.24
	500438	\$16.22	\$18.73	\$2.51
	500443	\$57.92	\$66.86	\$8.94
	500449	\$710.84	\$820.64	\$109.80
	500593	\$1,364.75	\$1,575.55	\$210.80
	500820	\$48.47	\$55.96	\$7.49
	501128	\$46.66	\$53.86	\$7.20
	501231	\$726.97	\$839.25	\$112.28
	501569	\$111.44	\$128.66	\$17.22
	501844	\$19.23	\$22.20	\$2.97
	501864	\$15.70	\$18.12	\$2.42

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	502101	\$46.75	\$53.97	\$7.22
	502266	\$31.49	\$36.35	\$4.86
	502376	\$94.37	\$108.94	\$14.57
	502616	\$1,279.66	\$1,477.31	\$197.65
	502619	\$83.82	\$96.77	\$12.95
	502884	\$8.78	\$10.13	\$1.35
	502897	\$3.67	\$4.25	\$0.58
	503534	\$958.16	\$1,106.15	\$147.99
	503536	\$1,216.50	\$1,404.39	\$187.89
	503538	\$875.10	\$908.41	\$33.31
	503539	\$1,188.35	\$1,371.90	\$183.55
	503541	\$1,327.70	\$1,532.78	\$205.08
	503542	\$963.97	\$1,112.87	\$148.90
	503543	\$1,312.77	\$1,515.54	\$202.77
	503544	\$1,141.69	\$1,318.03	\$176.34
	503546	\$0.48	\$0.55	\$0.07
	503547	\$0.81	\$0.94	\$0.13
	503548	\$0.48	\$0.55	\$0.07
	503549	\$0.48	\$0.55	\$0.07
	503550	\$0.48	\$0.55	\$0.07
	503883	\$1.91	\$2.20	\$0.29
	504085	\$1,209.78	\$1,396.64	\$186.86
	504603	\$65.60	\$75.73	\$10.13
	504609	\$2,689.95	\$3,105.43	\$415.48
	504644	\$91.84	\$106.02	\$14.18
	504645	\$71.56	\$82.61	\$11.05
	505761	\$744.24	\$859.19	\$114.95
	505762	\$998.35	\$1,152.55	\$154.20
	505764	\$1,051.95	\$1,214.43	\$162.48
	505765	\$913.65	\$1,054.77	\$141.12
	505766	\$786.99	\$908.55	\$121.56
	505767	\$1,079.58	\$1,246.32	\$166.74
	505768	\$854.68	\$986.69	\$132.01
	505769	\$989.93	\$1,142.84	\$152.91
	505770	\$833.83	\$962.63	\$128.80
	505771	\$1,068.27	\$1,233.27	\$165.00
	505772	\$751.63	\$867.73	\$116.10
	505773	\$937.79	\$1,082.64	\$144.85
	505774	\$896.14	\$1,034.56	\$138.42
	505775	\$849.24	\$980.41	\$131.17
	505776	\$1,081.72	\$1,248.80	\$167.08
	505777	\$740.09	\$854.40	\$114.31
	505778	\$1,085.63	\$1,253.32	\$167.69
	505779	\$861.60	\$994.68	\$133.08
	505780	\$716.66	\$827.36	\$110.70
	505781	\$978.10	\$1,129.18	\$151.08
	505783	\$804.16	\$928.37	\$124.21

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	505784	\$835.55	\$964.61	\$129.06
	505785	\$921.42	\$1,063.75	\$142.33
	505787	\$836.12	\$965.27	\$129.15
	505788	\$971.76	\$1,077.79	\$106.03
	505789	\$921.42	\$1,063.75	\$142.33
	505790	\$835.55	\$964.61	\$129.06
	505791	\$952.48	\$1,099.60	\$147.12
	505792	\$814.56	\$940.37	\$125.81
	505793	\$748.68	\$834.63	\$85.95
	505795	\$1,025.67	\$1,184.09	\$158.42
	505796	\$818.57	\$945.00	\$126.43
	505797	\$874.00	\$1,009.00	\$135.00
	505798	\$827.73	\$955.58	\$127.85
	505799	\$814.23	\$890.14	\$75.91
	505800	\$813.32	\$938.94	\$125.62
	505801	\$742.38	\$811.98	\$69.60
	505803	\$1,083.01	\$1,250.29	\$167.28
	505804	\$918.90	\$1,060.83	\$141.93
	505805	\$782.40	\$903.25	\$120.85
	505806	\$819.52	\$946.10	\$126.58
	505807	\$925.53	\$1,068.48	\$142.95
	505808	\$744.24	\$777.52	\$33.28
	505809	\$812.22	\$937.68	\$125.46
	505810	\$971.57	\$1,121.63	\$150.06
	505811	\$718.67	\$829.67	\$111.00
	505813	\$925.91	\$1,068.92	\$143.01
	505814	\$806.12	\$930.63	\$124.51
	505815	\$1,028.58	\$1,187.45	\$158.87
	505819	\$1,073.37	\$1,239.16	\$165.79
	505820	\$1,168.45	\$1,348.93	\$180.48
	505821	\$1,073.13	\$1,238.89	\$165.76
	505822	\$903.53	\$1,043.09	\$139.56
	505824	\$1,070.70	\$1,236.08	\$165.38
	505825	\$864.65	\$998.20	\$133.55
	505826	\$828.44	\$956.40	\$127.96
	505827	\$960.64	\$1,109.02	\$148.38
	505828	\$926.10	\$1,069.14	\$143.04
	505829	\$741.57	\$856.11	\$114.54
	505831	\$1,067.31	\$1,232.17	\$164.86
	505832	\$787.18	\$908.76	\$121.58
	505833	\$734.12	\$847.52	\$113.40
	505834	\$864.65	\$998.20	\$133.55
	505836	\$830.49	\$958.77	\$128.28
	505837	\$1,163.40	\$1,343.09	\$179.69
	505838	\$925.43	\$1,068.37	\$142.94
	505839	\$1,068.51	\$1,233.55	\$165.04
	505840	\$914.94	\$1,056.26	\$141.32

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332	505842	\$1,224.56	\$1,413.70	\$189.14
	505844	\$906.44	\$1,046.45	\$140.01
	505846	\$1,074.71	\$1,240.71	\$166.00
	505848	\$1,095.68	\$1,264.91	\$169.23
	505849	\$923.19	\$1,065.78	\$142.59
	505850	\$846.43	\$977.17	\$130.74
	505854	\$1,135.44	\$1,310.82	\$175.38
	505856	\$1,133.29	\$1,308.34	\$175.05
	505857	\$1,109.85	\$1,281.27	\$171.42
	505858	\$1,009.87	\$1,165.86	\$155.99
	505859	\$1,244.41	\$1,436.61	\$192.20
	505860	\$1,223.22	\$1,412.16	\$188.94
	505861	\$922.47	\$1,064.96	\$142.49
	505862	\$1,157.39	\$1,336.15	\$178.76
	505863	\$1,001.86	\$1,156.60	\$154.74
	505864	\$1,077.80	\$1,244.27	\$166.47
	505865	\$1,304.95	\$1,506.50	\$201.55
	505867	\$1,265.16	\$1,460.57	\$195.41
	505868	\$1,161.78	\$1,341.22	\$179.44
	505869	\$1,053.15	\$1,215.81	\$162.66
	505870	\$1,136.63	\$1,312.19	\$175.56
	505871	\$1,060.49	\$1,110.78	\$50.29
	505872	\$1,064.21	\$1,228.59	\$164.38
	505873	\$1,166.85	\$1,347.08	\$180.23
	505874	\$930.30	\$1,073.99	\$143.69
	505876	\$1,047.28	\$1,209.04	\$161.76
	505877	\$1,233.24	\$1,423.72	\$190.48
	505879	\$1,143.55	\$1,320.18	\$176.63
	505881	\$1,154.52	\$1,332.85	\$178.33
	505882	\$992.32	\$1,145.59	\$153.27
	505883	\$1,089.64	\$1,257.94	\$168.30
	505884	\$1,153.76	\$1,331.97	\$178.21
	505886	\$864.32	\$997.82	\$133.50
	505887	\$1,049.47	\$1,211.57	\$162.10
	505888	\$1,198.61	\$1,383.74	\$185.13
	505889	\$1,019.23	\$1,176.66	\$157.43
	505892	\$1,301.75	\$1,502.81	\$201.06
	505894	\$1,109.92	\$1,281.35	\$171.43
	505895	\$1,076.43	\$1,242.69	\$166.26
	505896	\$1,225.89	\$1,415.24	\$189.35
	505897	\$1,121.13	\$1,294.30	\$173.17
	505898	\$1,118.22	\$1,290.94	\$172.72
	505899	\$1,115.73	\$1,288.06	\$172.33
	505901	\$1,049.57	\$1,211.68	\$162.11
	505902	\$1,051.28	\$1,213.66	\$162.38
	505903	\$1,113.09	\$1,285.01	\$171.92
	505905	\$1,045.89	\$1,207.44	\$161.55

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	505906	\$1,165.31	\$1,345.30	\$179.99
	505907	\$1,169.74	\$1,350.42	\$180.68
	505908	\$1,026.38	\$1,184.91	\$158.53
	505909	\$984.83	\$1,136.94	\$152.11
	505910	\$1,309.76	\$1,512.07	\$202.31
	505911	\$1,073.61	\$1,239.44	\$165.83
	505912	\$1,006.63	\$1,162.11	\$155.48
	505913	\$1,096.23	\$1,265.55	\$169.32
	505914	\$1,034.83	\$1,194.66	\$159.83
	505915	\$1,011.45	\$1,167.67	\$156.22
	505916	\$1,237.92	\$1,429.12	\$191.20
	505917	\$1,053.53	\$1,216.25	\$162.72
	505919	\$1,254.47	\$1,448.23	\$193.76
	505921	\$1,275.89	\$1,472.96	\$197.07
	505922	\$939.84	\$1,085.01	\$145.17
	505923	\$790.23	\$912.29	\$122.06
	505924	\$1,053.38	\$1,216.09	\$162.71
	505925	\$1,258.34	\$1,452.70	\$194.36
	505926	\$1,161.16	\$1,340.50	\$179.34
	505931	\$1,293.35	\$1,493.12	\$199.77
	505933	\$918.00	\$1,059.80	\$141.80
	505935	\$845.62	\$976.23	\$130.61
	505936	\$883.21	\$1,019.62	\$136.41
	505937	\$919.04	\$1,060.99	\$141.95
	505938	\$862.79	\$996.06	\$133.27
	505939	\$925.34	\$1,068.26	\$142.92
	505940	\$797.91	\$921.15	\$123.24
	505941	\$1,134.87	\$1,310.16	\$175.29
	505942	\$967.94	\$1,117.45	\$149.51
	505943	\$1,155.72	\$1,334.23	\$178.51
	505944	\$1,264.16	\$1,459.41	\$195.25
	505946	\$934.64	\$1,079.00	\$144.36
	505947	\$892.50	\$1,030.35	\$137.85
	505948	\$883.21	\$1,019.62	\$136.41
	505949	\$930.01	\$1,073.66	\$143.65
	505950	\$807.02	\$931.67	\$124.65
	505951	\$382.19	\$382.87	\$0.68
	505952	\$1,106.15	\$1,277.00	\$170.85
	505953	\$866.61	\$1,000.46	\$133.85
	505954	\$986.31	\$1,138.65	\$152.34
	505957	\$1,002.24	\$1,157.05	\$154.81
	505958	\$743.75	\$858.63	\$114.88
	505959	\$1,091.12	\$1,157.43	\$66.31
	505960	\$757.69	\$874.72	\$117.03
	505961	\$907.88	\$1,048.10	\$140.22
	505962	\$1,029.48	\$1,188.49	\$159.01
	505966	\$892.13	\$1,029.93	\$137.80

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	505967	\$939.08	\$1,084.12	\$145.04
	505968	\$1,036.25	\$1,196.31	\$160.06
	505969	\$939.84	\$1,085.01	\$145.17
	505970	\$853.06	\$984.82	\$131.76
	505971	\$1,106.86	\$1,277.83	\$170.97
	505972	\$740.66	\$855.06	\$114.40
	505973	\$879.74	\$1,015.62	\$135.88
	505974	\$854.87	\$986.91	\$132.04
	505976	\$981.75	\$1,133.39	\$151.64
	505979	\$821.39	\$948.26	\$126.87
	505980	\$766.61	\$885.02	\$118.41
	505981	\$962.02	\$1,110.62	\$148.60
	505982	\$1,042.37	\$1,203.37	\$161.00
	505984	\$842.47	\$972.59	\$130.12
	505986	\$1,005.06	\$1,160.29	\$155.23
	505987	\$810.89	\$936.13	\$125.24
	505988	\$910.93	\$1,051.63	\$140.70
	505989	\$1,099.37	\$1,269.18	\$169.81
	505991	\$1,146.60	\$1,323.71	\$177.11
	505992	\$943.80	\$1,089.58	\$145.78
	505993	\$996.47	\$1,150.38	\$153.91
	505994	\$988.26	\$1,140.91	\$152.65
	505995	\$796.76	\$919.83	\$123.07
	505996	\$811.65	\$937.01	\$125.36
	505997	\$1,022.19	\$1,180.08	\$157.89
	505998	\$679.83	\$784.84	\$105.01
	505999	\$1,160.44	\$1,339.68	\$179.24
	506000	\$856.07	\$988.29	\$132.22
	506001	\$816.75	\$942.91	\$126.16
	506002	\$863.17	\$996.50	\$133.33
	506003	\$853.78	\$985.65	\$131.87
	506010	\$920.18	\$1,062.31	\$142.13
	506011	\$835.36	\$964.39	\$129.03
	506014	\$1,082.77	\$1,250.01	\$167.24
	506015	\$912.74	\$1,053.72	\$140.98
	506016	\$825.82	\$898.48	\$72.66
	506017	\$954.15	\$1,101.53	\$147.38
	506018	\$921.23	\$1,063.53	\$142.30
	506019	\$818.66	\$945.11	\$126.45
	506022	\$858.69	\$991.32	\$132.63
	506023	\$981.11	\$1,132.65	\$151.54
	506024	\$847.33	\$978.21	\$130.88
	506025	\$966.89	\$1,116.23	\$149.34
	506027	\$847.33	\$978.21	\$130.88
	506028	\$760.65	\$878.14	\$117.49
	506029	\$867.90	\$1,001.95	\$134.05
	506030	\$769.24	\$796.68	\$27.44

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332	506031	\$853.97	\$985.87	\$131.90
	506032	\$779.59	\$900.00	\$120.41
	506033	\$852.96	\$984.71	\$131.75
	506034	\$1,107.96	\$1,279.09	\$171.13
	506035	\$929.82	\$1,073.44	\$143.62
	506181	\$17.27	\$19.94	\$2.67
	506507	\$109.82	\$126.79	\$16.97
	506642	\$274.78	\$317.22	\$42.44
	509061	\$668.00	\$771.18	\$103.18
	509062	\$255.47	\$294.93	\$39.46
	509543	\$2.39	\$2.75	\$0.36
	509783	\$17.84	\$20.60	\$2.76
	509841	\$10.35	\$11.95	\$1.60
	510449	\$362.05	\$417.97	\$55.92
	510466	\$116.93	\$134.99	\$18.06
	510476	\$135.58	\$156.53	\$20.95
	510674	\$78.41	\$90.51	\$12.10
	510679	\$142.17	\$164.13	\$21.96
	510689	\$4.01	\$4.63	\$0.62
	510730	\$152.81	\$176.41	\$23.60
	510738	\$5.10	\$5.89	\$0.79
	510809	\$5.01	\$5.78	\$0.77
	511447	\$111.68	\$128.93	\$17.25
	511696	\$9,302.98	\$10,739.90	\$1,436.92
	511697	\$293.21	\$338.50	\$45.29
	511698	\$348.79	\$402.66	\$53.87
	511835	\$74.31	\$85.79	\$11.48
	512276	\$28.20	\$32.55	\$4.35
	512902	\$634.04	\$731.98	\$97.94
	512908	\$4,365.25	\$5,039.49	\$674.24
	513571	\$644.96	\$744.58	\$99.62
	513840	\$345.98	\$399.41	\$53.43
	513900	\$0.48	\$0.55	\$0.07
	513901	\$0.48	\$0.55	\$0.07
	513902	\$1,268.55	\$1,464.48	\$195.93
	513903	\$1,036.50	\$1,196.59	\$160.09
	513904	\$1,106.43	\$1,277.33	\$170.90
	513905	\$775.34	\$895.10	\$119.76
	513906	\$1,152.14	\$1,330.10	\$177.96
	513907	\$1,273.55	\$1,470.26	\$196.71
	513909	\$835.60	\$964.66	\$129.06
	513910	\$1,205.28	\$1,391.45	\$186.17
	513911	\$1,031.20	\$1,190.48	\$159.28
	513912	\$1,058.11	\$1,221.54	\$163.43
	513913	\$894.76	\$1,032.96	\$138.20
	513916	\$1,044.80	\$1,206.17	\$161.37
	513917	\$1,558.65	\$1,799.40	\$240.75

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	513918	\$1,265.30	\$1,460.74	\$195.44
	513919	\$1,047.56	\$1,209.36	\$161.80
	513920	\$858.74	\$991.38	\$132.64
	513921	\$938.80	\$1,083.81	\$145.01
	513922	\$914.46	\$1,055.70	\$141.24
	513924	\$763.32	\$881.22	\$117.90
	513925	\$865.18	\$998.81	\$133.63
	513926	\$1,186.97	\$1,370.30	\$183.33
	513927	\$1,071.04	\$1,236.47	\$165.43
	513928	\$818.19	\$944.56	\$126.37
	513929	\$845.86	\$976.51	\$130.65
	513930	\$975.67	\$1,126.37	\$150.70
	513931	\$890.32	\$1,027.84	\$137.52
	513932	\$774.58	\$894.22	\$119.64
	513934	\$801.49	\$925.28	\$123.79
	513935	\$1,260.72	\$1,455.45	\$194.73
	513936	\$882.59	\$1,018.91	\$136.32
	513937	\$849.24	\$980.41	\$131.17
	513938	\$1,003.77	\$1,158.81	\$155.04
	513939	\$824.10	\$951.39	\$127.29
	513940	\$1,202.04	\$1,387.70	\$185.66
	513941	\$1,059.20	\$1,222.81	\$163.61
	513942	\$839.65	\$969.34	\$129.69
	513943	\$890.32	\$1,027.84	\$137.52
	513944	\$971.76	\$1,121.85	\$150.09
	513945	\$787.18	\$908.76	\$121.58
	513948	\$1,014.07	\$1,170.70	\$156.63
	513949	\$916.27	\$1,057.80	\$141.53
	513950	\$1,083.49	\$1,250.84	\$167.35
	513951	\$824.86	\$952.27	\$127.41
	513952	\$935.07	\$1,079.50	\$144.43
	513953	\$974.38	\$1,124.88	\$150.50
	513954	\$930.25	\$1,073.93	\$143.68
	513955	\$1,199.23	\$1,384.46	\$185.23
	513956	\$882.59	\$1,018.91	\$136.32
	513958	\$714.37	\$824.71	\$110.34
	513959	\$997.52	\$1,151.59	\$154.07
	513960	\$796.72	\$919.78	\$123.06
	513961	\$768.95	\$887.72	\$118.77
	513962	\$819.52	\$946.10	\$126.58
	513963	\$1,091.07	\$1,259.60	\$168.53
	513964	\$1,035.25	\$1,195.16	\$159.91
	513965	\$1,035.96	\$1,195.97	\$160.01
	513966	\$1,270.98	\$1,467.29	\$196.31
	513967	\$1,090.68	\$1,259.14	\$168.46
	513968	\$1,120.89	\$1,294.02	\$173.13
	513969	\$913.63	\$1,054.75	\$141.12

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	513970	\$1,035.96	\$1,195.97	\$160.01
	513971	\$840.38	\$970.18	\$129.80
	513972	\$1,073.13	\$1,238.88	\$165.75
	513973	\$668.91	\$772.23	\$103.32
	513974	\$831.26	\$959.65	\$128.39
	513975	\$1,121.13	\$1,294.30	\$173.17
	513976	\$1,091.41	\$1,259.98	\$168.57
	513977	\$867.41	\$1,001.39	\$133.98
	513978	\$825.29	\$952.77	\$127.48
	513979	\$1,195.65	\$1,380.32	\$184.67
	513980	\$795.05	\$917.85	\$122.80
	513982	\$923.19	\$1,065.78	\$142.59
	513983	\$1,123.51	\$1,297.05	\$173.54
	513984	\$813.89	\$939.60	\$125.71
	513985	\$910.83	\$1,051.52	\$140.69
	513986	\$877.82	\$1,013.41	\$135.59
	513987	\$1,244.79	\$1,437.05	\$192.26
	513988	\$1,224.27	\$1,413.37	\$189.10
	513990	\$908.44	\$1,048.75	\$140.31
	513991	\$1,193.88	\$1,378.29	\$184.41
	513992	\$844.95	\$975.46	\$130.51
	513993	\$1,109.30	\$1,280.64	\$171.34
	513994	\$1,067.80	\$1,232.73	\$164.93
	513995	\$971.09	\$1,121.08	\$149.99
	513996	\$1,245.84	\$1,438.27	\$192.43
	513998	\$1,044.08	\$1,205.35	\$161.27
	513999	\$884.29	\$1,020.87	\$136.58
	514000	\$971.95	\$1,122.07	\$150.12
	514001	\$1,362.53	\$1,572.98	\$210.45
	514002	\$1,227.47	\$1,417.06	\$189.59
	514004	\$1,054.34	\$1,217.19	\$162.85
	514006	\$1,068.65	\$1,233.71	\$165.06
	514007	\$1,075.85	\$1,242.03	\$166.18
	514008	\$772.48	\$891.80	\$119.32
	514010	\$1,087.73	\$1,255.74	\$168.01
	514011	\$1,059.30	\$1,222.92	\$163.62
	514012	\$830.59	\$958.88	\$128.29
	514013	\$820.75	\$947.52	\$126.77
	514014	\$817.42	\$910.80	\$93.38
	514015	\$1,263.68	\$1,458.86	\$195.18
	514017	\$1,199.18	\$1,384.40	\$185.22
	514018	\$1,094.13	\$1,263.12	\$168.99
	514019	\$1,096.80	\$1,266.21	\$169.41
	514020	\$821.56	\$948.45	\$126.89
	514021	\$1,088.97	\$1,257.17	\$168.20
	514022	\$1,270.64	\$1,466.90	\$196.26
	514023	\$849.56	\$980.78	\$131.22

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	514024	\$1,263.77	\$1,458.97	\$195.20
	514025	\$949.38	\$1,096.02	\$146.64
	514026	\$847.91	\$978.87	\$130.96
	514027	\$923.05	\$1,065.62	\$142.57
	514028	\$1,011.11	\$1,167.29	\$156.18
	514029	\$1,068.89	\$1,233.99	\$165.10
	514030	\$794.24	\$916.91	\$122.67
	514031	\$1,198.22	\$1,383.30	\$185.08
	514032	\$1,235.58	\$1,426.42	\$190.84
	514033	\$1,016.41	\$1,173.40	\$156.99
	514034	\$916.89	\$1,058.51	\$141.62
	514035	\$1,095.65	\$1,264.88	\$169.23
	514036	\$1,102.05	\$1,272.26	\$170.21
	514039	\$1,191.07	\$1,375.04	\$183.97
	514040	\$915.51	\$1,056.92	\$141.41
	514041	\$1,368.11	\$1,579.43	\$211.32
	514042	\$1,171.70	\$1,352.68	\$180.98
	514043	\$991.22	\$1,144.32	\$153.10
	514044	\$774.91	\$894.61	\$119.70
	514047	\$770.48	\$798.61	\$28.13
	514048	\$1,041.84	\$1,202.76	\$160.92
	514049	\$908.54	\$1,048.87	\$140.33
	514050	\$912.74	\$1,053.72	\$140.98
	514051	\$1,260.67	\$1,455.39	\$194.72
	514052	\$1,080.48	\$1,247.37	\$166.89
	514053	\$769.95	\$888.88	\$118.93
	514054	\$1,178.14	\$1,360.11	\$181.97
	514057	\$846.52	\$977.28	\$130.76
	514058	\$1,132.82	\$1,307.79	\$174.97
	514060	\$922.06	\$1,064.48	\$142.42
	514061	\$1,108.44	\$1,279.65	\$171.21
	514062	\$824.79	\$952.19	\$127.40
	514063	\$842.63	\$972.78	\$130.15
	514064	\$916.13	\$1,057.63	\$141.50
	514066	\$1,007.61	\$1,163.25	\$155.64
	514067	\$822.15	\$949.13	\$126.98
	514068	\$1,051.90	\$1,214.38	\$162.48
	514069	\$905.49	\$1,045.35	\$139.86
	514070	\$777.11	\$897.14	\$120.03
	514071	\$1,001.10	\$1,155.72	\$154.62
	514072	\$866.51	\$1,000.35	\$133.84
	514073	\$893.30	\$1,031.28	\$137.98
	514074	\$1,094.13	\$1,263.12	\$168.99
	514075	\$1,054.86	\$1,217.79	\$162.93
	514076	\$991.60	\$1,144.76	\$153.16
	514077	\$1,136.25	\$1,311.75	\$175.50
	514078	\$1,233.81	\$1,424.39	\$190.58

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	514079	\$810.55	\$935.75	\$125.20
	514528	\$59.63	\$68.85	\$9.22
	514537	\$707.69	\$817.00	\$109.31
	516595	\$181.77	\$209.84	\$28.07
	516857	\$500.60	\$577.92	\$77.32
	516859	\$154.91	\$178.85	\$23.94
	516860	\$23.85	\$27.54	\$3.69
	517373	\$137.24	\$158.43	\$21.19
	517374	\$74.21	\$85.67	\$11.46
	517377	\$3.34	\$3.86	\$0.52
	517523	\$3,730.73	\$4,306.97	\$576.24
	517539	\$2.48	\$2.86	\$0.38
	517542	\$2.24	\$2.59	\$0.35
	517550	\$3,770.38	\$4,352.74	\$582.36
	517594	\$9.21	\$10.63	\$1.42
	517613	\$175.75	\$202.90	\$27.15
	517641	\$94.56	\$109.16	\$14.60
	517642	\$44.75	\$51.66	\$6.91
	517732	\$1.29	\$1.49	\$0.20
	517839	\$2,558.94	\$2,954.18	\$395.24
	517942	\$9.47	\$10.93	\$1.46
	518006	\$1,895.04	\$2,187.74	\$292.70
	518078	\$802.45	\$926.39	\$123.94
	518224	\$829.64	\$957.78	\$128.14
	518527	\$193.36	\$223.22	\$29.86
	518780	\$253.57	\$292.74	\$39.17
	518784	\$76.48	\$88.29	\$11.81
	519248	\$355.99	\$410.98	\$54.99
	519279	\$56.77	\$65.54	\$8.77
	520150	\$71.56	\$82.61	\$11.05
	520681	\$1,337.10	\$1,543.63	\$206.53
	520704	\$0.43	\$0.50	\$0.07
	520705	\$0.94	\$1.08	\$0.14
	520709	\$0.10	\$0.12	\$0.02
	520710	\$0.10	\$0.12	\$0.02
	520711	\$0.10	\$0.12	\$0.02
	521840	\$1,350.65	\$1,559.27	\$208.62
	522221	\$11.69	\$13.49	\$1.80
	525300	\$309.67	\$357.50	\$47.83
	525317	\$3,864.32	\$4,461.19	\$596.87
	525318	\$10,719.28	\$12,374.95	\$1,655.67
	525319	\$3,652.49	\$4,216.65	\$564.16
	525320	\$9,090.78	\$10,494.92	\$1,404.14
	525321	\$709.41	\$818.99	\$109.58
	525322	\$37,853.12	\$43,699.82	\$5,846.70
	600291	\$243.50	\$281.11	\$37.61
	600480	\$322.12	\$371.88	\$49.76

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	600487	\$127.13	\$146.77	\$19.64
	600488	\$127.13	\$146.77	\$19.64
	601140	\$6,679.06	\$7,710.70	\$1,031.64
	601141	\$7,394.68	\$8,536.84	\$1,142.16
	602691	\$5,286.67	\$6,103.24	\$816.57
	602894	\$47.09	\$54.36	\$7.27
	603279	\$127.24	\$146.89	\$19.65
	604248	\$1,908.21	\$2,202.95	\$294.74
	605238	\$13.12	\$15.15	\$2.03
	605545	\$132.34	\$152.78	\$20.44
	606243	\$20.13	\$23.24	\$3.11
	606298	\$975.03	\$1,125.63	\$150.60
	606299	\$607.27	\$701.07	\$93.80
	606881	\$351.56	\$405.86	\$54.30
	607072	\$1,159.29	\$1,338.36	\$179.07
	607073	\$1,025.71	\$1,184.14	\$158.43
	607074	\$1,256.86	\$1,450.99	\$194.13
	607075	\$971.66	\$1,121.74	\$150.08
	607076	\$986.12	\$1,138.43	\$152.31
	607077	\$1,328.98	\$1,534.25	\$205.27
	607078	\$971.66	\$1,121.74	\$150.08
	607079	\$1,343.21	\$1,550.68	\$207.47
	607080	\$1,265.37	\$1,460.82	\$195.45
	607081	\$955.15	\$1,102.68	\$147.53
	607082	\$1,018.56	\$1,175.88	\$157.32
	607083	\$970.23	\$1,120.09	\$149.86
	607084	\$993.27	\$1,146.69	\$153.42
	607085	\$1,159.29	\$1,338.36	\$179.07
	607086	\$943.23	\$1,088.92	\$145.69
	607087	\$1,164.07	\$1,343.86	\$179.79
	607088	\$1,154.52	\$1,332.85	\$178.33
	607089	\$970.23	\$1,120.09	\$149.86
	607090	\$1,330.47	\$1,535.97	\$205.50
	607091	\$978.67	\$1,129.84	\$151.17
	607092	\$899.53	\$1,038.47	\$138.94
	607093	\$996.81	\$1,150.77	\$153.96
	607094	\$899.53	\$1,038.47	\$138.94
	607095	\$1,281.15	\$1,479.03	\$197.88
	607096	\$1,217.50	\$1,405.55	\$188.05
	607097	\$1,176.47	\$1,358.18	\$181.71
	607098	\$903.21	\$1,042.71	\$139.50
	607099	\$1,086.68	\$1,254.53	\$167.85
	607100	\$1,100.50	\$1,270.48	\$169.98
	607101	\$1,084.25	\$1,251.72	\$167.47
	607102	\$1,206.19	\$1,392.50	\$186.31
	607103	\$1,096.31	\$1,265.64	\$169.33
	607104	\$1,125.90	\$1,299.80	\$173.90

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332	607105	\$986.93	\$1,139.37	\$152.44
	607106	\$1,162.40	\$1,341.94	\$179.54
	607107	\$1,360.05	\$1,570.12	\$210.07
	607108	\$1,045.75	\$1,207.27	\$161.52
	607109	\$978.72	\$1,129.89	\$151.17
	607110	\$1,087.92	\$1,255.96	\$168.04
	607111	\$1,353.27	\$1,562.30	\$209.03
	607112	\$1,044.80	\$1,206.17	\$161.37
	607113	\$1,216.54	\$1,404.45	\$187.91
	607114	\$1,045.03	\$1,206.44	\$161.41
	607115	\$980.63	\$1,132.10	\$151.47
	607116	\$1,179.95	\$1,362.20	\$182.25
	607117	\$1,359.71	\$1,569.73	\$210.02
	607118	\$1,096.80	\$1,266.21	\$169.41
	607119	\$1,183.39	\$1,366.17	\$182.78
	607120	\$901.30	\$1,040.51	\$139.21
	607122	\$901.30	\$1,040.51	\$139.21
	607123	\$1,085.59	\$1,253.26	\$167.67
	607124	\$978.58	\$1,129.73	\$151.15
	607125	\$980.68	\$1,132.15	\$151.47
	607126	\$1,049.51	\$1,211.62	\$162.11
	607127	\$1,185.59	\$1,368.71	\$183.12
	607129	\$1,068.65	\$1,233.71	\$165.06
	607130	\$971.66	\$1,121.74	\$150.08
	607131	\$1,319.31	\$1,523.08	\$203.77
	607132	\$971.66	\$1,121.74	\$150.08
	607133	\$1,164.88	\$1,344.80	\$179.92
	607134	\$1,217.50	\$1,405.55	\$188.05
	607135	\$1,038.12	\$1,198.46	\$160.34
	607136	\$1,143.90	\$1,320.59	\$176.69
	607998	\$0.48	\$0.55	\$0.07
	607999	\$0.48	\$0.55	\$0.07
	608000	\$0.48	\$0.55	\$0.07
	608001	\$1,233.00	\$1,423.45	\$190.45
	608002	\$1,102.05	\$1,272.26	\$170.21
	608003	\$1,183.15	\$1,365.89	\$182.74
	608004	\$985.83	\$1,138.10	\$152.27
	608005	\$1,248.94	\$1,441.85	\$192.91
	608008	\$1,035.25	\$1,195.16	\$159.91
	608009	\$1,196.94	\$1,381.81	\$184.87
	608010	\$989.93	\$1,142.84	\$152.91
	608011	\$1,431.40	\$1,652.49	\$221.09
	608012	\$1,178.85	\$1,360.94	\$182.09
	608013	\$983.73	\$1,135.68	\$151.95
	608014	\$1,164.21	\$1,344.03	\$179.82
	608015	\$1,097.27	\$1,266.76	\$169.49
	608016	\$1,090.12	\$1,258.50	\$168.38

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332	608017	\$1,102.00	\$1,272.21	\$170.21
	608018	\$1,093.41	\$1,262.30	\$168.89
	608019	\$1,207.96	\$1,394.53	\$186.57
	608020	\$1,202.33	\$1,388.04	\$185.71
	608021	\$1,041.60	\$1,202.48	\$160.88
	608022	\$1,202.57	\$1,388.31	\$185.74
	608023	\$1,231.19	\$1,421.35	\$190.16
	608024	\$985.31	\$1,137.49	\$152.18
	608025	\$1,124.33	\$1,297.99	\$173.66
	608028	\$1,251.42	\$1,444.71	\$193.29
	608030	\$974.62	\$1,125.16	\$150.54
	608031	\$1,116.79	\$1,289.28	\$172.49
	608032	\$1,264.51	\$1,459.83	\$195.32
	608292	\$1,094.08	\$1,263.07	\$168.99
	608669	\$177.62	\$205.05	\$27.43
	608734	\$2,014.69	\$2,325.88	\$311.19
	608824	\$119.13	\$137.53	\$18.40
	609041	\$15.55	\$17.95	\$2.40
	609215	\$244.50	\$282.27	\$37.77
	609245	\$95.42	\$110.15	\$14.73
	609248	\$47.71	\$55.08	\$7.37
	609867	\$0.48	\$0.55	\$0.07
	609868	\$0.48	\$0.55	\$0.07
	609869	\$935.88	\$1,080.43	\$144.55
	609870	\$1,030.91	\$1,190.15	\$159.24
	609871	\$921.00	\$1,063.25	\$142.25
	609872	\$996.13	\$1,150.00	\$153.87
	609873	\$923.95	\$1,066.66	\$142.71
	609874	\$1,020.32	\$1,177.92	\$157.60
	609875	\$978.20	\$1,129.29	\$151.09
	609876	\$933.92	\$1,078.18	\$144.26
	609877	\$1,030.25	\$1,189.37	\$159.12
	609878	\$1,063.88	\$1,228.20	\$164.32
	609879	\$915.84	\$1,057.30	\$141.46
	609880	\$1,171.36	\$1,352.29	\$180.93
	609884	\$1,112.02	\$1,283.78	\$171.76
	609885	\$926.82	\$1,069.97	\$143.15
	609886	\$934.93	\$1,079.33	\$144.40
	609887	\$957.97	\$1,105.93	\$147.96
	609888	\$996.04	\$1,149.89	\$153.85
	609889	\$949.38	\$1,096.02	\$146.64
	609890	\$1,158.91	\$1,337.92	\$179.01
	609891	\$957.97	\$1,105.93	\$147.96
	609892	\$1,010.02	\$1,166.02	\$156.00
	609893	\$1,163.25	\$1,342.93	\$179.68
	609894	\$917.42	\$1,059.12	\$141.70
	609895	\$1,167.17	\$1,347.44	\$180.27

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332	609896	\$962.64	\$1,111.33	\$148.69
	609897	\$919.28	\$1,061.27	\$141.99
	609899	\$1,019.13	\$1,176.54	\$157.41
	609900	\$1,059.11	\$1,222.70	\$163.59
	609901	\$1,177.09	\$1,358.90	\$181.81
	609902	\$1,306.71	\$1,508.54	\$201.83
	609904	\$922.00	\$1,064.41	\$142.41
	609905	\$1,245.17	\$1,437.49	\$192.32
	609906	\$1,239.68	\$1,431.16	\$191.48
	609907	\$1,039.50	\$1,200.06	\$160.56
	609908	\$1,082.01	\$1,249.13	\$167.12
	609909	\$915.13	\$1,056.48	\$141.35
	609910	\$1,163.02	\$1,342.65	\$179.63
	609911	\$915.99	\$1,057.47	\$141.48
	609912	\$1,073.23	\$1,239.00	\$165.77
	609913	\$1,010.35	\$1,166.41	\$156.06
	609914	\$1,164.49	\$1,344.36	\$179.87
	609915	\$924.72	\$1,067.55	\$142.83
	609916	\$986.59	\$1,138.98	\$152.39
	609918	\$1,173.56	\$1,354.82	\$181.26
	609919	\$1,123.61	\$1,297.16	\$173.55
	609920	\$704.79	\$813.65	\$108.86
	609921	\$1,166.93	\$1,347.17	\$180.24
	609922	\$1,013.55	\$1,170.10	\$156.55
	609923	\$1,167.69	\$1,348.05	\$180.36
	609925	\$1,168.45	\$1,348.93	\$180.48
	609926	\$958.30	\$1,106.32	\$148.02
	609927	\$899.10	\$1,037.97	\$138.87
	609928	\$1,198.37	\$1,383.46	\$185.09
	609929	\$882.59	\$1,018.91	\$136.32
	609930	\$1,337.29	\$1,543.84	\$206.55
	609931	\$1,169.17	\$1,349.76	\$180.59
	609932	\$920.57	\$1,062.75	\$142.18
	609933	\$1,172.08	\$1,353.12	\$181.04
	609934	\$1,018.60	\$1,175.94	\$157.34
	609935	\$1,172.65	\$1,353.78	\$181.13
	609936	\$1,019.18	\$1,176.60	\$157.42
	609937	\$977.39	\$1,128.35	\$150.96
	609938	\$1,029.82	\$1,188.88	\$159.06
	609940	\$1,032.15	\$1,191.58	\$159.43
	609941	\$923.52	\$1,066.17	\$142.65
	609942	\$962.93	\$1,111.66	\$148.73
	609943	\$940.79	\$1,086.11	\$145.32
	609944	\$962.31	\$1,110.95	\$148.64
	609945	\$949.41	\$1,096.05	\$146.64
	609946	\$988.50	\$1,141.18	\$152.68
	609947	\$1,182.24	\$1,364.85	\$182.61

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332	609948	\$944.37	\$1,090.24	\$145.87
	609949	\$971.52	\$1,121.58	\$150.06
	609952	\$966.03	\$1,115.24	\$149.21
	609953	\$898.76	\$1,037.58	\$138.82
	609954	\$1,174.75	\$1,356.20	\$181.45
	609955	\$963.26	\$1,112.05	\$148.79
	609956	\$837.27	\$966.59	\$129.32
	609957	\$881.64	\$1,017.81	\$136.17
	609958	\$857.21	\$989.61	\$132.40
	609959	\$992.13	\$1,145.37	\$153.24
	609960	\$1,021.90	\$1,179.74	\$157.84
	609961	\$1,187.35	\$1,370.75	\$183.40
	609962	\$917.37	\$1,059.06	\$141.69
	609963	\$961.83	\$1,110.40	\$148.57
	609964	\$1,400.93	\$1,617.32	\$216.39
	609965	\$1,018.37	\$1,175.66	\$157.29
	609967	\$961.64	\$1,110.17	\$148.53
	609968	\$952.72	\$1,099.88	\$147.16
	609969	\$1,166.78	\$1,347.00	\$180.22
	609970	\$938.41	\$1,083.35	\$144.94
	609971	\$961.36	\$1,109.84	\$148.48
	609972	\$917.89	\$1,059.67	\$141.78
	609973	\$917.08	\$1,058.73	\$141.65
	609974	\$1,166.40	\$1,346.56	\$180.16
	609975	\$1,013.12	\$1,169.60	\$156.48
	609976	\$870.72	\$1,005.21	\$134.49
	609977	\$1,011.31	\$1,167.51	\$156.20
	609978	\$1,373.84	\$1,586.04	\$212.20
	609979	\$914.89	\$1,056.20	\$141.31
	609980	\$959.02	\$1,107.15	\$148.13
	609981	\$914.84	\$1,056.15	\$141.31
	609982	\$963.26	\$1,112.05	\$148.79
	609984	\$958.88	\$1,106.98	\$148.10
	609985	\$1,010.88	\$1,167.01	\$156.13
	609987	\$915.17	\$963.46	\$48.29
	609988	\$1,127.84	\$1,302.04	\$174.20
	609989	\$1,344.27	\$1,551.90	\$207.63
	609990	\$922.71	\$1,065.23	\$142.52
	609991	\$1,111.55	\$1,283.24	\$171.69
	609992	\$856.85	\$989.20	\$132.35
	609993	\$920.23	\$1,062.37	\$142.14
	609994	\$930.30	\$1,073.99	\$143.69
	609995	\$1,014.50	\$1,171.20	\$156.70
	609996	\$85.89	\$99.16	\$13.27
	609997	\$1,198.46	\$1,383.57	\$185.11
	609998	\$961.40	\$1,109.90	\$148.50
	609999	\$916.89	\$1,058.51	\$141.62

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332	610000	\$1,012.74	\$1,169.16	\$156.42
	610001	\$1,165.59	\$1,345.63	\$180.04
	610002	\$864.56	\$998.09	\$133.53
	610004	\$1,011.83	\$1,168.12	\$156.29
	610005	\$1,169.74	\$1,350.42	\$180.68
	610520	\$0.48	\$0.55	\$0.07
	610521	\$0.48	\$0.55	\$0.07
	610522	\$0.48	\$0.55	\$0.07
	610524	\$0.48	\$0.55	\$0.07
	610525	\$548.35	\$633.05	\$84.70
	610526	\$1,199.85	\$1,385.17	\$185.32
	610527	\$932.16	\$998.15	\$65.99
	610528	\$978.10	\$1,129.18	\$151.08
	610529	\$1,170.16	\$1,350.90	\$180.74
	610530	\$1,262.72	\$1,457.76	\$195.04
	610531	\$1,223.89	\$1,412.93	\$189.04
	610532	\$1,113.54	\$1,285.54	\$172.00
	610533	\$1,223.74	\$1,412.75	\$189.01
	610536	\$1,135.36	\$1,310.72	\$175.36
	610537	\$1,205.14	\$1,391.28	\$186.14
	610538	\$997.90	\$1,152.03	\$154.13
	610539	\$1,039.01	\$1,199.50	\$160.49
	610540	\$1,296.50	\$1,496.76	\$200.26
	610541	\$1,094.03	\$1,198.30	\$104.27
	610543	\$1,259.48	\$1,454.02	\$194.54
	610544	\$1,116.98	\$1,289.50	\$172.52
	610545	\$1,388.00	\$1,602.39	\$214.39
	610546	\$1,206.10	\$1,392.39	\$186.29
	610547	\$1,112.02	\$1,283.78	\$171.76
	610548	\$1,121.13	\$1,294.30	\$173.17
	610549	\$1,240.45	\$1,432.04	\$191.59
	610550	\$1,034.49	\$1,194.28	\$159.79
	610551	\$1,112.97	\$1,284.88	\$171.91
	610553	\$1,066.12	\$1,230.79	\$164.67
	610554	\$1,345.59	\$1,553.43	\$207.84
	610555	\$1,093.94	\$1,262.90	\$168.96
	610556	\$1,121.13	\$1,294.30	\$173.17
	610557	\$1,207.34	\$1,393.82	\$186.48
	610558	\$963.69	\$1,112.54	\$148.85
	610559	\$1,035.25	\$1,195.16	\$159.91
	610560	\$1,068.51	\$1,233.55	\$165.04
	610561	\$1,290.16	\$1,489.43	\$199.27
	610562	\$1,221.36	\$1,251.12	\$29.76
	610563	\$1,208.77	\$1,395.47	\$186.70
	610565	\$1,211.15	\$1,398.22	\$187.07
	610566	\$1,243.68	\$1,435.78	\$192.10
	610567	\$1,114.45	\$1,286.58	\$172.13

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332	610568	\$1,121.08	\$1,294.24	\$173.16
	610570	\$1,060.54	\$1,224.35	\$163.81
	610571	\$1,204.81	\$1,390.90	\$186.09
	610572	\$1,146.22	\$1,154.24	\$8.02
	610851	\$60.11	\$69.40	\$9.29
	610898	\$1,539.09	\$1,776.82	\$237.73
	611795	\$35.07	\$40.48	\$5.41
	611814	\$23.95	\$27.65	\$3.70
	611928	\$9,722.90	\$11,224.68	\$1,501.78
	612009	\$3,649.63	\$4,213.34	\$563.71
	612010	\$519.77	\$600.06	\$80.29
	612274	\$66.79	\$77.11	\$10.32
	612333	\$122.37	\$141.27	\$18.90
	612337	\$14,312.28	\$16,522.92	\$2,210.64
	612710	\$0.48	\$0.55	\$0.07
	612711	\$0.48	\$0.55	\$0.07
	612713	\$0.48	\$0.55	\$0.07
	612714	\$0.48	\$0.55	\$0.07
	612715	\$1,115.02	\$1,287.25	\$172.23
	612716	\$979.34	\$1,130.61	\$151.27
	612717	\$1,199.66	\$1,384.95	\$185.29
	612718	\$1,076.90	\$1,243.24	\$166.34
	612719	\$1,092.55	\$1,261.30	\$168.75
	612722	\$1,121.13	\$1,294.30	\$173.17
	612723	\$1,154.52	\$1,332.85	\$178.33
	612725	\$1,032.46	\$1,060.86	\$28.40
	612726	\$1,221.70	\$1,410.40	\$188.70
	612729	\$978.01	\$1,129.07	\$151.06
	612732	\$1,255.81	\$1,449.78	\$193.97
	612733	\$1,094.27	\$1,263.29	\$169.02
	612735	\$1,216.54	\$1,404.45	\$187.91
	612737	\$1,213.68	\$1,401.14	\$187.46
	612738	\$1,092.27	\$1,260.97	\$168.70
	612739	\$1,090.07	\$1,258.44	\$168.37
	612740	\$1,222.75	\$1,411.61	\$188.86
	612741	\$1,204.52	\$1,390.57	\$186.05
	612742	\$869.85	\$951.61	\$81.76
	612743	\$1,049.61	\$1,211.74	\$162.13
	612744	\$1,165.45	\$1,345.46	\$180.01
	612746	\$1,133.39	\$1,308.46	\$175.07
	612748	\$1,001.91	\$1,156.66	\$154.75
	612749	\$1,198.03	\$1,383.08	\$185.05
	612750	\$1,116.69	\$1,289.17	\$172.48
	612752	\$1,097.27	\$1,266.76	\$169.49
	612753	\$1,203.66	\$1,389.58	\$185.92
	612754	\$1,249.94	\$1,443.00	\$193.06
	614197	\$1.77	\$2.04	\$0.27

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332	614257	\$46,503.70	\$53,686.55	\$7,182.85
	614318	\$0.48	\$0.55	\$0.07
	614319	\$0.48	\$0.55	\$0.07
	614320	\$0.48	\$0.55	\$0.07
	614321	\$0.48	\$0.55	\$0.07
	614322	\$0.48	\$0.55	\$0.07
	614323	\$1,177.90	\$1,359.84	\$181.94
	614325	\$1,125.90	\$1,299.80	\$173.90
	614326	\$1,084.58	\$1,252.11	\$167.53
	614327	\$1,068.65	\$1,233.71	\$165.06
	614328	\$1,190.88	\$1,374.82	\$183.94
	614329	\$1,254.57	\$1,448.34	\$193.77
	614330	\$1,104.62	\$1,275.24	\$170.62
	614331	\$1,168.74	\$1,349.26	\$180.52
	614332	\$1,227.85	\$1,417.50	\$189.65
	614333	\$1,140.12	\$1,316.22	\$176.10
	614334	\$1,117.79	\$1,290.44	\$172.65
	614335	\$1,106.34	\$1,277.22	\$170.88
	614336	\$1,227.85	\$1,417.50	\$189.65
	614337	\$946.57	\$1,092.77	\$146.20
	614338	\$1,109.34	\$1,280.69	\$171.35
	614339	\$1,388.20	\$1,602.61	\$214.41
	614340	\$1,129.53	\$1,303.99	\$174.46
	614341	\$1,115.45	\$1,287.74	\$172.29
	614342	\$1,044.80	\$1,206.17	\$161.37
	614343	\$1,428.36	\$1,648.98	\$220.62
	614344	\$1,067.51	\$1,232.39	\$164.88
	614345	\$1,411.19	\$1,629.16	\$217.97
	614348	\$1,185.96	\$1,369.14	\$183.18
	614349	\$1,226.66	\$1,416.12	\$189.46
	614350	\$1,005.25	\$1,160.51	\$155.26
	614351	\$1,011.40	\$1,167.62	\$156.22
	614353	\$1,242.88	\$1,434.85	\$191.97
	614354	\$1,187.92	\$1,371.40	\$183.48
	614355	\$960.83	\$1,109.24	\$148.41
	614356	\$1,216.54	\$1,268.28	\$51.74
	614357	\$1,035.25	\$1,195.16	\$159.91
	614359	\$1,100.66	\$1,270.67	\$170.01
	614360	\$1,209.05	\$1,395.80	\$186.75
	614361	\$1,161.11	\$1,340.45	\$179.34
	614362	\$1,188.49	\$1,372.06	\$183.57
	614364	\$987.17	\$1,139.64	\$152.47
	614810	\$18.99	\$21.92	\$2.93
	614917	\$204.46	\$236.04	\$31.58
	615052	\$17,890.35	\$20,653.65	\$2,763.30
	615110	\$4,590.52	\$5,299.56	\$709.04
	700224	\$54.86	\$63.34	\$8.48

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	700857	\$215.69	\$249.00	\$33.31
	700859	\$269.95	\$311.64	\$41.69
	700926	\$429.37	\$495.69	\$66.32
	701129	\$16.13	\$18.62	\$2.49
	701187	\$7.01	\$8.10	\$1.09
	701302	\$3.24	\$3.75	\$0.51
	701317	\$10.83	\$12.50	\$1.67
	701442	\$3.39	\$3.91	\$0.52
	701452	\$8.30	\$9.58	\$1.28
	701460	\$97.32	\$112.36	\$15.04
	701463	\$6.06	\$6.99	\$0.93
	701493	\$5.92	\$6.83	\$0.91
	701600	\$5.39	\$6.22	\$0.83
	701616	\$3,694.57	\$4,265.23	\$570.66
	701646	\$84.87	\$97.98	\$13.11
	701732	\$225.14	\$259.91	\$34.77
	701865	\$21.75	\$25.11	\$3.36
	701884	\$60.59	\$69.95	\$9.36
	702276	\$35.21	\$40.65	\$5.44
	702347	\$128.43	\$148.27	\$19.84
	702481	\$107.32	\$123.89	\$16.57
	702776	\$23.28	\$26.88	\$3.60
	702880	\$1.29	\$1.49	\$0.20
	702886	\$175.23	\$202.30	\$27.07
	703035	\$61.16	\$70.61	\$9.45
	703317	\$8.59	\$9.91	\$1.32
	703318	\$14.69	\$16.96	\$2.27
	703405	\$26.35	\$30.42	\$4.07
	703542	\$396.12	\$457.30	\$61.18
	703549	\$84.11	\$97.10	\$12.99
	703550	\$3,166.93	\$3,656.08	\$489.15
	703560	\$141.64	\$163.52	\$21.88
	703712	\$2,094.77	\$2,418.33	\$323.56
	703723	\$23.85	\$27.54	\$3.69
	703927	\$162.21	\$187.26	\$25.05
	703949	\$2.96	\$3.41	\$0.45
	704267	\$13.12	\$15.15	\$2.03
	704352	\$5.77	\$6.66	\$0.89
	704379	\$157.34	\$181.64	\$24.30
	704598	\$53.86	\$62.18	\$8.32
	704643	\$143.12	\$165.23	\$22.11
	704661	\$2.58	\$2.97	\$0.39
	704669	\$29.72	\$34.31	\$4.59
	704751	\$694.10	\$801.31	\$107.21
	704761	\$133.49	\$154.10	\$20.61
	704808	\$551.02	\$636.13	\$85.11
	704906	\$395.02	\$456.03	\$61.01

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332	705079	\$131.98	\$152.37	\$20.39
	705174	\$53.53	\$61.80	\$8.27
	705368	\$55.42	\$62.80	\$7.38
	705510	\$91.42	\$105.53	\$14.11
	705586	\$1,699.77	\$1,962.32	\$262.55
	705587	\$902.48	\$1,041.88	\$139.40
	705653	\$139.80	\$161.39	\$21.59
	705654	\$37.45	\$43.23	\$5.78
	705723	\$54.39	\$62.79	\$8.40
	705912	\$152.71	\$176.30	\$23.59
	705917	\$88.26	\$101.89	\$13.63
	706150	\$779.67	\$900.10	\$120.43
	706174	\$94.46	\$109.05	\$14.59
	706395	\$47.34	\$54.65	\$7.31
	706397	\$35.30	\$40.76	\$5.46
	706594	\$23.04	\$26.60	\$3.56
	706596	\$1.62	\$1.87	\$0.25
	706605	\$66.46	\$76.72	\$10.26
	706606	\$35.45	\$40.92	\$5.47
	706666	\$6.73	\$7.77	\$1.04
	706674	\$5.63	\$6.50	\$0.87
	706682	\$76.38	\$86.17	\$9.79
	706838	\$40.62	\$46.89	\$6.27
	707068	\$346.40	\$399.91	\$53.51
	707084	\$7.16	\$8.26	\$1.10
	707128	\$35.78	\$41.31	\$5.53
	707189	\$28.34	\$32.71	\$4.37
	707263	\$3.41	\$3.94	\$0.53
	707475	\$87.69	\$101.23	\$13.54
	707482	\$6.39	\$7.38	\$0.99
	707578	\$126.71	\$146.28	\$19.57
	707677	\$7.97	\$9.20	\$1.23
	707754	\$5.53	\$6.39	\$0.86
	708102	\$21.47	\$24.78	\$3.31
	708251	\$59.83	\$69.07	\$9.24
	708497	\$37.79	\$43.63	\$5.84
	708521	\$52.10	\$60.14	\$8.04
	708644	\$3,863.72	\$4,460.50	\$596.78
	708659	\$22.71	\$26.22	\$3.51
	708712	\$46.32	\$53.48	\$7.16
	709511	\$85.75	\$98.99	\$13.24
	709513	\$500.64	\$577.97	\$77.33
	709648	\$92.84	\$107.18	\$14.34
	709711	\$7.59	\$8.76	\$1.17
	709729	\$2.53	\$2.92	\$0.39
	709756	\$362.84	\$418.88	\$56.04
	709757	\$4.82	\$5.56	\$0.74

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332	709758	\$38.79	\$44.78	\$5.99
	709794	\$0.52	\$0.61	\$0.09
	709796	\$0.38	\$0.44	\$0.06
	709817	\$8.06	\$9.31	\$1.25
	709913	\$5.20	\$6.00	\$0.80
	709963	\$2.15	\$2.48	\$0.33
	710019	\$21.37	\$24.67	\$3.30
	710098	\$12.74	\$14.71	\$1.97
	710117	\$0.76	\$0.88	\$0.12
	710118	\$5.15	\$5.95	\$0.80
	710172	\$53.66	\$61.95	\$8.29
	710349	\$349.46	\$403.43	\$53.97
	710436	\$168.55	\$194.58	\$26.03
	710565	\$3,437.91	\$3,968.92	\$531.01
	710624	\$32.73	\$37.78	\$5.05
	711014	\$91.12	\$105.20	\$14.08
	711054	\$62.98	\$72.70	\$9.72
	711075	\$129.10	\$149.04	\$19.94
	711093	\$80.58	\$93.02	\$12.44
	711156	\$4.10	\$4.74	\$0.64
	711172	\$1,665.81	\$1,923.10	\$257.29
	711184	\$18.22	\$21.04	\$2.82
	711215	\$124.69	\$143.95	\$19.26
	711292	\$0.24	\$0.28	\$0.04
	711344	\$4.06	\$4.68	\$0.62
	711377	\$172.27	\$198.88	\$26.61
	711517	\$46.75	\$53.97	\$7.22
	711571	\$127.71	\$147.44	\$19.73
	711572	\$331.81	\$383.06	\$51.25
	711577	\$2,083.63	\$2,405.46	\$321.83
	711602	\$30.23	\$34.89	\$4.66
	711685	\$86.59	\$99.97	\$13.38
	711686	\$105.80	\$122.13	\$16.33
	711774	\$7.56	\$8.72	\$1.16
	711777	\$40.55	\$46.81	\$6.26
	711953	\$339.64	\$392.10	\$52.46
	712029	\$289.87	\$334.64	\$44.77
	712112	\$893.95	\$1,032.02	\$138.07
	712187	\$28.67	\$33.10	\$4.43
	712242	\$41.27	\$47.64	\$6.37
	712258	\$48.71	\$56.23	\$7.52
	712308	\$2,902.86	\$3,351.23	\$448.37
	712323	\$545.54	\$629.80	\$84.26
	712409	\$4,483.94	\$5,176.52	\$692.58
	712507	\$16,889.67	\$19,498.41	\$2,608.74
	712535	\$109.68	\$126.62	\$16.94
	712537	\$790.61	\$912.73	\$122.12

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332	712687	\$6,679.06	\$7,710.70	\$1,031.64
	712775	\$212.16	\$244.92	\$32.76
	712808	\$1.48	\$1.71	\$0.23
	712847	\$5.92	\$6.83	\$0.91
	712851	\$1.53	\$1.76	\$0.23
	712888	\$4.68	\$5.40	\$0.72
	712981	\$3,236.63	\$3,736.55	\$499.92
	713012	\$128.24	\$148.05	\$19.81
	713026	\$63.50	\$73.31	\$9.81
	713121	\$525.91	\$607.15	\$81.24
	713137	\$68.15	\$78.67	\$10.52
	713212	\$140.45	\$162.14	\$21.69
	713213	\$188.73	\$217.88	\$29.15
	713214	\$850.15	\$981.46	\$131.31
	713267	\$1,628.21	\$1,879.70	\$251.49
	713297	\$195.70	\$225.92	\$30.22
	713775	\$14.65	\$16.91	\$2.26
	713877	\$87.59	\$101.12	\$13.53
	713878	\$61.21	\$70.66	\$9.45
	713879	\$28.29	\$32.66	\$4.37
	713880	\$26.10	\$30.13	\$4.03
	714111	\$41.12	\$47.48	\$6.36
	714163	\$60.97	\$70.39	\$9.42
	714246	\$16.13	\$18.62	\$2.49
	715948	\$1.57	\$1.82	\$0.25
	716015	\$2,367.82	\$2,733.55	\$365.73
	716060	\$105.64	\$121.96	\$16.32
	716081	\$50.38	\$58.16	\$7.78
	716178	\$256.19	\$295.76	\$39.57
	716349	\$213.21	\$246.14	\$32.93
	716350	\$79.53	\$91.81	\$12.28
	716387	\$87.54	\$101.07	\$13.53
	716412	\$1.48	\$1.71	\$0.23
	716640	\$2.19	\$2.53	\$0.34
	716664	\$881.59	\$1,017.76	\$136.17
	716688	\$12.74	\$14.71	\$1.97
	716706	\$33.25	\$38.39	\$5.14
	716707	\$31.01	\$35.80	\$4.79
	716788	\$17.22	\$19.88	\$2.66
	718642	\$163.49	\$185.45	\$21.96
	718655	\$1,485.23	\$1,714.64	\$229.41
	718712	\$2.10	\$2.42	\$0.32
	718713	\$3.34	\$3.86	\$0.52
	718717	\$27.72	\$32.00	\$4.28
	718765	\$32.01	\$36.96	\$4.95
	718886	\$13.79	\$15.92	\$2.13
	719002	\$13.26	\$15.31	\$2.05

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332	719075	\$148.04	\$170.90	\$22.86
	719125	\$4.72	\$5.45	\$0.73
	719327	\$32.15	\$37.12	\$4.97
	719363	\$9.45	\$10.90	\$1.45
	719796	\$0.48	\$0.55	\$0.07
	719797	\$0.48	\$0.55	\$0.07
	719798	\$0.48	\$0.55	\$0.07
	719799	\$0.48	\$0.55	\$0.07
	719800	\$0.48	\$0.55	\$0.07
	719801	\$0.48	\$0.55	\$0.07
	719802	\$1,208.29	\$1,394.92	\$186.63
	719803	\$1,077.43	\$1,243.85	\$166.42
	719804	\$1,274.77	\$1,471.66	\$196.89
	719805	\$1,092.50	\$1,261.25	\$168.75
	719806	\$1,101.62	\$1,271.77	\$170.15
	719807	\$1,215.28	\$1,402.99	\$187.71
	719808	\$1,190.26	\$1,374.10	\$183.84
	719809	\$1,437.27	\$1,659.26	\$221.99
	719811	\$1,075.28	\$1,241.37	\$166.09
	719812	\$1,241.11	\$1,432.81	\$191.70
	719814	\$1,128.52	\$1,302.83	\$174.31
	719815	\$769.57	\$769.94	\$0.37
	719816	\$1,272.60	\$1,469.16	\$196.56
	719817	\$1,191.31	\$1,375.31	\$184.00
	719818	\$1,135.39	\$1,310.76	\$175.37
	719819	\$1,073.18	\$1,238.94	\$165.76
	719820	\$1,153.95	\$1,332.19	\$178.24
	719821	\$1,253.37	\$1,446.97	\$193.60
	719822	\$1,122.46	\$1,228.26	\$105.80
	719823	\$1,116.02	\$1,288.40	\$172.38
	719824	\$1,192.69	\$1,376.91	\$184.22
	719825	\$1,285.61	\$1,484.19	\$198.58
	719827	\$1,130.72	\$1,305.37	\$174.65
	719828	\$1,512.86	\$1,746.53	\$233.67
	719829	\$1,110.87	\$1,156.05	\$45.18
	719830	\$1,171.13	\$1,352.02	\$180.89
	719831	\$974.00	\$1,124.44	\$150.44
	719832	\$1,188.06	\$1,371.57	\$183.51
	719833	\$1,289.06	\$1,488.16	\$199.10
	719834	\$1,202.37	\$1,388.09	\$185.72
	719835	\$1,118.22	\$1,290.94	\$172.72
	719836	\$989.69	\$1,142.56	\$152.87
	719838	\$1,264.73	\$1,460.08	\$195.35
	719839	\$1,125.76	\$1,299.64	\$173.88
	719840	\$1,202.61	\$1,388.37	\$185.76
	719841	\$1,371.36	\$1,583.18	\$211.82
	719842	\$1,063.88	\$1,228.20	\$164.32

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332	719843	\$1,078.19	\$1,244.73	\$166.54
	719844	\$1,154.52	\$1,332.85	\$178.33
	719846	\$1,101.14	\$1,271.22	\$170.08
	719847	\$1,087.64	\$1,255.63	\$167.99
	719848	\$1,024.23	\$1,182.44	\$158.21
	720134	\$0.48	\$0.55	\$0.07
	720136	\$0.48	\$0.55	\$0.07
	720137	\$0.48	\$0.55	\$0.07
	720139	\$981.35	\$1,132.92	\$151.57
	720140	\$1,206.95	\$1,393.38	\$186.43
	720141	\$1,279.37	\$1,476.98	\$197.61
	720142	\$1,042.79	\$1,203.86	\$161.07
	720143	\$1,085.87	\$1,253.59	\$167.72
	720144	\$1,122.81	\$1,296.23	\$173.42
	720145	\$1,211.73	\$1,398.89	\$187.16
	720146	\$1,130.67	\$1,305.31	\$174.64
	720147	\$1,274.22	\$1,471.04	\$196.82
	720148	\$1,015.22	\$1,172.03	\$156.81
	720149	\$1,207.00	\$1,393.43	\$186.43
	720150	\$1,474.26	\$1,701.97	\$227.71
	720151	\$1,198.84	\$1,384.01	\$185.17
	720152	\$1,168.79	\$1,349.32	\$180.53
	720153	\$1,152.04	\$1,329.98	\$177.94
	720154	\$985.88	\$1,138.15	\$152.27
	720155	\$1,306.71	\$1,508.54	\$201.83
	720156	\$924.57	\$1,067.38	\$142.81
	720157	\$1,027.86	\$1,186.62	\$158.76
	720158	\$1,082.87	\$1,250.12	\$167.25
	720159	\$1,142.55	\$1,319.02	\$176.47
	720160	\$1,211.30	\$1,398.39	\$187.09
	720162	\$1,051.48	\$1,213.88	\$162.40
	720163	\$986.12	\$1,138.43	\$152.31
	720164	\$1,184.05	\$1,366.94	\$182.89
	720165	\$1,076.47	\$1,242.74	\$166.27
	720166	\$1,193.64	\$1,378.01	\$184.37
	720167	\$1,347.85	\$1,556.03	\$208.18
	720168	\$983.25	\$1,135.12	\$151.87
	720169	\$1,205.77	\$1,392.01	\$186.24
	720170	\$1,114.59	\$1,286.75	\$172.16
	720171	\$1,216.54	\$1,404.45	\$187.91
	720172	\$1,003.00	\$1,157.93	\$154.93
	720173	\$1,145.99	\$1,323.00	\$177.01
	720174	\$906.44	\$1,003.99	\$97.55
	720175	\$1,203.85	\$1,389.80	\$185.95
	720176	\$1,288.06	\$1,487.01	\$198.95
	720177	\$1,310.81	\$1,513.28	\$202.47
	720178	\$1,140.16	\$1,316.27	\$176.11

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332	720179	\$1,258.00	\$1,452.31	\$194.31
	720181	\$1,140.07	\$1,316.16	\$176.09
	720182	\$1,167.36	\$1,347.66	\$180.30
	720183	\$1,073.42	\$1,239.22	\$165.80
	720184	\$1,082.77	\$1,250.01	\$167.24
	720185	\$1,263.77	\$1,458.97	\$195.20
	721039	\$34.11	\$39.38	\$5.27
	721048	\$44.92	\$51.87	\$6.95
	721049	\$696.96	\$804.61	\$107.65
	721051	\$398.36	\$459.89	\$61.53
	721063	\$920.28	\$1,062.42	\$142.14
	721938	\$461.76	\$533.08	\$71.32
	722200	\$353.04	\$407.57	\$54.53
	722201	\$428.94	\$495.19	\$66.25
	722214	\$12.59	\$14.54	\$1.95
	722215	\$12.45	\$14.37	\$1.92
	722240	\$157.01	\$181.26	\$24.25
	722294	\$159.25	\$183.85	\$24.60
	722398	\$1,380.66	\$1,593.91	\$213.25
	722736	\$104.96	\$121.17	\$16.21
	722789	\$1,144.89	\$1,321.72	\$176.83
	722915	\$167.02	\$192.82	\$25.80
	722936	\$55.10	\$63.61	\$8.51
	722961	\$12.98	\$14.98	\$2.00
	722963	\$12.98	\$14.98	\$2.00
	722983	\$12.98	\$14.98	\$2.00
	722985	\$12.98	\$14.98	\$2.00
	722986	\$12.98	\$14.98	\$2.00
	722987	\$7.78	\$8.98	\$1.20
	722988	\$12.98	\$14.98	\$2.00
	722989	\$12.98	\$14.98	\$2.00
	722991	\$903.82	\$1,043.42	\$139.60
	722993	\$12.98	\$14.98	\$2.00
	723017	\$0.48	\$0.55	\$0.07
	723019	\$0.48	\$0.55	\$0.07
	723020	\$0.62	\$0.72	\$0.10
	723021	\$0.48	\$0.55	\$0.07
	723022	\$0.48	\$0.55	\$0.07
	723023	\$0.48	\$0.55	\$0.07
	723026	\$109.78	\$126.73	\$16.95
	723027	\$93.79	\$108.28	\$14.49
	723028	\$93.79	\$108.28	\$14.49
	723029	\$1,223.56	\$1,412.54	\$188.98
	723031	\$1,240.40	\$1,431.99	\$191.59
	723032	\$944.23	\$1,090.07	\$145.84
	723034	\$1,083.77	\$1,251.17	\$167.40
	723035	\$1,264.06	\$1,459.30	\$195.24

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332	723036	\$1,235.39	\$1,426.20	\$190.81
	723037	\$973.24	\$1,123.56	\$150.32
	723039	\$1,273.51	\$1,470.21	\$196.70
	723040	\$1,078.00	\$1,244.51	\$166.51
	723041	\$618.72	\$714.29	\$95.57
	723042	\$1,288.06	\$1,487.01	\$198.95
	723043	\$1,187.87	\$1,371.35	\$183.48
	723045	\$1,182.39	\$1,365.01	\$182.62
	723063	\$6.49	\$7.49	\$1.00
	723068	\$1,121.22	\$1,294.41	\$173.19
	723069	\$1,202.28	\$1,387.98	\$185.70
	723070	\$967.65	\$1,117.11	\$149.46
	723071	\$1,199.08	\$1,384.29	\$185.21
	723072	\$1,156.00	\$1,334.56	\$178.56
	723073	\$1,214.64	\$1,402.25	\$187.61
	723074	\$1,252.94	\$1,446.47	\$193.53
	723075	\$1,254.95	\$1,448.78	\$193.83
	723076	\$966.70	\$1,116.01	\$149.31
	723077	\$1,111.44	\$1,283.11	\$171.67
	723078	\$1,144.84	\$1,321.67	\$176.83
	723079	\$1,146.80	\$1,323.93	\$177.13
	723080	\$984.88	\$1,077.85	\$92.97
	723081	\$1,255.23	\$1,449.12	\$193.89
	723082	\$91.55	\$105.69	\$14.14
	723083	\$91.55	\$105.69	\$14.14
	723084	\$100.90	\$116.49	\$15.59
	723085	\$123.66	\$142.76	\$19.10
	723107	\$9.16	\$10.57	\$1.41
	723108	\$17.59	\$20.30	\$2.71
	723111	\$11.72	\$13.53	\$1.81
	723112	\$11.72	\$13.53	\$1.81
	723113	\$4.58	\$5.29	\$0.71
	723115	\$16.49	\$19.03	\$2.54
	723205	\$759.36	\$876.65	\$117.29
	723206	\$1,093.46	\$1,262.35	\$168.89
	723207	\$93.79	\$108.28	\$14.49
	723208	\$93.79	\$108.28	\$14.49
	723209	\$1,083.77	\$1,251.17	\$167.40
	723210	\$1,239.06	\$1,430.44	\$191.38
	723211	\$1,261.48	\$1,456.33	\$194.85
	723212	\$1,148.80	\$1,326.24	\$177.44
	723213	\$1,192.69	\$1,376.91	\$184.22
	723214	\$1,111.59	\$1,283.28	\$171.69
	723215	\$1,311.96	\$1,514.60	\$202.64
	723216	\$1,223.56	\$1,412.54	\$188.98
	723217	\$993.03	\$1,146.42	\$153.39
	723218	\$1,190.50	\$1,374.38	\$183.88

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332	723220	\$0.48	\$0.55	\$0.07
	723222	\$0.48	\$0.55	\$0.07
	723223	\$0.48	\$0.55	\$0.07
	723224	\$0.48	\$0.55	\$0.07
	723225	\$0.48	\$0.55	\$0.07
	723226	\$0.48	\$0.55	\$0.07
	723227	\$0.48	\$0.55	\$0.07
	723232	\$550.50	\$635.53	\$85.03
	723233	\$544.82	\$628.97	\$84.15
	723234	\$979.25	\$1,130.50	\$151.25
	723235	\$1,098.46	\$1,268.12	\$169.66
	723236	\$1,247.79	\$1,440.52	\$192.73
	723237	\$1,284.05	\$1,482.38	\$198.33
	723238	\$1,238.92	\$1,430.28	\$191.36
	723239	\$521.87	\$602.48	\$80.61
	723240	\$583.51	\$673.64	\$90.13
	723241	\$1,320.07	\$1,523.96	\$203.89
	723242	\$1,079.72	\$1,246.49	\$166.77
	723244	\$1,199.27	\$1,384.51	\$185.24
	723245	\$502.69	\$580.34	\$77.65
	723246	\$734.41	\$847.85	\$113.44
	723247	\$662.61	\$764.96	\$102.35
	723248	\$961.98	\$1,110.56	\$148.58
	723249	\$1,105.77	\$1,276.56	\$170.79
	723250	\$1,231.24	\$1,421.41	\$190.17
	723251	\$1,059.11	\$1,222.70	\$163.59
	723252	\$935.07	\$1,079.50	\$144.43
	723253	\$954.15	\$1,101.53	\$147.38
	723254	\$1,049.52	\$1,211.63	\$162.11
	723255	\$1,282.57	\$1,480.67	\$198.10
	723256	\$1,326.27	\$1,531.12	\$204.85
	723257	\$1,309.05	\$1,511.24	\$202.19
	723258	\$450.98	\$520.64	\$69.66
	723259	\$1,238.25	\$1,429.51	\$191.26
	723261	\$1,396.07	\$1,611.70	\$215.63
	723262	\$472.21	\$545.15	\$72.94
	723263	\$1,108.20	\$1,279.37	\$171.17
	723264	\$973.81	\$1,124.22	\$150.41
	723265	\$1,044.80	\$1,206.17	\$161.37
	723266	\$1,338.20	\$1,544.89	\$206.69
	723267	\$1,154.47	\$1,332.79	\$178.32
	723269	\$1,113.07	\$1,284.99	\$171.92
	723270	\$1,386.53	\$1,600.69	\$214.16
	723271	\$1,209.48	\$1,396.30	\$186.82
	723272	\$983.87	\$1,135.84	\$151.97
	723306	\$1,112.64	\$1,284.49	\$171.85
	723307	\$1,134.39	\$1,309.61	\$175.22

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	723308	\$1,197.46	\$1,382.42	\$184.96
	723309	\$1,131.05	\$1,305.75	\$174.70
	723310	\$861.17	\$974.19	\$113.02
	723312	\$1,270.69	\$1,466.96	\$196.27
	723372	\$639.17	\$737.89	\$98.72
	723373	\$607.66	\$701.51	\$93.85
	723374	\$667.52	\$770.63	\$103.11
	723375	\$605.65	\$699.19	\$93.54
	723376	\$662.71	\$765.07	\$102.36
	723377	\$635.94	\$734.17	\$98.23
	723378	\$689.80	\$796.35	\$106.55
	723379	\$617.57	\$712.96	\$95.39
	723380	\$646.77	\$746.67	\$99.90
	723381	\$608.84	\$702.89	\$94.05
	723382	\$670.48	\$774.04	\$103.56
	723383	\$614.19	\$709.05	\$94.86
	723384	\$706.31	\$815.41	\$109.10
	723385	\$649.92	\$750.31	\$100.39
	723386	\$682.74	\$788.20	\$105.46
	723387	\$617.10	\$712.41	\$95.31
	723388	\$636.23	\$734.50	\$98.27
	723389	\$610.23	\$704.48	\$94.25
	723390	\$655.26	\$756.47	\$101.21
	723391	\$621.74	\$717.78	\$96.04
	723392	\$649.01	\$749.26	\$100.25
	723393	\$633.03	\$730.81	\$97.78
	723394	\$693.00	\$800.04	\$107.04
	723395	\$617.67	\$713.07	\$95.40
	723396	\$643.86	\$743.31	\$99.45
	723397	\$596.73	\$688.90	\$92.17
	723398	\$659.37	\$761.21	\$101.84
	723399	\$593.10	\$684.71	\$91.61
	723400	\$648.01	\$748.10	\$100.09
	723401	\$606.65	\$700.35	\$93.70
	723402	\$707.93	\$817.28	\$109.35
	723403	\$612.57	\$707.18	\$94.61
	723404	\$636.47	\$734.77	\$98.30
	723405	\$606.36	\$700.02	\$93.66
	723406	\$669.91	\$773.38	\$103.47
	723407	\$632.13	\$729.76	\$97.63
	725637	\$642.72	\$741.99	\$99.27
	725638	\$628.74	\$725.85	\$97.11
	725639	\$682.36	\$787.76	\$105.40
	725640	\$602.83	\$695.95	\$93.12
	725641	\$655.22	\$756.42	\$101.20
	725642	\$597.82	\$690.16	\$92.34
	725643	\$623.40	\$719.68	\$96.28

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332	725644	\$604.46	\$697.82	\$93.36
	725645	\$678.26	\$783.02	\$104.76
	725646	\$629.26	\$726.46	\$97.20
	725647	\$602.50	\$695.56	\$93.06
	725649	\$654.88	\$756.03	\$101.15
	725650	\$612.23	\$706.80	\$94.57
	725651	\$665.33	\$768.10	\$102.77
	725652	\$599.21	\$691.76	\$92.55
	725653	\$683.17	\$788.69	\$105.52
	725654	\$626.16	\$722.88	\$96.72
	725655	\$663.47	\$765.95	\$102.48
	725656	\$602.50	\$695.56	\$93.06
	725657	\$632.79	\$730.53	\$97.74
	725658	\$612.47	\$707.07	\$94.60
	725659	\$667.86	\$771.01	\$103.15
	725660	\$614.76	\$709.71	\$94.95
	725661	\$635.42	\$733.56	\$98.14
	725662	\$644.24	\$743.75	\$99.51
	725663	\$602.21	\$695.23	\$93.02
	725664	\$694.19	\$801.42	\$107.23
	725665	\$643.77	\$743.20	\$99.43
	725667	\$653.45	\$754.38	\$100.93
	725668	\$617.00	\$712.30	\$95.30
	725669	\$660.03	\$761.98	\$101.95
	725670	\$596.39	\$688.51	\$92.12
	725671	\$651.02	\$751.57	\$100.55
	725672	\$635.85	\$734.06	\$98.21
	725673	\$670.72	\$774.32	\$103.60
	725674	\$625.02	\$721.56	\$96.54
	725675	\$666.62	\$769.58	\$102.96
	725676	\$602.79	\$695.89	\$93.10
	725677	\$628.79	\$725.91	\$97.12
	725678	\$606.51	\$700.19	\$93.68
	725679	\$692.14	\$799.05	\$106.91
	725680	\$655.17	\$756.36	\$101.19
	725681	\$615.67	\$710.76	\$95.09
	725682	\$694.48	\$801.75	\$107.27
	725683	\$636.85	\$735.21	\$98.36
	725684	\$661.94	\$764.19	\$102.25
	725685	\$626.83	\$723.65	\$96.82
	725686	\$685.27	\$791.12	\$105.85
	725687	\$600.97	\$693.80	\$92.83
	725688	\$625.26	\$721.83	\$96.57
	725689	\$611.52	\$705.97	\$94.45
	725690	\$608.08	\$702.00	\$93.92
	725691	\$657.08	\$758.57	\$101.49
	725694	\$632.41	\$730.09	\$97.68

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332	725695	\$692.62	\$799.60	\$106.98
	725696	\$636.80	\$735.16	\$98.36
	725697	\$666.33	\$769.25	\$102.92
	725698	\$610.37	\$704.65	\$94.28
	725699	\$671.10	\$774.76	\$103.66
	725700	\$616.00	\$711.15	\$95.15
	725701	\$643.91	\$743.37	\$99.46
	725702	\$648.44	\$748.60	\$100.16
	725703	\$634.37	\$732.35	\$97.98
	725704	\$691.47	\$798.28	\$106.81
	725705	\$615.91	\$711.04	\$95.13
	725706	\$606.36	\$700.02	\$93.66
	725707	\$658.51	\$760.22	\$101.71
	725708	\$599.78	\$692.42	\$92.64
	725709	\$663.18	\$765.62	\$102.44
	725710	\$680.93	\$786.11	\$105.18
	725711	\$615.86	\$710.98	\$95.12
	725712	\$677.02	\$781.59	\$104.57
	725713	\$610.75	\$705.09	\$94.34
	725714	\$682.31	\$787.70	\$105.39
	725715	\$646.96	\$746.89	\$99.93
	725716	\$712.85	\$822.95	\$110.10
	725717	\$638.14	\$736.70	\$98.56
	725718	\$670.34	\$773.88	\$103.54
	725719	\$680.64	\$785.77	\$105.13
	725720	\$614.28	\$709.16	\$94.88
	725721	\$671.39	\$775.09	\$103.70
	725722	\$602.12	\$695.12	\$93.00
	725723	\$656.36	\$757.74	\$101.38
	725724	\$623.73	\$720.07	\$96.34
	725725	\$717.43	\$828.24	\$110.81
	725726	\$648.68	\$748.87	\$100.19
	725727	\$684.27	\$789.96	\$105.69
	725728	\$618.39	\$713.90	\$95.51
	725729	\$729.35	\$842.01	\$112.66
	725730	\$676.40	\$780.87	\$104.47
	725731	\$617.81	\$713.24	\$95.43
	725732	\$699.39	\$807.42	\$108.03
	725733	\$643.10	\$742.43	\$99.33
	725734	\$658.60	\$760.33	\$101.73
	725735	\$617.77	\$713.18	\$95.41
	725736	\$677.54	\$782.20	\$104.66
	725737	\$624.30	\$720.73	\$96.43
	725738	\$705.45	\$814.41	\$108.96
	725739	\$675.87	\$780.27	\$104.40
	725740	\$717.52	\$828.35	\$110.83
	725741	\$639.14	\$737.86	\$98.72

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332	725742	\$621.30	\$717.26	\$95.96
	725743	\$659.27	\$761.10	\$101.83
	725744	\$618.58	\$714.12	\$95.54
	725745	\$676.64	\$781.15	\$104.51
	725746	\$612.90	\$707.57	\$94.67
	725747	\$693.67	\$800.81	\$107.14
	725748	\$702.64	\$811.17	\$108.53
	725749	\$636.80	\$735.16	\$98.36
	725750	\$735.65	\$849.28	\$113.63
	725751	\$653.07	\$753.94	\$100.87
	725752	\$677.54	\$782.20	\$104.66
	725753	\$612.80	\$707.46	\$94.66
	725754	\$683.79	\$789.41	\$105.62
	725755	\$635.61	\$733.78	\$98.17
	725756	\$660.94	\$763.03	\$102.09
	725757	\$635.23	\$733.34	\$98.11
	725758	\$686.04	\$792.00	\$105.96
	725759	\$645.63	\$745.35	\$99.72
	725797	\$2.00	\$2.31	\$0.31
	725933	\$1,246.41	\$1,438.93	\$192.52
	725962	\$393.83	\$454.66	\$60.83
	725997	\$1,006.68	\$1,162.17	\$155.49
	726005	\$868.23	\$1,002.34	\$134.11
	726006	\$1,068.65	\$1,233.71	\$165.06
	726007	\$997.09	\$1,151.10	\$154.01
	726008	\$858.74	\$991.38	\$132.64
	726009	\$997.09	\$1,151.10	\$154.01
	726010	\$1,172.80	\$1,353.94	\$181.14
	726011	\$888.79	\$1,026.07	\$137.28
	726012	\$937.36	\$1,082.14	\$144.78
	726013	\$1,089.64	\$1,257.94	\$168.30
	726014	\$1,172.70	\$1,353.83	\$181.13
	726015	\$897.52	\$1,036.15	\$138.63
	726016	\$1,135.30	\$1,310.65	\$175.35
	726021	\$1,185.53	\$1,368.65	\$183.12
	726022	\$890.84	\$1,028.44	\$137.60
	726023	\$1,091.98	\$1,260.64	\$168.66
	726024	\$873.05	\$1,007.90	\$134.85
	726025	\$997.09	\$1,151.10	\$154.01
	726026	\$1,073.42	\$1,239.22	\$165.80
	726027	\$868.28	\$1,002.39	\$134.11
	726028	\$1,001.86	\$1,156.60	\$154.74
	726029	\$868.28	\$1,002.39	\$134.11
	726030	\$1,001.86	\$1,156.60	\$154.74
	726031	\$869.38	\$1,003.66	\$134.28
	726032	\$873.05	\$1,007.90	\$134.85
	726033	\$1,030.48	\$1,189.65	\$159.17

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	726034	\$1,102.24	\$1,272.49	\$170.25
	726035	\$863.51	\$996.88	\$133.37
	726036	\$858.74	\$991.38	\$132.64
	726037	\$1,001.86	\$1,156.60	\$154.74
	726038	\$863.51	\$996.88	\$133.37
	726039	\$858.74	\$991.38	\$132.64
	726040	\$1,001.86	\$1,156.60	\$154.74
	726041	\$863.51	\$996.88	\$133.37
	726042	\$858.74	\$991.38	\$132.64
	726043	\$868.28	\$1,002.39	\$134.11
	726044	\$1,073.42	\$1,239.22	\$165.80
	726045	\$1,001.86	\$1,156.60	\$154.74
	726046	\$863.51	\$996.88	\$133.37
	726047	\$858.74	\$991.38	\$132.64
	726048	\$868.28	\$1,002.39	\$134.11
	726049	\$863.51	\$996.88	\$133.37
	726050	\$1,001.86	\$1,156.60	\$154.74
	726051	\$863.51	\$996.88	\$133.37
	726052	\$868.28	\$1,002.39	\$134.11
	726053	\$1,073.42	\$1,239.22	\$165.80
	726054	\$868.28	\$1,002.39	\$134.11
	726055	\$858.74	\$991.38	\$132.64
	726056	\$863.51	\$996.88	\$133.37
	726057	\$1,041.46	\$1,202.32	\$160.86
	726058	\$1,025.71	\$1,184.14	\$158.43
	726059	\$873.53	\$1,008.45	\$134.92
	726060	\$869.95	\$1,004.32	\$134.37
	726065	\$868.28	\$1,002.39	\$134.11
	726066	\$868.28	\$1,002.39	\$134.11
	726067	\$863.51	\$996.88	\$133.37
	726068	\$868.28	\$1,002.39	\$134.11
	726069	\$1,073.42	\$1,239.22	\$165.80
	726070	\$868.28	\$1,002.39	\$134.11
	726071	\$863.51	\$996.88	\$133.37
	726072	\$1,001.86	\$1,156.60	\$154.74
	726073	\$868.28	\$1,002.39	\$134.11
	726074	\$871.86	\$1,006.52	\$134.66
	726075	\$868.28	\$1,002.39	\$134.11
	726076	\$863.51	\$996.88	\$133.37
	726078	\$1,082.96	\$1,250.23	\$167.27
	726079	\$1,001.86	\$1,156.60	\$154.74
	726080	\$868.28	\$1,002.39	\$134.11
	726081	\$1,006.63	\$1,162.11	\$155.48
	726082	\$868.28	\$1,002.39	\$134.11
	726083	\$1,006.63	\$1,162.11	\$155.48
	726084	\$868.28	\$1,002.39	\$134.11
	726085	\$1,078.19	\$1,244.73	\$166.54

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332	726086	\$1,006.63	\$1,162.11	\$155.48
	726087	\$887.36	\$1,024.42	\$137.06
	726088	\$1,025.71	\$1,184.14	\$158.43
	726089	\$1,078.19	\$1,244.73	\$166.54
	726090	\$1,011.40	\$1,167.62	\$156.22
	726091	\$1,092.50	\$1,261.25	\$168.75
	726092	\$1,010.26	\$1,166.30	\$156.04
	726093	\$868.28	\$1,002.39	\$134.11
	726094	\$863.51	\$996.88	\$133.37
	726095	\$869.95	\$1,004.32	\$134.37
	726096	\$868.28	\$1,002.39	\$134.11
	726097	\$1,001.86	\$1,156.60	\$154.74
	726098	\$868.28	\$1,002.39	\$134.11
	726099	\$863.51	\$996.88	\$133.37
	726100	\$1,073.42	\$1,239.22	\$165.80
	726101	\$863.51	\$996.88	\$133.37
	726102	\$1,073.42	\$1,239.22	\$165.80
	726103	\$863.51	\$996.88	\$133.37
	726104	\$1,001.86	\$1,156.60	\$154.74
	726105	\$1,073.42	\$1,239.22	\$165.80
	726106	\$863.51	\$996.88	\$133.37
	726107	\$1,073.42	\$1,239.22	\$165.80
	726108	\$868.28	\$1,002.39	\$134.11
	726109	\$1,001.86	\$1,156.60	\$154.74
	726110	\$863.51	\$996.88	\$133.37
	726111	\$868.28	\$1,002.39	\$134.11
	726112	\$1,001.86	\$1,156.60	\$154.74
	726113	\$863.51	\$996.88	\$133.37
	726114	\$1,001.86	\$1,156.60	\$154.74
	726115	\$863.51	\$996.88	\$133.37
	726116	\$1,073.42	\$1,239.22	\$165.80
	726117	\$863.51	\$996.88	\$133.37
	726118	\$1,001.86	\$1,156.60	\$154.74
	726119	\$939.27	\$1,084.34	\$145.07
	726120	\$1,098.85	\$1,268.57	\$169.72
	726121	\$1,001.86	\$1,156.60	\$154.74
	726122	\$1,001.86	\$1,156.60	\$154.74
	726123	\$1,073.42	\$1,239.22	\$165.80
	726124	\$1,001.86	\$1,156.60	\$154.74
	726125	\$1,073.42	\$1,239.22	\$165.80
	726126	\$863.51	\$996.88	\$133.37
	726127	\$1,001.86	\$1,156.60	\$154.74
	726128	\$1,073.42	\$1,239.22	\$165.80
	726129	\$1,011.40	\$1,167.62	\$156.22
	726130	\$1,011.40	\$1,167.62	\$156.22
	726131	\$863.51	\$996.88	\$133.37
	726132	\$1,001.86	\$1,156.60	\$154.74

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332	726133	\$863.51	\$996.88	\$133.37
	726134	\$863.51	\$996.88	\$133.37
	726135	\$1,001.86	\$1,156.60	\$154.74
	726136	\$869.95	\$1,004.32	\$134.37
	726137	\$863.51	\$996.88	\$133.37
	726138	\$1,096.46	\$1,265.82	\$169.36
	726139	\$1,179.62	\$1,361.82	\$182.20
	726140	\$1,001.86	\$1,156.60	\$154.74
	726141	\$863.51	\$996.88	\$133.37
	726142	\$1,001.86	\$1,156.60	\$154.74
	726143	\$863.51	\$996.88	\$133.37
	726144	\$1,010.26	\$1,166.30	\$156.04
	726145	\$863.51	\$996.88	\$133.37
	726146	\$863.51	\$996.88	\$133.37
	726261	\$42.94	\$49.57	\$6.63
	726273	\$102.33	\$118.14	\$15.81
	726281	\$99.90	\$115.33	\$15.43
	726324	\$254.09	\$293.34	\$39.25
	726375	\$169.08	\$195.19	\$26.11
	726389	\$77.91	\$89.94	\$12.03
	726478	\$80.15	\$92.53	\$12.38
	726551	\$13.36	\$15.42	\$2.06
	726576	\$1,077.71	\$1,244.18	\$166.47
	726585	\$98.13	\$113.29	\$15.16
	726770	\$45.04	\$51.99	\$6.95
	726775	\$3.77	\$4.35	\$0.58
	726777	\$317.40	\$366.42	\$49.02
	726817	\$79.10	\$91.32	\$12.22
	726839	\$2,359.30	\$2,387.34	\$28.04
	726849	\$4.63	\$5.34	\$0.71
	726852	\$11.21	\$12.94	\$1.73
	726853	\$210.63	\$243.16	\$32.53
	727069	\$39.98	\$46.15	\$6.17
	727379	\$0.48	\$0.55	\$0.07
	727380	\$0.48	\$0.55	\$0.07
	727381	\$0.48	\$0.55	\$0.07
	727382	\$0.48	\$0.55	\$0.07
	727383	\$0.95	\$1.10	\$0.15
	727384	\$1,257.67	\$1,451.92	\$194.25
	727385	\$906.40	\$1,046.40	\$140.00
	727386	\$1,466.01	\$1,692.44	\$226.43
	727387	\$1,003.91	\$1,158.97	\$155.06
	727388	\$1,139.11	\$1,315.06	\$175.95
	727389	\$1,298.93	\$1,499.57	\$200.64
	727391	\$1,462.43	\$1,688.31	\$225.88
	727392	\$1,197.94	\$1,382.97	\$185.03
	727393	\$946.18	\$1,092.33	\$146.15

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	727394	\$1,214.16	\$1,401.69	\$187.53
	727395	\$1,074.66	\$1,240.65	\$165.99
	727396	\$1,202.76	\$1,388.53	\$185.77
	727397	\$1,075.81	\$1,241.97	\$166.16
	727398	\$1,240.39	\$1,431.98	\$191.59
	727399	\$111.35	\$128.55	\$17.20
	727429	\$1,333.05	\$1,538.94	\$205.89
	727430	\$1,293.26	\$1,493.01	\$199.75
	727432	\$1,038.31	\$1,198.68	\$160.37
	727433	\$1,233.62	\$1,424.17	\$190.55
	727434	\$1,280.95	\$1,478.80	\$197.85
	727435	\$1,133.39	\$1,308.45	\$175.06
	727436	\$1,164.07	\$1,343.86	\$179.79
	727437	\$1,232.38	\$1,422.73	\$190.35
	727438	\$1,306.62	\$1,508.43	\$201.81
	727439	\$1,462.29	\$1,688.15	\$225.86
	727441	\$1,277.51	\$1,474.84	\$197.33
	727442	\$1,179.09	\$1,361.21	\$182.12
	727448	\$1,166.93	\$1,347.17	\$180.24
	727449	\$763.80	\$881.77	\$117.97
	727450	\$1,448.26	\$1,671.95	\$223.69
	727451	\$1,069.08	\$1,234.21	\$165.13
	727452	\$1,305.90	\$1,507.61	\$201.71
	727453	\$1,211.73	\$1,398.89	\$187.16
	727454	\$1,302.94	\$1,504.19	\$201.25
	727455	\$1,229.47	\$1,419.37	\$189.90
	727456	\$1,008.20	\$1,163.93	\$155.73
	727457	\$694.62	\$705.31	\$10.69
	727608	\$1,072.94	\$1,238.67	\$165.73
	727733	\$872.67	\$1,007.46	\$134.79
	727869	\$608.08	\$702.00	\$93.92
	727923	\$20.52	\$23.68	\$3.16
	728275	\$734.70	\$848.18	\$113.48
	728309	\$39.12	\$45.16	\$6.04
	728386	\$587.38	\$678.10	\$90.72
	728523	\$53.67	\$61.96	\$8.29
	728567	\$3,913.26	\$4,517.70	\$604.44
	728579	\$75.57	\$87.24	\$11.67
	728581	\$53.53	\$61.80	\$8.27
	728598	\$343.73	\$396.83	\$53.10
	728622	\$862.65	\$995.89	\$133.24
	728975	\$346.31	\$399.80	\$53.49
	728976	\$388.77	\$448.82	\$60.05
	729055	\$40.04	\$46.22	\$6.18
	729226	\$23.85	\$27.54	\$3.69
	729294	\$131.20	\$151.46	\$20.26
	729303	\$62.98	\$72.70	\$9.72

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332	729317	\$157.01	\$181.26	\$24.25
	729319	\$137.21	\$158.40	\$21.19
	729333	\$3,309.43	\$3,820.59	\$511.16
	729378	\$31.20	\$36.02	\$4.82
	729486	\$26.24	\$30.29	\$4.05
	729498	\$84.68	\$97.76	\$13.08
	729682	\$9.54	\$11.02	\$1.48
	729859	\$221.35	\$255.54	\$34.19
	729886	\$64.17	\$74.08	\$9.91
	729905	\$93.03	\$107.40	\$14.37
	729917	\$499.26	\$576.37	\$77.11
	729955	\$43.22	\$49.90	\$6.68
	730199	\$192.36	\$222.07	\$29.71
	730200	\$489.38	\$564.97	\$75.59
	730509	\$23.47	\$27.10	\$3.63
	730514	\$49.28	\$56.89	\$7.61
	730522	\$376.08	\$434.17	\$58.09
	730523	\$3,836.07	\$4,428.58	\$592.51
	730565	\$0.72	\$0.83	\$0.11
	730580	\$942.98	\$1,088.63	\$145.65
	730581	\$125.90	\$145.35	\$19.45
	730595	\$3,615.47	\$4,173.91	\$558.44
	730623	\$8,277.65	\$9,556.20	\$1,278.55
	730629	\$263.92	\$304.68	\$40.76
	731140	\$105.96	\$122.32	\$16.36
	731194	\$125.47	\$144.85	\$19.38
	731507	\$128.52	\$148.38	\$19.86
	731622	\$45.94	\$53.04	\$7.10
	731746	\$20.04	\$23.13	\$3.09
	731761	\$1.81	\$2.09	\$0.28
	731788	\$5.82	\$6.72	\$0.90
	731826	\$5.30	\$6.11	\$0.81
	731933	\$300.56	\$346.98	\$46.42
	732590	\$1,121.13	\$1,294.30	\$173.17
	732638	\$673.35	\$777.35	\$104.00
	732670	\$9,928.43	\$11,461.95	\$1,533.52
	732672	\$7,967.17	\$9,197.76	\$1,230.59
	732696	\$23.47	\$27.10	\$3.63
	732873	\$394.21	\$455.10	\$60.89
	732874	\$424.88	\$490.51	\$65.63
	733015	\$0.48	\$0.55	\$0.07
	733016	\$0.48	\$0.55	\$0.07
	733017	\$0.48	\$0.55	\$0.07
	733018	\$0.48	\$0.55	\$0.07
	733019	\$982.35	\$1,134.08	\$151.73
	733020	\$1,155.48	\$1,333.95	\$178.47
	733021	\$1,157.39	\$1,336.15	\$178.76

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332	733022	\$147.42	\$170.19	\$22.77
	733023	\$147.42	\$170.19	\$22.77
	733024	\$1,176.47	\$1,358.18	\$181.71
	733025	\$1,157.39	\$1,336.15	\$178.76
	733026	\$982.35	\$1,134.08	\$151.73
	733027	\$1,236.91	\$1,427.97	\$191.06
	733028	\$1,111.54	\$1,283.23	\$171.69
	733029	\$982.35	\$1,134.08	\$151.73
	733030	\$1,157.39	\$1,336.15	\$178.76
	733031	\$1,155.38	\$1,333.84	\$178.46
	733032	\$1,243.40	\$1,435.46	\$192.06
	733033	\$1,316.68	\$1,520.05	\$203.37
	733034	\$1,110.11	\$1,281.57	\$171.46
	733035	\$1,155.96	\$1,334.50	\$178.54
	733037	\$1,235.48	\$1,426.31	\$190.83
	733038	\$149.18	\$172.22	\$23.04
	733039	\$144.94	\$167.32	\$22.38
	733040	\$1,427.79	\$1,648.33	\$220.54
	733042	\$1,092.46	\$1,261.19	\$168.73
	733043	\$983.21	\$1,135.07	\$151.86
	733044	\$1,237.11	\$1,428.19	\$191.08
	733045	\$742.81	\$857.54	\$114.73
	733046	\$1,144.98	\$1,321.83	\$176.85
	733047	\$1,297.65	\$1,498.08	\$200.43
	733048	\$171.56	\$198.05	\$26.49
	733049	\$144.70	\$167.05	\$22.35
	733050	\$1,109.06	\$1,280.36	\$171.30
	733051	\$1,173.99	\$1,355.32	\$181.33
	733052	\$979.87	\$1,131.21	\$151.34
	733053	\$1,109.06	\$1,280.36	\$171.30
	733054	\$1,149.71	\$1,327.29	\$177.58
	733056	\$144.94	\$167.32	\$22.38
	733057	\$1,248.41	\$1,441.24	\$192.83
	733058	\$1,253.56	\$1,447.19	\$193.63
	733059	\$884.45	\$1,021.06	\$136.61
	733060	\$1,013.64	\$1,170.21	\$156.57
	733061	\$1,234.43	\$1,425.10	\$190.67
	733062	\$1,173.99	\$1,355.32	\$181.33
	733074	\$5.25	\$6.06	\$0.81
	733238	\$739.47	\$853.68	\$114.21
	733246	\$2,749.96	\$3,174.71	\$424.75
	733260	\$415.63	\$479.83	\$64.20
	733290	\$183.68	\$212.05	\$28.37
	733292	\$117.03	\$135.10	\$18.07
	733298	\$143.12	\$165.23	\$22.11
	733318	\$23.85	\$27.54	\$3.69
	733329	\$78.72	\$90.87	\$12.15

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332	733331	\$14.79	\$17.07	\$2.28
	733336	\$16.27	\$18.78	\$2.51
	733337	\$39.36	\$45.44	\$6.08
	733345	\$111.25	\$128.44	\$17.19
	733346	\$5,328.84	\$6,151.92	\$823.08
	733349	\$39.36	\$45.44	\$6.08
	733351	\$1,353.95	\$1,563.07	\$209.12
	733498	\$237.11	\$273.73	\$36.62
	733543	\$12.12	\$13.99	\$1.87
	733571	\$243.69	\$281.33	\$37.64
	733583	\$82.06	\$94.73	\$12.67
	733624	\$293.64	\$339.00	\$45.36
	733628	\$86.78	\$100.18	\$13.40
	733802	\$68.70	\$79.31	\$10.61
	734274	\$212.15	\$244.91	\$32.76
	734305	\$5,900.43	\$6,811.79	\$911.36
	734473	\$137.21	\$158.40	\$21.19
	734516	\$718.14	\$829.07	\$110.93
	734517	\$137.21	\$158.40	\$21.19
	734518	\$172.03	\$198.61	\$26.58
	734677	\$1,454.70	\$1,679.39	\$224.69
	734684	\$29.48	\$34.04	\$4.56
	735015	\$1,323.03	\$1,527.38	\$204.35
	735034	\$16.08	\$18.56	\$2.48
	735139	\$686.99	\$793.10	\$106.11
	735140	\$758.55	\$875.71	\$117.16
	735141	\$686.99	\$793.10	\$106.11
	735164	\$1.14	\$1.32	\$0.18
	735468	\$107.82	\$124.47	\$16.65
	735600	\$171.94	\$198.50	\$26.56
	735602	\$0.48	\$0.55	\$0.07
	735603	\$0.48	\$0.55	\$0.07
	735604	\$0.48	\$0.55	\$0.07
	735605	\$170.22	\$196.51	\$26.29
	735606	\$170.32	\$196.62	\$26.30
	735607	\$171.41	\$197.89	\$26.48
	735608	\$173.89	\$200.75	\$26.86
	735609	\$582.41	\$672.37	\$89.96
	735610	\$178.95	\$206.59	\$27.64
	735611	\$183.48	\$211.82	\$28.34
	735612	\$378.51	\$436.98	\$58.47
	735613	\$186.92	\$215.79	\$28.87
	735614	\$186.49	\$215.29	\$28.80
	735615	\$386.62	\$446.34	\$59.72
	735616	\$505.22	\$583.26	\$78.04
	735617	\$506.37	\$584.58	\$78.21
	735618	\$1,095.13	\$1,264.28	\$169.15

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332	735619	\$1,004.91	\$1,160.13	\$155.22
	735620	\$173.13	\$199.87	\$26.74
	735621	\$173.13	\$199.87	\$26.74
	735623	\$501.88	\$579.40	\$77.52
	735624	\$170.03	\$196.29	\$26.26
	735625	\$740.80	\$855.23	\$114.43
	735626	\$173.75	\$200.59	\$26.84
	735627	\$174.47	\$201.41	\$26.94
	735628	\$174.51	\$201.47	\$26.96
	735629	\$174.42	\$201.36	\$26.94
	735630	\$174.75	\$201.74	\$26.99
	735631	\$1,054.05	\$1,216.86	\$162.81
	735632	\$870.00	\$1,004.37	\$134.37
	735633	\$773.86	\$893.39	\$119.53
	735634	\$1,196.75	\$1,381.59	\$184.84
	735635	\$168.60	\$194.64	\$26.04
	735636	\$171.03	\$197.45	\$26.42
	735637	\$178.90	\$206.54	\$27.64
	735638	\$336.24	\$388.18	\$51.94
	735639	\$171.65	\$198.16	\$26.51
	735640	\$171.94	\$198.50	\$26.56
	735641	\$171.94	\$198.50	\$26.56
	735923	\$4.53	\$5.23	\$0.70
	735925	\$3.01	\$3.47	\$0.46
	736025	\$2.67	\$3.08	\$0.41
	736028	\$14.50	\$16.74	\$2.24
	736031	\$0.38	\$0.44	\$0.06
	736103	\$2.34	\$2.70	\$0.36
	736105	\$0.67	\$0.77	\$0.10
	736116	\$0.38	\$0.44	\$0.06
	736133	\$38.74	\$44.72	\$5.98
	736178	\$11.02	\$12.72	\$1.70
	736180	\$6.54	\$7.55	\$1.01
	736182	\$39.65	\$45.77	\$6.12
	736192	\$7.39	\$8.54	\$1.15
	736218	\$69.89	\$80.69	\$10.80
	736243	\$2.54	\$2.94	\$0.40
	736340	\$51.86	\$59.87	\$8.01
	736377	\$3,101.47	\$3,580.52	\$479.05
	736426	\$695.05	\$802.41	\$107.36
	736428	\$0.48	\$0.55	\$0.07
	736429	\$0.48	\$0.55	\$0.07
	736430	\$0.48	\$0.55	\$0.07
	736431	\$821.48	\$948.36	\$126.88
	736432	\$657.55	\$759.12	\$101.57
	736433	\$655.45	\$756.69	\$101.24
	736434	\$94.77	\$107.49	\$12.72

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332	736435	\$647.44	\$747.44	\$100.00
	736436	\$573.68	\$662.29	\$88.61
	736438	\$478.17	\$552.03	\$73.86
	736439	\$434.76	\$501.91	\$67.15
	736440	\$256.33	\$295.93	\$39.60
	736442	\$278.85	\$321.92	\$43.07
	736443	\$117.41	\$135.54	\$18.13
	736444	\$535.85	\$618.62	\$82.77
	736445	\$122.94	\$141.93	\$18.99
	736446	\$120.80	\$139.45	\$18.65
	736447	\$126.85	\$146.45	\$19.60
	736448	\$124.28	\$143.47	\$19.19
	736449	\$134.15	\$154.87	\$20.72
	736450	\$131.24	\$151.52	\$20.28
	736451	\$129.34	\$149.31	\$19.97
	736452	\$120.41	\$139.01	\$18.60
	736453	\$123.61	\$142.70	\$19.09
	736454	\$119.98	\$138.52	\$18.54
	736455	\$118.46	\$136.75	\$18.29
	736456	\$116.41	\$134.39	\$17.98
	736457	\$116.41	\$134.39	\$17.98
	736458	\$116.41	\$134.39	\$17.98
	736459	\$116.41	\$134.39	\$17.98
	736460	\$116.41	\$134.39	\$17.98
	736461	\$114.26	\$131.91	\$17.65
	736462	\$119.56	\$138.02	\$18.46
	736463	\$119.56	\$138.02	\$18.46
	736464	\$114.26	\$131.91	\$17.65
	736465	\$114.26	\$131.91	\$17.65
	736466	\$120.18	\$138.74	\$18.56
	736467	\$120.27	\$138.85	\$18.58
	736468	\$120.18	\$138.74	\$18.56
	736469	\$120.08	\$138.63	\$18.55
	736470	\$119.94	\$138.46	\$18.52
	736471	\$118.36	\$136.64	\$18.28
	736472	\$114.26	\$131.91	\$17.65
	736473	\$114.26	\$131.91	\$17.65
	736474	\$174.75	\$201.74	\$26.99
	736476	\$507.04	\$585.35	\$78.31
	736477	\$628.36	\$725.41	\$97.05
	736478	\$793.14	\$915.65	\$122.51
	736479	\$584.04	\$674.25	\$90.21
	736480	\$632.79	\$730.53	\$97.74
	736810	\$74.19	\$85.64	\$11.45
	736813	\$33.11	\$38.22	\$5.11
	736830	\$266.40	\$307.55	\$41.15
	736845	\$11.93	\$13.77	\$1.84

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332	736857	\$197.27	\$227.74	\$30.47
	736858	\$16.36	\$18.89	\$2.53
	736874	\$37.64	\$43.46	\$5.82
	736878	\$62.98	\$72.70	\$9.72
	737023	\$11.86	\$13.70	\$1.84
	737037	\$10.49	\$12.12	\$1.63
	737060	\$262.96	\$303.58	\$40.62
	737086	\$1,746.34	\$2,016.07	\$269.73
	737090	\$261.01	\$301.32	\$40.31
	737091	\$787.17	\$908.77	\$121.60
	737214	\$79.81	\$92.14	\$12.33
	737261	\$33.40	\$38.55	\$5.15
	737273	\$120.41	\$139.01	\$18.60
	737275	\$0.48	\$0.55	\$0.07
	737276	\$0.48	\$0.55	\$0.07
	737277	\$0.48	\$0.55	\$0.07
	737279	\$0.48	\$0.55	\$0.07
	737280	\$118.65	\$136.98	\$18.33
	737281	\$118.65	\$136.98	\$18.33
	737282	\$119.65	\$138.13	\$18.48
	737283	\$120.37	\$138.96	\$18.59
	737284	\$120.70	\$139.34	\$18.64
	737285	\$116.50	\$134.50	\$18.00
	737286	\$117.07	\$135.16	\$18.09
	737287	\$117.07	\$135.16	\$18.09
	737288	\$117.07	\$135.16	\$18.09
	737289	\$117.07	\$135.16	\$18.09
	737290	\$117.07	\$135.16	\$18.09
	737291	\$117.07	\$135.16	\$18.09
	737292	\$117.07	\$135.16	\$18.09
	737293	\$117.07	\$135.16	\$18.09
	737294	\$117.07	\$135.16	\$18.09
	737295	\$116.69	\$134.72	\$18.03
	737296	\$123.09	\$142.10	\$19.01
	737297	\$122.80	\$141.77	\$18.97
	737298	\$117.69	\$135.87	\$18.18
	737299	\$114.26	\$131.91	\$17.65
	737300	\$119.56	\$138.02	\$18.46
	737301	\$119.56	\$138.02	\$18.46
	737302	\$114.26	\$131.91	\$17.65
	737303	\$114.26	\$131.91	\$17.65
	737304	\$114.26	\$131.91	\$17.65
	737305	\$114.26	\$131.91	\$17.65
	737306	\$114.26	\$131.91	\$17.65
	737307	\$114.26	\$131.91	\$17.65
	737308	\$114.26	\$131.91	\$17.65
	737309	\$114.26	\$131.91	\$17.65

GALVESTON COUNTY

Run Date: 05/19/2022 08:11:25 PM

Expected Refunds

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Request Seq: 4016740

CAD Seq = 4016430, Year = 2021

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	737310	\$117.31	\$135.43	\$18.12
	737311	\$117.46	\$135.60	\$18.14
	737312	\$117.46	\$135.60	\$18.14
	737313	\$117.46	\$135.60	\$18.14
	737314	\$117.46	\$135.60	\$18.14
	737315	\$117.46	\$135.60	\$18.14
	737316	\$117.46	\$135.60	\$18.14
	737317	\$117.46	\$135.60	\$18.14
	737318	\$117.46	\$135.60	\$18.14
	737319	\$117.46	\$135.60	\$18.14
	737320	\$118.89	\$137.25	\$18.36
	737525	\$4,293.68	\$4,956.88	\$663.20
	737526	\$435.00	\$502.19	\$67.19
	737740	\$2.86	\$3.30	\$0.44
	737778	\$219.12	\$252.97	\$33.85
	737788	\$28.43	\$32.83	\$4.40
	737931	\$26.57	\$30.68	\$4.11
	737933	\$26.57	\$30.68	\$4.11
	738144	\$75.00	\$86.58	\$11.58
	738553	\$104.29	\$120.40	\$16.11
	738556	\$135.25	\$156.14	\$20.89
	738557	\$109.01	\$125.85	\$16.84
	738558	\$130.53	\$150.69	\$20.16
	738653	\$140.26	\$161.92	\$21.66
	738655	\$11.93	\$13.77	\$1.84
	738656	\$18.13	\$20.93	\$2.80
	738664	\$262.39	\$302.92	\$40.53
	738665	\$183.68	\$212.05	\$28.37
	738666	\$72.71	\$83.94	\$11.23
	738785	\$339.25	\$384.59	\$45.34
	738886	\$433.69	\$500.67	\$66.98
	738992	\$5.25	\$6.06	\$0.81
	739028	\$4.77	\$5.51	\$0.74
	739102	\$26.24	\$30.29	\$4.05
	739152	\$66.36	\$76.61	\$10.25
	739379	\$813.89	\$939.60	\$125.71
	739551	\$2,550.59	\$2,944.55	\$393.96
	739677	\$45.89	\$52.98	\$7.09
	739780	\$2.72	\$3.14	\$0.42
	739783	\$7.30	\$8.43	\$1.13
	739809	\$77.86	\$89.88	\$12.02
	739832	\$543.87	\$627.87	\$84.00
	739853	\$623.11	\$719.35	\$96.24
	739860	\$13.79	\$15.92	\$2.13
	739861	\$32.10	\$37.06	\$4.96
	739912	\$132.01	\$152.40	\$20.39
	739918	\$95.46	\$110.21	\$14.75

GALVESTON COUNTY

Run Date: 05/19/2022 08:11:25 PM

Expected Refunds

cad_refund_rpt.rdf v1.2

Request Seq: 4016740

CAD Seq = 4016430, Year = 2021

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Tax Unit	Account	New Levy	Levy Paid	Expected Refund
332	740040	\$151.38	\$174.76	\$23.38
	740042	\$98.04	\$113.18	\$15.14
	740091	\$104.91	\$121.11	\$16.20
	740166	\$23.85	\$27.54	\$3.69
	740168	\$23.85	\$27.54	\$3.69
	740169	\$23.85	\$27.54	\$3.69
	740188	\$86.83	\$100.24	\$13.41
	740192	\$1,342.78	\$1,550.18	\$207.40
	740202	\$19.85	\$22.91	\$3.06
	740210	\$77.24	\$89.17	\$11.93
	740238	\$9.26	\$10.68	\$1.42
	740245	\$1.53	\$1.76	\$0.23
	740252	\$41.51	\$47.92	\$6.41
	740268	\$184.01	\$212.43	\$28.42
	740473	\$24.24	\$27.98	\$3.74
	740497	\$3.67	\$4.24	\$0.57
	740549	\$88.26	\$101.89	\$13.63
	740552	\$176.33	\$203.56	\$27.23
	740595	\$0.91	\$1.05	\$0.14
	740636	\$0.76	\$0.88	\$0.12
	740688	\$220.41	\$254.45	\$34.04
	740693	\$742.33	\$856.99	\$114.66
	740703	\$37.50	\$43.29	\$5.79
	740704	\$37.50	\$43.29	\$5.79
	740757	\$8.78	\$10.13	\$1.35
	740759	\$53.00	\$59.80	\$6.80
	740778	\$4.77	\$5.51	\$0.74
	740795	\$8.97	\$10.35	\$1.38
	741329	\$90.64	\$104.65	\$14.01
	741771	\$234.72	\$270.98	\$36.26
	741816	\$149.75	\$172.88	\$23.13
	743287	\$166.98	\$192.77	\$25.79
	9909208	\$79.90	\$92.24	\$12.34
	9909209	\$62.58	\$72.25	\$9.67
	9909210	\$23.97	\$27.67	\$3.70
Count of Accounts: 7414			Total:	\$800,380.94



CITY COUNCIL AGENDA FORM

Meeting Date: **June 27, 2022**

Prepared by: R. Sailer

Department: Public Works

Agenda item: _____

Reviewed by: _____

AGENDA ITEM DESCRIPTION: Discussion/possible action regarding the approval of Texas Pride Utilities to replace a Sanitary Sewer line and install a manhole on Grebb Street with a tie-in to Lake Road Sanitary Sewer line, in the amount of \$56,956.10

ATTACHMENTS FOR REFERENCE

☒

1. Resolution
2. Texas Pride Utilities Quote

STAFF BRIEFING:

- Emergency sanitary sewer line replacement of 600 feet by pipe bursting
- No preexisting manhole was found on Grebb Street, a manhole will need to be installed
- The tie in will be with Lake Road's sanitary sewer line

Has City authorized Engineer reviewed and approved?

Yes

Has City Attorney OR Special Legal Counsel reviewed and approved?

N/A

Have you discussed availability of funds/accounts with Finance Director?

Has Finance Director verified Purchasing Policy followed?

Yes

Have you presented your project to the Grants Administration Team and City Manager?

Yes

HISTORY:

TARGET IMPLEMENTATION: June 24, 2022

SIGNIFICANT ACTION DATES:



CITY COUNCIL AGENDA FORM

ACTION:

- | | |
|--|---|
| ☐ Ordinance | ☐ Resolution |
| ☐ Special Presentation | ☐ Proclamation |
| ☐ Finance Report | ☐ Public Hearing |
| ☐ Municode Codification | |
| ☒ Mark if this item does not conflict with any Resolution, Ordinance or City Charter, policies, procedures | |

Cost Details:

Budgeted	
Actual Bid	
Estimated Expenditure	56,956.10
Acct. Name(s)	
Line Items #	02-3011-22-00
Other Funding	

STAFF'S RECOMMENDATION: Motion to approve Texas Pride Utilities to replace a Sanitary Sewer line and installing a manhole on Grebb Street with tie in to Lake Road Sanitary Sewer line, in the amount of \$56,956.10

FISCAL IMPACT: \$56,956.10

RESOLUTION NO. R-2022-0031

A RESOLUTION AUTHORIZING THE PURCHASE OF EMERGENCY UTILITY REPAIR SERVICES
ALONG GREBB STREET

WHEREAS, the City has previously budgeted for the maintenance of utilities along and under city streets.

WHEREAS, an emergency occurred with the utilities along Grebb Street in the City of La Marque.

WHEREAS, the City of La Marque secured the necessary repair services from Texas Pride Utilities in the amount of \$56,956.10.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF LA MARQUE THAT:

The foregoing recitals are hereby found to be true and correct and are hereby adopted by the City Council and made a part hereof for all purposes as findings of fact.

The City Manager's purchase of the required materials and services, described in Exhibit 1 to this Resolution, is ratified and confirmed in all respects.

DULY PASSED by a majority vote of all members of the City Council of the City of La Marque on the 27th day of June 2022.

Keith Bell
Mayor

Kierra Nance, TRMC
City Clerk



Texas Pride Utilities

725 Carby Rd
Houston TX 77037

Estimate

Date	Estimate No.
5/31/2022	7002

TO:

City of La Marque 2022
Grebb St
Pipe Bursting

Our quotation include all labor and material for the installation of the each pay item on the list below. Any additional work will require written acceptance of quotation before additional work can be performed. All quotes are honored for 7 days ONLY.

Item No	Unit	Description	Qty	Unit Price	Total
1	LS	MOBILIZATION	1	2,800.00	2,800.00
2	EA	6 INCH POINT REPAIR UNDER 10' ON GRASS	0	1,900.00	0.00
3	EA	6 INCH POINT REPAIR UNDER 10' ON PAVING	0	2,400.00	0.00
4	EA	6 INCH POINT REPAIR OVER 10' ON GRASS	0	2,750.00	0.00
5	EA	6 INCH POINT REPAIR OVER 10' ON PAVING	0	3,650.00	0.00
6	EA	8 INCH POINT REPAIR UNDER 10' ON GRASS	0	2,100.00	0.00
7	EA	8 INCH POINT REPAIR UNDER 10' ON PAVING	0	2,700.00	0.00
8	EA	8 INCH POINT REPAIR OVER 10' ON GRASS	0	2,950.00	0.00
9	EA	8 INCH POINT REPAIR OVER 10' ON PAVING	0	3,850.00	0.00
10	EA	10 INCH POINT REPAIR UNDER 10' ON GRASS	0	2,200.00	0.00
11	EA	10 INCH POINT REPAIR UNDER 10' ON PAVING	0	2,900.00	0.00
12	EA	10 INCH POINT REPAIR OVER 10' ON GRASS	0	3,050.00	0.00
13	EA	10 INCH POINT REPAIR OVER 10' ON PAVING	0	3,950.00	0.00
14	LF	PIPE BURSTING COMPLETE IN PLACE WITH HDPE 8"	600	38.00	22,800.00
15	LF	PIPE BURSTING COMPLETE IN PLACE WITH 10" HDPE	0	39.00	0.00
16	LF	CIPP EXISTING 8"	0	28.00	0.00
17	LF	CIPP EXISTING 10"	0	30.00	0.00
18	LF	HEAVY CLEANING	0	8.00	0.00
19	LF	CCTV LINE	600	3.25	1,950.00
20	EA	SERVICE RECONNECTION	6	750.00	4,500.00
21	EA	CONNECTION TO MANHOLE	2	800.00	1,600.00
22	LS	RESTORATION AND CLEAN UP (7% OF TOTAL INVOICE AMOUNT)	1	3,726.10	3,726.10
A1	LS	---Additional Items not in original estimate list---			
A2	EA	EMERGENCY MOBILIZATION CHARGE	1	2,000.00	2,000.00
		REMOVE AND REPLACE OR INSTALL NEW MANHOLE	2	5,800.00	11,600.00
		UPTO 8' DEPTH COMPLETE IN PLACE TO INCLUDE ALL LABOR, TOOLS, EQUIPMENT AND MATERIALS			

Total

Phone #

8326070707

E-mail

lgtexaspride@yahoo.com

Web Site

www.texasprideutilities.com



Texas Pride Utilities

725 Carby Rd
Houston TX 77037

Estimate

Date	Estimate No.
5/31/2022	7002

TO:

City of La Marque 2022
Grebb St
Pipe Bursting

Our quotation include all labor and material for the installation of the each pay item on the list below. Any additional work will require written acceptance of quotation before additional work can be performed. All quotes are honored for 7 days ONLY.

Item No	Unit	Description	Qty	Unit Price	Total
A3	EA	EXPLORARY DIG TO LOOK FOR SERVICES FOR RECONNECTION DUE TO THE LINE NOT BEING ABLE TO PRE CCTV	6	600.00	3,600.00
A4	SY	REMOVE AND REPLACE CONCRETE AS REQUIRED, UNDEFINED QUANTITIES. TO BE MEASURED AFTER RESTORATION	1	140.00	140.00
A5	EA	STABILIZED SAND BACKFILL FOR EACH SERVICE AND PIT	8	280.00	2,240.00
Total					\$56,956.10

Phone #

8326070707

E-mail

lgtexaspride@yahoo.com

Web Site

www.texasprideutilities.com

RESOLUTION NO. 2022-0034

**A RESOLUTION OF THE CITY OF LA MARQUE AUTHORIZING THE ADOPTION OF THE
2022 GALVESTON COUNTY, TX HAZARD MITIGATION PLAN UPDATE**

WHEREAS, all jurisdictions within Galveston County, Texas have exposure to natural hazards that increase the risk to life, property, environment, and the county and local economy; and

WHEREAS; pro-active mitigation of known hazards before a disaster event can reduce or eliminate long-term risk to life and property; and

WHEREAS, The Disaster Mitigation Act of 2000 (Public Law 106-390) established new requirements for pre and post disaster hazard mitigation programs; and

WHEREAS; a coalition of Galveston County municipalities with like planning objectives has been formed to pool resources and create consistent mitigation strategies within Galveston County; and

WHEREAS, the coalition has completed a planning process that engages the public, assesses the risk and vulnerability to the impacts of natural hazards, develops a mitigation strategy consistent with a set of uniform goals and objectives, and creates a plan for implementing, evaluating and revising this strategy;

NOW, THEREFORE, BE IT RESOLVED that the CITY OF LA MARQUE

- 1) Adopts in its entirety, the 2022 Galveston County, TX Hazard Mitigation Plan Update (the “Plan”) as the jurisdiction’s Natural Hazard Mitigation Plan and resolves to execute the actions identified in the Plan that pertain to this jurisdiction.
- 2) Will use the adopted and approved portions of the Plan to guide pre- and post-disaster mitigation of the hazards identified.
- 3) Will coordinate the strategies identified in the Plan with other planning programs and mechanisms under its jurisdictional authority.
- 4) Will continue its support of the Mitigation Planning Committee as described within the Plan.
- 5) Will help to promote and support the mitigation successes of all participants in this Plan.

6) Will incorporate mitigation planning as an integral component of government and partner operations.

7) Will provide an update of the Plan in conjunction with the County no less than every five years. PASSED AND ADOPTED on this 27th day of June, 2022

CITY OF LA MARQUE, TEXAS

Keith Bell, Mayor

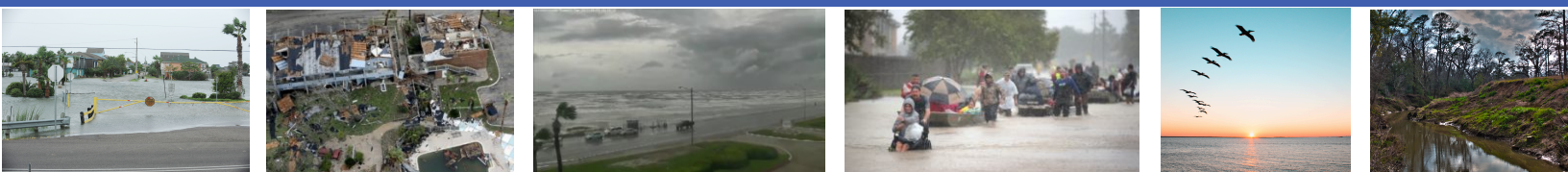
ATTEST:

Kierra K. Nance, TRMC
City Clerk

APPROVED AS TO FORM:

Gus Knebel, City Attorney

Galveston County **2022 Multi-Jurisdictional Hazard Mitigation Plan**



Volume I

May 2022



TETRA TECH





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SECTION 1. INTRODUCTION

1.1 PURPOSE

Galveston County and 11 of its jurisdictions have prepared this hazard mitigation action plan update to better protect the residents and property throughout the County from the effects of hazard events. This plan demonstrates the County's and each jurisdiction's commitment to reducing risk from hazards, increasing resilience overall, and provide a tool to help decision makers integrate mitigation in their day-to-day processes. This plan was also developed to position Galveston County and its participating jurisdictions for eligibility of pre- and post-disaster Federal Emergency Management Agency (FEMA) grants, including Hazard Mitigation Assistance grant programs (HMA), which include Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC), and Flood Mitigation Assistance (FMA). This plan also aligns with the planning elements of the National Flood Insurance Program's Community Rating System (CRS) which provides for lower flood insurance premiums in CRS communities.

1.2 BACKGROUND

A Hazard Mitigation Plan (HMP) is a living document that communities use to reduce their vulnerability to hazards. It forms the foundation for a community's long-term strategy to reduce disaster losses and creates a framework for decision making to reduce damages to lives, property, and the economy from future disasters. Examples of mitigation projects include home acquisitions or elevations to remove structures from high-risk areas, upgrades to critical public facilities, and infrastructure improvements. Ultimately, these actions reduce vulnerability, and communities are able to recover more quickly from disasters. Galveston County has demonstrated its commitment to reducing disaster losses by initially developing its multi-jurisdictional HMP in 2006 and updating information upon which to base a successful mitigation strategy to reduce the impacts of natural disasters and to increase the resiliency of its communities.

Hazard Mitigation is any sustained action taken to reduce or eliminate the long-term risk and effects that can result from specific hazards.

FEMA defines a **Hazard Mitigation Plan** as the documentation of a state or local government evaluation of natural hazards and the strategies to mitigate such hazards.

In response to the requirements of the Disaster Mitigation Act of 2000 (DMA 2000), which requires local governmental agencies to develop and update their HMP every five years, this plan serves as the 2022 update to the 2017 Galveston County HMP. During the course of the planning process, the entire plan was updated with a focus on examining changes in vulnerability due to hazard events, reviewing local and county capabilities and how they implement hazard mitigation, and reviewing the mitigation strategy and identifying new initiatives to increase overall resiliency in the County.

1.3 PLAN ORGANIZATION

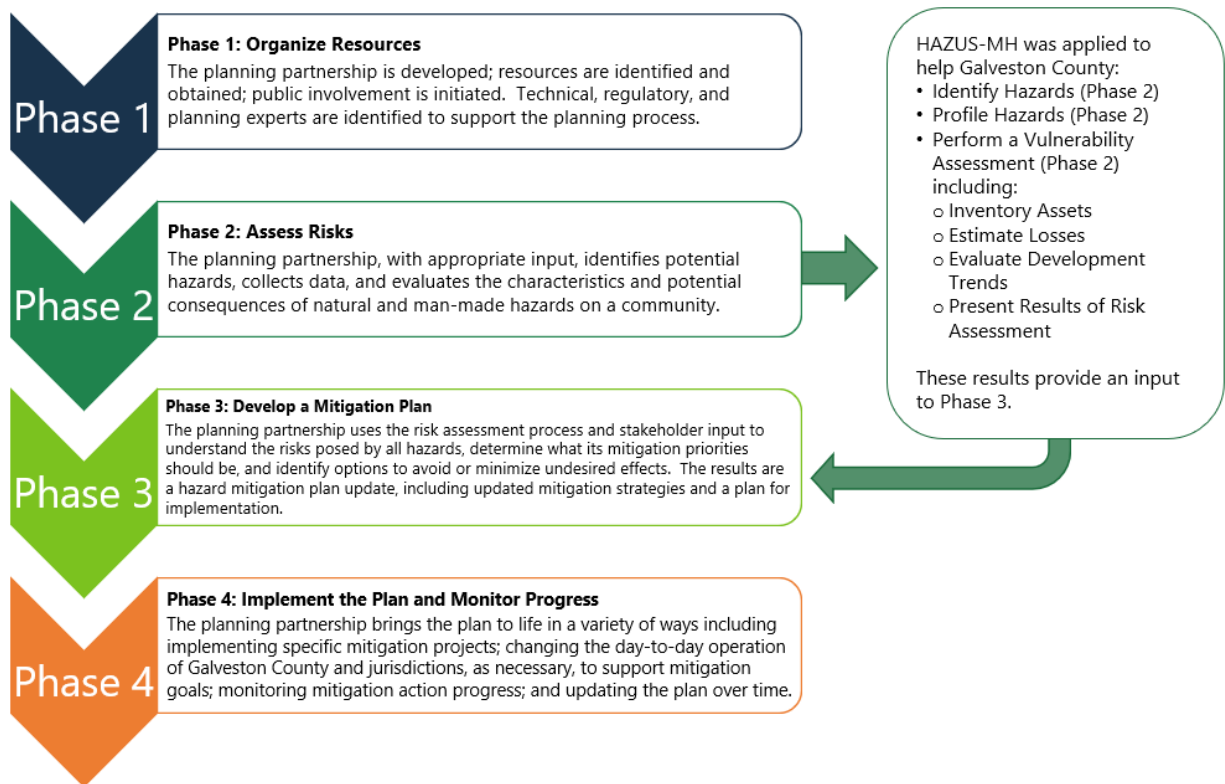
The Galveston County Hazard Mitigation Action Plan 2022 Update is organized as a two-volume plan and is in alignment with the DMA planning requirements, the 2013 FEMA Local Mitigation Planning Handbook, and the FEMA Local Mitigation Plan Review Tool.



Volume I provides information on the overall planning process and hazard profiling and vulnerability assessments, which serves as a basis for understanding risk and identifying mitigation actions. As such, Volume I is intended for use as a resource for on-going mitigation analysis.

Volume II provides an annex dedicated to each participating jurisdiction. Each annex summarizes the jurisdiction's legal, regulatory, and fiscal capabilities; identifies vulnerabilities to hazards; documents mitigation plan integration with other planning efforts; records status of past mitigation actions; and presents an individualized mitigation strategy. The annexes are intended to provide a useful resource for each jurisdiction for implementation of mitigation projects and future grant opportunities, as well as a place for each jurisdiction to record and maintain their local aspect of the countywide plan.

Figure 1-1. Galveston County Hazard Mitigation Planning Process



Volume I of this HMP includes the following sections:

- Section 1:** Introduction: Overview of the planning process and layout of the plan.
- Section 2:** Planning Process: Description of the HMP methodology and development process; Steering Committee, Planning Committee, Planning Partnership, and stakeholder involvement efforts; and a description of how this HMP will be incorporated into existing programs.
- Section 3:** County Profile: Overview of Galveston County, including: (1) physical setting, (2) land use, (3) land use trends, (4) population and demographics, (5) general building stock and (6) critical facilities and lifelines.
- Section 4:** Risk Assessment: Documentation of the hazard identification and hazard risk ranking process, hazard profiles, and findings of the vulnerability assessment (estimates of the impact of hazard



events on life, safety, health, general building stock, critical facilities, the economy); description of the status of local data; and planned steps to improve local data to support mitigation planning.

Section 5: Capability Assessment: A summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county, local) that support hazard mitigation within the County.

Section 6: Mitigation Strategy: Provides information regarding the mitigation goals and objectives in response to priority hazards of concern and the process by which Galveston County and local mitigation strategies have been developed or updated.

Section 7: Plan Maintenance Procedures: System established to continue to monitor, evaluate, maintain, and update the HMP.

Volume II of this plan includes the following sections:

Section 8: Planning Partnership: Description of the planning partnership, their responsibilities, and description of jurisdictional annexes.

Section 9: Jurisdictional Annexes: Jurisdiction-specific annex for Galveston County and each participating jurisdiction containing their hazards of concern, hazard ranking, capability assessment, mitigation actions, action prioritization specific only to Galveston County or that jurisdiction, progress on prior mitigation activities (as applicable), and a discussion of prior local hazard mitigation plan integration into local planning processes.

Appendices include the following:

Appendix A: Plan Adoption: Resolutions from the County and each jurisdiction included as each formally adopts the HMP update.

Appendix B: Participation Documentation: Matrix to give a broad overview of who attended meetings and when input was provided to the HMP update, as well as Letters of Intent to Participate described in Section 2 (Planning Process), annex sign-off sheets discussed in Section 6 (Mitigation Strategy) and additional worksheets submitted during workshops conducted throughout the planning process.

Appendix C: Meeting Documentation: Agendas, attendance sheets, minutes, and other documentation (as available and applicable) of planning meetings convened during the development of the plan.

Appendix D: Public and Stakeholder Outreach Documentation: Documentation of the public and stakeholder outreach effort including webpages, informational materials, public and stakeholder meetings and presentations, surveys, and other methods used to receive and incorporate public and stakeholder comment and input to the plan process.

Appendix E: Mitigation Strategy Supplementary Data: Documentation of the broad range of actions identified during the mitigation process; types of mitigation actions; the mitigation catalog developed using jurisdiction input and potential mitigation funding sources.

Appendix F: Plan Maintenance Tools: Examples of plan review tools and templates available to support annual plan review.



Appendix G: Linkage Procedures: Procedures for non-participating local governments to "link" to the plan within the period of performance to gain eligibility for programs under the DMA 2000.

Appendix H: Critical Facilities: Includes a full list of critical facilities identified for the update of the HMP. Due to the sensitive nature of the information, critical facility details have been redacted.

1.4 THE UPDATED PLAN – WHAT IS DIFFERENT?

Galveston County's initial HMP was approved by FEMA and adopted in 2006. Since then, it's been updated in 2011 and 2016. The 2022 update builds on the previous plans and includes the following changes or enhancements:

- Updated data and tools provided for a more detailed and accurate risk assessment. The risk assessment was prepared to better support future grant applications by providing risk and vulnerability information that would directly support the measurement of "cost-effectiveness" required under FEMA mitigation grant programs.
- The plan identified implementable actions, with enough information to serve as the basis for policy and funding decisions and represent measurable impacts on resiliency and mitigation progress. Strategies provide direction, but actions are fundable under grant programs.
- Each participating jurisdiction has their own jurisdictional annex in the plan, found in Volume II, Section 9.

Table 1-1. Plan Changes Crosswalk

44 CFR Requirement	2017 Plan	2022 Updated Plan
<i>Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:</i> (1) <i>An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.</i> (2) <i>An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process; and</i> (3) <i>Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.</i>	The 2017 plan followed an outreach strategy utilizing multiple media developed and approved by the Steering Committee. This strategy involved the following: • Public participation on an oversight Steering Committee. • All Planning Partnership meetings were open to the public. • Advertisements, social media posts, and flyers were distributed to gain public input. • Use of a public mitigation survey. • Stakeholders were identified and coordinated with throughout the process.	Building upon the success of the 2017 plan, the 2022 planning effort deployed the same public engagement methodology. The plan included the following enhancements: • Using social media. • Web-deployed survey. As with the 2017 plan, the 2022 planning process identified key stakeholders and coordinated with them throughout the process. A comprehensive review of relevant plans and programs was performed by the planning team.
<i>§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.</i>	The 2017 plan included a risk assessment of hazards of concern. It looked at assets exposed to the hazard, vulnerability, frequency of occurrence, warning time, geographic extent, potential impact, and hazard summary.	The 2022 plan update includes a comprehensive update to the risk assessment. The flood hazard was expanded to include urban flooding (or flooding outside of the floodplain). New and updated hazards of concern were included. The hazard ranking methodology was adjusted and includes adaptive capacity and climate change. Jurisdiction-specific



44 CFR Requirement	2017 Plan	2022 Updated Plan
		risk assessment results are summarized in Section 4 (Risk Assessment) and in each jurisdictional annex (Section 9).
<i>§201.6(c)(2)(i): [The risk assessment] shall include a] description of the ... location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.</i>	The 2017 plan presented a risk assessment of each hazard of concern. Each section included the following: • Hazard description • Location • Extent • Historical occurrences • Probability of future events • Vulnerability assessment and impact	A similar format, using new and updated data, was used for the 2022 plan update. Each section of the risk assessment includes the following: • Hazard profile, including maps of extent and location, previous occurrences, and probability of future events. • Climate change impacts on future probability. • Vulnerability assessment including impact on life, safety, and health, general building stock, critical facilities, and the economy, as well as future changes that could impact vulnerability. • The vulnerability assessment also includes changes in vulnerability since the 2017 plan.
<i>§201.6(c)(2)(ii): [The risk assessment] shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i). This description shall include an overall summary of each hazard and its impact on the community.</i>	Vulnerability was assessed for all hazards of concern. Each hazard of concern included a summary of assets exposed to the hazard (people/parcels annualized losses and expected damage to critical facilities).	A robust vulnerability assessment was conducted for the 2022 plan update, using new and updated asset and hazard data. Volume 1, Section 4.3 summarizes countywide and municipal-specific vulnerability for each hazard of concern. The jurisdictional annexes (Section 9) include a summary table of impacts on each community.
<i>§201.6(c)(2)(ii): [The risk assessment] must also address National Flood Insurance Program insured structures that have been repetitively damaged floods.</i>	A summary of NFIP insured properties including an analysis of repetitive loss property locations was included in the plan.	The resolution of the RL data accessible by the County to support this planning effort was limited by FEMA's Privacy Act Policies and the time associated with processing the requisite Information Sharing Access Agreement (ISAA).
<i>Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure and critical facilities located in the identified hazard area.</i>	A complete inventory of the numbers and types of buildings exposed was generated for each hazard of concern. The Steering Committee defined "critical facilities" for the planning area, and these were inventoried by exposure.	Quantitative and qualitative analyses were conducted using the updated hazard and inventory data as presented in Section 4 (Risk Assessment). In addition, critical facilities considered lifelines in accordance with FEMA's definition were identified.
<i>Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) and a description of the methodology used to prepare the estimate.</i>	Loss estimates were generated for all hazards of concern by using readily available information.	Quantitative and qualitative analyses were conducted using the updated hazard and inventory data as presented in Section 4 (Risk Assessment). Estimated potential losses are reported in both Volume 1, Section 4.3, and Volume II Section 9 for each jurisdiction.
<i>Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land</i>	There is a summary of anticipated development in the Community profile.	A spatial analysis using identified growth areas, and potential new development identified by



44 CFR Requirement	2017 Plan	2022 Updated Plan
<i>uses and development trends within the community so that mitigation options can be considered in future land use decisions.</i>		municipalities was conducted to determine if located in hazard areas. These results were reported to all participants and summarized in their annexes to discuss mitigation measures. In Volume I, Section 4.3, projected changes in population and development are discussed in each hazard section and how these projected changes may lead to increased vulnerability, or plans/regulations/ordinances in place to implement mitigation to protect the development.
<i>§201.6(c)(3):[The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.]</i>	The 2017 plan contained goals, objectives, and actions. The identified actions covered multiple hazards, goals, and objectives.	The Steering Committee reviewed and updated the goals and objectives, and they were approved by the Planning Committee. A mitigation strategy workshop with associated tools and guidance on problem statement development was deployed to inform the identification of mitigation actions. Actions that were completed or no longer considered to be feasible were removed; and actions considered general or capabilities were moved to the capability and integration sections. The balance of the actions was carried over to the 2022 plan, and in some cases, new actions were added to the action plan.
<i>Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.</i>	The Steering Committee identified goals and objectives targeted specifically for this hazard mitigation plan. These planning components supported the actions identified in the plan.	The Steering Committee reviewed and updated the goals and objectives and they were approved by the Planning Committee. Several new objectives were identified to align with updated County and municipal priorities.
<i>Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.</i>	For each identified hazard, goals and objectives were provided as part of the mitigation strategy. The strategies were compiled into categories depending on the hazard they are related to. The strategies were then prioritized.	For the 2022 update, a mitigation catalog was developed to provide a comprehensive range of specific mitigation actions to be considered. A table with the analysis of mitigation actions by type and hazard was used in jurisdictional annexes to the plan. Mitigation action worksheets with an alternative project evaluation were prepared for FEMA-eligible projects.
<i>Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program, and continued compliance with the program's requirements, as appropriate.</i>	Each municipality identified an action stating their commitment to maintain compliance and good standing under the program.	Each municipality identified an action stating their commitment to maintain compliance and good standing under the program.
<i>Requirement: §201.6(c)(3)(iii): [The mitigation strategy shall describe] how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special</i>	Each recommended action was prioritized using a qualitative methodology based on the objectives the project will meet, the timeline for completion, how the project will be funded, the impact of the project, the	A revised methodology based on the STAPLEE criteria and using new and updated data was used for the 2022 plan update. The 14 criteria were used to evaluate each potential mitigation action. The evaluation



44 CFR Requirement	2017 Plan	2022 Updated Plan
<i>emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.</i>	benefits of the project, and the costs of the project.	included a qualitative benefits and cost review. The results of the evaluation were used to identify the actions to include in the plan and assist with the prioritization.
<i>Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.</i>	The 2017 plan details a plan maintenance strategy stating that the plan will be revised and maintained as required.	The 2022 plan details a plan maintenance strategy similar to that of the initial plan.
<i>Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.</i>	The 2017 plan details recommendations for incorporating the plan into other planning mechanisms.	The 2022 plan details recommendations for incorporating the plan into other planning mechanisms such as the following: • Comprehensive/Master Plan. • Emergency Response Plan/ Emergency Operations Plan. • Capital Improvement Programs. • Municipal Code.
<i>Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.</i>	The 2017 plan details a strategy for continuing public involvement.	The 2017 plan maintenance strategy was carried over to the 2022 plan.
<i>Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).</i>	The County and participating jurisdictions adopted the 2017 HMP.	The 2022 plan achieves DMA compliance for Galveston County and all participating jurisdictions. Resolutions for each partner adopting the plan can be found in Appendix A of this volume.



SECTION 2. PLANNING PROCESS

2.1 INTRODUCTION

This section includes a description of the planning process used to update the 2022 *Galveston County, Texas Hazard Mitigation Plan* (HMP, also referred herein as the *Hazard Mitigation Plan* or *the plan*), including how it was prepared, who was involved in the process, and how the public was involved. To ensure that the plan meets requirements of the DMA 2000 and that the planning process would have the broad and effective support of the County, regional and local stakeholders, and the public, an approach to the planning process and plan documentation was developed to achieve the following:

- The HMP is multi-jurisdictional and considers natural and human-caused hazards facing Galveston County, thereby satisfying the natural hazards mitigation planning requirements specified in the DMA 2000.
- Galveston County invited all municipalities in the County to join with them in the preparation of the Galveston County HMP. The County and all municipalities are participating in the HMP as indicated in Table 2-1 below.
- The HMP was developed following the process outlined by the DMA 2000, FEMA regulations, and prevailing FEMA and TDEM guidance. Following this process ensures all the requirements are met and support HMP review

Table 2-1. Participating Galveston County Jurisdictions

Jurisdictions	
Galveston County	
Bayou Vista (C)	Kemah (C)
Clear Lake Shores (C)	La Marque (C)
Dickinson (C)	League City (C)
Friendswood (C)	Santa Fe (C)
Hitchcock (C)	Tiki Island (V)
Jamaica Beach (C)	

The Galveston County HMP update was written using the best available information obtained from a wide variety of sources. Throughout the HMP update process, a concerted effort was made to gather information from municipal and regional agencies and staff, as well as stakeholders, federal and state agencies, and the residents of the County. The Steering Committee solicited information from local agencies and individuals with specific knowledge of certain hazards and past historical events. In addition, the Steering Committee took into consideration planning and zoning codes, ordinances, and recent land use planning decisions. The hazard mitigation strategies identified in this HMP update were developed through an extensive planning process involving local, county, and regional agencies, residents, and stakeholders.

This section of the plan describes the mitigation planning process, including (1) Organization of the Planning Process; (2) Stakeholder Outreach and Involvement; (3) Integration of Existing Data, Plans, and Technical Information; (4) Integration with Existing Planning Mechanisms and Programs; and (5) Continued Public Involvement.



2.2 ORGANIZATION OF THE PLANNING PROCESS

Many parties supported the preparation of this HMP update: County officials, municipal officials, the Steering Committee, Planning Partnership, stakeholders, and planning consultant. This planning process does not represent the start of hazard risk management in the County; rather it is part of an ongoing process that various State, County and local agencies and individuals have continued to embrace. A summary of the past and ongoing mitigation efforts is provided in Section 6 (Mitigation Strategy), as well as in Volume II Section 9 (Jurisdictional Annexes), to give an historical perspective of the County and local activities implemented to reduce vulnerability to hazards in the planning area.

This section of the plan identifies how the planning process was organized with the many planning partners involved and outlines the major activities that were conducted in the development of this HMP update.

2.2.1 Organization of Planning Partnership

Recognizing the need to manage risk within the County, and to meet the requirements of the DMA 2000, the Galveston County Office of Emergency Management led the update to the 2017 Galveston County HMP. On March 18, 2020, Galveston County Office of Emergency Management signed the Grantee-Subgrantee Agreement (PDMC-PL-06-TX-2019-010) between the State of Texas and Galveston County for funds to update the Galveston County HMP. The period of performance for this grant is from October 1, 2018 and ending April 1, 2022.

Project management and grant administration has been the responsibility of the Galveston County Office of Emergency Management. The County has been proactive in supporting natural hazard mitigation. This update supported implementation of projects, provided the basis of the initial mitigation strategy update, and formed problem statements to focus efforts on identifying high priority mitigation projects to reduce vulnerability to hazards of concern for the planning area.

The County selected a contract planning consultant (Tetra Tech Inc. – Parsippany, NJ) to guide the County and participating jurisdictions through the HMP update process. A contract between Tetra Tech Inc. (Tetra Tech) and the County was executed in August 2021. Specifically, Tetra Tech, the “contract consultant”, was tasked with:

- Assisting with the organization of a Steering Committee and Planning Partnership.
- Assisting with the development and implementation of a public and stakeholder outreach program.
- Data collection.
- Facilitation and attendance at meetings (Steering Committee, Planning Partnership, stakeholder, public and other).
- Review and update of the hazards of concern, and hazard profiling and risk assessment.
- Assistance with the review and update of mitigation planning goals and objectives.
- Assistance with the review of progress of past mitigation strategies.
- Assistance with the screening of mitigation actions and the identification of appropriate actions.
- Assistance with the prioritization of mitigation actions.
- Authoring of the draft and final HMP documents.

On September 20, 2021, Galveston County Office of Emergency Management notified all municipalities within the County of the pending planning process and invited them to formally participate. Municipalities were provided with a copy of the Planning Partner Expectations and asked to formally notify the County of their intent



to participate. Section 9 (Jurisdictional Annexes) and Appendix B (Participation Documentation) detail contributions provided by the municipality.

To facilitate HMP development, with support from their contract planning consultant, Galveston County developed a Steering Committee to provide guidance and direction to the planning effort, and to ensure the resulting document will be embraced both politically and by the constituency within the planning area. The Steering Committee consisted of county and local officials (refer to Table 2-2 for a list of Steering Committee members). Specifically, the Steering Committee was charged with: Providing guidance and overseeing the planning process on behalf of the general planning partnership.

- Attending and participating in Steering Committee meetings.
- Establish a timeline for completion of the plan.
- Assisting with the development and completion of certain planning elements, including:
- Reviewing and updating the hazards of concern,
- Developing a public and stakeholder outreach program,
- Assuring that the data and information used in the plan update process is the best available
- Reviewing and updating the hazard mitigation goals and objectives,
- Identification and screening of appropriate mitigation strategies and activities; and
- Reviewing and commenting on plan documents prior to submission to TDEM and FEMA.
- Ensure that the plan meets the requirements of DMA 2000, FEMA, and TDEM guidance.
- The organizational structure was successfully implemented for the 2022 HMP updated consistent with the development of the initial 2017 planning process.

The Steering Committee provided guidance and leadership, oversight of the planning process, and acted as the point of contact for all participating jurisdictions and the various interest groups in the planning area. The members of the Steering Committee worked to maintain continuity of the process throughout the process, to overcome the issues created by the COVID-19 pandemic.

Table 2-2. Steering Committee Members

Name	Title	Organization
Laura Norman	Deputy Emergency Management Coordinator; HMP Coordinator for Planning Process	Galveston County Office of Emergency Management
James Gentile	Director of Contract Services	Galveston County Contract Services
Julie Diaz	Director	Galveston County Parks and Cultural Services
Lee Crowder	Road Administrator	Galveston County Roads and Bridges
Martha Lee	Assistant Director	Galveston County Parks and Cultural Services
Michael Shannon	County Engineer	Galveston County Engineering & Right of Way
Randy Valcin	Director of Public Health Surveillance	Galveston County Health District
William Riordan	Facilities Director	Galveston County Facilities

As part of the initial outreach to each municipality, the County outlined the planning partner expectations that outlined the responsibilities of the participants and asked each municipality to respond to Galveston County OEM if they wish to participate. By agreeing to Galveston County, each municipality authorized the Steering Committee to represent the municipality in the completion of certain portions of the planning elements. All municipalities in the County agreed to participate. Table 2-3 lists the current members of the Steering Committee, at the time of this HMP's publication. Please note that Steering Committee members are also part



of the overall project Planning Partnership, fulfilling these responsibilities on behalf of Galveston County. This planning partnership (Steering and Planning Committees) were charged with the following:

- Represent their jurisdiction throughout the planning process and assure participation expectations are met by their community.
- Assure participation of all department and functions within their jurisdiction that have a stake in mitigation (e.g., planning, engineering, code enforcement, police and emergency services, public works).
- Assist in gathering information for inclusion in the HMP update, including the use of previously developed reports and data.
- Support and promote the public involvement process.
- Report on progress of mitigation actions identified in prior or existing HMPs, as applicable.
- Identify, develop, and prioritize appropriate mitigation initiatives.
- Report on progress of integration of prior or existing HMPs into other planning processes and municipal operations.
- Develop and author a jurisdictional annex for their jurisdiction.
- Review, amend, and approve all sections of the plan update when requested.
- Adopt, implement, and maintain the plan update

Table 2-3. Galveston County Hazard Mitigation Planning Partnership (Steering Committee and Municipalities)

Jurisdiction	Name	Title	Jurisdiction Representative	Steering Committee
Galveston County Office of Emergency Management	Laura Norman	Deputy Emergency Management Coordinator; HMP Coordinator for Planning Process		X
Galveston County Contract Services	James Gentile	Director of Contract Services		X
Galveston County Parks and Cultural Services	Julie Diaz	Director		X
	Martha Lee	Assistant Director		X
Galveston County Roads and Bridges	Lee Crowder	Road Administrator		X
Galveston County Engineering & Right of Way	Michael Shannon	County Engineer		X
Galveston County Health District	Randy Valcin	Director of Public Health Surveillance		X
Galveston County Facilities	William Riordan	Facilities Director		X
Bayou Vista (C)	Jimmie Gillane	Emergency Management Coordinator	X	
Clear Lake Shores (C)	Brent Spiers	City Admin/EMC	X	
Dickinson (C)	Greg Trantham	Co-Emergency Mgt Coordinator	X	
	Derek Hunt	Co-Emergency Mgt Coordinator	X	
Friendswood (C)	Steven Simmons	Deputy Fire Marshal	X	
Hitchcock (C)	Wilmon Smith	Police Chief	X	
	Arnie Cross	Director of Community Development	X	
Jamaica Beach (C)	Brad Heiman	Police Chief	X	
Kemah (C)	Walter Gant	Emergency Management Coordinator	X	
La Marque (C)	Kyle Hunter	Emergency Management	X	
League City (C)	Ryan Edghill	Emergency Management	X	
Santa Fe (C)	Bobby Shores	Police Captain	X	
Tiki Island (V)	Graham George	Emergency Management Coordinator	X	



Ultimately, jurisdictional participation is evidenced by a completed annex (chapter) of the HMP (Section 9) wherein the jurisdictions have identified their planning points of contact, evaluated their risk to the hazards of concern, identified their capabilities to effect mitigation in their community, and identified and prioritized an appropriate suite of mitigation initiatives, actions, and projects to mitigate their natural hazard risk; and eventually by the adoption of the updated plan via resolution.

Appendix B (Participation Documentation) identifies those individuals who represented their jurisdictions during this planning effort and indicates how they contributed to the planning process. This matrix is intended to give a broad overview of who attended meetings and when input was provided. All participants were encouraged to attend the Kick-off Meeting, Risk Assessment Meeting, and Mitigation Action Workshop. During the planning process the planning consultant contacted each participant to offer support, explain the process, meet individually to collect updated information and to facilitate the submittal and review of critical documents.

All municipalities actively participate in the National Flood Insurance Program (NFIP) and have designated NFIP Floodplain Administrators (FPA). All known FPAs were informed of the planning process, were provided the opportunity to review the plan including the jurisdictional annex and provide direct input to the plan update. Local FPAs are identified in the Administrative and Technical portions of the jurisdictional annexes in Section 9 (Jurisdictional Annexes).

2.2.2 Planning Activities

Members of the Planning Partnership (individually and as a whole), as well as key stakeholders, convened and/or communicated regularly to share information and participate in workshops to identify hazards; assess risks; review existing inventories of and identify new critical facilities; assist in updating and developing new mitigation goals and strategies; and provide continuity through the process to ensure that natural hazards vulnerability information and appropriate mitigation strategies were incorporated. All members of the Steering Committee and Planning Partnership had the opportunity to review the draft plan and supported interaction with other stakeholders and assisted with public involvement efforts.

A summary of committee meetings (Steering Committee and Planning Partnership) held and key milestones met during the development of the HMP update is included in Table 2-4 that also identifies which DMA 2000 requirements the activities satisfy. Documentation of meetings (e.g., agendas, sign-in sheets, meeting notes) are in Appendix C (Meeting Documentation). Table 2-4 identifies only the formal meetings held during plan development and does not reflect all planning activities conducted by individuals and groups throughout the planning process. In addition to these meetings, there was a great deal of communication between the County, committee members, and the contract consultant through individual local meetings, electronic mail (email), and by phone.

Table 2-4. Summary of Mitigation Planning Activities and Efforts

Date	DMA 2000 Requirement	Description of Activity	Participants
September 10, 2021	2	<u>Pre-Kick Off Meeting with County:</u> Plan timing and administration; Data needs and sharing; Hazards of concern; Dates and next steps	County OEM, Tetra Tech
September 16, 2021	2	<u>Steering Committee Meeting #1:</u> Introduce Steering Committee to the HMP update process, discuss mitigation planning, project organization, roles and responsibilities, data collection, hazards of concern, and schedule of plan.	County OEM, County Engineer, County Roads and Bridges, County Parks, County Facilities, and Tetra Tech



Date	DMA 2000 Requirement	Description of Activity	Participants
September 20, 2021	2	All municipalities invited to participate in the planning process	Galveston County OEM, all municipal governments
September 29, 2021	2, 1a, 1b	<u>Municipal Kick-Off Meeting/ Planning Partnership Meeting #1</u> : open to the public Introduce Planning Partnership to the HMP update process, discuss mitigation planning, project organization, roles and responsibilities, data collection, hazards of concern, HMP update process and municipal worksheets, and schedule of plan.	Galveston County, Bayou Vista, City of Clear Lake Shores, City of Dickinson, City of Hitchcock, City of La Marque, League City, Santa Fe, Tiki Island, Gulf Coast Center, City of Texas, Port of Texas Security Council, National Weather Service, Bolivar Peninsula Special Utility District, Clear Creek Independent School District, Dallas Independent School District, Texas City Independent School District, Texas A&M University at Galveston, Friendswood Medical Outreach, Tetra Tech
November 18, 2021	2, 4a	<u>Steering Committee Meeting #2</u> : Review project schedule and status, hazards of concern, critical facilities and lifelines, goals, and objectives, SWOO exercise and next steps	County OEM, County Roads and Bridges, County Parks, County Contract Services, County Health, Tetra Tech
December 2, 2021	2, 4a, 4b	<u>Mitigation Action Workshop</u> : Review project schedule and status, hazards of concern, critical facilities and lifelines, goals, and objectives, SWOO exercise and next steps.	County OEM, Galveston County, Galveston County Engineering Department, Friendswood, Jamaica Beach, La Marque, League City, Santa Fe, Tetra Tech
December 21, 2021	2, 3a, 3b, 3c, 3d, 3e	<u>Risk Assessment Presentation</u> : Review project schedule and status, present risk ranking, and go over how to review and provide input	County OEM, Tetra Tech
January 25, 2022	2	<u>Draft Plan Review Presentation</u> : Overview of entire plan and sections; confirmed plan maintenance schedule	County OEM, Dickinson, Clear Lake Shores, League City, Jamaica Beach, Santa Fe, Friendswood, Congressman Weber's Office, and Tetra Tech
TBD	1b, 2	Draft HMP posted to public project website; all plan participants were notified and asked to assist with the public outreach including social media. Neighboring counties and stakeholders were notified of the posting as well.	Public and Stakeholders
TBD	2	HMP submitted to TDEM and FEMA Region VI	TDEM, FEMA Region VI
Upon plan approval by FEMA	1a	Plan adoption by resolution by the governing bodies of all participating municipalities	All Plan Participants

Note: All activities/efforts were conducted during the National Emergency response to the COVID-19 pandemic.

TBD = to be determined.

Each number in column 2 identifies specific DMA 2000 requirements, as follows:

1a – Prerequisite – Adoption by the Local Governing Body

1b – Public Participation

2 – Planning Process – Documentation of the Planning Process

3a – Risk Assessment – Identifying Hazards

3b – Risk Assessment – Profiling Hazard Events

3c – Risk Assessment – Assessing Vulnerability: Identifying Assets

3d – Risk Assessment – Assessing Vulnerability: Estimating Potential Losses

3e – Risk Assessment – Assessing Vulnerability: Analyzing Development Trends

4a – Mitigation Strategy – Local Hazard Mitigation Goals

4b – Mitigation Strategy – Identification and Analysis of Mitigation Measures

4c – Mitigation Strategy – Implementation of Mitigation Measures

5a – Plan Maintenance Procedures – Monitoring, Evaluating, and Updating the Plan

5b – Plan Maintenance Procedures – Implementation through Existing Programs

5c – Plan Maintenance Procedures – Continued Public Involvement



2.3 STAKEHOLDER OUTREACH AND INVOLVEMENT

Stakeholders are the individuals, agencies, and jurisdictions that have a vested interest in the recommendations of the HMP, including all planning partners. Diligent efforts were made to assure broad regional, county, and local representation in this planning process. To that end, a comprehensive list of stakeholders was developed with the support of the Planning Partnership. Stakeholder outreach was performed early on, and continually throughout the planning process. However, due to the limitations on participation posed by the pandemic and the strains on time and resources for many local governments and other community organizations starting in 2020 through present, participation of stakeholders at the municipal level was limited. In accordance with FEMA guiding principles for inclusive participation at various levels, the planning team will place a high priority on an expanded effort on stakeholder participation with local planning committees in future plan updates.

This subsection discusses the various stakeholders that were invited to participate in the development of this HMP update, and how these stakeholders participated and contributed. This summary listing cannot possibly represent the total of stakeholders that were aware of and/or contributed to this HMP update, as outreach efforts were being made, both formally and informally, throughout the process by the many planning partners involved in the effort, and documentation of all such efforts is impossible. Instead, this summary is intended to demonstrate the scope and breadth of the stakeholder outreach efforts made during the plan update process:

- All Planning Partnership meetings were open to the public and advertised via the Galveston County website (<https://www.galvestoncountytexas.gov/>).
- Municipalities were provided outreach materials to post on their websites, social media platforms, and distribute printed materials.
- Distributed a stakeholder survey and neighboring county survey to provide input regarding vulnerabilities, capabilities, and mitigation projects.
- Posted draft plan on the Galveston County website and advertised using social media platforms.
- Email correspondence to regional stakeholders and neighboring counties to review the draft HMP and provide input.

2.3.1 Federal, State, and County Agencies

The following describes the various departments and agencies that were involved during the planning process.

Federal Agencies

Please see Appendix B (Participation Documentation) for further details regarding federal agency participation. All responses to the stakeholder surveys may be found in Appendix D (Public and Stakeholder Outreach).

FEMA Region VI: Provided updated planning guidance; conducted plan review.

National Weather Service (NWS): Provided information regarding hazard identification and the risk assessment; attended planning partnership meetings. Additionally, the NWS provides weather briefings, forecasts, and incident support to Galveston County. They provide live webinars to the County and municipalities ahead of floods, hurricanes, and severe weather. They also support weather-sensitive incidents including hazardous materials releases.

Information regarding hazard identification and the risk assessment for this plan update were requested and received or incorporated by reference from the following agencies and organizations:

- National Climatic Data Center (NCDC)
- National Hurricane Center (NHC)



- National Oceanic and Atmospheric Administration (NOAA)
- Storm Prediction Center (SPC)
- U.S. Army Corps of Engineers (USACE)
- U.S. Census Bureau
- U.S. Department of Agriculture (USDA)
- U.S. Department of Health and Human Services
- U.S. Environmental Protection Agency (USEPA)
- U.S. Geological Survey (USGS)

State Agencies

Please see Appendix B (Participation Documentation) for further details regarding state agency participation. All responses to the surveys may be found in Appendix D (Public and Stakeholder Outreach).

Texas Division of Emergency Management (TDEM): Administered the planning grant; provided updated planning guidance; provided review of the draft HMP update.

Texas Department of Transportation (TX DOT): Invited to attend planning partnership meetings and provide input through the stakeholder survey.

County Departments

Several county departments were represented on the Steering Committee and involved in the HMP update planning process. Appendix B (Participation Matrix) provides further details regarding regional and local stakeholder agencies. All responses to the stakeholder surveys are in Appendix D (Public and Stakeholder Outreach). Refer to Section 5 (Capability Assessment) for details on each department and their roles during the HMP update and their overall responsibilities in Galveston County.

- Galveston County Office of Emergency Management
- Galveston County Contract Services
- Galveston County Parks and Cultural Services
- Galveston County Roads and Bridges
- Galveston County Engineering & Right of Way
- Galveston County Health District
- Galveston County Facilities

2.3.2 Regional and Local Stakeholders

All Planning Partnership meetings were announced on the Galveston County HMP project website and posted on social media to invite residents and stakeholders. In addition, the County and municipal representatives emailed regional and local stakeholders requesting their participation in stakeholder sector-specific surveys to provide input on vulnerable assets, capabilities, and current/potential future mitigation projects; and invited to provide input on the draft HMP. Refer to Appendix C (Participation Documentation) for further details regarding regional and local stakeholder agency attendance at meetings and Appendix D for additional details on the public and stakeholder outreach, including responses received to the surveys.

Academia

Schools, universities, and other academia institutions were invited to attend planning process meetings and asked to complete the stakeholder survey. The following provided input in person or virtually at Planning Partnership meetings, as well as through the County's online stakeholder survey:



- Clear Creek Independent School District
- Dickinson Independent School District
- Friendswood Independent School District
- Galveston College
- Galveston Independent School District
- High Island Independent School District
- Hitchcock Independent School District
- Santa Fe Independent School District
- Texas A&M University at Galveston
- Texas City Independent School District
- University of Texas Medical Branch

Business and Commercial Interests

Businesses and commercial industries in the County were invited to take the stakeholder survey and provide input to the planning process. The following provided input in person or virtually at Planning Partnership meetings, as well as through the County's online stakeholder survey:

- Port of Texas City – attended planning partnership meetings
- Port of Galveston

Emergency Services

All state, county, and local emergency service providers (police, fire, and EMS) were invited to take the stakeholder survey and provide input to the planning process. The following provided input in person or virtually at Planning Partnership meetings, as well as through the County's online stakeholder survey:

- Galveston County Emergency Communications District
- Galveston County Emergency Communications District #2
- Port of Texas City Security Council
- Santa Fe Fire and Rescue
- San Leon Volunteer Fire Department

Highway and Public Works

All state, county, and local highway and public works departments were notified of the Highway and Public Work's stakeholder survey and invited to provide input on the draft HMP. In addition, many of the participating municipalities had representatives from their highway and public works departments representing them on the planning partnership. The following provided input to the planning process via the County's online stakeholder survey:

- Galveston County Roads and Bridges – attended meetings
- Galveston County Engineering & Right of Way
- Galveston County Facilities & Maintenance
- Galveston County Parks & Cultural Services
- Texas Department of Transportation



Hospitals and Healthcare

All hospitals and healthcare facilities and providers located in County were invited to take the stakeholder survey and provide input to the planning process. The following provided input in person or virtually at Planning Partnership meetings, as well as through the County's online stakeholder survey:

- Galveston County Health Department
- Galveston County Health District Office of Environmental Health Programs
- Gulf Coast Center
- University of Texas Medical Branch at Galveston

Utilities

Utility providers in the County were invited to take the stakeholder survey and provide input to the planning process. The following provided input in person or virtually at Planning Partnership meetings, as well as through the County's online stakeholder survey:

- Bolivar Peninsula Special Utility District
- Gulf Coast Water Authority
- Galveston County Water Control and Improvement District #1
- Galveston County Water Control and Improvement District #19

Adjacent Counties

Galveston County has made an effort to keep surrounding counties and municipalities apprised of the project and allowed the opportunity to provide input to this planning process. Specifically, the following adjoining and nearby county representatives were contacted in September 2021 to invite them to provide input to the planning process. In January 2022, they were invited to complete a neighboring county survey. In February 2022, they were informed of the posting of the draft plan and invited to review and provide feedback. The following provided input in person or virtually at Planning Partnership meetings, as well as through the County's online neighboring county survey:

- Brazoria County
- Chambers County
- Harris County – completed the survey and provided feedback regarding their involvement with Galveston County.

2.3.3 Stakeholder Survey Summary

The following provides a summary of the results and feedback received by stakeholders who completed the survey. Feedback was reviewed by the Steering Committee and integrated where appropriate in the plan.

Stakeholder Survey

The stakeholder survey was designed to help identify general needs for hazard mitigation and resiliency within Galveston County from its perspective, as well as to identify specific projects that may be included in the mitigation plan. It was distributed to identified stakeholders, including the various county and municipal departments and agencies in the county. As of January 28, 2022, 8 stakeholders completed the survey, 40% of which in the emergency services category, 20% in academic/research, 20% in public work, and 20% in utilities.



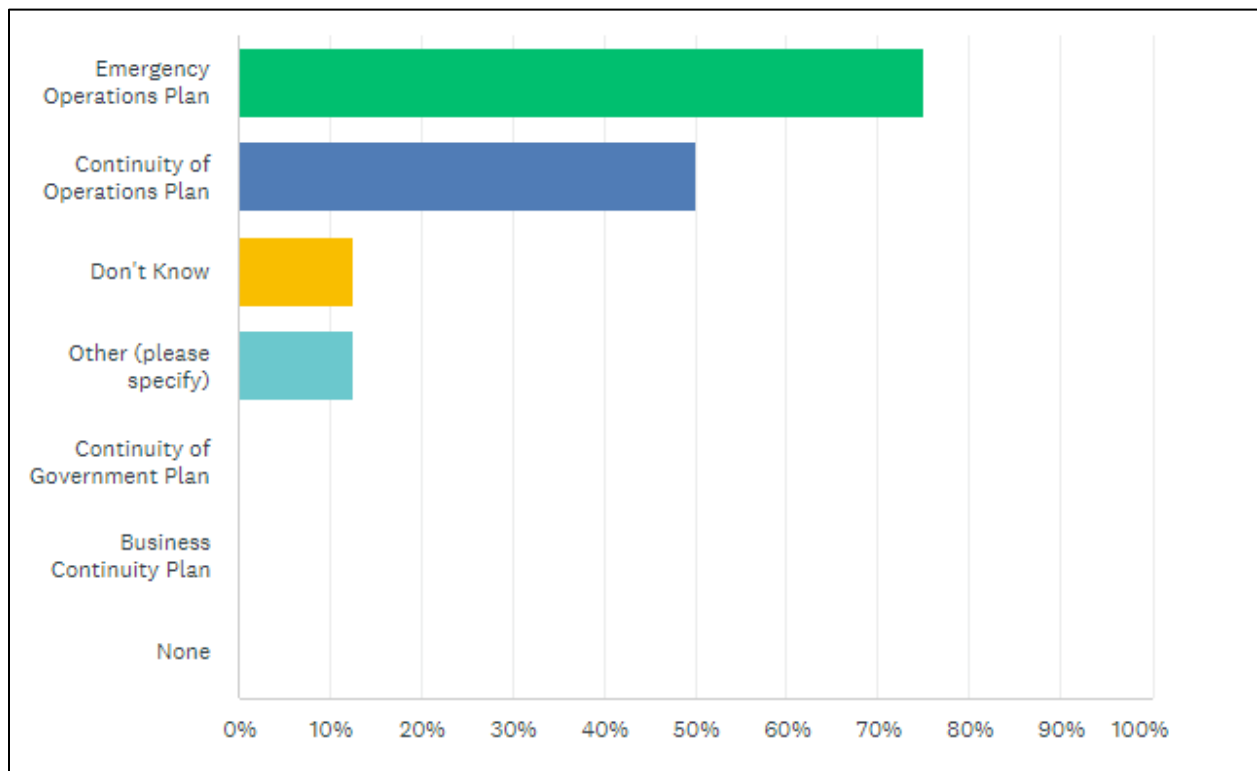
Hazard and Damage Identification

Half of respondents said the buildings/facilities/structures they have worked in and/or are responsible for have been impacted by a hazard; 25% said no and 25% were unsure. Those that experienced damage stated that the structures had wind and flood damage from hurricanes, with some reporting complete destruction of buildings. When asked what areas are most vulnerable to hazards in the County, answers included storm surge flooding, hazardous material releases, flooding from heavy rainfall, structures not built to withstand hurricane impacts, exposed water lines, and road/underpass flooding. Over 60% of respondents believe the facilities and infrastructure for their organization are equipped to handle a disaster and/or are resilient to damages; 25% said no; and 12/5% says maybe.

Community Preparedness

A majority of respondents (75%) stated that their organization has an emergency operations plan. Half of the respondents stated they are covered by a Continuity of Operations Plan, a Continuity of Government Plan. One respondent indicated that they have risk and vulnerability assessments and one was unsure of what plans are available in their organization.

Figure 2-1. Plans of Stakeholders



Project Identification

Respondents identified the following projects or programs that could reduce their organization's vulnerability to damages, including operation of service:

- Reduce vulnerability to water systems
- Storage and emergency operations building to place equipment and materials prior to a hurricane or other event to allow for access during the event



- Relocating water lines to reduce risk of line being severed during a storm
- Improvements to drainage systems

The following were identified as recently implemented projects that reduced vulnerabilities to hazard events:

- Elevated operations center in Dickinson
- Elevated 1-million-gallon storage tank to provide drinking water during power outages or damages

Respondents were also asked to detail how their organization has been involved in response to the ongoing COVID-19 pandemic. Respondents detailed the following:

- Weather briefings to support outdoor testing and vaccination operations
- Testing, vaccinations, contact tracing, and data collection
- Providing potable water throughout the pandemic
- Testing center for fire, police, EMS, and municipal employees
- Emotional support and resources

The following services and infrastructure needs were identified by respondents as needing to be built or improved upon within their communities in order to mitigate damages experienced by the pandemic:

- Crew living quarters
- Air filtration systems
- Water and wastewater operations

Neighboring County Survey

The neighbor survey was sent to the surrounding counties of Galveston County due to their proximity to and because effects of hazard events that impact Galveston County would be similar to that of their neighbors. As of January 28, 2022, one county completed the survey. The respondent stated Galveston County is involved in their county's comprehensive emergency operations planning. Together, they are part of UASI, HGAC, MACC and various hurricane and evacuation plans. During emergency operations and disaster response, the counties communicate through conference calls, MACC, and mutual aid requests. They are also part of an evacuation hub plan.

2.4 PUBLIC PARTICIPATION – RESIDENT INVOLVEMENT

In order to facilitate better coordination and communication between the Planning Partnership and residents and to involve the public in the planning process, it was determined that meeting dates/locations will be made available to the public via the Galveston County website and social media outlets. The participating partners also feel that community input on the HMP will increase the likelihood of hazard mitigation becoming one of the standard considerations in the evolution and growth of the County.

The Planning Partnership has made the following efforts toward public participation in the development and review of the HMP:

- All hazard mitigation planning meetings that were open to the public were advertised on the Galveston County website.
- An on-line natural hazards preparedness public survey was developed to gauge household preparedness relevant to hazards in the Galveston County and to assess the level of knowledge of tools and techniques to assist in reducing risk and loss of those hazards. The questionnaire asks quantifiable questions about citizen perception of risk, knowledge of mitigation, and support of community programs. The



questionnaire also asks several demographic questions to help analyze trends. The questionnaire was advertised via social media and available for two months to facilitate public input garnering over 140 responses. The survey results were provided to the Steering Committee to use to identify vulnerabilities and develop mitigation strategies. A summary of survey results is provided in Appendix D (Public and Stakeholder Outreach) of this plan.

- Results from the natural hazards preparedness survey were used to inform the action plans of the planning partners. To address the most requested types of projects that residents wanted local and county agencies to be doing, many planning partners included actions to improve and strengthen infrastructure, improve the damage resistance of utilities, buy out flood prone properties, improve protective structures, and provide greater control over development in high hazard areas.
- All plan participants were requested to advertise the public survey via local homepage links, and other available public announcement methods (e.g., Facebook, Twitter, email blasts). Refer to Appendix D which highlights these local efforts.
- Starting in February 2022, draft sections of the plan (as available) were posted on the County's website for public review and comment.
- Once approved by TDEM/FEMA, the final HMP will be available on the County website.

2.5 INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS, AND TECHNICAL INFORMATION

The Galveston County HMP strives to use the best available technical information, plans, studies, and reports throughout the plan process to support hazard profiling; risk and vulnerability assessment; review and evaluation of mitigation capabilities; and the identification, development, and prioritization of county and local mitigation strategies.

The asset and inventory data used for the risk and vulnerability assessments is presented in the County Profile (Section 3). Details of the source of this data, along with technical information on how the data was used to develop the risk and vulnerability assessment, is presented in the Risk Assessment, specifically in Section 4.1 Methodology and Tools, as well as throughout the hazard profiles in Section 4.3 (Hazard Profiles).

Plans, reports, and other technical information were identified and provided directly by the County, participating jurisdictions, and numerous stakeholders involved in the planning effort, as well as through independent research by the planning consultant. The County and participating jurisdictions were tasked with updating the inventory of their Planning and Regulatory capabilities in Section 9 (Jurisdictional Annexes) and providing relevant planning and regulatory documents, as applicable. Relevant documents, including plans, reports, and ordinances were reviewed to identify the following:

- Existing County and municipal capabilities.
- Needs and opportunities to develop or enhance capabilities, which may be identified within the County or local mitigation strategies.
- Mitigation-related goals or objectives considered in the review and update of the overall Goals and Objectives in Section 6 (Mitigation Strategy).
- Proposed, in-progress, or potential mitigation projects, actions, and initiatives to be incorporated into the updated County and local mitigation strategies.

The following local regulations, codes, ordinances, and plans were reviewed during this process to develop mitigation planning goals, objectives, and strategies that are consistent across local and regional planning and regulatory mechanisms to accomplish complementary and mutually supportive strategies:



- Master/Comprehensive Plans
- Building Codes
- Zoning and Subdivision Ordinances
- NFIP Flood Damage Prevention Ordinances
- Site Plan Requirements
- Stormwater Management Plans
- Emergency Management and Response Plans
- Land Use and Open Space Plans
- Capital Plans
- Texas State Hazard Mitigation Plan (2018)

2.6 INTEGRATION WITH EXISTING PLANNING MECHANISMS AND PROGRAMS

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making. Within the Galveston County, there are many existing plans and programs that support hazard risk management, and thus it is critical that this hazard mitigation plan integrate, coordinate with, and complement, those existing plans, and programs.

The Capability Assessment section of Section 5 (Capability Assessment) provides a summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county, and local) that support hazard mitigation within the County. Within each jurisdictional annex in Section 9, the County and each participating jurisdiction identified how they integrated hazard risk management into their existing planning, regulatory, and operational/administrative framework (integration capabilities) and how they intend to promote this integration (integration actions).

A further summary of these continued efforts to develop and promote a comprehensive and holistic approach to hazard risk management and mitigation is presented in Section 7 (Plan Maintenance).

2.7 CONTINUED PUBLIC INVOLVEMENT

Galveston County and participating jurisdictions are committed to the continued involvement of the public in the hazard mitigation process. This HMP update will be posted online at <https://gcoem.org/galveston-county-multi-jurisdiction-hazard-mitigation-plan/>. Each jurisdiction's elected official shall be responsible for receiving, tracking, and filing public comments regarding this HMP update.

A notice regarding annual updates of the plan and the location of plan copies will be publicized annually after the Steering Committee's annual evaluation and posted on the public website at <https://gcoem.org/galveston-county-multi-jurisdiction-hazard-mitigation-plan/>.

The public will have an opportunity to comment on the plan as a part of the annual mitigation planning evaluation process and the next five-year mitigation plan update. The HMP Coordinator is responsible for coordinating the plan evaluation portion of the meeting, soliciting feedback, collecting, and reviewing the comments, and ensuring their incorporation in the five-year plan update as appropriate. The purpose of these meetings would be to provide the public an opportunity to express concerns, opinions, and ideas about the plan.

Further details regarding continued public involvement are provided in Section 7 (Plan Maintenance).



After completion of this plan, implementation and ongoing maintenance will continue to be a function of the Steering Committee. The Steering Committee will review the plan and accept public comment as part of an annual review and as part of five-year mitigation plan updates.

A notice regarding annual updates of the plan and the location of plan copies will be publicized annually after the Steering Committee's annual evaluation and posted on the public web site.

Laura Norman, Galveston County's Deputy Emergency Management Coordinator, is identified as the Galveston County's HMP Coordinator in Section 7 (Plan Maintenance), and is responsible for receiving, tracking, and filing public comments regarding this plan. Contact information is: laura.norman@co.galveston.tx.us



SECTION 3. GALVESTON COUNTY PROFILE

3.1 GENERAL INFORMATION

Prior to European settlement, indigenous peoples inhabited the mainland and island area now known as Galveston County. The first Europeans to lay claim to the area were Spanish and named the area after Viceroy Bernardo de Gálvez. In the early 1800's, Americans began arriving in the area, but the County was not formally established until 1839. When Texas joined the Union, Galveston was the largest city in Texas (Kleiner 2021).

The county commissioners court serves as the governing body in the county. This administrative body was established by the Texas Constitution of 1876 and is comprised of a county judge and four elected commissioners. The major duties of the commissioner's court involve overseeing county functions in their area.

Galveston County is comprised of the cities of: Bayou Vista, Clear Lake Shores, Dickinson, Friendswood, Galveston, Hitchcock, Jamaica Beach, Kemah, La Marque, League City, Santa Fe, Texas City, and the Village of Tiki Island. The City of Galveston is the county seat. The jurisdictions participating in this plan update include all of the unincorporated areas of the County and the incorporated jurisdictions of:

- Bayou Vista
- Clear Lake Shores
- Dickinson
- Friendswood
- Hitchcock
- Jamaica Beach
- Kemah
- La Marque
- League City
- Santa Fe
- Tiki Island

3.2 MAJOR PAST HAZARD EVENTS

Presidential disaster declarations are issued for hazard events that cause more damage than state and local governments can handle without assistance from the federal government. No specific dollar loss threshold has been established for these declarations. A presidential disaster declaration puts operationalizes federal recovery programs to assist disaster victims, businesses, and public entities. Programs can be matched by state programs. Review of presidential disaster declarations helps establish the probability of reoccurrence for each hazard and identify targets for risk reduction. Table 3-1 shows FEMA disaster declarations that have included Galveston County between 2001 and February 2021.

Table 3-1. History of Hazard Events in Galveston County, Texas

Disaster Number	Declaration Date	Event Date	Incident Type	Title
DR-1379	June 9, 2001	June 5-20, 2001	Coastal Storm	Tx-Tropical Storm Allison-06-06-2001
DR-1434	September 26, 2002	September 6-30, 2002	Coastal Storm	Tropical Storm Fay



Disaster Number	Declaration Date	Event Date	Incident Type	Title
DR-1479	July 17, 2003	July 15-28, 2003	Hurricane	Hurricane Claudette
EM-3216	September 2, 2005	August 29-October 1, 2005	Hurricane	Hurricane Katrina Evacuation
EM-3261	September 21, 2005	September 20-October 14, 2005	Hurricane	Hurricane Rita
DR-1606	September 24, 2005	September 23-October 14, 2005	Hurricane	Hurricane Rita
DR-1624	January 11, 2006	November 27, 2005-May 14, 2006	Fire	Extreme Wildfire Threat
EM-3277	August 18, 2007	August 17-September 5, 2007	Hurricane	Hurricane Dean
EM-3284	March 14, 2008	March 14-September 1, 2008	Fire	Wildfires
EM-3290	August 29, 2008	August 27-September 7, 2008	Hurricane	Hurricane Gustav
DR-1791	September 13, 2008	September 7-October 2, 2008	Hurricane	Hurricane Ike
EM-3294	September 10, 2008	September 7-26, 2008	Hurricane	Hurricane Ike
DR-4245	November 25, 2015	October 22-31, 2015	Severe Storm(s)	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
DR-4332	August 25, 2017	August 23-September 15, 2017	Hurricane	Hurricane Harvey
EM-3458	March 13, 2020	January 20, 2020	Biological	COVID-19
DR-4485	March 25, 2020	January 20, 2020	Biological	COVID-19 Pandemic
EM-3530	July 26, 2020	July 25-31, 2020	Hurricane	Hurricane Hanna
EM-3540	August 24, 2020	August 23-27, 2020	Hurricane	Tropical Storms Marco and Laura
DR-4572	December 9, 2020	August 23-27, 2020	Hurricane	Hurricane Laura
EM-3554	February 19, 2021	February 11-21, 2021	Severe Storm(s)	Severe Winter Storm
DR 4586	February 19, 2021	February 11-21, 2021	Severe Storm(s)	Severe Winter Storm

3.3 PHYSICAL SETTING

This section presents the physical setting of the County, including land use/land cover, location, climate, hydrography and hydrology, topography, and geology.

3.3.1 Location

Galveston County is located on the Gulf Coast of Texas, east of Brazoria County, west of Chambers County and south of Harris County. According to the U. S. Census Bureau, Galveston County has 378 square miles of land area, 495 square miles of water area, and is the 244th largest county in Texas by total area.

3.3.2 Topography and Geology

Galveston County is part of the Coastal Prairie physiographic province, underlain by Deltaic sands and muds in a nearly flat stratum. The topography consists of a nearly flat prairie. Galveston County is located in the Gulf Coast Prairie and Marshes ecoregion of Texas, which is characterized by expansive rolling brushlands and prairies that transition to estuarine marshes and dune environments. The County is a small part of this ecosystem, which stretches from Louisiana to Mexico. The Gulf coastline is characterized by marshy plains, narrow beach ridges, and long barrier islands that separate the mainland coast from the Gulf waters. On the coast, Galveston Island has an elevation of approximately 7 feet, while inland Friendswood is approximately 31 feet.



3.3.3 Hydrography and Hydrology

Galveston County is bordered to the north by Clear Creek, a small river, which forms the boundary with Harris County and empties into Clear Lake, which in turn feeds Galveston Bay. Galveston Bay is the seventh largest estuary in the United States and is connected to the Gulf of Mexico. Two major bayou watersheds are also located in the County.

Dickinson Bayou Watershed

The Dickinson Bayou watershed encompasses approximately 100 square miles of land that drains water into the bayou. In Galveston County, it encompasses the cities of Dickinson, Friendswood, Kemah, League City, Santa Fe, and Texas City. The Dickinson Bayou Watershed Partnership developed a Bacteria Implementation Plan to reduce the bacteria concentrations in the watershed. The plan addresses on-site sewage facilities (septic systems), wastewater treatment facilities and collection systems, animal waste, restoration and repair of riparian zones, and preservation and restoration of the natural wetlands (Dickinson Bayou Watershed Partnership n.d.).

Highland Bayou Coastal Basin

The Highland Bayou Coastal Basin is a 120 square mile drainage basin located on mainland Galveston County. Bayou and stream segments consist of non-tidal, tidally influenced, and tidal waters. Fresh water in the bayous is largely precipitation-driven overland flows. Fresh water in the bayous is largely precipitation-driven overland flows. The freshwater bayous transition to estuarine conditions. (Texas A&M AgriLife Extension n.d.).

3.3.4 Climate

Galveston County's temperatures range from an average low of 48.9 degrees in January to an average high of 79.8 degrees in August. The County receives approximately 47 inches of rainfall each year (NWS 2020). The County receives moderating climatic influences due to its proximity to the Gulf of Mexico.

3.3.5 Land Use and Land Cover

The prevailing land use types in Galveston County are urban and wetland, which comprise 37.6 percent 26.9 percent, respectively, of the County. Agricultural lands (14.9 percent) and forests (10.3 percent) are smaller land uses, while barren land and water are the minority uses. Table 3-2 summarizes the land use for Galveston County. Figure 3-1 shows the distribution of land use throughout the County.

Table 3-2. Land Use Breakdown for Galveston County

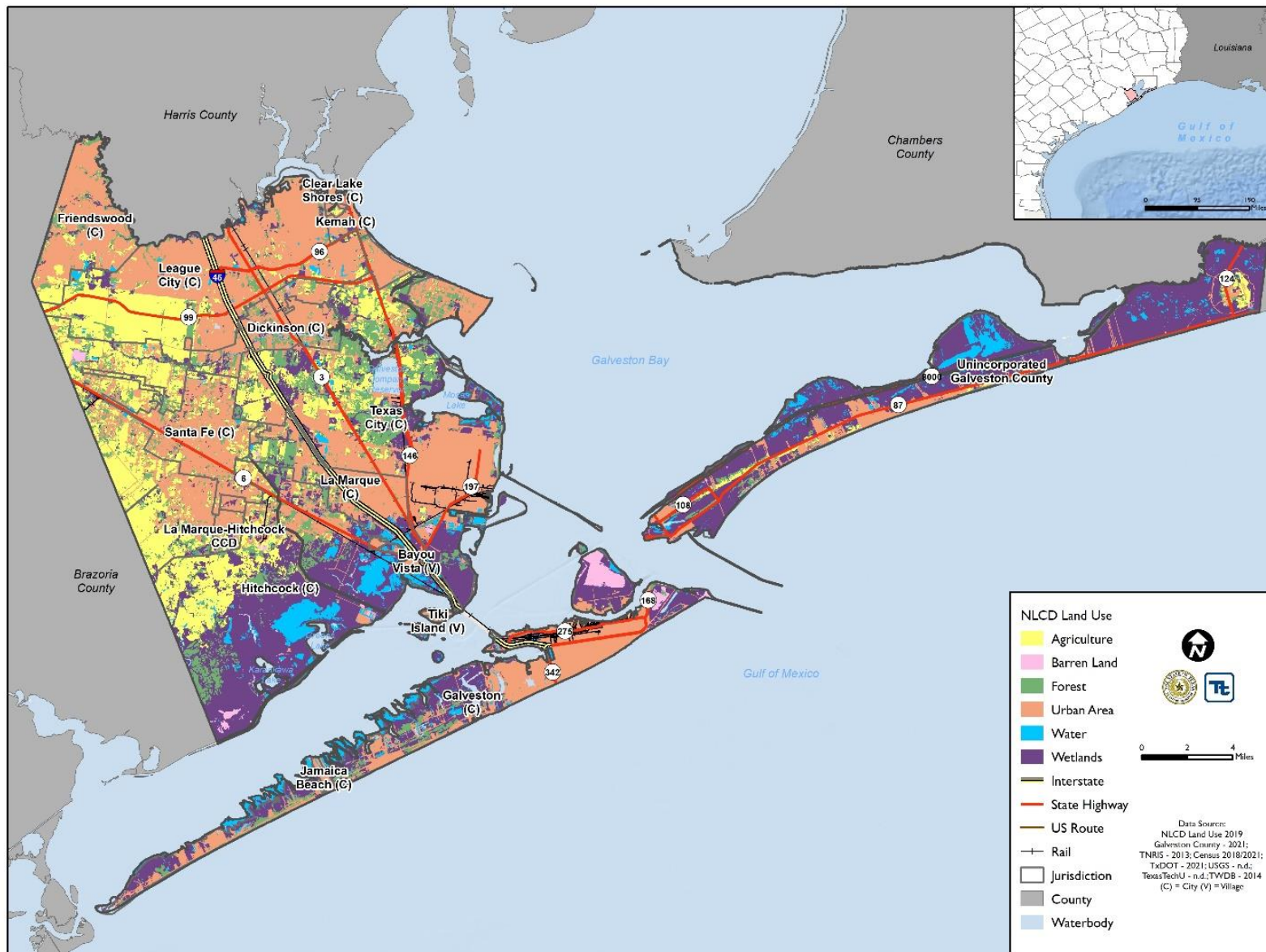
Land Use Category	2011 Data		2016 Data		2019 Data	
	Acreage	Percent of County	Acreage	Percent of County	Acreage	Percent of County
Agriculture	36,498	14.0%	36,711	14.1%	38,816	14.9%
Barren	9,468	3.6%	4,694	1.8%	4,569	1.8%
Forest	31,289	12.0%	30,875	11.9%	26,798	10.3%
Urban	91,639	35.2%	93,316	35.9%	97,795	37.6%
Water	16,072	6.2%	22,459	8.6%	22,207	8.5%
Wetland	75,136	28.9%	72,055	27.7%	69,928	26.9%
Galveston County (Total)	260,102	100.0%	260,111	100.0%	260,113	100.0%

Sources: NLCD 2014, NLCD 2019, NLCD 2021

Note: Changes in total LULC indicates areas where unclassified LULC are now classified



Figure 3-1. 2021 Land Use in Galveston County, Texas





3.4 POPULATION AND DEMOGRAPHICS

According to the 2020 Decennial Census, Galveston County had a population of 350,682 people which represents a significant increase from the 2010 U.S. Census population of 291,309 people. HAZUS demographic data will be used in the loss estimation analyses in Section 4 of this plan. All demographic data in HAZUS corresponds to the 2010 U.S. Census data. Table 3-3 presents the population statistics for Galveston County based on the 2000, 2010, and 2020 U.S. Census data. For the purposes of this plan, the 2020 Census was used where the data was available and supplemented with HAZUS data (representing 2010 data).

Table 3-3. Recent Population by Jurisdiction

Jurisdiction	Population			
	1990	2000	2010	2020
Bayou Vista	1,320	1,644	1,537	1,631
Clear Lake Shores	1,135	1,205	1,063	1,249
Friendswood	22,809	29,214	35,805	41,213
Hitchcock	5,868	6,386	6,961	7,301
Jamaica Beach	624	1,075	983	1,081
Kemah	1,150	2,330	1,773	2,037
La Marque	14,120	13,682	14,509	18,347
League City	29,903	45,444	83,560	114,392
Santa Fe	8,628	9,548	12,222	13,599
Tiki Island	537	1,016	968	1,065
Unincorporated	131,302	138,614	131,928	148,767
Total	217,396	250,158	291,309	350,682

Source: 2017 Galveston County HMP, U. S. Census

Population and Demographic Trends

This section discusses population trends to use as a basis for estimating future changes that could result from the seasonal character of the population and significantly change the character of the area. Population trends can provide a basis for making decisions on the type of mitigation approaches to consider and the locations in which these approaches should be applied. This information can also be used to support planning decisions regarding future development in vulnerable areas.

According to the U.S. Census Bureau, the 2010 population for Galveston County was 291,309 persons, which is a 16.5% increase from the 2000 Census population of 250,158. Over the last 50 years, from 1970 to 2020, the County has seen notable population growth. The largest increase in absolute terms and in percentage was between 2010 and 2020.

Table 3-4. Galveston County Population Trends, 1960 to 2020

Year	Population	Change in Population	Percent (%) Population Change
1970	169,812	-	-
1980	195,738	25,926	15.2%
1990	217,396	21,658	11.1%
2000	250,158	32,762	15.1%
2010	291,309	41,151	16.5%
2020	350,682	59,373	20.4%

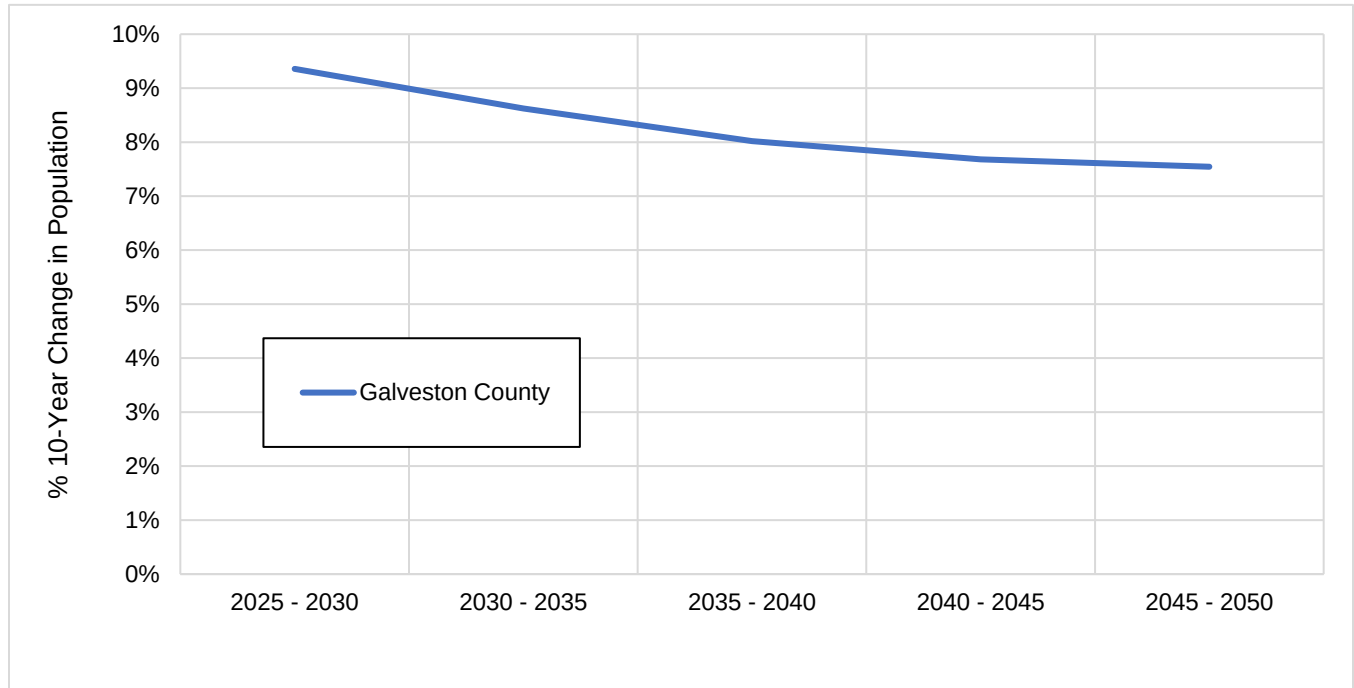
Source: 2017 Galveston County HMP, U. S. Census

Note: Change in population and percent in population change were calculated from available data.



The Texas Demographic Center has produced population estimates for the region that were last updated in 2018 based on 2010 Census data. The estimates show projected growth between 7.54 and 9.36 percent every five years from 2025 to 2050.

Figure 3-2. Galveston County Population Projected Change, 2025 to 2050



Source: (Texas Demographic Center Population Projections 2018)

3.4.1 Vulnerable Populations

DMA 2000 requires that HMPs consider socially vulnerable populations. These populations can be more susceptible to hazard events, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. For the purposes of this study, vulnerable populations shall include (1) the elderly (persons aged 65 and over) and (2) those living in low-income households.

Table 3-5. Galveston Vulnerable Population Statistics

Municipality	ACS 2019				
	Total	Population 65+	% Population 65+	Low-Income Population	% Low-Income Population of Total
Galveston County	342,139	51,182	15%	36,764	10.9%

Source: 2019 American Community Survey 1-Year Estimates (2021)

* Individuals below poverty level (Census poverty threshold for a 3-person family unit is approximately \$18,500)

It is noted that the Census data for household income provided in HAZUS includes two ranges (\$0-10,000 and \$10,000-\$20,000/year) that were totaled to provide the “low-income” data used in this study. This does not correspond exactly with the “poverty” thresholds established by the 2019 U.S. Census Bureau, which identifies households with three adults and no children with an annual household income below \$19,998 per year, or households with two adults and one child with an annual household income below \$17,622 per year as “low income” for this region. This difference is not believed to be significant for the purposes of this planning effort.



The 2019 American Community Survey data identified approximately 36,764 people in Galveston County living below the poverty line. This represents nearly 11 percent of the population. Though this is an absolute increase from 36,063 in 2010, the proportion of individuals in poverty has declined by 1.6% since 2010.

Income

The 2019 American Community Survey 5-Year Estimates provides that the median household income in Galveston County was \$74,977. The U.S. Census Bureau identifies households with two adults and one child with an annual household income below \$17,622 per year as *low income* (U. S. Census 2021). The 2019 American Community Survey 5-Year Estimates indicates that nearly 11 percent of persons are below the poverty level within the County.

The spatial U.S. Census data for household income provided in HAZUS includes two ranges (less than \$10,000 and \$10,000-\$20,000/year) that were totaled to provide the *low-income* data used in this study. This does not correspond exactly with the *poverty* thresholds established by the 2019 U.S. Census Bureau data. This difference is not believed to be significant for the purposes of this planning effort; therefore, for the exposure and loss estimations in the risk assessment, the 2010 U.S. Census data in HAZUS is reported.

Physically or Mentally Disabled

According to the Centers for Disease Control, “A disability is any condition of the body or mind (impairment) that makes it more difficult for the person with the condition to do certain activities (activity limitation) and interact with the world around them (participation restrictions) (CDC 2020).” Cognitive impairments can increase the level of difficulty that individuals might face during an emergency and reduce an individual’s capacity to receive, process, and respond to emergency information or warnings. Individuals with a physical or sensory disability can face issues of mobility, sight, hearing, or reliance on specialized medical equipment. According to the 2019 American Community Survey, 11.1 percent of residents in Galveston County are living with a disability.

Non-English Speakers

Individuals who are not fluent or working proficiency in English are vulnerable because they can have difficulty with understanding information being conveyed to them. Cultural differences also can add complexity to how information is being conveyed to populations with limited proficiency of English (CDC 2021). According to the 2019 American Community Survey, 22% of the County’s population over the age of 5 primarily speaks a language other than English at home. Approximately, 6.6% of the population over the age of 5 speaks limited English.

3.4.2 General Building Stock

For this Plan, the default general building stock in Hazus was updated and replaced with a custom building inventory for Galveston both at the aggregate and structure level. The building stock update was performed using 2021 certified assessor data from the Galveston Central Appraisal District (GCAD). The replacement cost value was calculated using the square footage value of each building and RS Means 2021 data.

For the purposes of this plan, there are approximately 209,947 structures identified through data provided by the GCAD. These structures account for a replacement cost value of approximately \$166.3 billion (structure and contents). Estimated content value was calculated by using 50-percent of the residential replacement cost value, and 100-percent of the non-residential replacement values. Using this methodology, there is approximately \$70.1 billion in contents within these structures. Table 3-6 presents building and improvement values in the County.

**Table 3-6. Number of Buildings and Improvement Value in Galveston County**

Jurisdiction	Count	Replacement Cost Value (Structure Only)	All Occupancies	Total Replacement Cost Value (Structure + Contents)
			Replacement Cost Value (Contents Only)	
Clear Lake Shores (C)	1,155	\$519,006,216.88	\$385,556,151.78	\$904,562,368.66
Dickinson (C)	10,351	\$3,924,480,999.53	\$2,677,229,646.10	\$6,601,710,645.63
Friendswood (C)	14,891	\$6,532,042,745.35	\$4,283,413,638.77	\$10,815,456,384.12
Hitchcock (C)	5,452	\$2,606,611,538.31	\$1,985,425,113.55	\$4,592,036,651.86
Jamaica Beach (C)	1,291	\$292,462,937.69	\$165,742,901.13	\$458,205,838.82
Kemah (C)	1,634	\$1,410,211,778.23	\$1,221,490,327.37	\$2,631,702,105.60
La Marque (C)	10,749	\$4,518,194,733.81	\$3,409,097,788.47	\$7,927,292,522.28
League City (C)	46,742	\$18,876,791,173.65	\$12,361,183,420.45	\$31,237,974,594.10
Santa Fe (C)	7,942	\$2,826,459,977.04	\$2,005,168,185.08	\$4,831,628,162.13
Bayou Vista (C)	1,365	\$287,902,599.47	\$157,451,487.86	\$445,354,087.33
Tiki Island (V)	868	\$240,413,556.57	\$124,795,588.86	\$365,209,145.44
Galveston County (Total)	209,947	\$96,229,561,611.86	\$70,092,043,076.59	\$166,321,604,688.46

Sources: Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Notes: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County. RCV = Land Use and Population Trends

This Hazard Mitigation Plan provides a general overview of population, land use, and types of development occurring within the study area. An understanding of these development trends can assist in planning for further development and ensuring that appropriate mitigation, planning, and preparedness measures are in place to protect human health and community infrastructure.

3.4.3 Land Use Trends

While the County does not have a comprehensive plan to cite land use trends, patterns emerge from the statistics in this plan. The amount of urban land has been increasing over the past decade, while the amount of barren land, forest land, and wetland has decreased. While the amount of agricultural land has increase slightly, the workforce in the County is predominantly in the retail and healthcare sectors. The aging population is also a trend that may impact land use in the County.

Economy

The U.S. Census Bureau's Economic Census provides an annual series of sub-national economic data by industry covering the majority of the country's economic activity. According to the 2019 Galveston County Economic Census, the retail sector has the largest number of employees, while the accommodation and food services sector has the largest number of employees. The healthcare and social assistance industry comprises the highest payroll (nearly \$628 million) and the second-highest number of jobs.

Table 3-7. 2017 Economic Census for Galveston County, Texas

Sector	# of Establishments	# of employees	Annual payroll (\$1,000)
Utilities	11	300	29,067
Manufacturing	162	5,481	558,130
Wholesale trade	218	1,952	107,130



Sector	# of Establishments	# of employees	Annual payroll (\$1,000)
Retail trade	944	14,163	384,500
Transportation and warehousing	156	3,132	144,796
Information	77	742	37,892
Finance and insurance	380	4,373	256,469
Real estate and rental and leasing	338	1,920	100,921
Professional, scientific, and technical services	575	4,388	241,018
Professional, scientific, and technical services (establishments subject to federal income tax)	D	2,500 to 4,999 employees	D
Administrative and support and waste management and remediation services	282	3,752	126,944
Educational services	65	437	9,810
Educational services (establishments subject to federal income tax)	D	250 to 499 employees	D
Educational services (establishments exempt from federal income tax)	D	20 to 99 employees	D
Health care and social assistance	648	15,736	627,900
Health care and social assistance (establishments subject to federal income tax)	572	7,751	267,078
Health care and social assistance (establishments exempt from federal income tax)	76	7,985	360,822
Arts, entertainment, and recreation	106	1,959	36,192
Arts, entertainment, and recreation (establishments subject to federal income tax)	85	1,734	32,377
Arts, entertainment, and recreation (establishments exempt from federal income tax)	21	225	3,815
Accommodation and food services	757	17,232	299,222
Other services (except public administration)	463	2,828	94,886
Other services (except public administration) (establishments subject to federal income tax)	373	2,343	77,868
Other services (except public administration) (establishments exempt from federal income tax)	90	485	17,018
Total (does not include withheld data or range of numbers)	6,399	98,918	\$3,813,855

Source: U.S. Census, Economic Census 2017

D = Withheld to avoid disclosing data for individual companies; data are included in higher level totals.

Agriculture

Farmland plays a smaller role in Galveston County than in does in many other counties in Texas. The US Department of Agriculture produces a Census of Agriculture that tracks agricultural data on the County level. In Galveston County, the number of farms has increased by 3% since 2012 but the acreage of farms has decreased 18% during the same time to just over 73,000 acres of land for farming. Cattle, hogs, sheep, layers, and meat chickens make up the main sales for farms in the County. Galveston County's agriculture products generate more than \$9.2 million in sales each year, but farms operate at a net loss (USDA 2019).

Corridors and Gateways

Interstate 45, known as the Gulf Freeway, runs from Galveston Island north through the middle of the County. It is an important corridor that ties Galveston County to the Houston metropolitan area. State Highway 3 runs parallel to I-45 from La Marque through League City into Harris County. State Highway 6 branches off of I-45 at Bayou Vista and continues northwest through Brazoria and Harris Counties. State Highway 87 runs along Bolivar Peninsula and Galveston Island where it empties into I-45. State Highway 146 starts at the intersection of State Highway 6 and I-45 where it heads north along the bay side of Galveston County into Harris County.



3.4.4 Population Trends

Galveston County has grown significantly in recent years. Between 2010 and 2020 alone, the estimated population has increased from 291,309 residents to 350,682 residents, a 20 percent increase. The County has grown steadily since 1970, adding between 11 and 16 percent to its population every decade until 2010. The County's median age increased from 32.5 years in 1990 to 38.7 years in 2020.

As the County has grown, it has also aged and change composition. In 1990, those between the ages of 25 and 44 years old represented the plurality of residents. As of 2010, those between the ages of 45 and 64 years of age represent the plurality. Whereas the population share of those under 18 years has remained relatively constant, the share of residents between the ages of 45 and 64 years has increased from 19.4 percent to 28.1 percent during the same time. The County has also diversified racially and ethnically, with the share of Black residents increasing by 5.1 percent and the share of Asian residents more than doubling (3,569 to 8,690) from 1990 to 2010.

3.4.5 Future Growth and Development

While Galveston County does not have a Comprehensive Plan that addresses the County as a whole, several communities look at future growth and development in their city plans. By considering these city plans, future growth and development patterns throughout the planning area can be generalized.

- City of Dickinson – Based on the Future Land Use Plan, the City of Dickinson would add 8,941 residential dwellings, or 26,824 residents and 65,259 new jobs within the city limits and 1,839 residential dwelling units or 5,518 residents and 6,013 new jobs in the extraterritorial jurisdiction (ETJ).
- City of Friendswood – Full buildout is projected with a population of 45,000 to 50,000.
- City of Hitchcock – Agricultural residential land is expected to decrease 10 percent while single family residential, multi-family residential, and manufactured homes are expected to increase slightly. Open space is expected to increase with a designated 3,300-acre wetland conservation area.
- City of League City – The Future Land Use Plan accounts for a population of up to 178,875 while increasing employment opportunities. New residential activity primarily focuses on rural/estate and suburban character development with a limited number of mixed-use centers.

3.5 LIFELINES AND CRITICAL FACILITIES

Critical infrastructure and facilities are those that are essential to the health and welfare of the population. These facilities are especially important after any hazard event. Critical facilities are those that maintain essential and emergency functions and are typically defined to include police and fire stations, schools, and emergency operations centers. Critical infrastructure can include the roads and bridges that provide ingress and egress and allow emergency vehicles access to those in need and the utilities that provide water, electricity, and communication services to the community. Also included are Tier II facilities (hazardous materials) and rail yards; rail lines hold or carry significant amounts of hazardous materials with

Critical Facilities are those facilities considered critical to the health and welfare of the population and that are especially important following a hazard. As defined for this HMP, critical facilities include transportation systems, lifeline utility systems, high-potential loss facilities, and hazardous material facilities, and essential facilities

Essential facilities are a subset of critical facilities that include those facilities that are important to ensure a full recovery following the occurrence of a hazard event. For the county risk assessment, this category was defined to include police, fire, EMS, schools/colleges, shelters, senior facilities, and medical facilities.

Lifelines enable the continuous operation of critical business and government functions and are essential to human health and safety or economic security.



a potential to impact public health and welfare in a hazard event.

Beginning in 2017, FEMA developed a new construct to increase effectiveness for disaster operations and position response to catastrophic incidents. This construct, known as “community lifelines”, represents the most fundamental services in the community that, when stabilized, enable all other aspects of society. Following a disaster event, intervention is required to stabilize community lifelines. Lifelines are divided into seven categories which include:

- Safety and Security
- Food, Water, Shelter
- Health and Medical
- Energy (Power and Fuel)
- Communications
- Transportation
- Hazardous Materials

To facilitate consistency with the National Response Framework, FEMA Strategic Plan, and guidance for the Building Resilient Infrastructure and Communities grant program, critical facilities in Galveston County are discussed in terms of lifelines.

A comprehensive inventory of critical facilities and lifelines in Galveston County was developed from various sources including input from the Planning Committees. The inventory of critical facilities presented in this section represents the current state of this effort at the time of publication of the HMP and was used for the risk assessment in Section 4 (Risk Assessment).

3.5.1 Safety and Security

This section provides information on Safety and Security lifelines. Components of this lifeline category include law enforcement/security, fire services, search and rescue services, government services, and community safety (e.g., dams). There are 405 safety and security lifelines in Galveston County.

Emergency Facilities

There are 31 police stations, 69 fire stations, and nine emergency operations centers (EOCs) in Galveston County.

Schools

The County contains 142 primary education facilities, 12 secondary education facilities, and 13 colleges.

Government Buildings

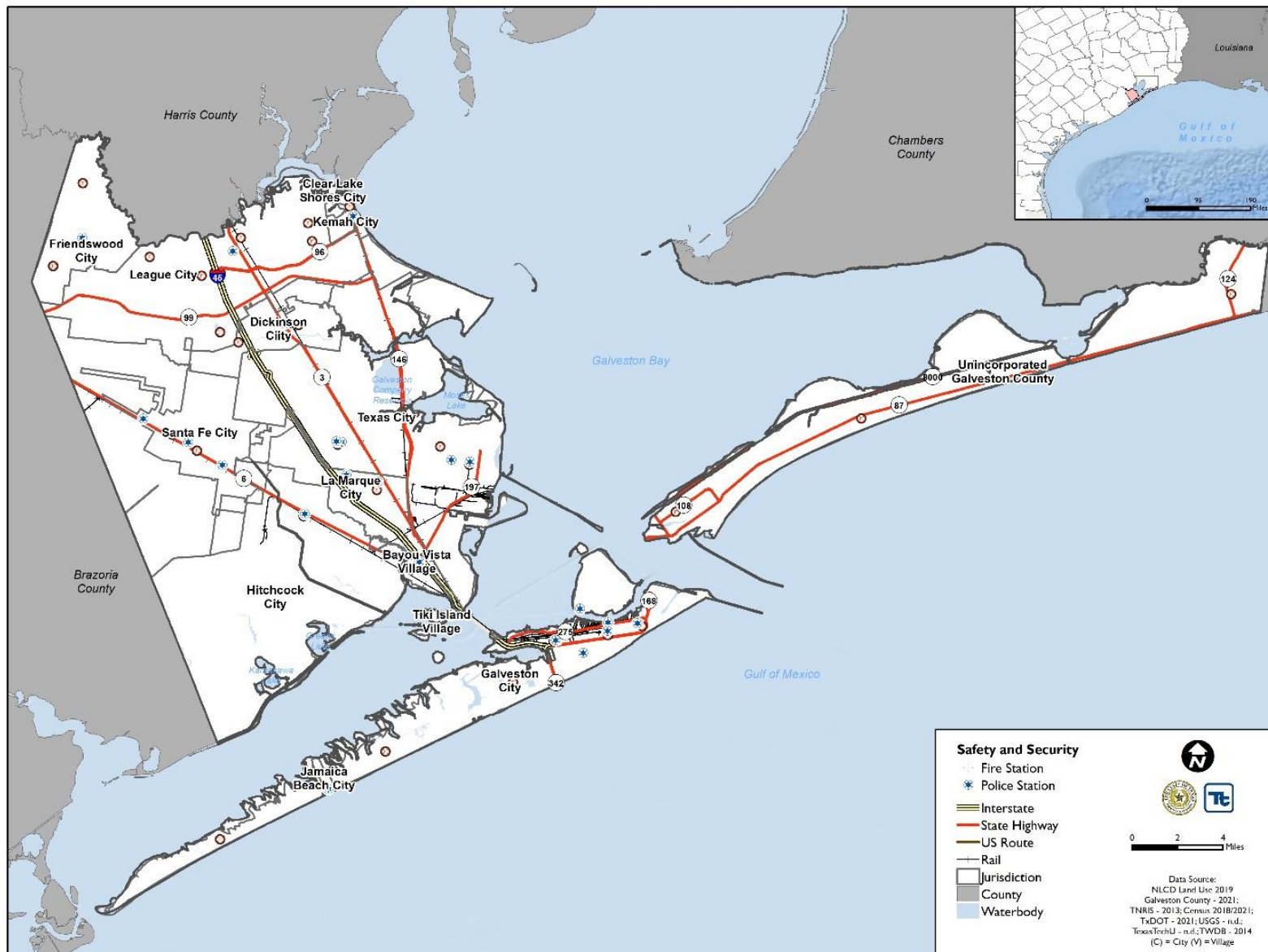
There are 136 government buildings located in Galveston County and includes municipal buildings, public works departments, libraries, and prisons.

Dams and Levees

Galveston County contains one major dam and one 17-mile levee.



Figure 3-3. Safety and Security Lifelines in Galveston County





3.5.2 Food, Water, and Shelter Lifelines

Food, Water, and Shelter lifelines include facilities pertaining to food supply (distribution facilities, programs, and supply chain), water supply (including both potable and wastewater systems), shelter (housing and hotels), and agricultural facilities.

Food Supply

Food supply includes commercial food distribution, commercial food supply chains, and food distribution programs. Numerous grocery stores, including large chain stores, and one County-operated food bank are located in Galveston County. In addition to the County's food bank, there are numerous locations throughout the County that provide food and meals to residents in need.

Water Supply

Potable Water

There are four potable water systems, 25 potable water wells, and 14 storage tanks in Galveston County. Water is provided through surface water and groundwater systems located throughout the County. Numerous utility districts and improvement districts distribute potable water to residents throughout.

Wastewater Facilities

The County contains 82 lift stations, 30 pump stations, and 2 treatment plants. Similar to potable water, there are numerous utility districts that provide wastewater treatment and services to the County.

Shelters

Three buildings are identified as shelters in Galveston County and hundreds of hotels are located throughout the County.

3.5.3 Health and Medical Lifelines

Health and medical lifelines include medical care (e.g., hospitals, pharmacies, long-term care facilities), patient movement (e.g., EMS), fatality management, public health, and medical supply chain. In Galveston County, there are 91 facilities identified as health and medical lifelines. This includes 27 hospitals, 18 medical clinics, 40 nursing homes, 6 urgent care centers, and 8 ambulance service providers.



Figure 3-4. Food, Water, and Shelter Lifelines in Galveston County

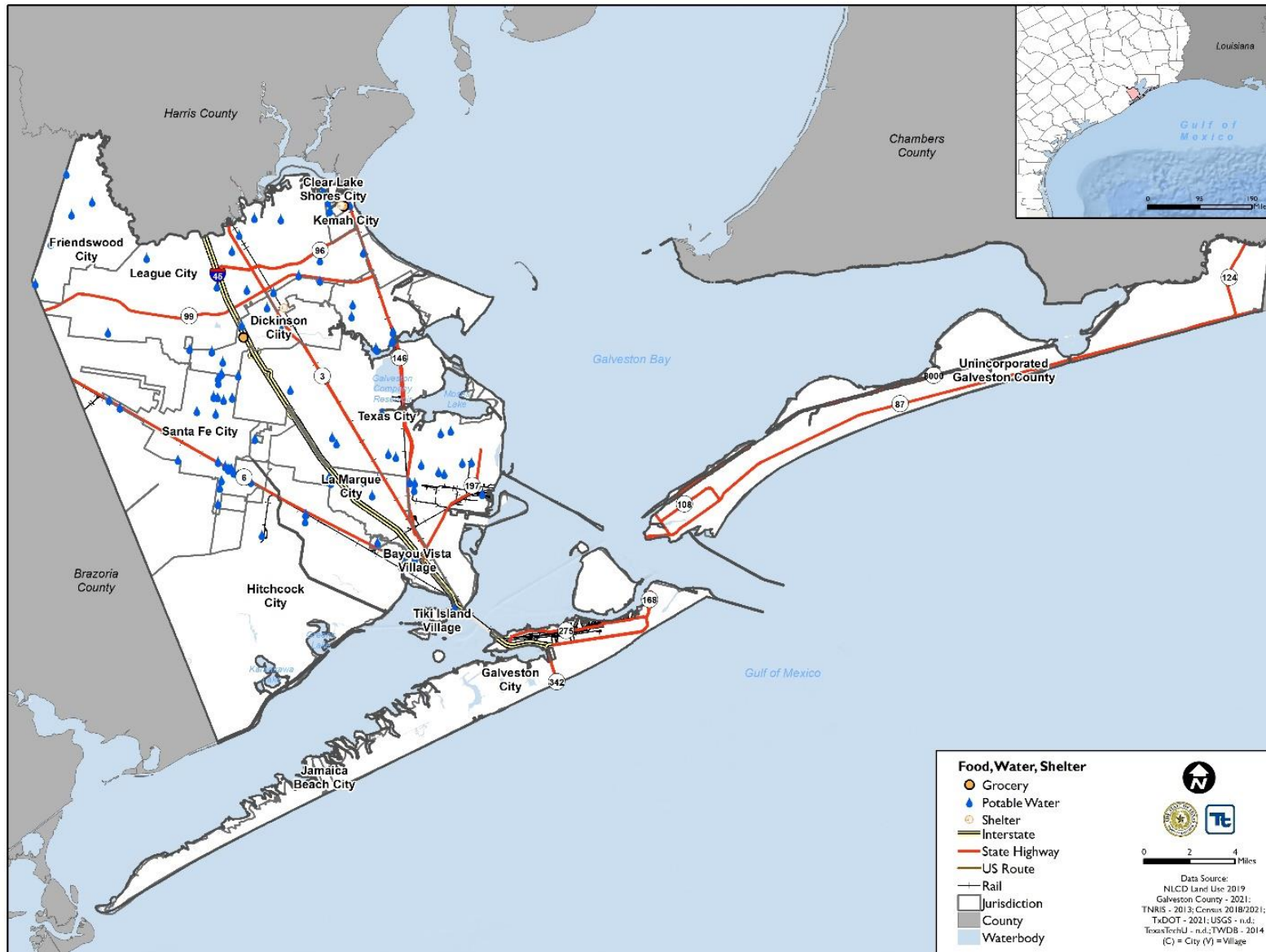
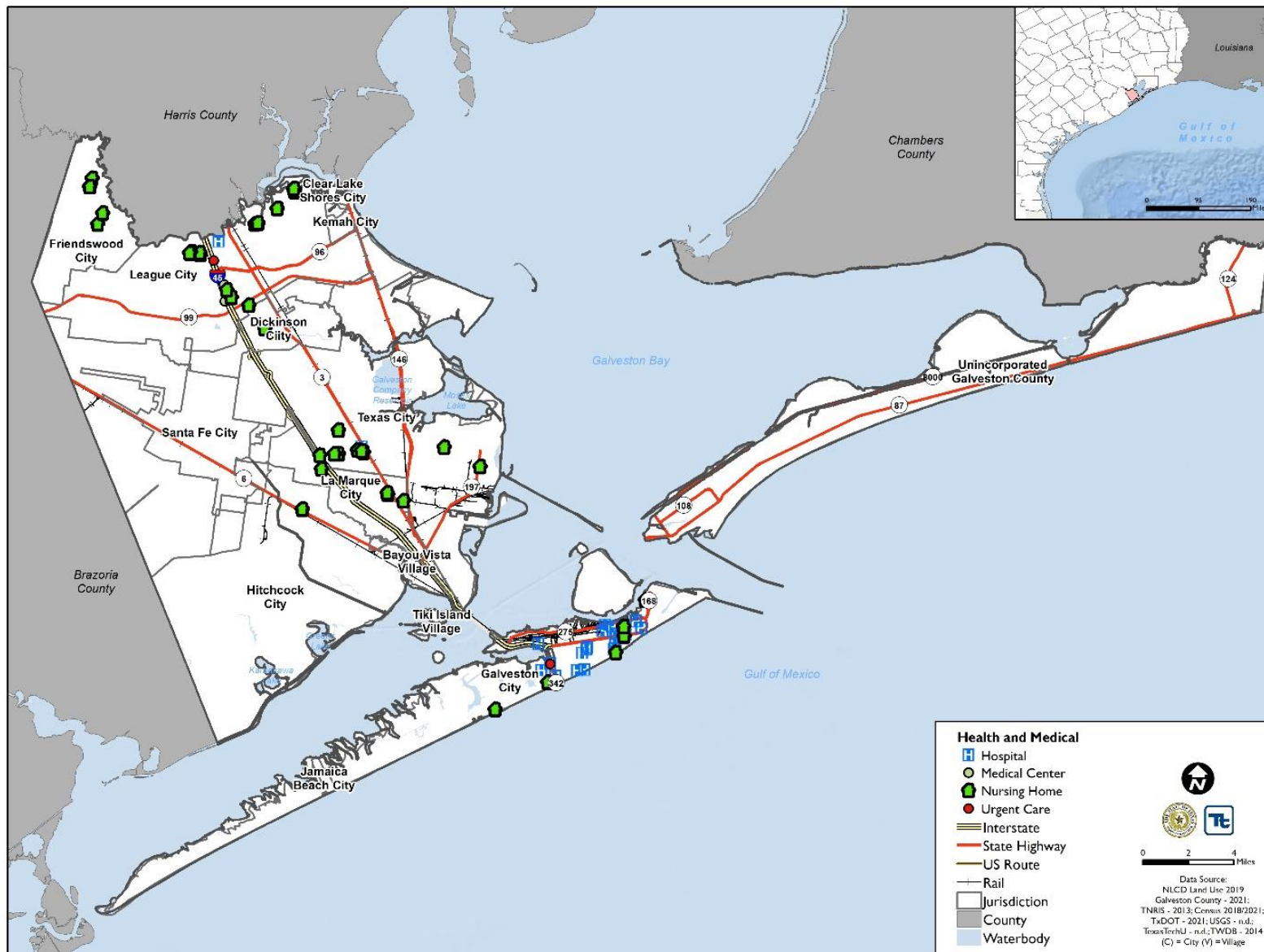




Figure 3-5. Health and Medical Lifelines in Galveston County





3.5.4 Energy (Power and Fuel) Lifelines

The energy (power and fuel) lifeline include facilities pertaining to the power grid and fuel supplies. Galveston County has 598 energy lifelines: one gas pipeline, 535 gas wells, two petroleum ports, 7 power plans, three pump stations, and 50 substations. Figure 3-6 shows the distribution of energy lifelines throughout Galveston County.

3.5.5 Communication Lifelines

Communication lifelines include facilities pertaining to infrastructure, alerts/warnings/messages, 911 and dispatch, responder communications, and finance. There are 111 communication facilities in Galveston County: 73 banks and 38 communication towers. Refer Figure 3-7 to see locations of communication lifelines in the County.

3.5.6 Transportation Lifelines

Transportation lifelines include facilities pertaining to highway/roadway, mass transit, railway, aviation, and maritime. Major highways in the County include Interstate 45 and State Highways 3, 6, 87, and 146. Figure 3-8 shows the distribution of transportation lifelines throughout the County.

Bridges

There are 491 bridges and 35 railroad bridges in Galveston County.

Ports

There are 355 port facilities in Galveston County.

Public Transportation

There are multiple public transportation providers in Galveston County including a fixed-route bus service, ADA paratransit service, taxi services, and a ferry.

Rail

The Galveston Railroad operates 32 miles of track.

Air

Galveston County has one international airport, two airstrips, and two heliports.



Figure 3-6. Energy Lifelines in Galveston County

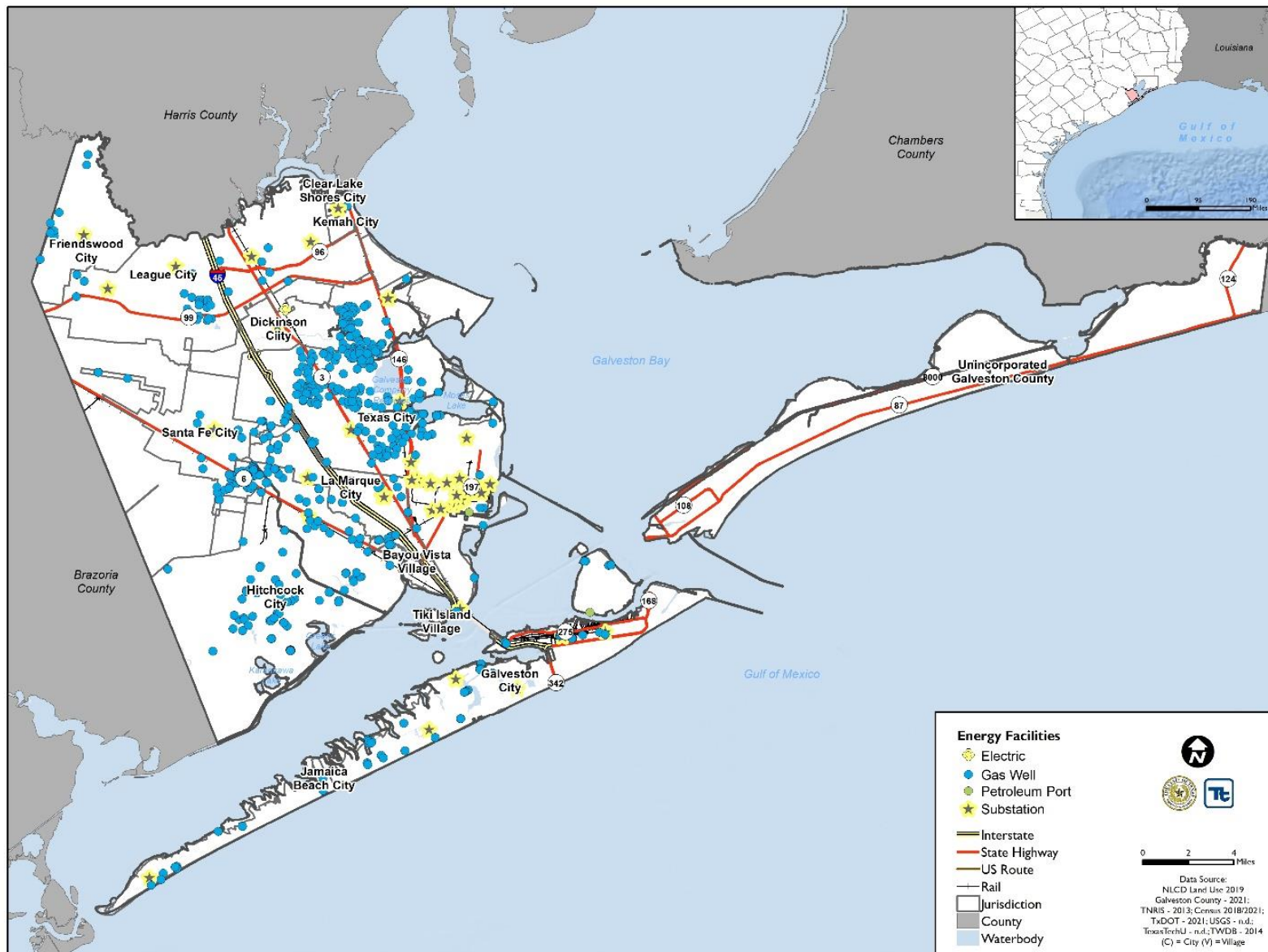




Figure 3-7. Communication Lifelines in Galveston County

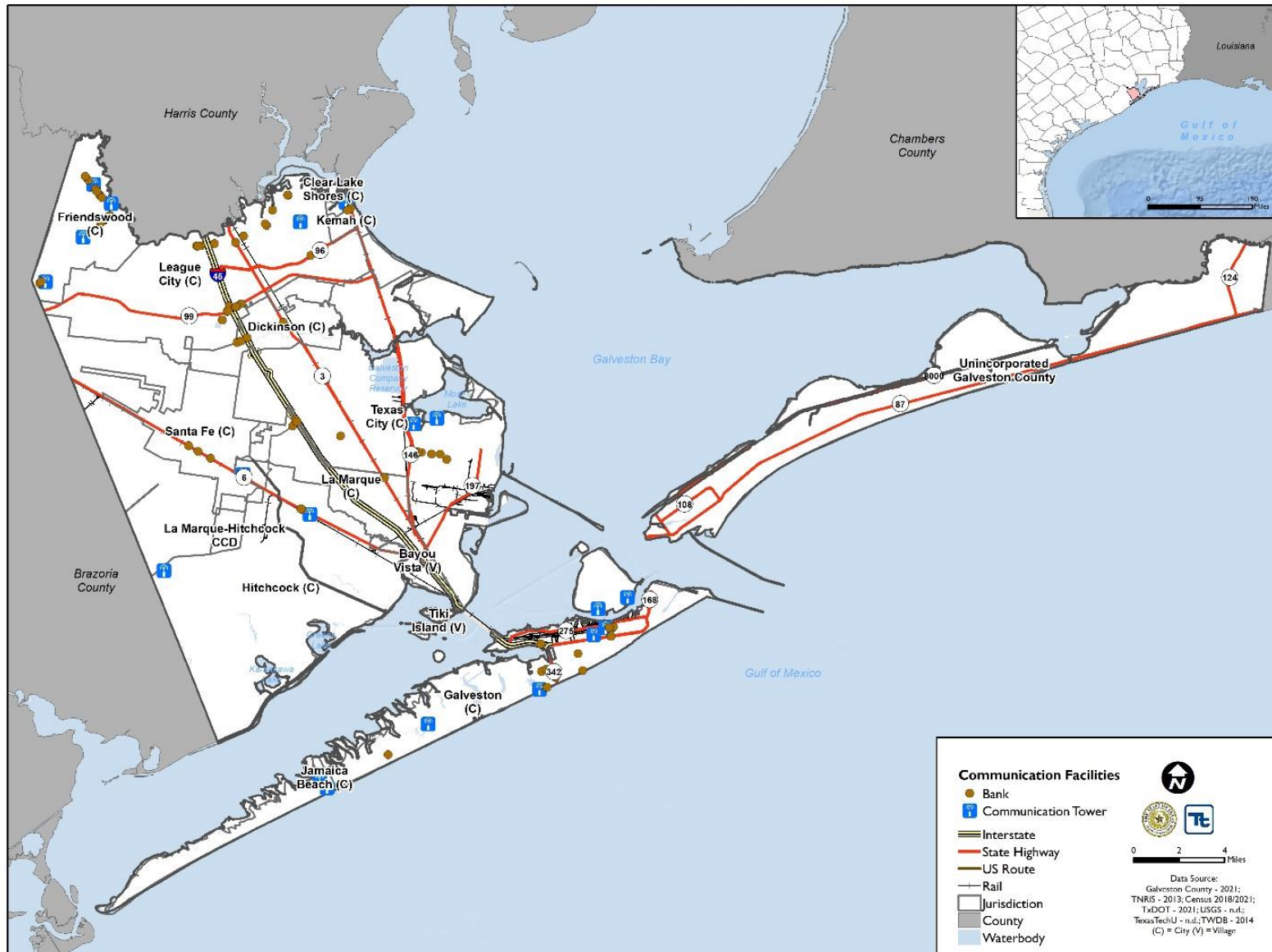
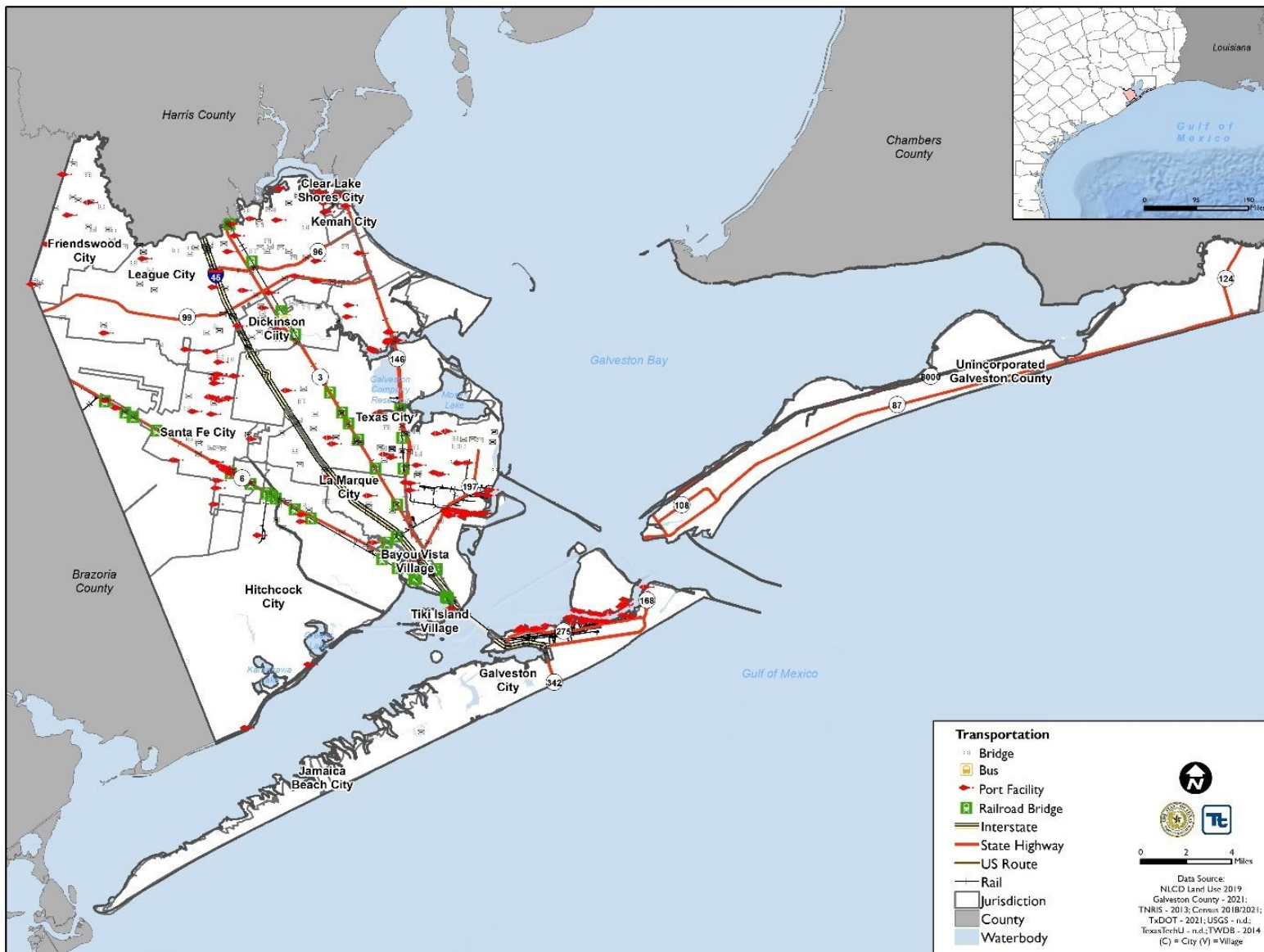




Figure 3-8. Transportation Lifelines in Galveston County





3.5.7 Hazardous Materials Lifelines

The hazardous material lifeline includes facilities pertaining to facilities containing hazardous materials and HAZMAT/pollutants/containments. There are 68 hazardous material lifelines in Galveston County: 8 Superfund sites and 60 waste stations.

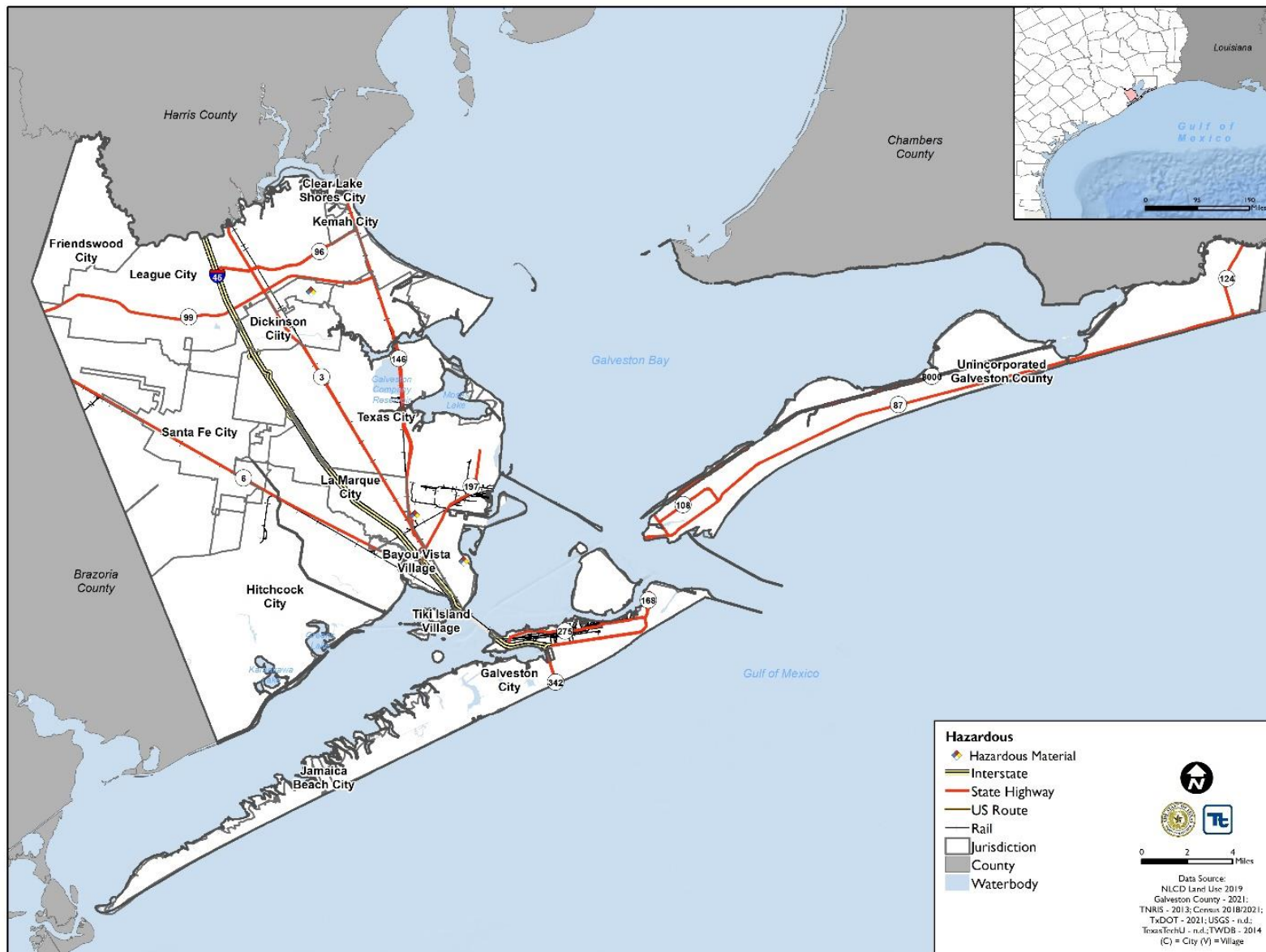
HAZMAT Facilities

A Superfund site consists of land in the United States that has been contaminated by hazardous waste and identified by the U.S. Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health or the environment. These sites are placed on the National Priorities List (NPL), the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide EPA in determining which sites warrant further investigation.

Abandoned hazardous waste sites placed on the federal NPL include those that EPA has determined present *a significant risk to human health or the environment*, with the sites being eligible for remediation under the Superfund Trust Fund Program. As of 2021, Galveston County hosts 8 hazardous sites in the federal Superfund Program that are listed as on the NPL (CERCLIS 2021).



Figure 3-9 Hazardous Materials Lifelines in Galveston County





SECTION 4. RISK ASSESSMENT

Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from identified hazards. It allows emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets. The process focuses on the following elements:

- Hazard identification—Use all available information to determine what types of hazards may affect a jurisdiction, how often they can occur, and their potential severity.
- Exposure identification—Estimate the total number of people and properties in the jurisdiction that are likely to experience a hazard event if it occurs.
- Vulnerability identification and loss estimation—Assess the impact of hazard events on the people, property, environment, economy, and lands of the region, including estimates of the cost of potential damage or cost that can be avoided by mitigation.

The risk assessment for this hazard mitigation plan update evaluates the risk of natural hazards prevalent in the planning area and meets requirements of the Disaster Mitigation Act (44 CFR, Section 201.6(c)(2)).

To protect individual privacy and the security of critical facilities, information on properties assessed is presented in aggregate, without details about specific individual personal or public properties.

4.1 METHODOLOGY AND TOOLS

The following describes the methodology and tools used to conduct the risk assessment for the Galveston County HMP 2022 update.

4.1.1 Risk Assessment Tools

Mapping

National, state, and county databases were reviewed to locate available spatially based data relevant to this planning effort. Maps were produced using geographic information system (GIS) software to show the spatial extent and location of hazards when such datasets were available. These maps are included in the hazard profile chapters of this document.

Hazus

In 1997, FEMA developed the standardized Hazards U.S. (Hazus) model to estimate losses caused by earthquakes and identify areas that face the highest risk and potential for loss. Hazus was later expanded into a multi-hazard methodology with new models for estimating potential losses from hurricanes and floods.

Hazus is a GIS-based software program used to support risk assessments, mitigation planning, and emergency planning and response. It provides a wide range of inventory data, such as demographics, building stock, critical facility, transportation and utility lifeline, and multiple models to estimate potential losses from natural disasters. The program maps and displays hazard data and the results of damage and economic loss estimates for buildings and infrastructure. Its advantages include the following:

- Provides a consistent methodology for assessing risk across geographic and political entities.
- Provides a way to save data so that they can readily be updated as population, inventory, and other factors change and as mitigation planning efforts evolve.



- Facilitates review of mitigation plans because it helps to ensure that FEMA methodologies are incorporated.
- Supports grant applications by calculating benefits using FEMA definitions and terminology.
- Produces hazard data and loss estimates that can be used in communication with local stakeholders.
- Is administered by the local government and can be used to manage and update a hazard mitigation plan throughout its implementation.

Level of Detail for Evaluation

Hazus provides default data for inventory, vulnerability, and hazards; these default data can be supplemented with local data to provide a more refined analysis. The model can carry out three levels of analysis, depending on the format and level of detail of information about the planning area:

- Level 1—All of the information needed to produce an estimate of losses is included in the software's default data. These data are derived from national databases and describe in general terms the characteristic parameters of the planning area.
- Level 2—More accurate estimates of losses require more detailed information about the planning area. To produce Level 2 estimates of losses, detailed information is required about local geology, hydrology, hydraulics, and building inventory, as well as data about utilities and critical facilities. This information is needed in a GIS format.
- Level 3—This level of analysis generates the most accurate estimate of losses. It requires detailed engineering and geotechnical information to customize it for the planning area.

4.1.2 Risk Assessment Approach

The risk assessments in this plan describe the risks associated with each hazard of concern identified. The following steps were used to define the risk of each hazard:

- **Identify and profile each hazard**—The following information is given for each hazard:
 - Geographic areas most affected by the hazard
 - Event frequency estimates
 - Severity estimates
 - Warning time likely to be available for response.
- **Determine exposure to each hazard**—Exposure was assessed by overlaying hazard maps with an inventory of structures, facilities, and systems to decide which of them would be exposed to each hazard.
- **Assess the vulnerability of exposed facilities**—Vulnerability of exposed structures and infrastructure was evaluated by interpreting the probability of occurrence of each event and assessing structures, facilities, and systems that are exposed to each hazard. Tools such as GIS and FEMA's hazard-modeling program Hazus were used for this assessment for the earthquake, flood, and hurricane hazards. Outputs similar to those from Hazus were generated for other hazards, using data generated through GIS.

Flood and Hurricane

The following hazards were evaluated using Hazus.

Flood

The 1-percent and 0.2-percent chance flood events were examined to evaluate Galveston County's risk and vulnerability to the flood hazard.



The effective Galveston County FEMA Digital Flood Insurance Rate Map (DFIRM) dated February 16, 2018 was used to evaluate potential future losses caused by the 1-percent and 0.2-percent annual chance flood events. These flood events are generally those considered by planners and evaluated under federal programs such as the NFIP.

The coastal flood risk areas for the 1-percent and 0.2-percent annual chance flood events were published on the FEMA map service center December 2014. The 2014 coastal flood risk area was used to divide the AE zones in the 2019 effective DFIRMs into coastal and riverine AE zones. The coastal AE zones were merged with 2019 VE zones to create the coastal flood hazard boundary, which was used to create the coastal depth grids for the 1-percent and 0.2-percent annual chance flood events. The riverine AE zones were merged with the AO and A zones to create the 1-percent annual chance flood event riverine depth grid. The 0.2-percent annual chance flood event riverine depth grid was created by merging the riverine AE, A, and AO zones with the 0.2-percent annual chance X zones. The final coastal and riverine depth grids were processed using a 2018 USGS 1-meter resolution Digital Elevation Model (DEM). These depth grids were integrated into the Hazus v5.0 riverine and coastal flood models used to estimate potential losses for the 1-percent and 0.2-percent annual chance flood events.

A Level 2 Hazus riverine and coastal flood analysis was performed. Both the critical facility and building inventories were formatted to be compatible with Hazus and its Comprehensive Data Management System (CDMS). Once updated with the inventories, the Hazus riverine and coastal flood model was run to estimate potential losses in Galveston County for the 1-percent and 0.2-percent annual chance flood events. A user-defined analysis was also performed for the building stock. Buildings located within the floodplain were imported as user-defined facilities to estimate potential losses to the building stock at the structural level. Hazus calculated the estimated potential losses to the population (default 2010 U.S. Census data), potential damages to the general building stock, and potential damages to critical facility inventories based on the depth grids generated and the default Hazus damage functions in the flood model. Furthermore, social impacts and debris were estimated by Hazus at the census block level. These results were presented at the municipal level. Since there are multiple census blocks that contain more than one jurisdiction, a density analysis was used to extract the percent of building structures that fall within each block and jurisdiction. The percentage was multiplied against the results calculated for each block and summed for each municipality.

Hurricane

A Hazus probabilistic analysis was performed to analyze the wind hazard losses for Galveston County for the 100- and 500-year mean return period events. The probabilistic Hazus hurricane model activates a database of thousands of potential storms that have tracks and intensities reflecting the full spectrum of Atlantic hurricanes observed since 1886 and identifies those with tracks associated with the County. Hazus contains data on historic hurricane events and wind speeds. It also includes surface roughness and vegetation (tree coverage) maps for the area. Surface roughness and vegetation data support the modeling of wind force across various types of land surfaces. Default demographic and updated building and critical facility inventories in Hazus were used for the analysis. Although damages are estimated at the census tract level, results were presented at the municipal level. Since there are multiple census tracts that contain more than one jurisdiction, a density analysis was used to extract the percent of building structures that fall within each tract and jurisdiction. The percentage was multiplied against the results calculated for each tract and summed for each municipality.

Coastal and Inland Erosion

Best available data was used to assess Galveston County's vulnerability to coastal and inland erosion. To help understand the geographic distribution of the County's risk to coastal erosion, a 100-foot buffer was created from NOAA's 2011 shoreline. The inland erosion hazard area was determined using USDA's Natural Resources Conservation Service's 2020 soil data for Galveston County. Soils with an erodibility factor (k) of 0.49 or greater



were extracted to assess the County's risk to inland erosion. Asset data (population, building stock, critical facilities, and new development) were used to support an evaluation of assets exposed and potential impacts and losses. To determine what assets are at risk to coastal and inland erosion, the County's assets were overlaid with the hazard area. Assets with their centroid located in the hazard area were totaled to estimate the number of persons, buildings, and facilities at risk to impacts from coastal and inland erosion.

Expansive Soils

Best available data was used to assess Galveston County's vulnerability to expansive soils. To help understand the geographic distribution of expansive soils, USDA's Natural Resources Conservation Service's 2020 soil data for Galveston County was referenced. Soils with linear extensibility greater than or equal to 6-percent were selected as expansive soils. Asset data (population, building stock, critical facilities, and new development) were used to support an evaluation of assets exposed and potential impacts and losses. To determine what assets are at risk to impacts from expansive soils, the County's assets were overlaid with the hazard area. Assets with their centroid located in the hazard area were totaled to estimate the number of persons, buildings, and facilities at risk to impacts from expansive soils.

Sea Level Rise: 1-foot Increments

Projected sea-level rise data (in one-foot increments) available from the NOAA Office of Coastal Management (<https://coast.noaa.gov/slrdata/>) was considered and used for this analysis to understand the assets within communities projected to be impacted by sea level rise (refer to Section 4.3.6 – Flood). Please note these levels do not include additional storm surge due to a hurricane or Nor'easter. The current Flood Insurance Rate Maps (FIRMs) also do not include the effects of sea-level rise. To assess the County's risk to sea level rise, the 2017 NOAA 1-foot, 2-feet, 3-feet, and 4-feet sea level rise hazard areas were referenced.

Asset data (population, building stock, critical facilities and lifelines, and new development) were used to support an evaluation of assets exposed and potential impacts and losses. To determine what assets are vulnerable to sea-level rise, the County's assets were overlaid with the hazard area. Assets with their centroid located in the hazard area were totaled to estimate the number of persons, buildings, and facilities at risk to impacts from sea-level rise.

Severe Winter Weather

All of Galveston County (population, buildings, and environment) is exposed and vulnerable to the winter storm hazard. In general, structural impacts include damage to roofs and building frames, rather than building content. Current modeling tools are not available to estimate specific losses for this hazard. A percentage of the custom-building stock structural replacement cost value was utilized to estimate damages that could result from winter storm conditions (i.e., 1-percent, 5-percent, and 10-percent of total replacement cost value). Given professional knowledge and currently available information, the potential losses for this hazard are considered to be overestimated; hence, providing a conservative estimate for losses associated with winter storm events.

Storm Surge: Categories 1-4

Storm surge hazard data available from the NOAA was considered and used for this analysis to understand the assets within communities projected to be impacted by hurricane storm surge (refer to Section 4.3.8 – Hurricane). This risk assessment used NOAA's 2014 Sea Lake Overland Surge from Hurricanes (SLOSH) data to analyze the assets at risk to impacts from hurricane storm surge. SLOSH represents potential flooding from worst-case combinations of hurricane direction, forward speed, landfall point, and high astronomical tide were used to estimate exposure. Please note these inundation zones do not include riverine flooding caused by hurricane surge or inland freshwater flooding. The model, developed by the NOAA National Hurricane Center to forecast surges that occur from wind and pressure forces of hurricanes, considers only storm surge height, and



does not consider the effects of waves. The SLOSH spatial data includes boundaries for Category 1 through Category 4 hurricane events.

To estimate exposure to the SLOSH Category 1 through Category 4 flood hazard areas, the spatial flood hazard boundaries were overlaid on centroids of updated assets (population, building stock, critical facilities and lifelines, and new development). Centroids that intersected the hazard areas were totaled to estimate the building replacement cost value and population vulnerable to the storm surge inundation areas.

Tsunami

Best available data was used to assess Galveston County's vulnerability to impacts from tsunamis. At this time, the Hazus model does not assess tsunami risk to areas in the State of Texas. Therefore, a hazard area was developed based upon the number of assets within 322 feet of a tsunami evacuation route. This area represents the locations within the County that will experience the greatest amount of congestion to evacuate out of the County due to a tsunami event. Asset data (population, building stock, critical facilities, and new development) were used to support an evaluation of assets exposed and potential impacts and losses. To determine what assets are at risk to impacts from tsunamis, the County's assets were overlaid with the hazard area. Assets with their centroid located within 322 feet of a tsunami evacuation route were totaled to estimate the number of persons, buildings, and facilities at risk to impacts from tsunamis.

Wildfire

The Wildfire-Urban Interface (Interface and Intermix) obtained through the SILVIS Laboratory, Department of Forest Ecology and Management, University of Wisconsin – Madison, was referenced to delineate wildfire hazard areas. The University of Wisconsin – Madison wildland fire hazard areas are based on the 2010 Census and 2006 National Land Cover Dataset and the Protected Areas Database. For this risk assessment, the high-, medium-, and low-density interface areas were combined and used as the "Interface" hazard area, and the high-, medium-, and low-density intermix areas were combined and used as the "Intermix" hazard areas.

Asset data (population, building stock, critical facilities, and new development) were used to support an evaluation of assets exposed and potential impacts and losses. To determine what assets are at risk to impacts from wildfires, the County's assets were overlaid with the hazard area. Assets with their centroid located within the wildfire hazard areas were totaled to estimate the number of persons, buildings, and facilities at risk to impacts from wildfire events.

All Other Assessed Hazards

No GIS format datasets appropriate for an exposure analysis were identified for the following hazards: dam and levee failure, drought, extreme temperature, hail, land subsidence, lightning, pandemic, thunderstorm wind, tornadoes, and utility failure.

4.1.3 Sources of Data Used in Hazus Modeling and Exposure Analyses

Galveston County assets were identified to assess potential exposure and loss associated with the hazards of concern. For the HMP update, Galveston County assessed exposure vulnerability of the following types of assets: population, buildings, and critical facilities/infrastructure. Some assets may be more vulnerable because of their physical characteristics or socioeconomic uses. To protect individual privacy and the security of critical facilities, information on properties assessed is presented in aggregate, without details about specific individual personal or public properties.



Building and Cost Data

Replacement cost values and detailed structure information derived from parcel and tax assessor data provided by the Galveston County Appraisal District were loaded into Hazus. An updated inventory was used in place of the Hazus defaults for critical facilities and infrastructure.

Replacement cost is the cost to replace the entire structure with one of equal quality and utility. Replacement cost is based on industry-standard cost-estimation models published in *RS Means Square Foot Costs* (RS Means, 2021). It is calculated using the RS Means square foot cost for a structure, which is based on the Hazus occupancy class (i.e., multi-family residential or commercial retail trade), multiplied by the square footage of the structure from the tax assessor data. The construction class and number of stories for single-family residential structures also factor into determining the square foot costs.

Critical Facilities and Lifelines

The 2021 HMP critical facility inventory, which includes essential facilities, utilities, government offices, transportation features and user-defined facilities was updated by the Planning Partnership. The update involved a review for accuracy, additions, or deletions of new/moved critical assets, identification of backup power for each asset (if known) and whether the critical facility is considered a lifeline in accordance with FEMA's definition. To protect individual privacy and the security of assets, information is presented in aggregate, without details about specific individual properties or facilities.

Population

Total population statistics from the 2015-2019 ACS 5-year estimate were used to estimate the exposure and potential impacts to the County's population in place of the 2010 U.S. Census block estimates. Population counts were evenly distributed by the number of residential buildings per municipality generated from the building stock inventory used in the hazard mitigation plan update. This estimate is a more precise distribution of population across the County compared to only using the Census block or Census tract boundaries. Limitations of these analyses are recognized, and thus the results are used only to provide a general estimate for planning purposes.

As discussed in Section 3 (County Profile), research has shown that some populations are at greater risk from hazard events because of decreased resources or physical abilities. Vulnerable populations in Galveston County included in the risk assessment are children, elderly, and population below the poverty level.

Hazus Data Inputs

The following hazard datasets were used for the Hazus Level 2 analysis conducted for the risk assessment:

- **Flood**—The FEMA 2019 effective Digital Flood Insurance Rate Map (DFIRM) and FEMA 2014 coastal hazard area depth grids for the planning area was used to delineate the coastal and riverine flood hazard areas to estimate potential losses. Using the DFIRM floodplain boundaries and base flood elevation information, and the USGS 1-meter digital elevation model data, flood depth grids were generated and integrated into the Hazus model.
- **Hurricane**—Hazus hurricane probabilistic data were used for the analysis of this hazard.

Other Local Hazard Data

Locally relevant information on hazards was gathered from a variety of sources. Frequency and severity indicators include past events and the expert opinions of geologists, emergency management specialists, and others. Data sources for specific hazards were as follows:

- **Coastal Erosion**—NOAA 2011 CUSP Shoreline 100-foot buffer



- **Inland Erosion**—USDA Natural Resources Conservation Service soils data where erosion factor (k) is equal or greater than 0.49
- **Storm Surge**—NOAA 2014 storm surge data
- **Sea Level Rise**—NOAA 2017 sea level rise data
- **Wildfire**—Wildland Urban Interface (WUI) data was acquired from the University of Wisconsin

No GIS format datasets appropriate for an exposure analysis were identified for the following hazards: dam and levee failure, drought, extreme temperature, hail, land subsidence, lightning, pandemic, thunderstorm wind, tornadoes, and utility failure.

Data Source Summary

Table 4-1 summarizes the data sources used for the risk assessment for this plan.

Table 4-1. Data Sources

Data	Source	Date	Format
Critical Facilities	Essential Government Functions Government Offices; City of Galveston; HIFLD; Texas Commission on Environmental Quality; Texas Tech University	2021/2021/2020/2021/2021	Digital (GIS) format
General Building Stock	Galveston Central Appraisal District; Microsoft Bing; RS Means	2021/2018/2021	Digital (GIS) format
Population data	American Community Survey 5-year Estimates	2019	Digital (GIS and tabular) format
Digital Elevation Model	USGS	2018	Digital (GIS) format
FEMA Effective DFIRM Data	FEMA	2018	Digital (GIS) format
Coastal Flood Hazard Area	FEMA	2014	Digital (GIS) format
Coastal Erosion	NOAA	2011	Digital (GIS) format
Inland Erosion	USGS/NRCS	2020	Digital (GIS) format
Sea Level Rise	NOAA	2017	Digital (GIS) format
SLOSH	NOAA	2014	Digital (GIS) format
Wildfire	University of Wisconsin	2010	Digital (GIS) format
Expansive Soils	USGS/NRCS	2020	Digital (GIS) format
Tsunami Evacuation Routes	Galveston County GIS	2021	Digital (GIS) format

4.1.4 Limitations

Loss estimates, exposure assessments, and hazard-specific vulnerability evaluations rely on the best available data and methodologies. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from the following:

- Approximations and simplifications necessary to conduct a study
- Incomplete or outdated inventory, demographic or economic parameter data
- The unique nature, geographic extent, and severity of each hazard
- Mitigation measures already employed
- The amount of advance notice residents has to prepare for a specific hazard event.

These factors can affect loss estimates by a factor of two or more. Therefore, potential exposure and loss estimates are approximate and should be used only to understand relative risk. Over the long term, Galveston County will collect additional data to assist in estimating potential losses associated with other hazards.



4.2 IDENTIFICATION OF HAZARDS OF CONCERN

To provide a strong foundation for mitigation actions considered in Sections 6 (Mitigation Strategy), Galveston County focused on considering a full range of hazards that could impact the area and then identified and ranked those hazards that presented the greatest concern. The hazard of concern identification process incorporated input from the Steering Committee; review of the State of Texas Hazard Mitigation Plan (2019); review of the 2017 Galveston County HMP; research and local, state, and federal information on the frequency, magnitude, and costs associated with the various hazards that have previously, or could feasibly, impact the region; and qualitative or anecdotal information regarding natural (not manmade) hazards and the perceived vulnerability of the study area's assets to them. Table 4.2-1 documents the process of identifying the hazards of concern for further profiling and evaluation.

Hazards of Concern are defined as those hazards that are considered most likely to impact a community. These are identified using available data and local knowledge.

Other natural and human-caused hazards of concern have occurred within Galveston County, have a low potential to occur and/or result in significant impacts within the County, or are covered in other plans that specifically address technological and intentional hazards. Therefore, these hazards will not be further addressed within this version of the plan. However, if deemed necessary by the County, these hazards may be considered in future versions of the HMP.

4.2.1 Changes from the 2017 Hazard Mitigation Plan

Since the development of the last plan, hazards and disasters not assessed in the prior plan have occurred in the County. These hazards were identified by stakeholders as areas to address in the plan.

The prior plan did not address pandemic as a hazard of concern. Beginning in March 2020, Galveston County was hit with the COVID-19 pandemic along with the rest of the world. As of December 28, 2021, there were 58,824 confirmed cases in Galveston County and 588 deaths associated with the virus.

The prior plan only addressed extreme heat, but this update includes both heat and cold when addressing extreme temperatures. This reflects the devastating cold event of February 2021.

The prior plan addressed coastal erosion as a single hazard. This update includes inland erosion in the profile.

The 2022 Galveston County Hazard Mitigation Plan Update includes best available data throughout the plan to present an updated understanding the County's risk.

4.2.2 Hazard Groupings

As per the 2017 Galveston County HMP, the Steering Committee maintained the grouping of hazards based on the similarity of hazard events, typical concurrence or impacts, consideration of how hazards have been grouped in FEMA guidance documents (*FEMA 386-2 Understanding Your Risks, Identifying Hazards and Estimating Losses; Multi-Hazard Identification and Risk Assessment – The Cornerstone of the National Mitigation Strategy; Local Mitigation Planning Handbook*), and consideration of hazard grouping in the State of Texas HMP.



The *Coastal and Inland Erosion* profile addresses erosion associated with water in Galveston County.



The *Dam and Levee Failure* profile addresses dam/levee failures that may impact Galveston County.



The *Drought* hazard profile specifically addresses drought events that occurred in Galveston County.



The *Expansive Soils* profile addresses expansive soil-related events that may occur in Galveston County.



The *Extreme Temperature* hazard profile specifically addresses periods of extreme temperature (heat and cold) that occurred in the County or had considerable impact on the County.



The *Flood* hazard includes riverine, flash flooding, coastal and stormwater flooding. Inclusion of the various forms of flooding is consistent with that used in FEMA's *Multi-Hazard Identification and Risk Assessment* guidance.



The *Hail* hazard profile specifically addresses hail events that occurred in Galveston County.



The *Hurricane and Tropical Storm* profile addresses hurricanes and tropical storms that occurred in or impacted Galveston County.



The *Land Subsidence* profile addresses land subsidence events occurring in Galveston County or having impacts on the County.



The *Lightning* hazard profile specifically addresses lightning events that occurred in Galveston County.



The *Pandemic* hazard profile addresses diseases with the potential to impact the County, including the novel coronavirus (COVID-19), West Nile Virus, and Influenza.



The *Severe Winter Storm* profile includes heavy snow, blizzards, and ice storms. This grouping is consistent with the State of Texas HMP.



The *Thunderstorm Wind* hazard profile specifically addresses thunderstorm events that occurred in Galveston County.



The *Tornado* hazard profile specifically addresses tornado events that occurred in Galveston County.



The *Tsunami* profile addresses the potential for events that may occur in Galveston County.



The *Utility Failure* profile includes events related to power outages in Galveston County.



The *Wildfire* profile addresses wildfire events that occurred in Galveston County.

Table 4-2. Identification of Hazards of Concern for Galveston County

Hazard	Description
Natural Hazards	
Coastal and Inland Erosion	- Coastal erosion impacts the jurisdictions in Galveston County that border the Gulf or tidal waterway. - Inland erosion is common along the streams and bayous.



Hazard	Description
	- Inland and coastal erosion are identified as hazards of concern in the 2018 State of Texas Hazard Mitigation Plan; however, they were profiled individually. - Due to the history of occurrence in the County, the coastal and inland erosion hazard is identified as a hazard of concern for Galveston County.
Dam and Levee Failure	- According to the National Inventory of Dams, there is 1 major dam dams in Galveston County. It is classified as a high hazard dam. - The identified dam is for water supply purposes and was built in 1949. - The Galveston County hurricane flood protection levee protects the cities of Texas City and La Marque. The levee is comprised of 15.7 miles of an earthen berm and 1.3 miles of concrete wall, offering a total of 17 miles of protection. - There have been no reported dam or levee incidents in the County. - Due to the high hazard dam and the levee system located in the County, dam and levee failure was identified as a hazard of concern for the county. - The 2018 State of Texas HMP includes dam/levee failure as a hazard of concern for the State.
Drought	- Galveston County was the subject of seven USDA declarations for drought that occurred between 2012 and 2021. - Due to the history of occurrence and the impacts drought can have, drought was identified as a hazard of concern for Galveston County.
Earthquake	The 2018 State of Texas HMP includes earthquakes as a hazard of concern for the State; however, due to the lack of earthquake events in the County and the unlikely possibility of future events, earthquake is not identified as a hazard of concern for Galveston County.
Expansive Soils	- According to the 2018 State of Texas HMP, Galveston County is underlain by soils with a high potential for swelling. - Groundwater withdrawal will continue to increase the risk for expansive soil issues. An increase in development will increase the need for groundwater. - While portions of the County are underlain by expansive soils, Galveston County has insufficient data on losses and no record of impacts from expansive soils.
Extreme Temperature	- Extreme heat and extreme cold temperatures were identified as hazards of concern in the State of Texas HMP; however, they were profiled individually. - Galveston County has been impacted by eight heat events and three cold events between 1996 and 2021. - Galveston County has experienced extreme heat and cold events and will continue to experience them in the future. Therefore, extreme temperature was identified as a hazard of concern for the County.
Flood	- Riverine and coastal flooding are identified as hazards of concern in the 2018 State of Texas Hazard Mitigation Plan; however, they were profiled individually. 96 flood events have been identified as occurring in Galveston County between 1996 and 2020. The flood events have resulted in six FEMA disaster declarations. - As of September 2021, there are 58,956 flood insurance policies in force and claims that have totaled over \$2.1 million since 1970. - The State HMP indicated that Galveston County is located in one of the storm surge basins and has a large percentage of land inside the SFHA. The County will continue to experience flood events. - Based on the history of events and losses, flooding was identified as a hazard of concern for Galveston County.
Hail	- Hailstorms were identified as a hazard of concern in the 2018 Texas State Hazard Mitigation Plan. - Galveston County was not subject to a hail-related major disaster/emergency declaration; however, the County has been subject to a number of hail events since 1996. There is a 100% chance of the County being impacted by a hail event during a given year. - Hail was identified as a hazard of concern for Galveston County.
Hurricanes, Tropical Storms, and Depressions	- Hurricanes and tropical storms were identified as a hazard of concern in the 2018 State Hazard Mitigation Plan. - Galveston County was included in 14 of 29 hurricane-related major disaster and emergency declarations. Since 1996, there have been 19 tropical storm/hurricane events. - Based on history of occurrences and losses, the hazard was identified as a hazard of concern for Galveston County.
Land Subsidence	Land subsidence was identified as a hazard of concern in the State Hazard Mitigation Plan. The State HMP indicates that Galveston County is located within a coastal lowlands aquifer system area of the State that is vulnerable to land subsidence.



Hazard	Description
	There have been no impacts to any critical facilities, infrastructure, or other community assets. Rates of subsidence have decreased across Galveston County, but its effects continue to compound.
Lightning	- Lightning was identified as a hazard of concern in the 2018 State Hazard Mitigation Plan. - Lightning is a somewhat frequent occurrence in the County. However, based on available data, there have been only 20 reported events since 1996 causing over \$3.5 million in property damage, five fatalities, and three injuries. - The hazard was identified as a hazard of concern for Galveston County.
Pandemic	- Galveston County has experienced three separate public health events since 2003. These include West Nile Virus, Zika Virus, and COVID-19. - At the time of this plan's writing, COVID-19 continues to impact public health both locally and globally. - The hazard was identified as a Hazard of Concern for Galveston County.
Severe Winter Storm	- Winter weather was identified as a hazard of concern in the State Hazard Mitigation Plan. - Galveston County has infrequently been impacted by ice storms and heavy snow, but property damages have been in the millions of dollars. - The hazard was identified as a Hazard of Concern for Galveston County.
Thunderstorm Wind	- Severe Winds were identified as a hazard in the State Hazard Mitigation Plan. - For this plan, Severe Winds were included as part of the Thunderstorm Wind hazard. - Galveston County has been subject to two thunderstorm-related major disaster declarations and more than 200 events since 1950. - The hazard was identified as a Hazard of Concern for Galveston County.
Tornadoes	- The Texas State Hazard Mitigation Plan identified tornadoes as a state hazard of concern. - Galveston County has not been the subject and tornado-related FEMA disaster declarations; however, 54 funnel clouds and 124 tornadoes have occurred in the County since 1950, causing over \$36 million in property damage, 9 fatalities, and 243 injuries. - The hazard was identified as a Hazard of Concern for Galveston County.
Tsunami	- The 2018 State of Texas HMP does not list tsunami as a hazard of concern for the State; however, the 2017 Galveston County HMP included it for the County. - There has been one small wave tsunami event recorded in the County over 100 years ago in 1918. - The hazard was identified as a Hazard of Concern for Galveston County.
Wildfire	- The Texas State Hazard Mitigation Plan identified wildfires as a state hazard of concern. - While wildfires have occurred in the County, Galveston County has insufficient data on losses and no record of impacts from wildfires. - The wildfire hazard was identified as a Hazard of Concern for Galveston County.
Non-Natural Hazards	
Utility Failure	- Power failures are usually the result of a natural hazard event involving high winds. - Power failure is especially problematic for homes that are cooled or heated by electricity and for residents who rely on power for home medical devices. - The hazard was identified as a Hazard of Concern for Galveston County.



4.3 HAZARD PROFILES

4.3.1 Erosion

The following section provides the hazard profile and vulnerability assessment for the erosion hazard in Galveston County.

Hazard Profile

Description

Erosion is the process of the wearing away of beaches and bluffs along the coastline by large storms, flooding, strong wave action, sea level rise, fluvial currents, and human activities. In the State of Texas, there are two types of erosion: coastal erosion and inland erosion.

Coastal Erosion

Coastal erosion is a hydrologic hazard defined as the wearing away of land and loss of beach, shoreline, or dune material because of natural coastal processes or manmade influences. Coastal erosion is linked to hurricane damage in that healthy coastal dunes and beaches help reduce impacts of hurricane, tropical storms, tropical depressions, and severe coastal flooding. Mitigating coastal erosion also mitigates those hazards (State of Texas Hazard Mitigation Plan 2018).

Erosion is measured as a rate of change in the position or displacement of a shoreline over a period of time. Short-term erosion typically results from periodic natural events, such as wave action, storm surges and wind. Long-term erosion is a result of repetitive occurrences of this type and of severe storm and flooding events. Erosion can affect natural and built environments. Impacts depend on topography, soils, building types and construction materials. Coastal erosion can affect natural systems, coastal food supplies, tourism industry, and small town viability. When sea water infiltrates freshwater wetlands, they can die, removing key habitats for animals and a protective buffer for nearby communities (State of Texas Hazard Mitigation Plan 2018).

The most vulnerable jurisdictions in Texas are the cities and towns along the coast and barrier islands in Region 2, Region 3, and Region 6. The planning area is in Region 2 and therefore especially vulnerable to coastal erosion.

See Figure 4-2 for shoreline movement rates. Mitigation techniques include dune and beach restoration, building seawalls, and placing semi-permanent obstructions perpendicular to beaches. Coastal erosion mitigation actions have the benefit of helping reduce impacts from hurricanes and severe coastal flooding. The Texas General Land Office (GLO) manages coastal erosion and documents its progress to the legislature in Coastal Erosion Planning and Response Act reports.

Figure 4-1 Texas Regions

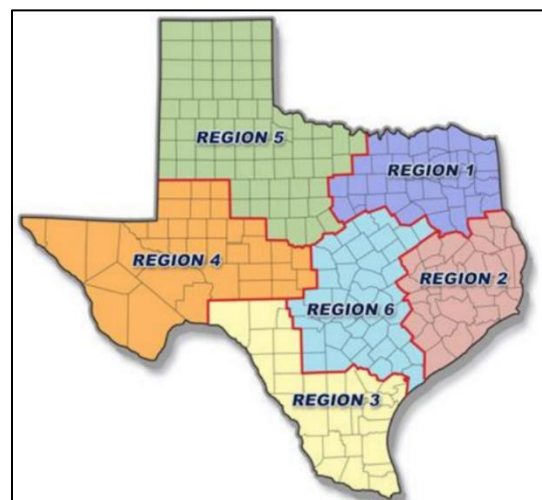
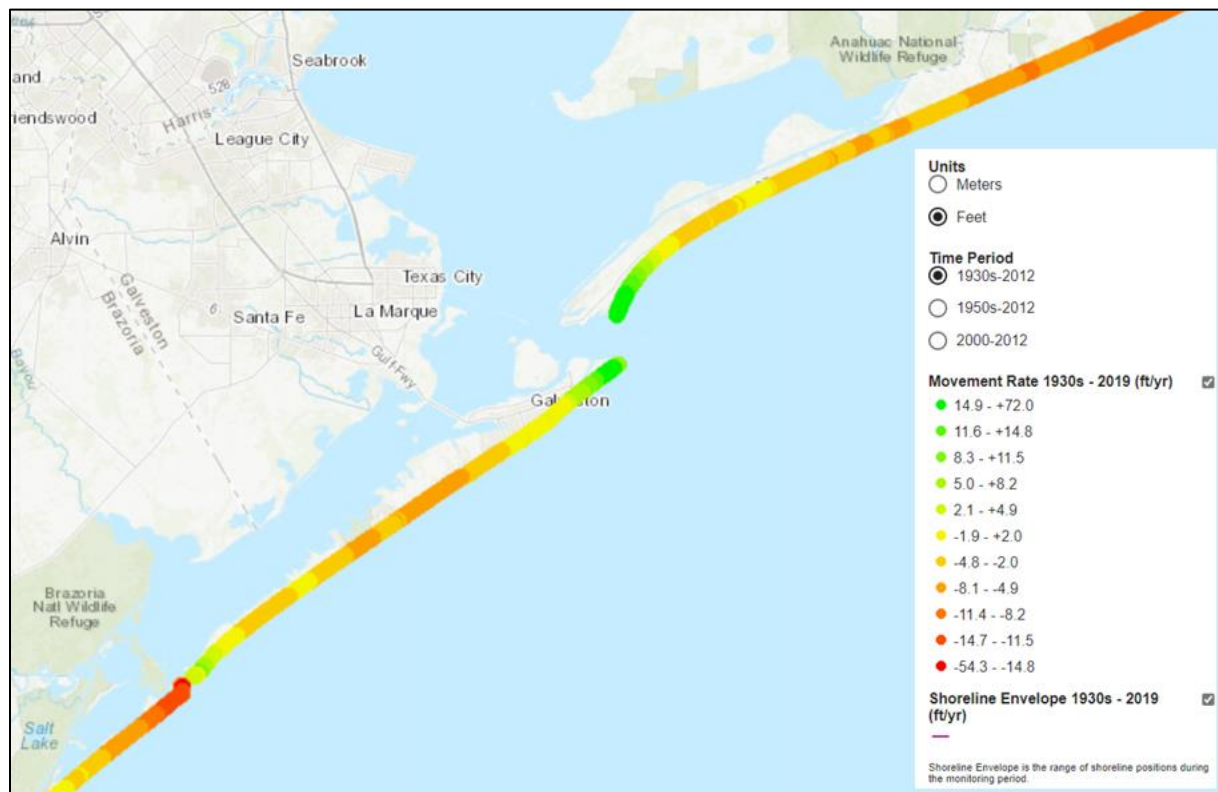




Figure 4-2 Texas Shoreline Movement Rate Map



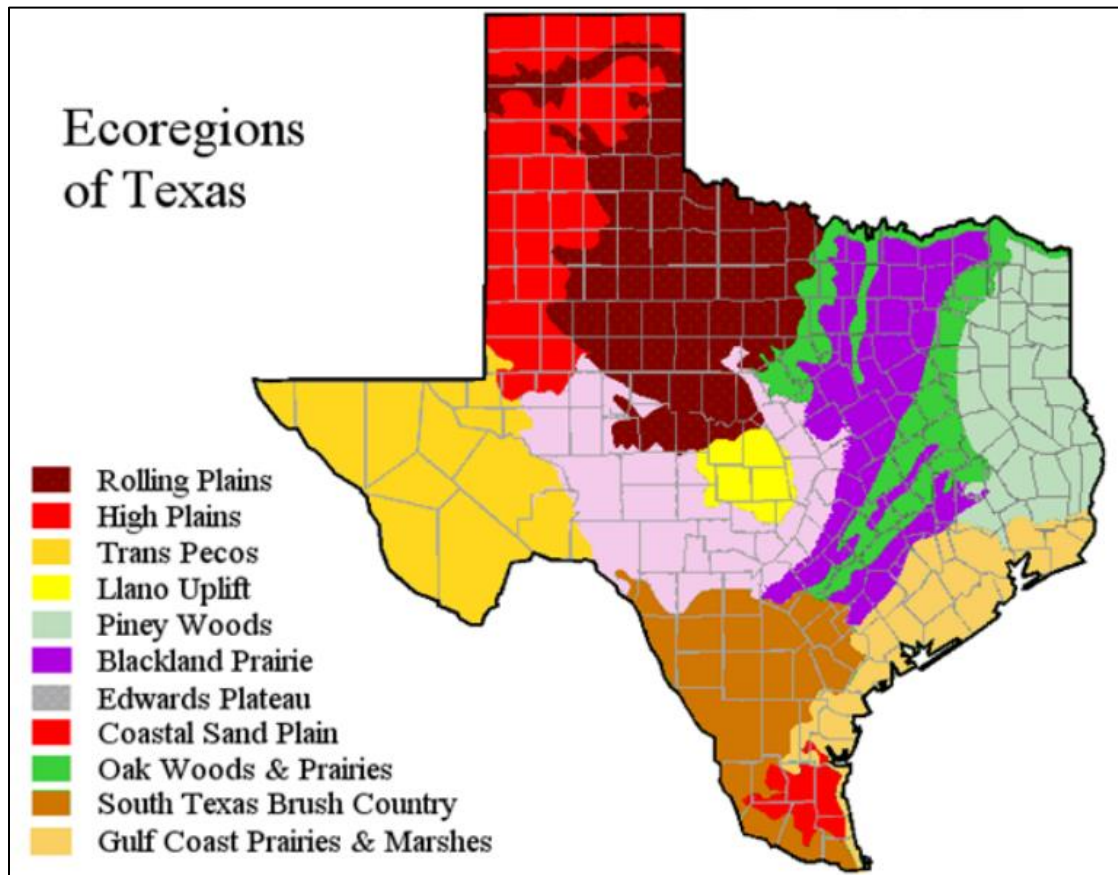
Source: (Bureau of Economic Geology, University of Texas 2012)

Inland Erosion

Inland erosion is the wearing-away of soil or removal of the banks of streams or rivers. It involves the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity. Soil erosion on cropland is of particular interest because of its onsite impacts on soil quality and crop productivity, and its off-site impacts on water quantity and quality, air quality, and biological activity. Erosion is measured as a rate of change in the position or displacement of a river or stream bank over a period of time or the amount of soil removal. Short-term erosion results from periodic flooding and wind. Long-term erosion is a result of repetitive events of this type and of prolonged drought.

In the State of Texas, inland erosion is more prominent in the High Plains, Rolling Plains, and Coastal Sand Plains. Galveston County is located in the Gulf Coast Prairies & Marshes ecoregion and therefore inland erosion is not as prominent as coastal erosion (Figure 4-3).

Figure 4-3. Location of Erosion Areas in the State of Texas



Source: Kids on the Land, 2021

Erosion caused by water is the primary concern for the County. Water erosion is the detachment and removal of soil by water. The process can occur naturally or be accelerated by human activity. The rate of erosion can be a slow process that continues relatively unnoticed or can occur very rapidly. The rate is dependent on the type of soil, the local landscape, and weather conditions (Ritter 2018, USDA 2000).

There are three types of water erosion that can occur: sheet, rill, and gully. Sheet erosion is the most difficult to see as it is a uniform soil layer being removed from an area over the surface. Rill erosion starts as water flowing over the soil surface concentrates into small streams, creating channels of water flow. Gully erosion is when rill erosion is not kept under control and creates gullies (deeper and wider cuts) (Soil Science Society of America n.d.)

Erosion can be most severe where urbanization, development, recreational activities, logging, and agricultural practices take place. Extreme rainfall events, lack of vegetative cover, fragile soils and steep slopes combine to accelerate erosion (Ritter 2018).

Location

Coastal Erosion

Coastal erosion impacts the jurisdictions in Galveston County that border the Gulf or tidal waterway. These include Clear Lake Shores, Hitchcock, Jamaica Beach, Kemah, Tiki Island, and the unincorporated areas of Galveston County (Galveston County 2017).



Inland Erosion

The Dickinson Bayou watershed encompasses approximately 100 square miles of land that drains water into the bayou. Vegetated riparian zones are an important component of the bayous that provide functional and aesthetic values. Vegetated shorelines minimize soil erosion and naturally increase filtration of surface water runoff. In many areas of the watershed, Dickinson Bayou has little natural riparian buffer left (Dickinson Bayou Watershed Partnership n.d.).

The Highland Bayou Coastal Basin is a 120 square mile drainage basin located on mainland Galveston County. Bayou and stream segments consist of non-tidal, tidally influenced, and tidal waters. Fresh water in the bayous is largely precipitation-driven overland flows (Texas A&M AgriLife Extension n.d.). Even though the topography is flat, overland flows can cause erosion in basin.

Extent

Coastal Erosion

Galveston County has approximately 55 miles of Gulf shoreline and 291 miles of Bay shoreline. As shown in Figure 4-2, the jurisdictions located on the Gulf of Mexico have experienced substantial land loss along the shoreline. According to the Texas General Land Office, the Texas coast is eroding at 4.0 feet per year (Texas General Land Office 2015).

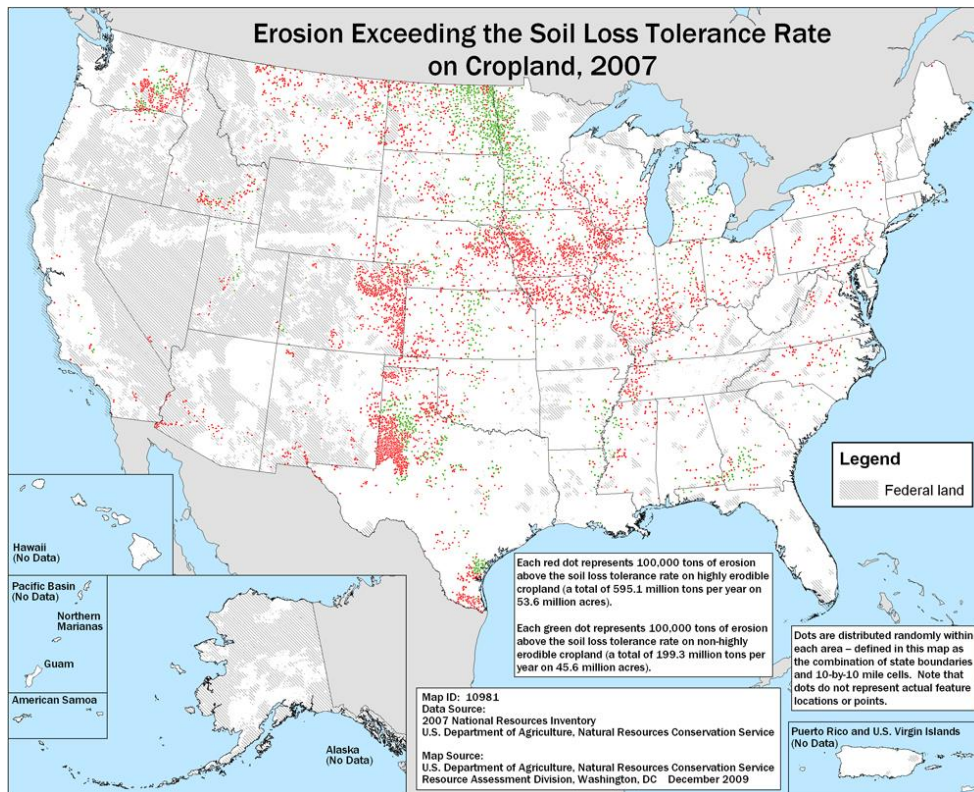
Inland Erosion

It is difficult to directly measure erosion and the risk of erosion. There are other properties, however, that can be used to measure erosion: soil surface stability, aggregate stability, infiltration, compaction, and content of organic matter. Measuring these properties can help with understanding the susceptibility of erosion at a specific location. Comparing visual observations along with quantitative measurements can help provide information about soil surface stability, sedimentation, and soil loss (USDA 2001).

Every five years the Natural Resources Conservation Service conducts a statistical survey of natural resource conditions and trends on non-federal land in the United States called the National Resources Inventory (NRI). The NRI provides nationally consistent statistical data on erosion resulting from water and wind processes on cropland. It uses a variety of tables and maps to document the ongoing state of erosion across the county (State of Texas Hazard Mitigation Plan 2018, NRCD 2010).

One key measure used in the NRI is the Erodibility Index (EI). This index is a numerical expression of the potential of a soil to erode, considering climatic factors and the soils' physical and chemical properties. The higher the index, the greater is the investment needed to maintain the sustainability of the soil resource base of high-yield crops. Highly Erodible Land is defined to have an EI of at least 8 (State of Texas Hazard Mitigation Plan 2018).

Figure 4-4. National Erosion Loss Rates



Source: NRI 2007

Another soil erosion component is the soil loss tolerant rate. Identified as ‘T’, this is the maximum rate of annual soil loss that will permit crop productivity to be economically sustained. Erosion is considered to be greater than ‘T’ if either water or wind erosion rates exceed the soil tolerance rate (State of Texas Hazard Mitigation Plan 2018). Figure 4-4 illustrates the locations of where erosion exceeded the soil loss tolerance rates across the United States. Each red dot represents 100,000 tons of erosion above the soil loss tolerance. According to this figure, areas of erosion exceeding the soil loss tolerance rates was not identified in Galveston County.

Worst-Case Scenario

Magnitude scales for erosion events do not currently exist, but any storm that produces significant amounts of rain in a short period of time could lead to a worst-case scenario for an erosion incident along the shoreline or the bayous of Galveston County. Storms that occur in rapid succession similar to the events that occurred in August and September 2020 (see Table 4-3) may cause several feet of dune and bayou erosion to occur, similar to those previous events. Additionally, hurricane winds can create wave action that quickly erodes shoreline areas. Rainfall events that occur upstream from the bayous can create flood stages and high flow rates. This causes the water to move at higher speeds through the County, causing erosion along the banks of the bayous. Impacts from such events includes road closures, damage to infrastructure and buildings, and inaccessible areas that can disrupt emergency response.

Previous Occurrences and Losses

Between 1953 and 2021, the State of Texas was not included in any erosion-related FEMA disaster declarations. For this plan update, there was limited information regarding inland erosion in Galveston County. Statistical data for individual erosion events is not readily available, however the following events were identified as coastal erosion events associated with severe weather events.

**Table 4-3. Severe Storm/Erosion Events for Galveston County, 2003-2021**

Start Date of Event	Event Type	Event Details
July 14, 2003	Hurricane Claudette	The highest recorded tide level, 7.56 ft. above mean low-lower water, was recorded at Pleasure Pier in Galveston.
September 23, 2005	Hurricane Rita	In Galveston County, tropical storm force sustained winds with gusts to hurricane force were reported across the county, especially on the Bolivar Peninsula.
November 15, 2006	High Winds	A strong cold front moved through Southeast Texas in the morning. A tight surface pressure gradient behind the front produced winds at wind advisory levels with some higher gusts observed at Bacliff.
September 12, 2007	Hurricane Humberto	Developed from a tropical depression into a hurricane within nineteen hours. Maximum rainfall totals from Humberto ranged from around two inches to over fourteen inches mainly along and east of a line from Freeport to the Hitchcock and Texas City area to around Winnie.
September 5, 2008	Tropical Storm Edouard	Storm tide damage on the Bolivar Peninsula was confined to the Gilchrist area. Ten single family homes experienced flooding up to eighteen inches deep inside the home. Fifteen single family homes and two mobile homes experienced flooding up to six inches deep inside the home.
September 12, 2008	Hurricane Ike	Ike produced damage due to high storm surge and high winds along Galveston Island, the Bolivar Peninsula, and along the Galveston Bay. Storm tides of 10 to 15 feet above mean sea level were observed in these areas.
April 24, 2010	High Winds	A low-pressure system combined with a gravity wave disturbance produced a period of strong winds mainly along the coast. Wind gusts were in excess of 69 mph.
September 3, 2011	High Surf	High offshore winds associated with Tropical Storm Lee impacted areas of Galveston County.
June 15, 2015	Tropical Storm	High surf caused erosion of Galveston Island beaches during Tropical Storm Bill.
June 21, 2017	Tropical Storm	Coastal flooding occurred in connection with Tropical Storm Cindy.
August 26, 2017	Hurricane Harvey	Hurricane Harvey produced major flooding throughout the County.
August 26, 2020	Storm Surge/Tide	Storm surge flooding and high surf associated with Hurricane Laura. Beach erosion on both the Gulf and Bay sides.
September 23, 2020	Storm Surge/Tide	Storm surge flooding and high surf associated with Tropical Storm Beta. Significant beach erosion occurred along the Bolivar Peninsula and Galveston Island.
October 8, 2020	Tropical Storm	Hurricane Delta produced high surf and elevated tides along Gulf facing beaches and around Galveston Bay.

Source: NOAA-NCEI 2021, Galveston County HMP 2017

Note: Due to limitations in data, not all erosion events are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated

Climate Change Projections

Climate change may impact storm patterns, increasing the probability of more frequent, intense storms with varying duration. Increase in global temperature could affect the snowpack and its ability to hold and store water. Warming temperatures also could increase the occurrence and duration of droughts, which would increase the probability of wildfire, reducing the vegetation that helps to support steep slopes. All of these factors would increase the probability for erosion to occur.



Probability of Future Events

It is anticipated that erosion will continue to occur along the shoreline and bayous of Galveston County. As the frequency of storms occur due to climate change, the probability for future events will likely increase as well. Table 4-4 summarizes data regarding the probability of occurrences of erosion events in the County based on the historic record. The information used to calculate the probability of occurrences is based on the 2017 Galveston HMP, the NOAA-NCEI Storm Events Database, and FEMA.

Table 4-4 Probability of Future Occurrence of Erosion Events

Hazard Type	Number of Occurrences Between 2003 and 2020	% chance of occurrence in any given year
Erosion	14	77.8%

Based on the 14 recorded erosion events over 17 years, the planning area averages nearly one erosion event every year. Based on the history of events, the probability for erosion events occurring in the County is considered occasional (between 10 and 100% annual chance of occurring). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To assess Galveston County's risk to the coastal and inland erosion hazards, a spatial analysis was conducted using the best available data. To help understand the geographic distribution of the County's risk to coastal erosion, a 100-foot buffer was created from NOAA's 2011 shoreline. The inland erosion hazard area was determined using USDA's Natural Resources Conservation Service's 2020 soil data for Galveston County. Soils with an erodibility factor (k) of 0.49 or greater were extracted to assess the County's risk to inland erosion. Figure 4-5 depicts these hazard areas in the County.

Refer to Section 4.1 (Methodology and Tools) for additional details on the methodology used to assess coastal and inland erosion risk.

Impact on Life, Health and Safety

Coastal and inland erosion is not generally considered an imminent threat to public safety when the changes are gradual over many years. However, drastic changes to the shoreline may occur as a result of a single storm event which can threaten homes and public safety. Furthermore, erosion can cause damage to residential buildings, displace residents, and block major roadways, thus inhibiting travel for emergency responders or populations trying to evacuate the area.

Erosion can create water quality problems in surface waters and drainage ways. These problems can adversely impact the health and biological diversity of water bodies. According to the USDA, this includes:

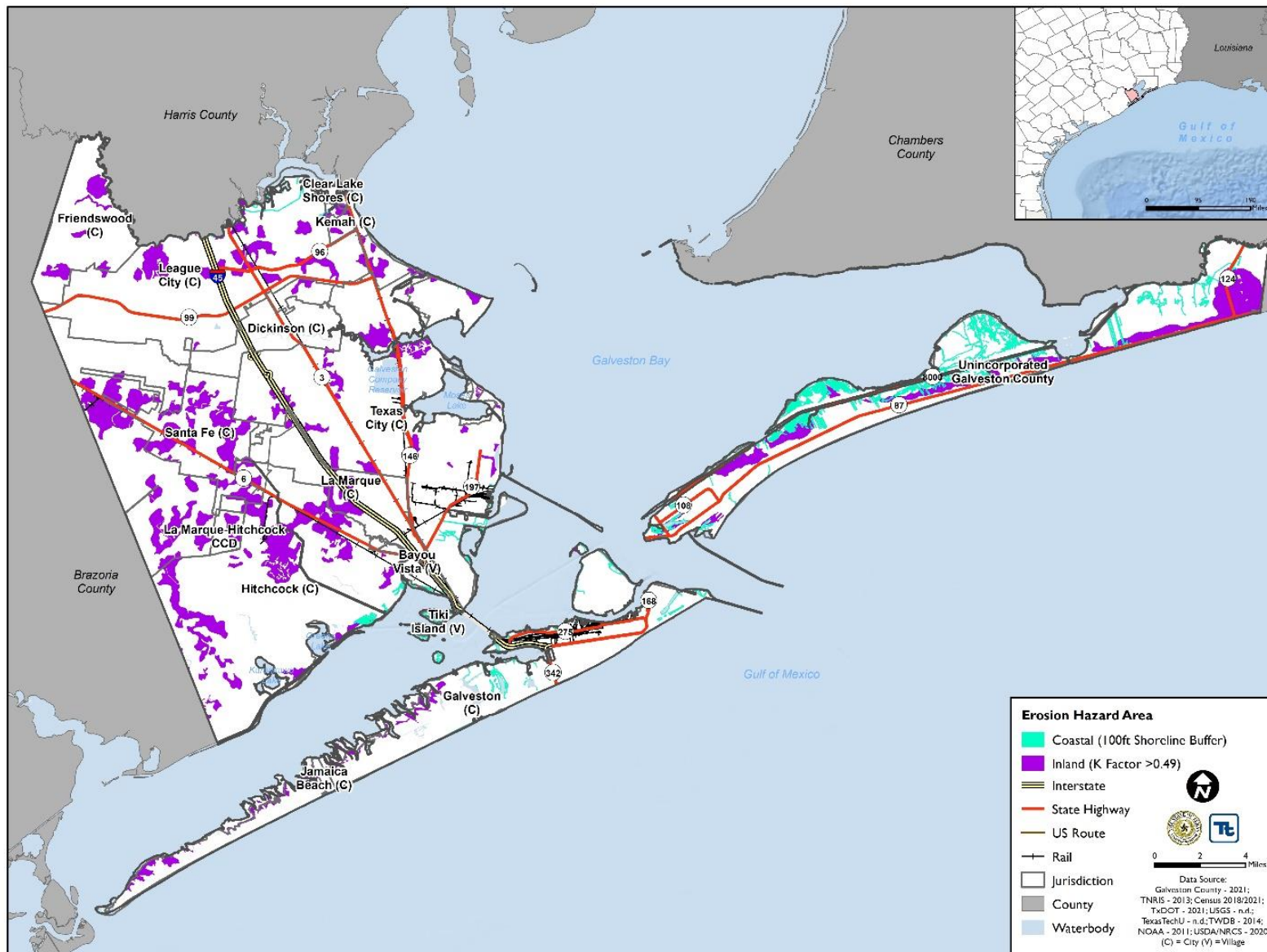
- Excess nutrients impact water quality through eutrophication, a process where excess nitrogen and phosphorus causes unwanted biological growth in water bodies.
- Sediment reduces water quality by making the water cloudy. Turbidity prevents sunlight from penetrating the water and reduces photosynthesis and underwater vegetation. Oxygen levels are reduced in turbid waters, further degrading habitat for fish and other aquatic organisms.
- Sediment can build up in stream channels, lowering flow capacity. The problem of low stream capacity is compounded as runoff increases from newly built-up or paved areas and causes stream channels to receive larger amounts of water in shorter periods of time. This leads to more frequent flooding in areas that never or only rarely flooded in the past. In flood prone areas, levees may need to be built or enlarged to better protect public safety.



- A financial burden results from cleanup of sediment-damaged areas. Taxpayers often bear the cost of removing sediment from public roads, road ditches, culverts, or streams; not to mention damage to homes and the safety hazards associated with flooding. Other costs of erosion that are borne by the public are degraded soils, a polluted environment, more runoff, greater need for irrigation, and aesthetically displeasing sites (USDA 2000).



Figure 4-5. Erosion Hazard Areas in Galveston County, TX





The population exposed, or located in the estimated hazard area, is considered vulnerable to this hazard. The analysis indicates that 5,049 people are located in the estimated coastal erosion hazard area, and a total of 42,644 are located in the inland erosion hazard area (Table 4-5).

Table 4-5. Estimated Population Located in the Coastal Erosion Hazard Area

Jurisdiction	Total Population (American Community Survey 2015- 2019)	Estimated Population Located in the Erosion Hazard Areas			
		Number of Persons Located in the Coastal Erosion Hazard Area	Percent of Total	Number of Persons Located in the Inland Erosion Hazard Area	Percent of Total
Clear Lake Shores (C)	1,258	66	5.2%	0	0.0%
Dickinson (C)	20,847	0	0.0%	20	0.1%
Friendswood (C)	41,213	0	0.0%	3,791	9.2%
Hitchcock (C)	7,301	170	2.3%	3,770	51.6%
Jamaica Beach (C)	1,078	1	0.1%	0	0.0%
Kemah (C)	1,807	20	1.1%	344	19.0%
La Marque (C)	18,030	0	0.0%	1,686	9.4%
League City (C)	114,392	2,258	2.0%	15,118	13.2%
Santa Fe (C)	12,735	0	0.0%	4,938	38.8%
Bayou Vista (C)	1,763	0	0.0%	0	0.0%
Tiki Island (V)	1,106	973	88.0%	0	0.0%
Galveston County (Total)	350,682	5,049	1.4%	37,595	10.7%

Source: ACS 5-year Estimate 2015-2019; NOAA 2011 (100 foot buffer from CUSP Shoreline), USDA/NRCS 2020 (K factor >0.49)

Note (1): C = City, V = Village, % = Percent, < = Less Than

Note (2): The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County. RCV = Land Use and Population Trends

Impact on General Building Stock

After considering the population exposed and potentially vulnerable to the coastal and inland erosion, the built environment was evaluated. Erosion can impact structures located along the banks of waterways, having the potential to destabilize the foundation of structures. It can also impact infrastructure such as dams, levees, roads, and other developed land. Table 4-6 and Table 4-7 summarizes the results of the vulnerability analysis regarding erosion in Galveston County.

In summary, 4,922 buildings accounting for approximately \$6.07 billion of replacement cost value are located in the estimated coastal erosion hazard area (Table 4-6). In total, this represents about nearly 4% percent of the County's total general building stock inventory. Furthermore, 21,966 structures (approximately \$16.5 billion) are located in inland erosion hazard area (Table 4-7).



Table 4-6. Estimated Buildings Located in the Coastal Erosion Hazard Area

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located in the Coastal Erosion Hazard Areas			
			Number of Buildings Located in the Coastal Erosion Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings Located in the Coastal Erosion Hazard Area	Percent of Total
Clear Lake Shores (C)	1,155	\$904,562,368.66	76	6.6%	\$66,169,833	7.3%
Dickinson (C)	10,351	\$6,601,710,645.63	0	0.0%	\$0	0.0%
Friendswood (C)	14,891	\$10,815,456,384.12	0	0.0%	\$0	0.0%
Hitchcock (C)	5,452	\$4,592,036,651.86	112	2.1%	\$57,463,776	1.3%
Jamaica Beach (C)	1,291	\$458,205,838.82	5	0.4%	\$12,472,408	2.7%
Kemah (C)	1,634	\$2,631,702,105.60	35	2.1%	\$164,157,938	6.2%
La Marque (C)	10,749	\$7,927,292,522.28	0	0.0%	\$0	0.0%
League City (C)	46,742	\$31,237,974,594.10	926	2.0%	\$846,109,429	2.7%
Santa Fe (C)	7,942	\$4,831,628,162.13	0	0.0%	\$0	0.0%
Bayou Vista (C)	1,365	\$445,354,087.33	0	0.0%	\$0	0.0%
Tiki Island (V)	868	\$365,209,145.44	750	86.4%	\$303,617,859	83.1%
Galveston County (Total)	209,947	\$166,321,604,688.46	4,922	2.3%	\$6,077,155,937	3.7%

Source: Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021, NOAA 2011 (100 foot buffer from CUSP Shoreline)

Note (1): C = City, V = Village, % = Percent, < = Less Than

Note (2): The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County. RCV = Land Use and Population Trends

Table 4-7. Estimated Buildings Located in the Inland Erosion Hazard Area

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located in the Inland Erosion Hazard Areas			
			Number of Buildings Located in the Inland Erosion Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings Located in the Inland Erosion Hazard Area	Percent of Total
Clear Lake Shores (C)	1,155	\$904,562,368.66	14	1.2%	\$245,995,024	27.2%
Dickinson (C)	10,351	\$6,601,710,645.63	9	0.1%	\$4,507,445	0.1%
Friendswood (C)	14,891	\$10,815,456,384.12	1,451	9.7%	\$1,514,963,977	14.0%
Hitchcock (C)	5,452	\$4,592,036,651.86	2,715	49.8%	\$1,928,182,025	42.0%
Jamaica Beach (C)	1,291	\$458,205,838.82	0	0.0%	\$0	0.0%
Kemah (C)	1,634	\$2,631,702,105.60	320	19.6%	\$739,122,117	28.1%
La Marque (C)	10,749	\$7,927,292,522.28	1,016	9.5%	\$738,400,989	9.3%
League City (C)	46,742	\$31,237,974,594.10	6,315	13.5%	\$4,032,743,676	12.9%
Santa Fe (C)	7,942	\$4,831,628,162.13	3,030	38.2%	\$1,786,356,664	37.0%
Bayou Vista (C)	1,365	\$445,354,087.33	0	0.0%	\$0	0.0%
Tiki Island (V)	868	\$365,209,145.44	0	0.0%	\$0	0.0%
Galveston County (Total)	209,947	\$166,321,604,688.46	21,966	10.5%	\$16,543,834,687	9.9%

Source: Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021, USDA/NRCS 2020 (K factor >0.49)

Note (1): C = City, V = Village, % = Percent, < = Less Than



Note (2): The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County. RCV = Land Use and Population Trends

Impact on Critical Facilities and Lifelines

Coastal erosion and sea level rise may potentially impact critical facilities and lifelines identified within the County. Critical services may not be available if critical facilities or lifelines are directly damaged or transportation routes to access these critical facilities are breached due to erosion. Erosion may destabilize the roadways leading to facilities or destroy the foundation that supports the critical facilities along the shoreline.

Table 4-8. Estimated Critical Facilities and Lifelines in the Coastal Erosion Hazard Areas

Jurisdiction	Total Number of Critical Facilities	Total Number of Lifelines	Number of Critical Facilities and Lifeline Facilities Located in the Coastal Erosion Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Clear Lake Shores (C)	24	24	15	62.5%	15	62.5%
Dickinson (C)	91	83	0	0.0%	0	0.0%
Friendswood (C)	96	82	0	0.0%	0	0.0%
Galveston (C)	691	671	63	9.1%	63	9.4%
Hitchcock (C)	214	212	2	0.9%	2	0.9%
Jamaica Beach (C)	11	11	0	0.0%	0	0.0%
Kemah (C)	15	14	2	13.3%	2	14.3%
La Marque (C)	121	107	0	0.0%	0	0.0%
League City (C)	321	283	19	5.9%	19	6.7%
Santa Fe (C)	135	128	0	0.0%	0	0.0%
Bayou Vista (C)	5	5	0	0.0%	0	0.0%
Tiki Island (V)	7	7	1	14.3%	1	14.3%
Galveston County (Total)	2,437	2,317	175	7.2%	175	7.6%

Source: Essential Government Functions Government Offices 2021; City of Galveston 2021; HIFLD 2020; Texas Commission on Environmental Quality 2021; Texas Tech University 2021; NOAA 2011 (100 foot buffer from CUSP Shoreline); USDA/NRCS 2020 (K factor >0.49)

Note (1): C = City, V = Village, % = Percent, < = Less Than

Note (2): The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County. RCV = Land Use and Population Trends

Table 4-9. Estimated Critical Facilities and Lifelines in the Inland Erosion Hazard Areas

Jurisdiction	Total Number of Critical Facilities	Total Number of Lifelines	Number of Critical Facilities and Lifeline Facilities Located in the Inland Erosion Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Clear Lake Shores (C)	24	24	2	8.3%	2	8.3%
Dickinson (C)	91	83	0	0.0%	0	0.0%
Friendswood (C)	96	82	16	16.7%	14	17.1%
Hitchcock (C)	214	212	39	18.2%	39	18.4%
Jamaica Beach (C)	11	11	0	0.0%	0	0.0%
Kemah (C)	15	14	10	66.7%	10	71.4%



Jurisdiction	Total Number of Critical Facilities	Total Number of Lifelines	Number of Critical Facilities and Lifeline Facilities Located in the Inland Erosion Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
La Marque (C)	121	107	9	7.4%	8	7.5%
League City (C)	321	283	60	18.7%	47	16.6%
Santa Fe (C)	135	128	53	39.3%	50	39.1%
Bayou Vista (C)	5	5	0	0.0%	0	0.0%
Tiki Island (V)	7	7	0	0.0%	0	0.0%
Galveston County (Total)	2,437	2,317	231	9.5%	211	9.1%

Source: Essential Government Functions Government Offices 2021; City of Galveston 2021; HIFLD 2020; Texas Commission on Environmental Quality 2021; Texas Tech University 2021; NOAA 2011 (100 foot buffer from CUSP Shoreline); USDA/NRCS 2020 (K factor >0.49)

Note (1): C = City, V = Village, % = Percent, < = Less Than

Note (2): The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County. RCV = Land Use and Population Trends

Impact on Economy

The impact of erosion on the economy and estimated dollar losses are difficult to measure. Erosion and other geological hazards can impose direct and indirect impacts on society. Erosion directly causes damages to buildings. The total replacement cost value of structures located in the coastal and inland erosion hazard areas in Galveston County is \$22.6 billion (\$6.08 billion coastal and \$16.5 billion inland).

Coastal and inland erosion can cause extensive damage to public utilities and disruptions to delivery of services. Loss of power and communications may occur and drinking water and wastewater treatment facilities may be temporarily out of operation. Additionally, disruption to business operations can occur in cases where infrastructure is breached by erosion. Loss of income may occur as a secondary impact if businesses are closed under repairs due to this breaching. To prevent these potential business losses, public expenditures may need to be spent to implement shoreline stabilizers and to protect key infrastructure like highways and interstates that follow along the coastline. Furthermore, erosion may result in additional clean-up costs, reduced property values, and loss of productivity, all of which are difficult to measure (USGS 2003).

Impact on the Environment

Erosion is a natural or man-made process that can greatly impact the environment. Sediment transferred through streams, lakes, rivers can erode soil and impact ecosystems. High sediment concentrations can benefit the environment by retaining dead plant production and capturing suspended sediment (Delaware Estuary Regional Sediment Management Plan Workbook 2013). Alternatively, upland erosion can degrade water quality and quantity, ultimately impacting aquatic life. Negative overall impacts to the environment occur when erosion eliminates or contaminates critical habitats. For instance, filter-feeding bivalves consume small particles, which, if contaminated from erosion runoff, could kill them (Kreeger et al. 2010).

FEMA estimates that every dollar spent on erosion control and mitigation to preserve wetlands and other natural ecosystems provides a return on average of four dollars in cost-savings for the future. Preliminary studies following Hurricane Harvey indicated this ration will increase from 1:4 to 1:6. Without healthy beaches, dunes and wetlands to protect the coast, there is more day-to-day wear and the impact of major storms and hurricanes is far more severe (Texas HMP 2018).



Future Changes That May Impact Vulnerability

Understanding future changes that affect vulnerability can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change

Projected Development

As discussed, and illustrated in Section 3 (County Profile), areas targeted for future growth and development have been identified across the County. Any areas of growth could be affected by erosion if the growth areas are within identified hazard areas. Areas targeted for potential future growth and development could be potentially impacted by erosion if they are located within areas prone to erosion

Projected Changes in Population

Increasing population trends in the Texas coastal region will directly increase the risks associated with coastal erosion. A larger population will require additional structures to be constructed on land that is eroding in the coastal regions. Coastal erosion does not pose a risk to loss of life, but the structures built on the coast will require constant maintenance costs due to the continually loss of the coastal shorelines in Texas.

Climate Change

A direct impact of climate change on erosion is difficult to determine. Multiple secondary effects of climate change have the potential to increase the likelihood of erosion. Warming temperatures resulting in wildfires would reduce vegetative cover along steep slopes and destabilize the soils due to destruction of the root system; increased intensity of rainfall events would increase saturation of soils on steep slopes.

Change of Vulnerability Since 2017 HMP

Since the 2017 analysis, population statistics have been updated using the 2015-2019 American Community Survey population data. RS Means 2021-dollar values were used to develop a structure-level building inventory and estimate replacement cost value for each building. The 2017 critical facility and lifeline inventory was also reviewed and updated by the Planning Partnership. Furthermore, a coastal erosion hazard area and inland erosion hazard area were generated using a 100-foot buffer from NOAA's Continually Updated Shoreline Product (CUSP) and soils with a K factor of great than 0.49 from the NRCS soil survey for Galveston County. These changes provide an up-to-date look at the entire building stock for Galveston County and gives more accurate results for the exposure and loss estimation analysis.

4.3.2 Dam and Levee Failure

The following section provides the hazard profile and vulnerability assessment for the dam and levee failure hazard for Galveston County.

Profile

Hazard Description

Dams

A dam is an artificial barrier that has the ability to store water, wastewater, or liquid-borne materials for many reasons—flood control, human water supply, irrigation, livestock water supply, energy generation, containment



of mine tailings, recreation, or pollution control. Many dams fulfill a combination of these functions. They are an important resource in the United States (Association of State Dam Safety Officials 2021).

Dams can be classified according to their purpose, the construction material or methods used, their slope or cross-section, the way they resist the force of the water pressure, or the means used for controlling seepage. Materials used to construct dams include earth, rock, tailings from mining or milling, concrete, masonry, steel, timber, plastic, rubber, and combinations of these.

Dam failures typically occur when spillway capacity is inadequate and excess flow overtops the dam, or when internal erosion (piping) through the dam or foundation occurs. Complete failure occurs if internal erosion or overtopping results in a complete structural breach, releasing a high-velocity wall of debris-filled water that rushes downstream, damaging anything in its path. Dam failures in the United States typically occur in one of four ways:

- Overtopping of the primary dam structure, which accounts for 34 percent of all dam failures, can occur due to inadequate spillway design, settlement of the dam crest, blockage of spillways, and other factors.
- Foundation defects due to differential settlement, slides, slope instability, uplift pressures, and foundation seepage can also cause dam failure. These account for 30 percent of all dam failures.
- Failure due to piping and seepage accounts for 20 percent of all failures. These are caused by internal erosion due to piping and seepage, erosion along hydraulic structures such as spillways, erosion due to animal burrows, and cracks in the dam structure.
- Failure due to problems with conduits and valves, typically caused by the piping of embankment material into conduits through joints or cracks, constitutes 10 percent of all failures.

Regulatory Oversight for Dams

National Dam Safety Act

Potential for catastrophic flooding due to dam failures led to passage of the National Dam Safety Act (Public Law 92-367). The National Dam Safety Program requires a periodic engineering analysis of the majority of dams in the country; exceptions include the following:

- Dams under jurisdiction of the Bureau of Reclamation, Tennessee Valley Authority, or International Boundary and Water Commission
- Dams constructed pursuant to licenses issued under the Federal Power Act
- Dams that the Secretary of the Army determines do not pose any threat to human life or property.

The goal of this FEMA-monitored effort is to identify and mitigate the risk of dam failure so as to protect lives and property. The National Dam Safety Program is a partnership among states, federal agencies, and other stakeholders that encourages individual and community responsibility for dam safety. Under FEMA's leadership, state assistance funds have allowed all participating states to improve their programs through increased inspections, emergency action planning, and purchases of needed equipment. FEMA has also expanded existing and initiated new training programs. Grant assistance from FEMA provides support for improvement of dam safety programs that regulate most of the dams in the United States.

Texas State Dam Safety Program

The Texas Commission on Environmental Quality Dam Safety Program monitors and regulates private and public dams in Texas. The program periodically inspects dams that pose a high or significant hazard and makes recommendations and reports to dam owners to help them maintain safe facilities. This program is governed by Texas Administrative Code Title 30, Part 1, Chapter 299: Dams and Reservoirs.

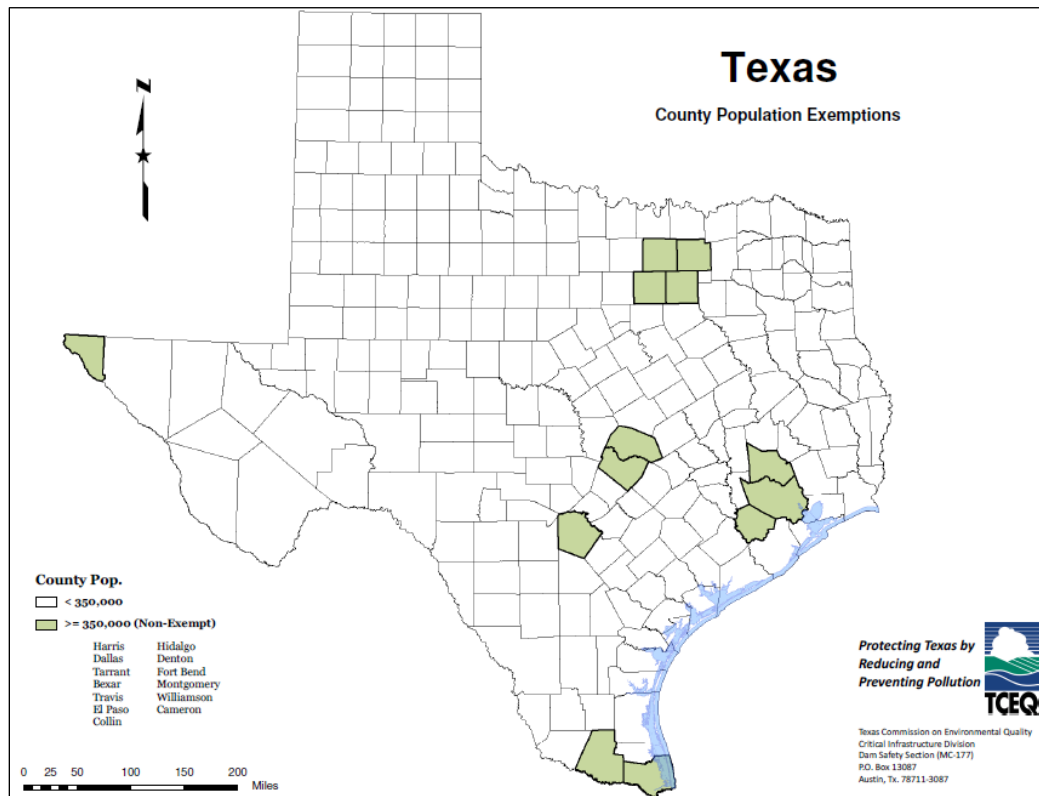


Effective September 1, 2013, dams are exempt from safety requirements if they meet all of the following criteria:

- Are located on private property
- Have a maximum impoundment capacity of less than 500 acre-feet
- Are classified as low or significant hazard
- Are located in a county with a population of less than 350,000 (per the 2010 census)
- Are not located within the corporate limits of a municipality.

Owners of exempt dams still have to comply with maintenance and operation requirements. There is no exemption expiration date. Figure 4-6 shows the counties covered by the population exemption. Galveston County is an exempt county.

Figure 4-6 Counties Exempt from the Texas Dam Safety Program



U.S. Army Corps of Engineers Dam Safety Program

The U.S. Army Corps of Engineers (USACE) operates and maintains approximately 700 dams nationwide. It is also responsible for safety inspections of some federal and non-federal dams in the United States that meet the size and storage limitations specified in the National Dam Safety Act. The Corps has inventoried dams; surveyed each state and federal agency's capabilities, practices and regulations regarding design, construction, operation, and maintenance of the dams; and developed guidelines for inspection and evaluation of dam safety. The Corps maintains the National Inventory of Dams, which contains information about a dam's location, size, purpose, type, last inspection and regulatory status (U.S. Army Corps of Engineers n.d.).

Federal Energy Regulatory Commission Dam Safety Program



The Federal Energy Regulatory Commission (FERC) cooperates with a large number of federal and state agencies to ensure and promote dam safety. More than 3,000 dams are part of regulated hydroelectric projects in the FERC program. Two-thirds of these are more than 50 years old. As dams age, concern about their safety and integrity grows, so oversight and regular inspection are important.

FERC inspects hydroelectric projects on an unscheduled basis to investigate the following:

- Potential dam safety problems
- Complaints about constructing and operating a project
- Safety concerns related to natural disasters
- Issues concerning compliance with the terms and conditions of a license.

Every five years, an independent engineer approved by the FERC must inspect and evaluate projects with dams higher than 32.8 feet (10 meters), or with a total storage capacity of more than 2,000 acre-feet.

FERC monitors seismic research and applies it in performing structural analyses of hydroelectric projects. FERC also evaluates the effects of potential and actual large floods on the safety of dams. During and following floods, FERC visits dams and licensed projects, determines the extent of damage, if any, and directs any necessary studies or remedial measures the licensee must undertake. The FERC publication *Engineering Guidelines for the Evaluation of Hydropower Projects* guides the FERC engineering staff and licensees in evaluating dam safety. The publication is frequently revised to reflect current information and methodologies.

FERC requires licensees to prepare emergency action plans and conducts training sessions on how to develop and test these plans. The plans outline an early warning system if there is an actual or potential sudden release of water from a dam due to failure. The plans include operational procedures that may be used, such as reducing reservoir levels and reducing downstream flows, as well as procedures for notifying affected residents and agencies responsible for emergency management. These plans are frequently updated and tested to ensure that everyone knows what to do in emergency situations.

Levees

Levees have been constructed in the State of Texas for over 100 years to protect farms, ranch land, and populated areas from flooding (State of Texas Hazard Mitigation Plan 2018). A levee is a physical barrier constructed to protect areas from rising floodwaters. Levees typically remove valuable floodplain storage and block the ability of the channel to move water. There are also concerns with rainfall that falls on the levee itself. Most important is the possibility for catastrophic and sudden failure under extreme flood events, potentially resulting in loss of life and total destruction of property.

A levee breach occurs when part of a levee gives way, creating an opening through which floodwaters may pass. A breach may occur gradually or suddenly. The most dangerous breaches happen quickly during periods of high water. Earthen levees can be damaged in several ways. Strong river currents and waves can erode the surface. Trees growing on a levee can blow over, leaving a hole where the root wad and soil used to be. Burrowing animals can create holes that enable water to pass through a levee. If severe enough, any of these situations can lead to a zone of weakness that could cause a levee breach. In seismically active areas, earthquakes and ground shaking can cause a loss of soil strength, weakening a levee and possibly resulting in failure. Seismic activity can also cause levees to slide or slump, both of which can lead to failure.

The resulting torrent from a levee breach can quickly swamp a large area behind the failed levee with little or no warning. When a levee system fails or is overtopped, severe flood damage can occur due to increased water surface elevation associated with levees and the resulting increase in water velocity.



Regulatory Oversight for Levees

U.S. Army Corps of Engineers and FEMA Levee Oversight

USACE and FEMA have differing roles and responsibilities related to levees. USACE addresses a range of operation and maintenance, risk communication, risk management, and risk reduction issues as part of its responsibilities under the Levee Safety Program. FEMA addresses mapping and floodplain management issues related to levees, and it accredits levees as meeting requirements set forth by the National Flood Insurance Program.

Depending on the levee system, USACE and FEMA may be involved with the levee sponsor and community independently or—when a levee system overlaps both agency programs—jointly. Under both scenarios, the long-term goals are similar: to reduce risk and lessen the devastating consequences of flooding. Some USACE and FEMA partnering activities related to levees include:

- Joint meetings with levee sponsors and other stakeholders
- Integration of levee information into the National Levee Database
- State Silver Jackets teams
- Sharing of levee information
- Targeted task forces to improve program alignment

The Silver Jackets is a program that provides an opportunity to consistently bring together multiple state, federal, tribal, and local agencies to learn from each other and apply their knowledge to reduce risk. The Program's primary goals include the following:

- Create or supplement a mechanism to collaboratively identify, prioritize, and address risk management issues and implement solutions.
- Increase and improve risk communication through a unified interagency effort.
- Leverage information and resources and provide access to such national programs as FEMA's Risk MAP and USACE's Levee Inventory and Assessment Initiative.
- Provide focused, coordinated hazard mitigation assistance in implementing high-priority actions such as those identified by state hazard mitigation plans.
- Identify gaps among agency programs and/or barriers to implementation, such as conflicting agency policies or authorities, and provide recommendations for addressing these issues.

The State of Texas has a Silver Jackets team. Their vision is to increase efficiency and coordination between the state and federal governments in developing comprehensive and sustainable solutions to flood risk management in the State of Texas. The team provides a variety of projects, plans, and outreach to help the State mitigate and prevent future floods. Information about the team can be found online: <https://silverjackets.nfrmp.us/State-Teams/Texas>

Coordination between USACE and FEMA with regard to levees is now standard within many of each agency's policies and practices. Over the past several years, both agencies coordinated policies where appropriate; jointly participated in meetings with stakeholders; and participated in many multiagency efforts, such as the National Committee on Levee Safety, the Federal Interagency Floodplain Management Task Force, and the Silver Jackets Program.

National Committee on Levee Safety

The National Committee on Levee Safety was created by Congress to “develop recommendations for a national levee safety program, including a strategic plan for implementation of the program.” The Committee adopted



the vision of “an involved public and reliable levee system working as part of an integrated approach to protect people and property from floods,” and has been working toward this goal since October 2008 (National Committee on Levee Safety 2010). The Committee is made up of representatives from state, regional, and local agencies; the private sector; USACE; and FEMA.

Maintenance Requirements

No levee provides protection from events for which it was not designed, and levees require maintenance to continue to provide the level of protection they were designed and built to offer. Maintenance responsibility belongs to a variety of entities including local, state, and federal government and private landowners. Well-maintained levees may obtain certification through independent inspections.

Levees may not be certified for maintaining flood protection when the levee owner does not maintain the levee or pay for an independent inspection. The impacts of an un-certified levee include higher risk of levee failure. In addition, insurance rates may increase because FEMA identifies on Flood Insurance Rate Maps that the structures are not certified to protect from a 1-percent annual chance flood event.

Location

Dam

According to the National Inventory of Dams, there are two dams in Galveston County.

- Galveston County Water Industrial Reservoir Dam - located at Dickinson Bayou in Texas City. This dam, operated and maintained by the Gulf Coast Water Authority, is classified as a “High” hazard dam. Although Texas City is not part of this plan, the neighboring jurisdictions of Clear Lake Shores, Kemah, La Marque, and unincorporated areas of Galveston County could be impacted should this dam experience a breach (Figure 4-7). Inundation mapping is not currently available for the dam, but a Countywide action has been included in this plan to pursue obtaining inundation area data.
- GCWA Off Channel Term Stop Res Levee – privately owned, earthen dam with a height of 8 feet and a storage area of 90 acre feet.
- Participating jurisdictions that could be impacted by the high hazard dam have mitigation actions to address the hazard in their annexes, including Galveston County, Clear Lake Shores, Kemah, and La Marque.

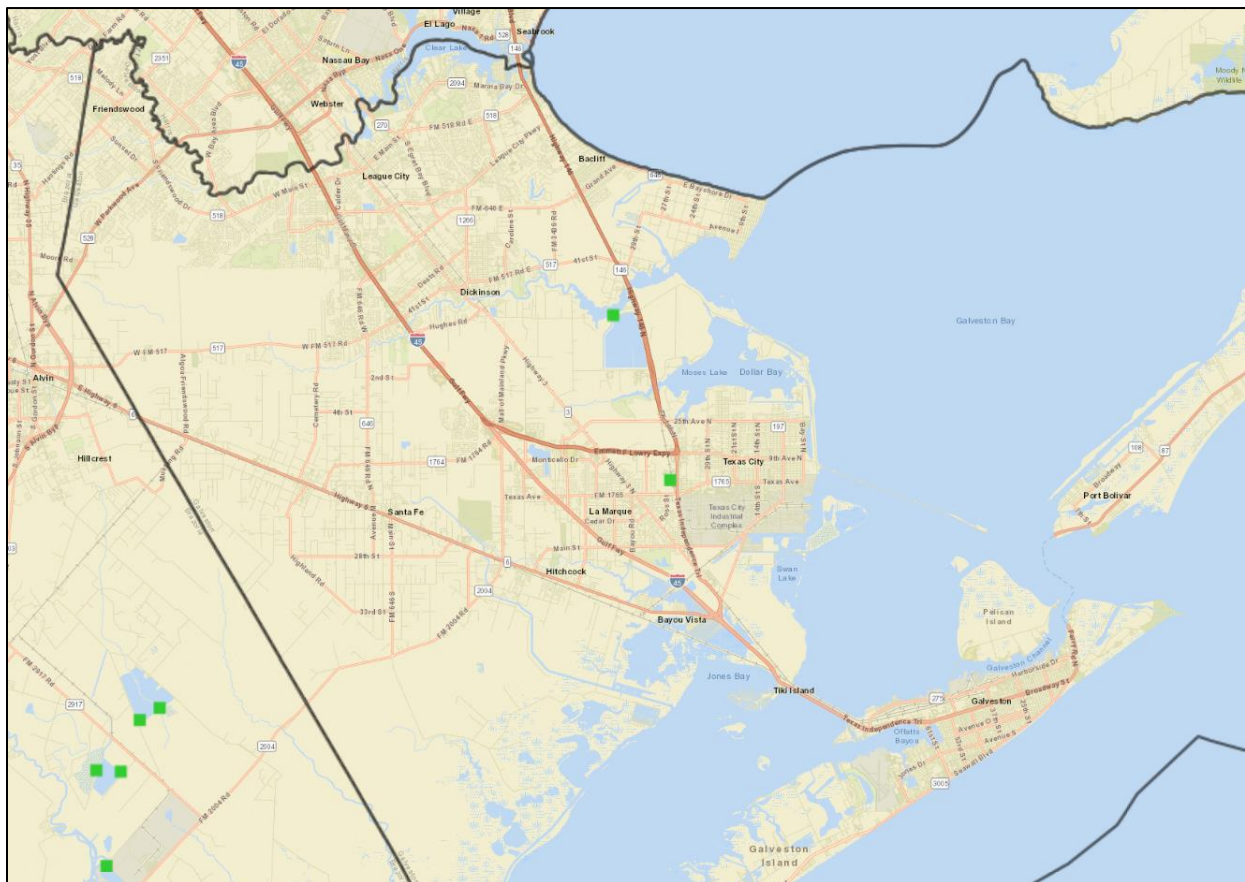


Figure 4-7. Galveston County Water Industrial Reservoir Dam Area



Source: Galveston County HMP 2017

Figure 4-8. Dams Located in Galveston County, TX



Source: USACE 2022

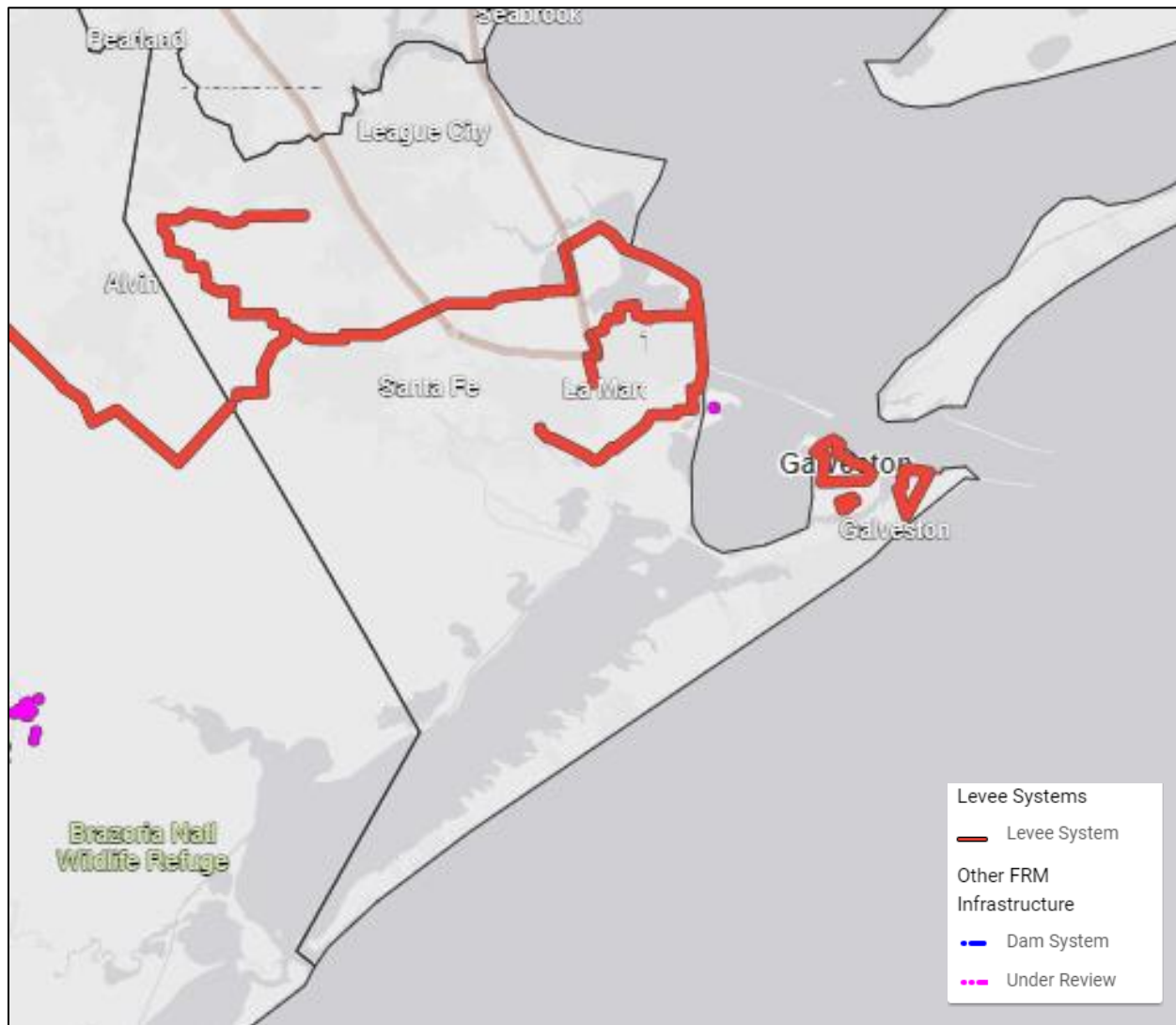
Note: The green squares indicate the location of a dam.



Levee

There are six levee systems located in Galveston County. The largest is the Galveston County hurricane flood protection levee protects the cities of Texas City and La Marque. The levee is comprised of 15.7 miles of an earthen berm and 1.3 miles of concrete wall, offering a total of 17 miles of protection. Hurricane flood protection efforts in the Texas City area began in 1928 when some 13,500 feet of earthen levees were constructed by Galveston County in the general area of the port and industrial section of Texas City. These levees reached an elevation of about 14.5 feet. In 1932, construction began on an additional 8,300-foot-long concrete wall and a 3,800-foot-long earthen levee. Both of these structures were built to an elevation of 12.5 feet. The Texas City/La Marque Hurricane Flood Protection Levee has numerous appurtenant structures. The project is designed to provide protection for about 36 square miles of residential and industrial development from tropical hurricanes of magnitudes up to and including a Standard Project Hurricane Tide of 15 feet (Galveston County 2017).

Figure 4-9. Levees Located in Galveston County, TX



Source: USACE 2022



Extent

Dam Failure

The extent or magnitude of a dam failure event can be measured in terms of the classification of the dam. Additionally, there are two factors that influence the potential severity of a full or partial dam failure are: (1) the amount of water impounded; and (2) the density, type, and value of development and infrastructure located downstream (Association of State Dam Safety Officials 2020). The following classification system is used by the USACE for the hazard potential of dams.

- **Low Hazard Potential Dams** are dams where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.
- **Significant Hazard Potential Dams** where failure or mis-operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.
- **High Hazard Potential Dams** are dams where failure or mis-operation will probably cause loss of human life.

Levee Failure

In the event of a levee failure, floodwaters may ultimately inundate the protected area landward of the levee. The extent of inundation is dependent on the flooding intensity. Failure of a levee during a 1 percent annual chance flood will inundate the approximate 100-year flood plain previously protected by the levee. Residential and commercial buildings located nearest the levee overtopping or breach location will suffer the most damage from the initial embankment failure flood wave. Landward buildings will be damaged by inundation (FEMA 2004).

Levees require maintenance to continue to provide the level of protection they were designed and built to offer. Maintenance responsibility belongs to a variety of entities including local, state, and federal government and private landowners. Well-maintained levees may obtain certification through independent inspections. Levees may not be certified for maintaining flood protection when the levee owner does not maintain the levee or pay for an independent inspection. The impacts of an uncertified levee include higher risk of levee failure. In addition, insurance rates may increase because FEMA identifies on Flood Insurance Rate Maps that the structures are not certified to protect from a 1-percent annual chance flood event (FEMA 2004).

Worst-Case Scenario

While the probability of a dam or levee failure is low, a worst-case scenario would be a hurricane or tropical storm that would stall over the County, causing the dam or levee to breach or overtop, impacting areas that are supposed to be protected. If a dam or levee failure were to occur, properties protected by the structure could see up to four feet of standing water. Injuries may occur, but loss of life is not expected.

Previous Occurrences and Losses

According to available records from the State of Texas 2018 HMP Update, Galveston County Multi-Jurisdictional HMP, and the National Performance of Dams Program, there have been no reported dam or levee incidents recorded for Galveston County.



Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016).

An increasing average annual temperature will directly impact the atmospheric moisture potential. The probability of expanding atmospheric moisture leads to an increasing amount of rainfall during storm events. The increased potential volume of rainfall will directly lead to an increasing pressure placed on levee systems during future riverine flood events (State of Texas Hazard Mitigation Plan 2018).

Probability of Future Occurrences

All dams face a “residual risk” of failure, which represents the risk that conditions may exceed those for which the dam was designed. For example, dams may be designed to withstand a probable maximum precipitation, defined as “theoretically, the greatest depth of precipitation for a given duration that is physically possible over a given storm area at a particular geographical location at a certain time of the year”. The chance of occurrence of a precipitation event of a greater magnitude than that represents residual risk for such dams. This in turn represents a theoretical probability of future occurrence for a dam failure event, though the probability of an event exceeding the assumed maximum is not generally calculated as part of dam design.

Levee failure probabilities are considered to be higher than dam failure probabilities because levees are often exposed to more adverse conditions associated with high velocity flood flows, such as erosion and scour. Many levees are designed to overtop in high flow conditions; such overtopping is referred to as design failure.

No historical events of dam or levee failures have been recorded in the County, though the risk of failures is monitored. Based on the lack of historical occurrences, the probability of a future event is considered *low* (not likely to occur in 100 years). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entire City of Texas City and La Marque are vulnerable to the levee failure hazard; and the jurisdictions of Clear Lake Shores, Kemah, La Marque, and unincorporated areas of Galveston County are vulnerable to the dam failure hazard. The following text evaluates and estimates the potential impact of the dam and levee failure hazard in the County as a whole.

Impact on Life, Health and Safety

The impact of dam and levee failure on life, health, and safety is dependent on several factors such as the class of dam/levee, the area that the dam/levee is protecting, the location of the dam/levee, and the proximity of structures, infrastructure, and critical facilities to the dam or levee structure. The level of impact that a failure could have can be predicted based upon the hazard potential classification as rated by the USACE.

Table 4-10. USACE Hazard Potential Classifications for Dams

Hazard Category (a)	Direct Loss of Life (b)	Lifeline Losses (c)	Property Losses (d)	Environmental Losses (e)
Low	None (rural location, no permanent structures for human habitation)	No disruption of services (cosmetic or rapidly repairable damage)	Private agricultural lands, equipment, and isolated buildings	Minimal incremental damage



Hazard Category (a)	Direct Loss of Life (b)	Lifeline Losses (c)	Property Losses (d)	Environmental Losses (e)
Significant	Rural location, only transient or day-use facilities	Disruption of essential facilities and access	Major public and private facilities	Major mitigation required
High	Certain (one or more) extensive residential, commercial, or industrial development	Disruption of essential facilities and access	Extensive public and private facilities	Extensive mitigation cost or impossible to mitigate

Source: FEMA 2004

Note:

- Categories are assigned to overall projects, not individual structures at a project.
- Loss-of-life potential is based on inundation mapping of area downstream of the project. Analyses of loss-of-life potential should consider the population at risk, time of flood wave travel, and warning time.
- Lifeline losses include indirect threats to life caused by the interruption of lifeline services from project failure or operational disruption; for example, loss of critical medical facilities or access to them.
- Property losses include damage to project facilities and downstream property and indirect impact from loss of project services, such as impact from loss of a dam and navigation pool, or impact from loss of water or power supply.
- Environmental impact downstream caused by the incremental flood wave produced by the project failure, beyond what would normally be expected for the magnitude flood event under which the failure occurs.

Levee failure impacts depend on several factors including severity of the event and whether or not adequate warning time is provided to residents. The population living in or near the inundation areas are considered exposed to the hazard. However, exposure should not be limited only to those who reside within a defined hazard zone, but everyone who may be affected by a hazard event (e.g., people are at risk while traveling in flooded areas, or their access to emergency services is compromised during an event); the degree of that impact varies and is not strictly measurable.

Vulnerable populations are all populations downstream from levee failures that are incapable of escaping the area within the allowable time frame. This population includes the elderly, young and individuals with disabilities, access or functional needs who may be unable to get themselves out of the inundation area. The vulnerable population also includes individuals who would not have adequate warning from the emergency warning system (e.g., television or radio); this would include residents and visitors. The population adversely affected by a levee failure may also include those beyond the disaster area that rely on the dam for providing potable water.

Floods created from a levee failure and their aftermath present numerous threats to public health and safety including exposure to unsafe food, contaminated drinking and washing water, mosquitoes, animals, mold, and mildew. For more detailed descriptions of these and additional threats to public health and safety, refer to Section 4.3.6 (Flood). Current loss estimation models such as Hazus are not equipped to measure public health impacts such as these. The best preparation for these effects includes awareness that they can occur, education of the public on prevention, and planning to deal with them during responses to dam or levee failure events.

Impact on General Building Stock

Vulnerable properties are those closest to the dam or levee area. These properties would experience the largest, most destructive surge of water. Transportation routes are vulnerable to dam inundation and have the potential to be wiped out, creating isolation issues. This includes all roads, railroads, and bridges in the path of the dam inundation. Those that are most vulnerable are those that are already in poor condition and would not be able to withstand a large water surge. Utilities such as overhead power lines, cable and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas.

Impact on Critical Facilities and Lifelines

Transportation routes are vulnerable to dam inundation and have the potential to be wiped out, creating isolation issues and significant disruption to travel, including all roads, railroads, and bridges in areas in and around the



levee. Those that are most vulnerable are those that are already in poor condition and would not be able to withstand a large water surge. Utilities such as overhead power lines, cable and phone lines in the inundation zone could also be vulnerable. If phone lines were lost, significant communication issues may occur in the planning area due to limited cell phone reception in many areas. In addition, emergency response would be hindered due to the loss of transportation routes as well as some protective-function facilities located in the inundation zone. Recovery time to restore many critical functions after an event may be lengthy, as wastewater, potable water, and other community facilities are located in the dam inundation zone.

Impact on the Economy

Severe flooding that follows an event like a dam failure can cause extensive structural damage and withhold essential services. The cost to recover from flood damages after a surge will vary depending on the hazard risk of each dam. Severe flooding that follows an event like a dam failure can cause extensive damage to public utilities and disruptions to delivery of services. Loss of power and communications may occur and drinking water and wastewater treatment facilities can become temporarily out of operation. Debris from surrounding buildings can accumulate should the dam mimic major flood events, such as the 1-percent annual chance flood event that is discussed in Section 4.3.6 (Flood).

Levee failure events can significantly impact the local and regional economy. Similar to flooding, losses include, but are not limited to, damages to buildings and infrastructure, agricultural losses, business interruption and impacts on tax base. Flooding as a result of levee failure can cause extensive damage to public utilities and disruptions in delivery of services. Loss of power and communications may occur and drinking water and wastewater treatment facilities may be temporarily out of operation.

Impact on the Environment

The environmental impacts of a dam or levee failure can include significant water-quality and debris-disposal issues or severe erosion that can impact local ecosystems. Flood waters can back up sanitary sewer systems and inundate wastewater treatment plants, causing raw sewage to contaminate residential and commercial buildings and the flooded waterway. The contents of unsecured containers of oil, fertilizers, pesticides, and other chemicals may get added to flood waters. Hazardous materials may be released and distributed widely across the floodplain. Water supply and wastewater treatment facilities could be offline for weeks. After the flood waters subside, contaminated and flood-damaged building materials and contents must be properly disposed of. Contaminated sediment must be removed from buildings, yards, and properties.

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change

Projected Development

Any areas of growth in Texas City, La Marque, Clear Lake Shores, Kemah, and unincorporated areas of Galveston County could be potentially impacted by the dam and levee failure hazard because these areas are exposed and vulnerable. Areas in and around the levees are the most vulnerable to losses; therefore, any development in these areas will be more susceptible to levee failure impacts.



Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2019 American Community Survey estimated population of 350,682. The population of the county is expected to increase over the next few years. The increase in population will expose more people to the dam and levee failure hazard.

Climate Change

An increasing average annual temperature will directly impact the atmospheric moisture potential. The probability of expanding atmospheric moisture leads to an increasing amount of rainfall during storm events. The increased potential volume of rainfall will directly lead to an increasing pressure placed on levee systems during future riverine flood events (State of Texas HMP 2018).

Change of Vulnerability Since the 2017 HMP

Overall, the County's vulnerability has not changed, and the County will continue to be exposed and vulnerable to dam and levee failure events, especially those located within or near downstream inundation zones. Because of the sensitive nature of the dam failure inundation zones, potential losses have not been quantified and presented in this plan. To estimate potential losses to population, buildings, critical facilities and infrastructure, inundation areas and depths of flooding may be used to generate depth grids. Hazus may be used to estimate potential losses for the County and participating municipalities in future HMP updates.

4.3.3 Drought

This section provides a hazard profile and vulnerability assessment of the drought hazard for Galveston County.

Hazard Profile

This section presents information regarding the description, extent, location, previous occurrences and losses, climate change projections and probability of future occurrences for the drought hazard.

Description

Drought is defined as the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length (State of Texas Hazard Mitigation Plan 2018). Drought conditions occur in virtually all climatic zones. Drought characteristics vary significantly from one region to another and are relative to the normal precipitation in that region. Drought can increase wildfire/brush fire risk and can affect agriculture, water supply, aquatic ecology, wildlife, and plant life. There are five classifications of drought, as presented in the figure to the right.

FIVE TYPES OF DROUGHT	
1	METEOROLOGICAL drought refers to an extended period of dry weather patterns. 
2	HYDROLOGICAL drought refers to low water supply in our rivers, lakes, aquifers, and other reservoirs that often follows meteorological drought. 
3	AGRICULTURAL drought occurs when a water shortage significantly damages or destroys agricultural crops. 
4	ECOLOGICAL drought is the most recently defined type of drought and refers to ecological damage caused by the lack of soil moisture. 
5	SOCIOECONOMIC drought refers to when a water shortage affects the supply and demand of drought commodities, such as water, food grains, and fish. 

Source: University of Nevada Cooperative Extension.

Location

A drought occurs on a regional scale; therefore, all of Galveston County is vulnerable and at risk. Droughts can occur at any time and have the potential to impact every person directly or indirectly in the County, as well as the local economy.



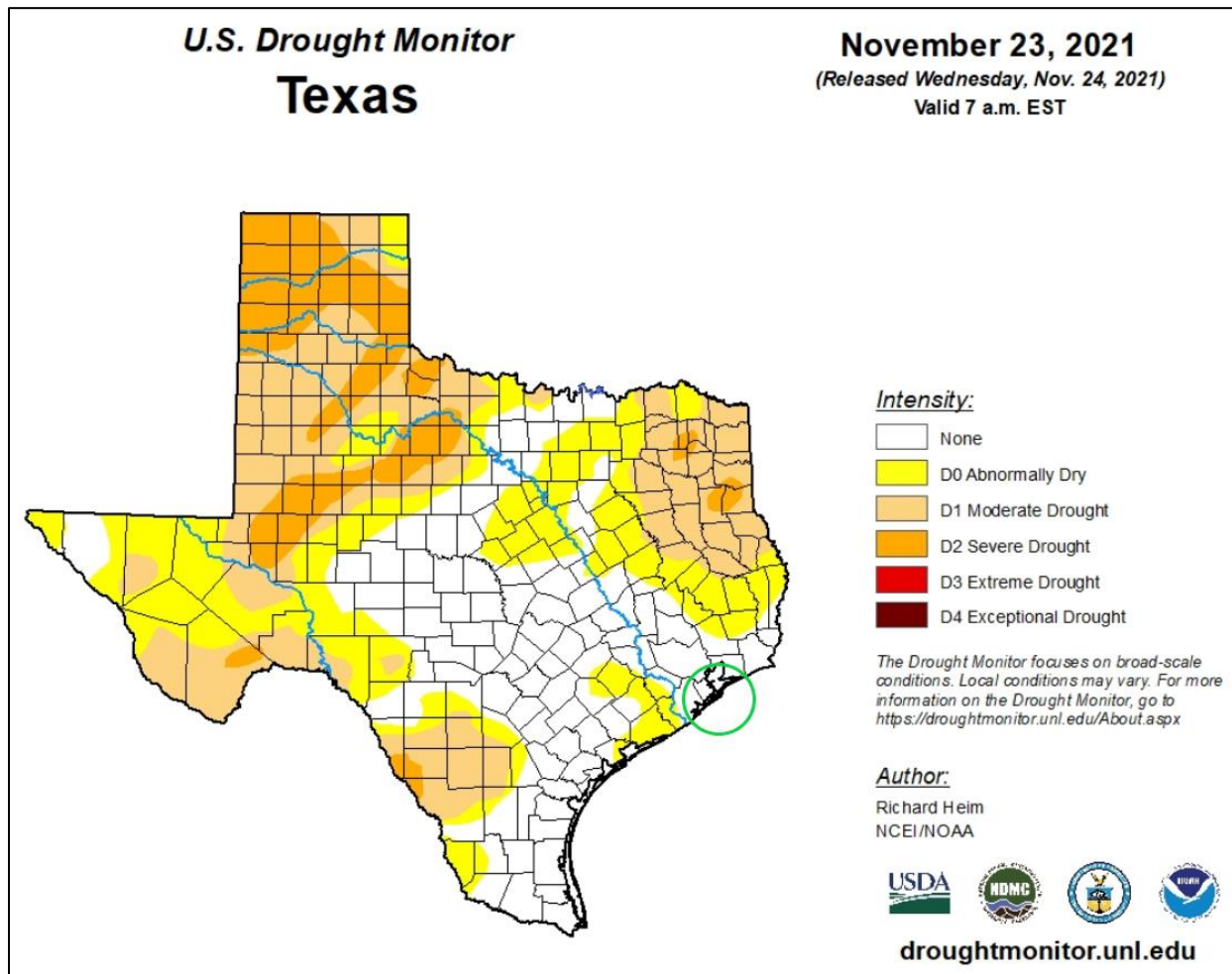
Extent

The severity of a drought depends on the degree of moisture deficiency, the duration of the event, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts (University of Nevada, Reno Extension College of Agriculture, Biotechnology & Natural Resources n.d.), Galveston County has the potential to experience the entire range of effects, from extreme drought to extremely moist conditions, as described in the Palmer Drought Severity Index (PDSI).

U.S. Drought Monitor

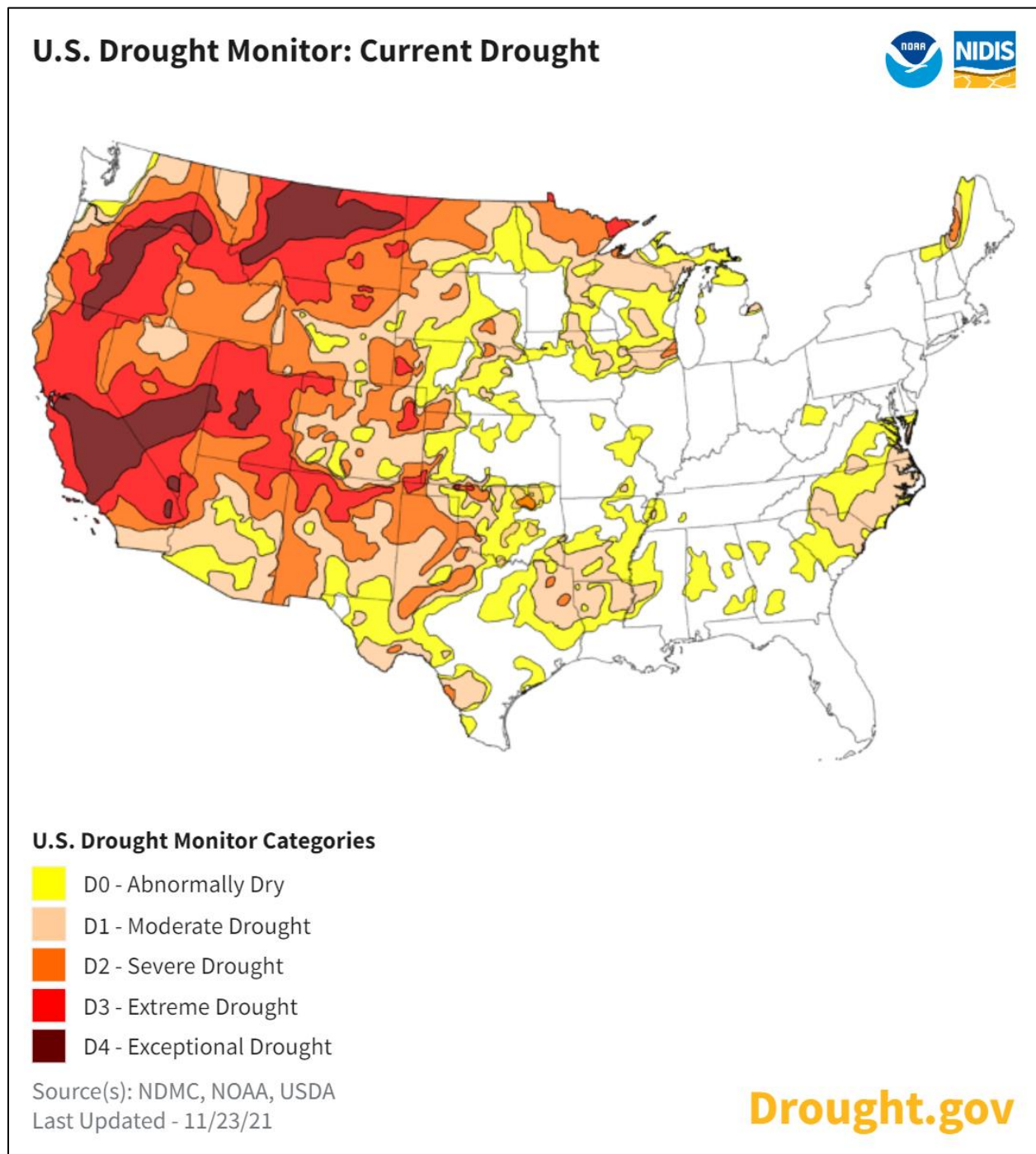
The U.S. Drought Monitor (USDM) is a map that shows the location and intensity of drought across the United States. The data is updated every. The USDM uses a five-category system, labeled Abnormally Dry or D0, (a precursor to drought, not actually drought), and Moderate (D1), Severe (D2), Extreme (D3) and Exceptional (D4) Drought. Drought categories show experts' assessments of conditions related to dryness and drought including observations of how much water is available in streams, lakes, and soils compared to usual for the same time of year. Figure 4-11 shows the USDM for November 23, 2021. The figure is shows that Galveston County had no drought condition for the week of November 23, 2021.

Figure 4-10 U.S. Drought Monitor for Texas, November 23, 2021



Note: The green circle represents the approximate location of Galveston County

Figure 4-11. U.S. Drought Monitor for November 23, 2021



Palmer Drought Severity Index

The Palmer Drought Severity Index (PDSI) is primarily based on soil conditions. Soil with decreased moisture content is the first indicator of an overall moisture deficit. Table 4-11 lists the PDSI classifications. At the one end of the spectrum, 0 is used as normal and drought is indicated by negative numbers. For example, -2 is moderate drought, -3 is severe drought, and -4 is extreme drought. The PDSI can reflect excess precipitation



using positive numbers; however, this is not shown in Table 4-11. The PDSI is commonly converted to the Palmer Drought Category (U.S. Drought Monitor n.d.).

Table 4-11. Palmer Drought Category and Palmer Drought Index Descriptions

Category	Description	Possible Impacts (for Texas)	Palmer Drought Index
D0	Abnormally Dry	- Producers begin supplemental feeding for livestock - Planting is postponed; forage germination is stunted; hay cutting is reduced - Grass fires increase - Surface water levels decline	-1.0 to -1.9
D1	Moderate Drought	- Dryland crops are stunted - Early cattle sales begin - Wildfire frequency increases - Stock tanks, creeks, streams are low; voluntary water restrictions are requested	-2.0 to -2.9
D2	Severe Drought	- Pasture conditions are very poor - Soil is hard, hindering planting; crop yields decrease - Wildfire danger is severe; burn bans are implemented - Wildlife moves into populated areas - Hydroelectric power is compromised; well water use increases; mandatory water restrictions are implemented	-3.0 to -3.9
D3	Extreme Drought	- Soil has large cracks; soil moisture is very low; dust and sandstorms occur - Row and forage crops fail to germinate; decreased yields for irrigated crops and very large yield reduction for dryland crops are reported - Need for supplemental feed, nutrients, protein, and water for livestock increases; herds are sold - Increased risk of large wildfires is noted - Many sectors experience financial burden - Severe fish, plant, and wildlife loss reported - Water sanitation is a concern; reservoir levels drop significantly; surface water is nearly dry; river flow is very low; salinity increases in bays and estuaries	-4.0 to -4.9
D4	Exceptional Drought	- Exceptional and widespread crop loss is reported; rangeland is dead; producers are not planting fields - Culling continues; producers wean calves early and liquidate herds due to importation of hay and water expenses - Seafood, forestry, tourism, and agriculture sectors report significant financial loss - Extreme sensitivity to fire danger; firework restrictions are implemented - Widespread tree mortality is reported; most wildlife species' health and population are suffering - Devastating algae blooms occur; water quality is very poor - Exceptional water shortages are noted across surface water sources; water table is declining - Boat ramps are closed; obstacles are exposed in water bodies; water levels are at or near historic lows	-5.0 or less

Source: U.S. Drought Monitor 2021

Keetch-Byram Drought Index (KBDI)

The KBDI is an index used to determining forest fire potential. The drought index is based on a daily water balance, where a drought factor is balanced with precipitation and soil moisture (assumed to have a maximum storage capacity of eight-inches) and is expressed in hundredths of an inch of soil moisture depletion. The index ranges from 0 to 800, where a drought index of 0 represents no moisture depletion, while an index of 800 represents absolutely dry conditions (USFS - Wildland Fire Assessment System n.d.)

Table 4-12. KBDI Index

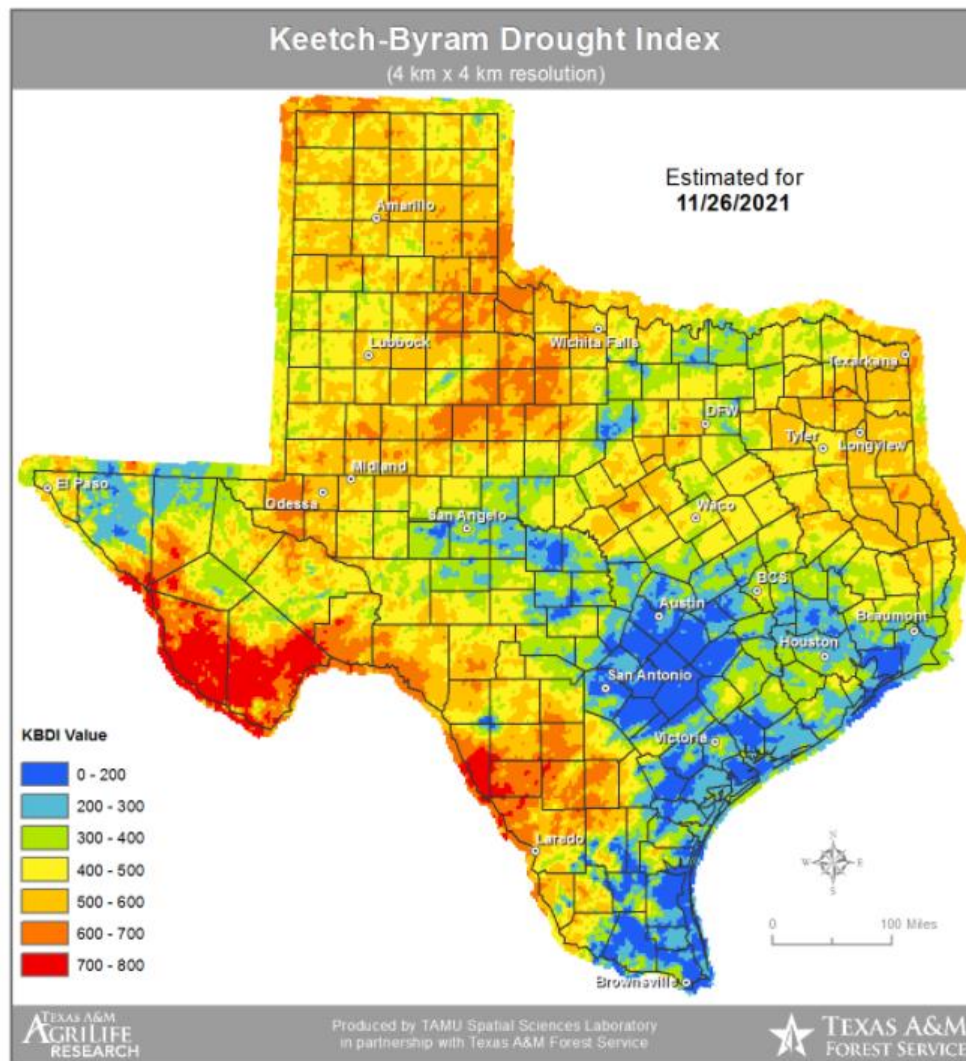
KBDI Value	Description
0 to 200	Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of spring dormant season following winter precipitation
200 to 400	Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity
400 to 600	Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.



KBDI Value	Description
600 to 800	Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

This index is currently derived from ground based estimates of temperature and precipitation resulting from weather stations and interpolated manually by experts at the Texas Forest Service (TFS) for counties across the State. Figure 4-12 shows the KBDI for the State of Texas for November 28, 2021. The figure shows KBDI value of 0-500 for the County.

Figure 4-12. KBDI for the State of Texas, November 26, 2021



Worst-Case Scenario

A multi-year drought with a Palmer Drought Category of D4 that impacts the southeastern portion of Texas, like the 2008 to 2011 drought, is the worst-case scenario for the County. If another severe drought occurs before these systems have a chance to recover, it could exacerbate the stress already placed on existing planning area water resources. Severe droughts can also lead to crop and livestock losses, impacting the food supply and economy.



Previous Occurrences and Losses

Between 1954 and 2021, Federal Emergency Management Agency (FEMA) declared that Texas experienced 46 drought-related major disaster (DR) or emergency (EM). Generally, drought-related disasters affect a wide region of the state and can impact many counties; however, Galveston County was not included in the disaster declarations.

The U.S. Department of Agriculture (USDA) keeps records of agricultural disasters. Between 2012 and November 2021, Galveston County was included seven declarations related to drought.

Table 4-13. USDA Drought Disaster Declarations for Galveston County, TX between 2012 and 2021

Designation Number	Incident Date(s)	Approval Date	Description of Disaster	Crop Disaster Year
S3288	Starting January 1, 2012	July 12, 2012	Drought, Wind, Fire, Heat	2012
S3500	Starting February 5, 2013	April 3, 2013	Drought, Wind, Fire, Heat, Insects	2013
S3507	Starting April 2, 2013	April 10, 2013	Drought, Wind, Fire, Heat, Insects	2013
S3555	Starting July 9, 2013	July 17, 2013	Drought, Wind, Fire, Heat, Insects	2013
S3681	April 1 – October 31, 2013	April 23, 2014	Drought, Wind, Fire, Heat	2013
S4669	Starting February 18, 2020	May 6, 2020	Drought	2020
S4932	Starting February 2, 2021	March 26, 2021	Drought	2021

Source: USDA Farm Service Agency 2021

Climate Change Projections

Climate is defined not simply as average temperature and precipitation but also by the type, frequency, and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of extremes such as droughts. While predicting changes of drought events under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (EPA 2016).

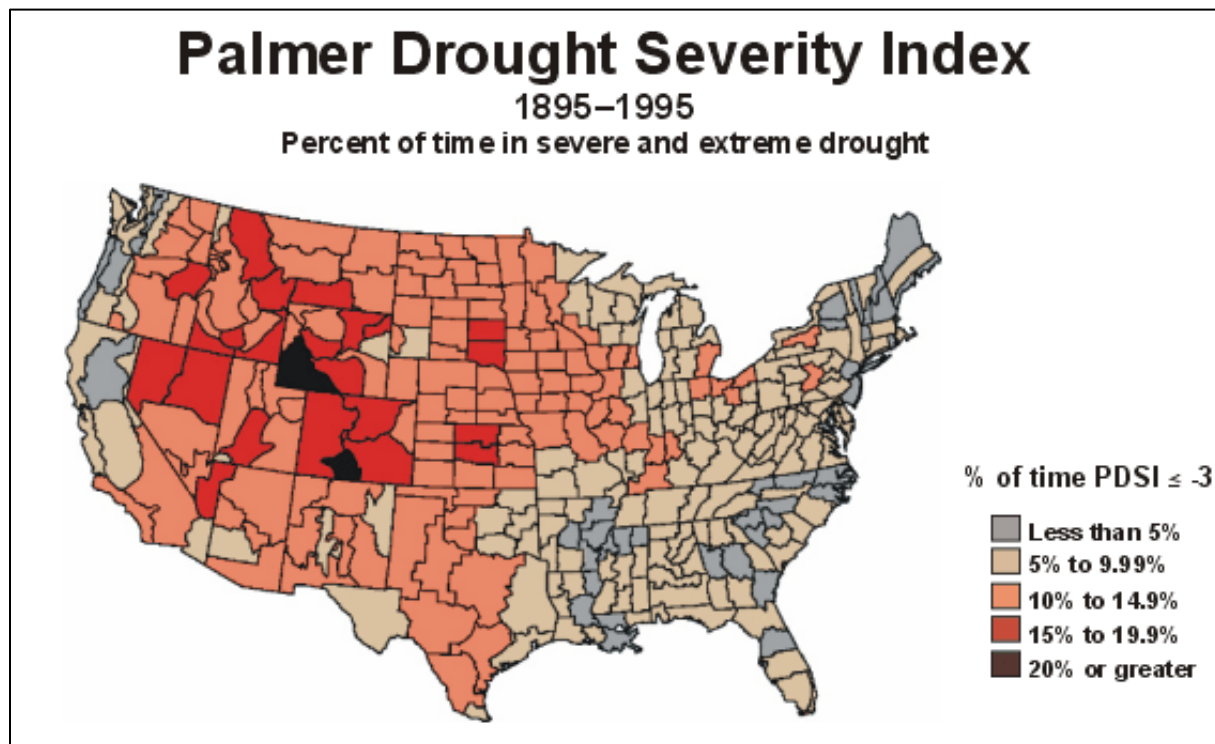
With a warmer climate, droughts can become more frequent, more severe, and longer lasting. According to the National Climate Assessment, variable precipitation and rising temperatures are intensifying droughts, increasing heavy downpours, reducing snowpack, and causing declines in water supply quality. Future warming will add to the stress on water supplies and impact the availability of water supply (USGCRP 2018)

Probability of Future Occurrences

The frequency of droughts is difficult to forecast as drought occurrences are cyclical in nature and will occur in the future. Based on national annual data from 1895 to 1995, Galveston County underwent severe or extreme conditions approximately 5 to 9.9% of the time (illustrated in Figure 4-13).



Figure 4-13. Palmer Drought Severity Index (1895 to 1995)



Source: National Drought Mitigation Center 2020

For the 2022 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of drought events, of all magnitudes, for Galveston County. Information from NOAA-NCEI storm events database, the 2018 State of Texas HMP, the 2017 Galveston County HMP, and the Drought Impact Report were used to identify the number of drought events that occurred between 1950 and 2021. Using these sources ensures the most accurate probability estimates possible. Table 4-14 presents the probability of future occurrence of drought events in Galveston County.

Table 4-14. Probability of Future Drought Events in Galveston County

Hazard Type	Number of Occurrences Between 1950 and 2021	Percent chance of occurrence in any given year
Drought	13	18.06%

Sources: NOAA NCEI 2021, State of Texas 2018, Galveston County 2017

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected drought events since 1968. Due to limitations in data, not all drought events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated

Based on the 13 recorded drought events over 71 years, Galveston County averages less than one drought a year. A drought event has an 18.06% chance of occurring in any given year in the County. Based on the history of events and input from the Steering Committee, the probability for drought occurring in the County is considered *occasional* (between 10 and 100% annual chance of occurring). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entire County is exposed to the drought hazard; therefore, all assets within the County (population, structures,



critical facilities, and lifelines), as described in Section 3 (County Profile), are potentially vulnerable to a drought event. The following text evaluates and estimates the potential impact of the drought hazard in the County.

Impact on Life, Health, and Safety

The entire population of Galveston County is vulnerable to drought events (2019 American Community Survey 5-Year Estimate: 342,139 people). Drought conditions can affect public health and safety, including reduced local firefighting capabilities, health problems related to low water flows and poor water quality, and health problems related to dust. If droughts are severe enough, these health problems can lead to loss of human life.

Other possible impacts include recreational risks; effects on air quality; diminished living conditions related to energy, air quality, and sanitation and hygiene; compromised food and nutrition; and increased incidence of illness and disease. Due to their age, health conditions, and limited ability to mobilize to shelters, cooling, and medical resources, the infirm, young, and elderly are particularly susceptible to drought and extreme temperatures, sometimes associated with drought conditions. Some drought-related health effects are short term, while others can be long term (CDC 2012).

Impact on General Building Stock

No structures will be directly affected by drought conditions, though some structures may become vulnerable to wildfires, which are more likely following years of drought. Droughts can have significant impacts on other types of property such as landscaped areas and economically important natural resources.

Impact on Critical Facilities and Lifelines

Water supply facilities may be affected by drought events. However, a majority of the critical facilities defined for this plan will continue to be operational during a drought.

Impact on the Economy

Drought causes the most significant economic impacts on industries that use water or depend on water for their business, most notably agriculture and related sectors, power plants, and oil refineries. In addition to losses in yields in crop and livestock production, drought is associated with increased insect infestations, plant diseases, and wind erosion. Drought can lead to other losses because so many sectors are affected—losses that include reduced income for farmers and reduced business for retailers and others who provide goods and services to farmers. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls, and loss of tax revenue. Prices for food, energy, and other products may also increase as supplies decrease.

According to the 2017 Census of Agriculture, Galveston County has 73,125 acres of farmland, resulting in a \$9.2 billion market value of products sold. According to the 2018 State of Texas HMP, between 1996 and 2016, the County experienced drought-related losses (property plus crop losses) ranging between \$143 million and \$3.1 billion (State of Texas HMP 2018).

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.



Projected Development

Any areas of growth could be potentially impacted by the drought hazard because the entire County is exposed and vulnerable to droughts. Future growth and development could impact the amount of potable water available due to a drain on the available water resources. An increased drain on water resources would not only impact the county's population, but it would also exacerbate impacts to other areas of the county as discussed above, including agriculture and recreational facilities.

Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2019 American Community Survey population of 350,682. The population of the County is expected to increase over the next few years. With an increase in population, the demand for water supply will increase. During a drought, the amount of water needed might not be available. This might require reallocation of water resources to meet demands during a drought. If needed, the County can pass special ordinances regulating the amount of water consumed and used during periods of drought to conserve water.

Climate Change

Climate change has the potential to impact the number of and the severity of droughts. An increased incidence of drought might impact availability of water supplies, primarily placing an increased stress on the population. It is unlikely that structure exposure and vulnerability would increase as a direct result of drought, although secondary impacts of drought, such as wildfire, could increase and threaten structures. If a wildfire were to occur during a drought, emergency services might face complications from a water shortage depending on their water source, and critical water-related service sectors might need to adjust management practices and actively manage resources. Increased incidence of drought increases the potential for impacts on the local economy, including the production of agricultural products.

Change of Vulnerability since the 2017 HMP

Since the 2017 HMP, Galveston County has grown in population and the economic value of its agricultural sector. Therefore, the number of people and farms exposed to the hazard has increased. Overall, the County will continue to be exposed and vulnerable to drought events.

4.3.4 Expansive Soils

The following section provides the hazard profile and vulnerability assessment for the expansive soils hazard in Galveston County.

Hazard Profile

Description

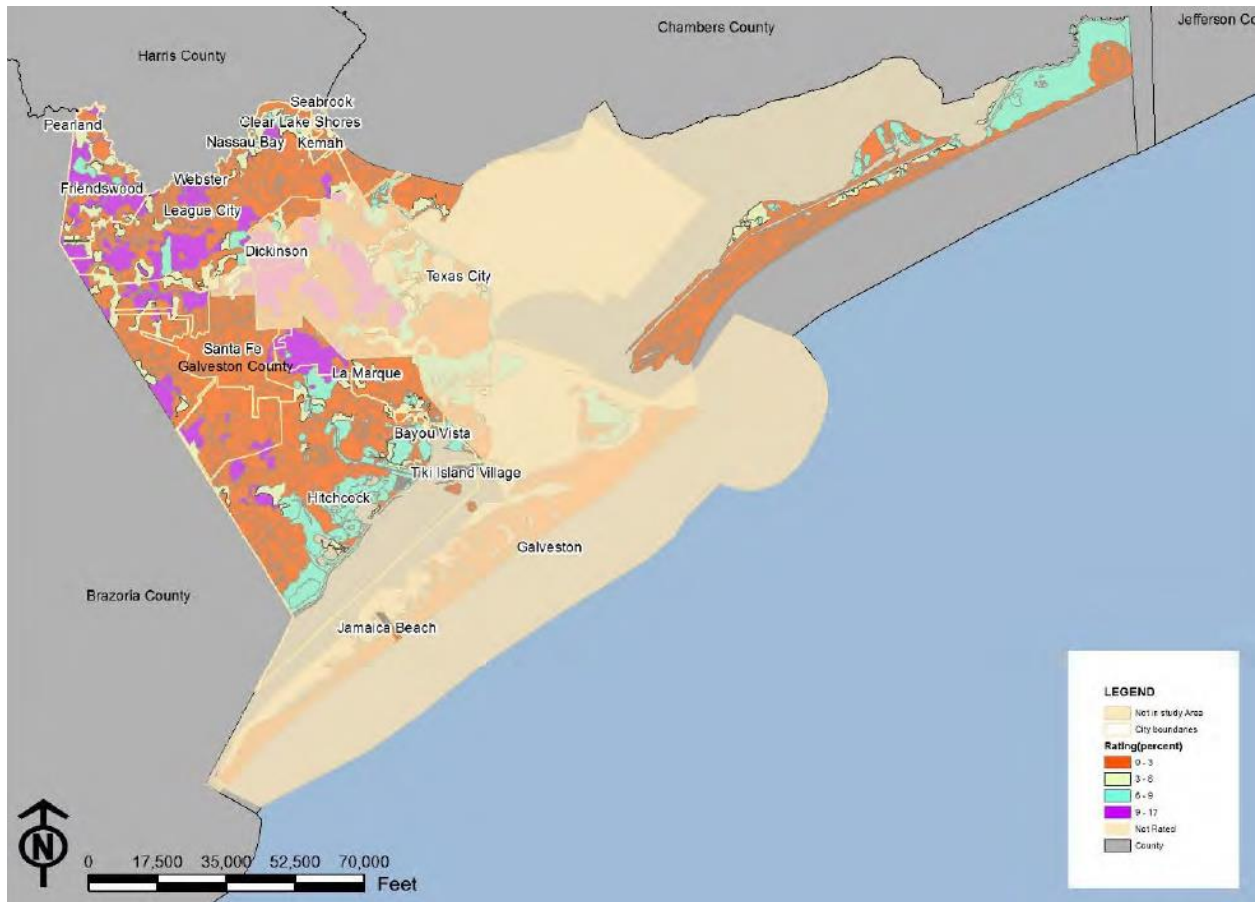
Expansive soils are soils that expand when water is added and shrink when they dry out. This continuous change in soil volume can cause structures to move unevenly and crack and roads and sidewalks to buckle. Soils with a high clay content exhibit high expansive properties. Slab on grade construction is the most susceptible to damage from expansive clays.

Location

Figure 4-14 provides the expansive soil ratings (in percent) as classified by the USGS. The low range, 0-3 percent, represents fine sand with little moisture content and thus low linear extensibility. The high range, 9-17 percent represents clay like soils and is found in areas of Galveston County, Friendswood, League City, and La Marque. Bayou Vista, Clear Lake Shores, Hitchcock, Jamaica Beach, Kemah, Santa Fe, and Tiki Island are located within the low to moderate areas (Galveston County 2017).



Figure 4-14 Expansive Soil Ratings



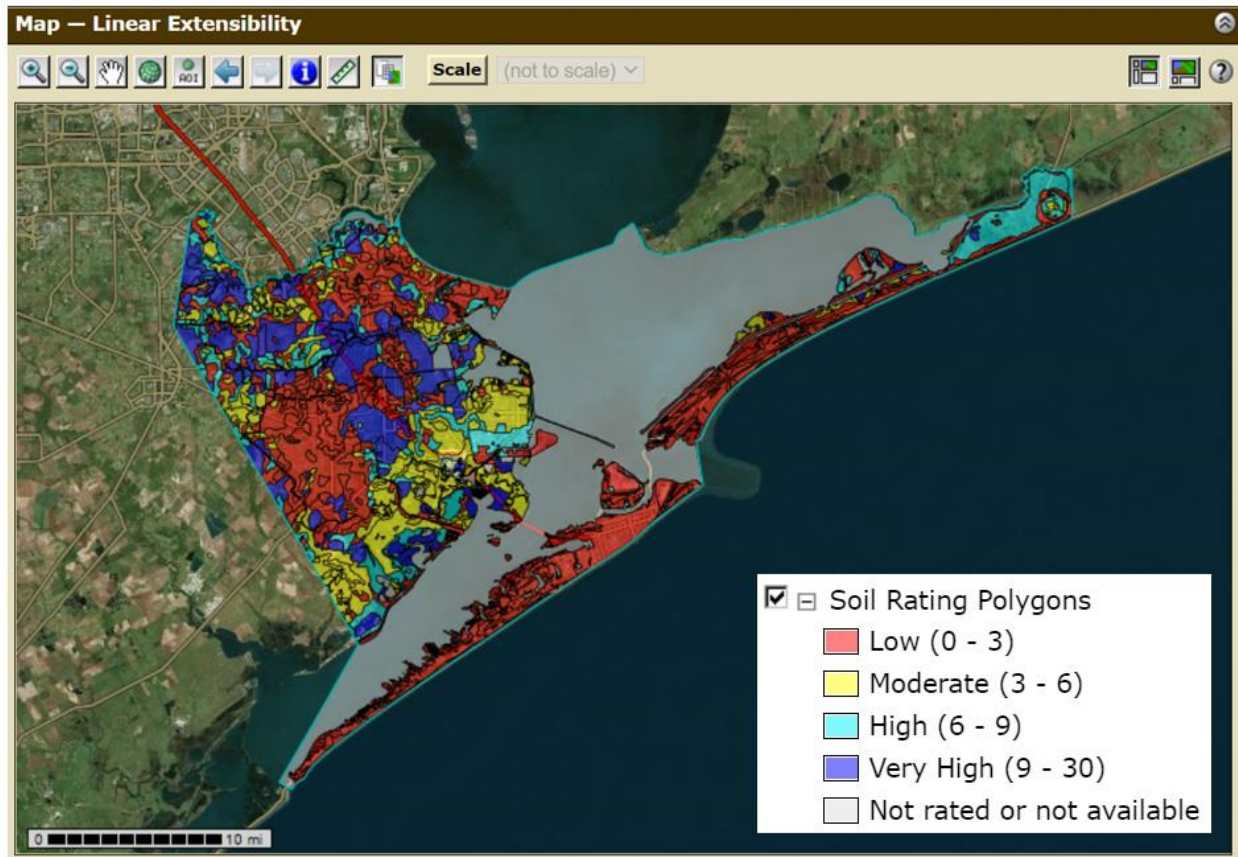
(Galveston County 2017)

Extent

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change as a percentage change for the soil. The amount and type of clay minerals in the soil influence volume change. Figure 4-15 shows soil extensibility ratings in the County. Soil extensibility ratings over 9 percent are considered to be very high. Areas along the Gulf have lower linear extensibility rates in general. Inland soil extensibility rates vary greatly by location. For the high and very high extensibility areas, the extent of damages may include cracking foundations, shifting and/or disruption of underground utilities, and shifting of roadways.



Figure 4-15 Linear Extensibility of Galveston County Soils



Source: (USDA 2021)

Worst-Case Scenario

A season of flooding with rapid drying conditions such as in a drought would present a worst-case scenario for the expansive soils hazard in areas with a soil extensibility rating over 9; however, since insufficient historical records exist, it is not possible to use previous records to project details surrounding a worst-case scenario in the future. Nevertheless, underground utility pipes, foundations, roadways, and sidewalks would be vulnerable to cracking or buckling, causing damage to the built environment.

Previous Occurrences and Losses

There is insufficient data on losses from expansive soils in Galveston County, and there are no recorded previous occurrences in the FEMA, NCEI, USGS, or USDA databases.

Climate Change Projections

Climate change is likely to have significant impacts on the performance of residential buildings constructed on expansive soils. Precipitation and temperature are the primary weather parameters used for determining ground movement (Sun, Li and Zhou 2017). The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016).



Probability of Future Events

It is anticipated that expansive soils will continue to affect Galveston County. As the frequency of severe weather and drought conditions continues to increase, the probability for future expansive soils changes will likely increase as well. Due to the gradual nature of this hazard and the lack of data on individual expansive soil events, the probability of future events is based on history of occurrences and input from the County. The probability of occurrence for expansive soils affecting the planning area is considered high (100% chance occurring; occurs multiple times a year).

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entire County is vulnerable, but Galveston County, Friendswood, League City, and La Marque, are especially vulnerable. The following text evaluates and estimates the potential impact of the expansive soils hazard in the County as a whole.

Impact on Life, Health and Safety

The population living in areas of high linear extensibility are considered especially vulnerable to the expansive soils hazard. A quantitative analysis was conducted using expansive soil hazard areas to determine the population living in expansive soils hazard areas. It was found that almost half of the population of Galveston County is exposed to this hazard (Table 4-15). However, exposure should not be limited only to those who reside within a defined hazard zone, but everyone who may be affected by a hazard event (e.g., people are at risk while traveling, people inside of vulnerable buildings, or people whose access emergency services is compromised during an event); the degree of that impact varies and is not strictly measurable.

Table 4-15. Population living in the expansive soils hazard area

Jurisdiction	Total Population (American Community Survey 2015-2019)	Estimated Population Located in the Expansive Soils (Linear Extensibility >6%) Hazard Area	
		Number of People	Percent of Total
Bayou Vista (C)	1,763	1,762	99.9%
Clear Lake Shores (C)	1,258	55	4.4%
Dickinson (C)	20,847	15,209	73.0%
Friendswood (C)	41,213	34,226	83.0%
Hitchcock (C)	7,301	6,006	82.3%
Jamaica Beach (C)	1,078	0	0.0%
Kemah (C)	1,807	526	29.1%
La Marque (C)	18,030	16,350	90.7%
League City (C)	114,392	49,884	43.6%
Santa Fe (C)	12,735	498	3.9%
Tiki Island (V)	1,106	0	0.0%
Galveston County (Total)	350,682	167,514	47.8%

Source: USDA/NRCS 2020 (Linear Extensibility >6%)

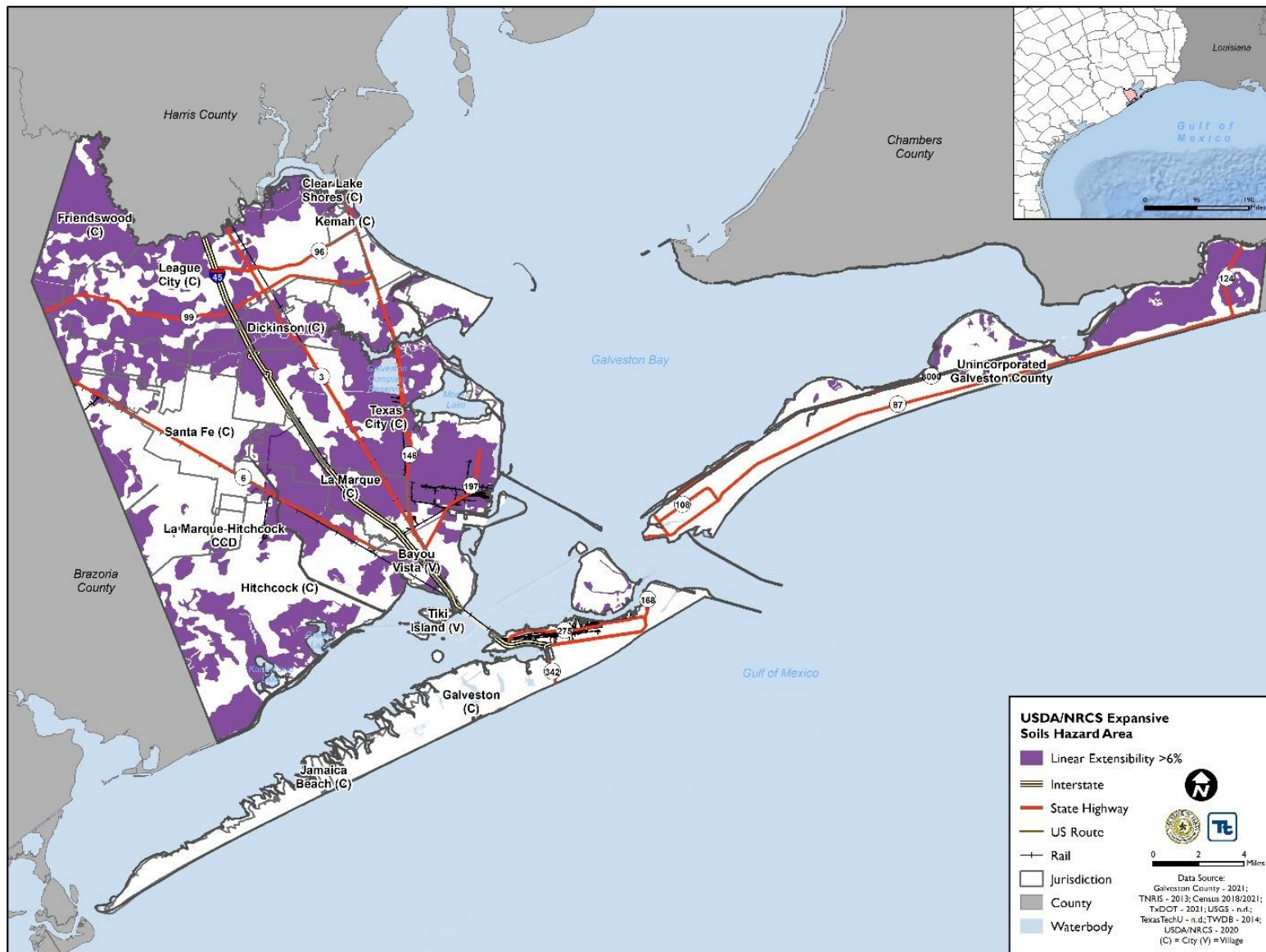
Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on General Building Stock and Critical Facilities

Soils capable of changes in volume present a hazard to structures built over them and to the pipelines, sewer and water lines buried in them. Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling clays than are multi-story buildings, which are usually heavy enough to counter swelling pressures. However, if constructed on wet clay, multi-story buildings may also be damaged by clay shrinkage when moisture levels are substantially reduced (State of Texas HMP 2018). Figure 4-16 illustrates where the expansive soil hazard areas are located in Galveston County.



Figure 4-16. USDA/NRCS Expansive Soils Hazard Area – Galveston County





An estimated 40% of buildings in Galveston County are located in the expansive soils hazard area, with the most vulnerable jurisdictions being Bayou Vista (99.9%), La Marque (89.6%), Friendswood (82.8%), and Hitchcock (80.8%) (Table 4-16).

Table 4-16. Building Stock Located in the Expansive Soils Hazard Area

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located in the Expansive Soils (Linear Extensibility >6%) Hazard Area			
			Number of Buildings	Percent of Total	Total Replacement Cost Value of Buildings	Percent of Total
Bayou Vista (C)	1365	\$445,354,087.33	1,364	99.9%	\$445,280,611	100.0%
Clear Lake Shores (C)	1155	\$904,562,368.66	76	6.6%	\$204,737,419	22.6%
Dickinson (C)	10351	\$6,601,710,645.63	7,483	72.3%	\$5,124,865,418	77.6%
Friendswood (C)	14891	\$10,815,456,384.12	12,325	82.8%	\$8,583,015,518	79.4%
Hitchcock (C)	5452	\$4,592,036,651.86	4,407	80.8%	\$3,495,801,680	76.1%
Jamaica Beach (C)	1291	\$458,205,838.82	0	0.0%	\$0	0.0%
Kemah (C)	1634	\$2,631,702,105.60	483	29.6%	\$967,274,297	36.8%
La Marque (C)	10749	\$7,927,292,522.28	9,633	89.6%	\$6,799,665,275	85.8%
League City (C)	46742	\$31,237,974,594.10	20,362	43.6%	\$13,886,431,057	44.5%
Santa Fe (C)	7942	\$4,831,628,162.13	321	4.0%	\$152,788,092	3.2%
Tiki Island (V)	868	\$365,209,145.44	0	0.0%	\$0	0.0%
Galveston County (Total)	209947	\$166,321,604,688.46	85,766	40.9%	\$62,998,467,572	37.9%

Source: USDA/NRCS 2020 (Linear Extensibility >6%), Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

While all infrastructures in the higher-risk areas are vulnerable, slab-on-grade structures are most likely to suffer damages from expansive soils. In addition, older structures built to less stringent building codes may be more susceptible to damages than new construction. Bridges, highways, streets, and parking lots are especially vulnerable when they are constructed when clays are dry, such as during a drought, and then subsequent soaking rains swell the clay (State of Texas HMP 2018).

Impact on Critical Facilities and Lifelines

Expansive soil events may potentially impact critical facilities and lifelines identified within the County. Critical services may not be available if critical facilities or lifelines are directly damaged or transportation routes to access these critical facilities are breached due to expansive soil events.

Table 4-17. Critical Facilities and Lifelines Located in the Expansive Soils Hazard Area

Jurisdiction	Total CFs Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located in the Expansive Soils (Linear Extensibility >6%) Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Bayou Vista (C)	5	5	5	100.0%	5	100.0%
Clear Lake Shores (C)	24	24	6	25.0%	6	25.0%
Dickinson (C)	91	83	74	81.3%	68	81.9%
Friendswood (C)	96	82	83	86.5%	69	84.1%
Hitchcock (C)	214	212	104	48.6%	102	48.1%
Jamaica Beach (C)	11	11	0	0.0%	0	0.0%
Kemah (C)	15	14	11	73.3%	11	78.6%
La Marque (C)	121	107	83	68.6%	70	65.4%



Jurisdiction	Total CFs Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located in the Expansive Soils (Linear Extensibility >6%) Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
League City (C)	321	283	156	48.6%	138	48.8%
Santa Fe (C)	135	128	16	11.9%	16	12.5%
Tiki Island (V)	7	7	0	0.0%	0	0.0%
Galveston County (Total)	2,437	2,317	940	38.6%	874	37.7%

Source: USDA/NRCS 2020 (Linear Extensibility >6%), Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on the Economy

Expansive soil events can significantly impact the local and regional economy. Similar to erosion, losses include, but are not limited to, damages to buildings and infrastructure, agricultural losses, business interruption, and disruptions in delivery of service.

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change

Projected Development

Any areas of growth in Friendswood, League City, and La Marque, could be potentially impacted by the expansive soils hazard because these areas are especially vulnerable. Therefore, any development in these areas will be more susceptible to expansive soil impacts.

Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2019 American Community Survey estimated population of 350,682. Furthermore, the populations of the most vulnerable jurisdictions have increased. The population of the county is expected to increase over the next few years. The increase in population will expose more people to the expansive soils hazard.

Climate Change

Climate change has the potential to impact the number and severity of droughts. Furthermore, climate change is predicted to increase temperatures, leading to an expansion in atmospheric moisture, resulting in an increased amount of rainfall during storm events. The increasing severity of future droughts and rainfall directly impact the risk potential of expansive soils across the State of Texas (State of Texas HMP 2018).

Changes since the 2017 HMP

The location of expansive soils within the County has not changed since the Galveston County 2017 HMP. However, the 2017 HMP did not include an analysis of the vulnerable buildings. The analysis suggests that Bayou Vista is especially vulnerable to expansive soils, yet the previous plan stated it was only moderately



vulnerable. Furthermore, since the population of the County has increased since the 2017 HMP, more people are vulnerable to the expansive soils hazard.

4.3.5 Extreme Temperature

The following section provides the hazard profile and vulnerability assessment for the extreme temperature hazard in Galveston County.

Profile

Hazard Description

Extreme temperature includes both heat and cold events, which can have a significant impact to human health, commercial/agricultural businesses, and primary and secondary effects on infrastructure (e.g., burst pipes and power failure). What constitutes *extreme cold* or *extreme heat* can vary across different areas of the country, based upon what the population is accustomed.

Extreme Heat

Extreme heat is defined as summertime temperatures that are much hotter and/or humid than average. Because some areas are hotter than others, extreme heat temperatures depend on what's considered average for a particular location at that time of year (CDC 2017). A heat wave is a period of abnormally hot weather generally lasting more than two days. Heat waves can occur with or without high humidity. They have potential to cover a large area, exposing a high number of people to hazardous heat (NWS n.d.). Extreme heat during the summer months is a common occurrence in the State of Texas, including Galveston County.

Extreme Cold

Extreme cold events are when temperatures drop well below normal in an area. What constitutes as extreme cold varies in different parts of the country. In the southern United States, near freezing temperatures are considered extreme cold. Freezing temperatures can cause severe damage to citrus fruit crops and other vegetation. Pipes may freeze and burst in homes that are poorly insulated or without heat (NWS n.d.). Galveston County typically does not experience extreme cold; however, the County does have a history of occurrence for extreme cold temperatures.

Extent

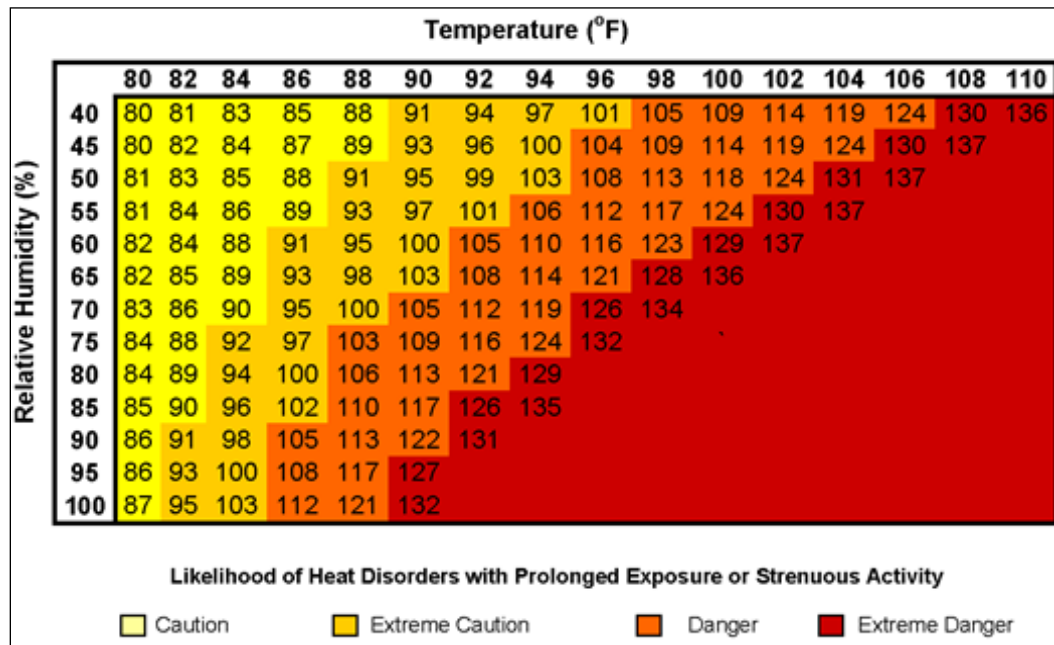
Extreme Heat

The extent of extreme heat temperatures generally is measured through the Heat Index, identified in Figure 4-17. Created by the NWS, the Heat Index is a chart that accurately measures what the temperature feels like to the human body when relative humidity is combined with the air temperature (NWS n.d.). To determine the Heat Index, the temperature and relative humidity are needed. Once both values are identified, the Heat Index is the corresponding number of both the values. This provides a measure of how temperatures feel; however, the values are devised for shady, light wind conditions. Exposure to full sun can increase the index by up to 15 degrees.

Relative humidity is the amount of moisture in the air at a certain temperature compared to what the air can "hold" at that temperature...it is measured as a percentage or ratio of the amount of water vapor in a volume of air **RELATIVE** to a given temperature and the amount it can hold at that given temperature. Warm air can hold more



Figure 4-17 Heat Index Chart



Source: NWS

Each National Weather Service office issues some or all of the following heat-related products as conditions warrant (Table 4-18):

Table 4-18 National Weather Service Alerts for Extreme Heat

Alert	Criteria
Excessive Heat Warning—Take Action!	An Excessive Heat Warning is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Warning is when the maximum heat index temperature is expected to be 105° or higher for at least 2 days and night time air temperatures will not drop below 75°; however, these criteria vary across the country, especially for areas not used to extreme heat conditions. If you don't take precautions immediately when conditions are extreme, you may become seriously ill or even die.
Excessive Heat Watches—Be Prepared!	Heat watches are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.
Heat Advisory—Take Action!	A Heat Advisory is issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Advisory is when the maximum heat index temperature is expected to be 100° or higher for at least 2 days, and night time air temperatures will not drop below 75°; however, these criteria vary across the country, especially for areas that are not used to dangerous heat conditions. Take precautions to avoid heat illness. If you don't take precautions, you may become seriously ill or even die.
Excessive Heat Outlooks—Be Aware!	The outlooks are issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to those who need considerable lead-time to prepare for the event.

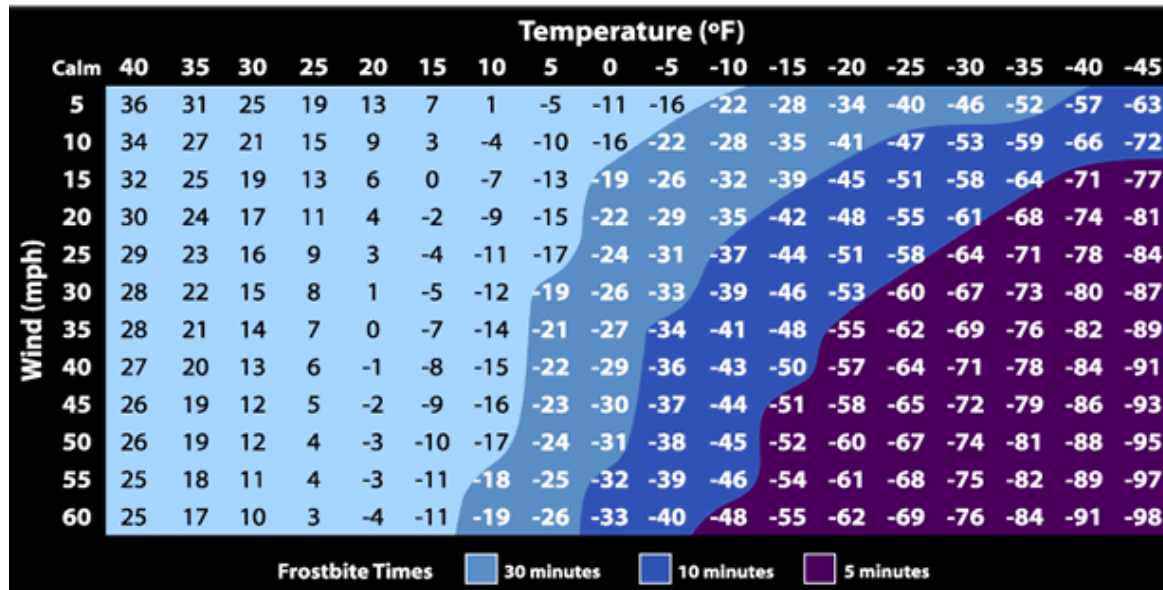
Extreme Cold

The extent (severity or magnitude) of extreme cold temperatures is generally measured through the Wind Chill Temperature (WCT) Index. The WCT Index uses advances in science, technology, and computer modeling to



provide an accurate, understandable, and useful formula for calculating the dangers from wind chill. For details regarding the WCT Index, refer to: <http://www.nws.noaa.gov/om/winter/windchill.shtml>

Figure 4-18. NWS WCT Index



Source: (NWS n.d.)

The NWS provides alerts when Wind Chill indices approach hazardous levels. Table 4-19 explains these alerts.

Table 4-19. National Weather Service Alerts for Extreme Cold

Alert	Criteria
Wind Chill Warning – Take Action!	NWS issues a wind chill warning when dangerously cold wind chill values are expected or occurring. If you are in an area with a wind chill warning, avoid going outside during the coldest parts of the day. If you do go outside, dress in layers, cover exposed skin, and make sure at least one other person knows your whereabouts. Update them when you arrive safely at your destination.
Wind Chill Watch – Be Prepared	NWS issues a wind chill watch when dangerously cold wind chill values are possible. As with a warning, adjust your plans to avoid being outside during the coldest parts of the day. Make sure your car has at least a half a tank of gas and update your winter survival kit.
Wind Chill Advisory – Be Aware	NWS issues a wind chill advisory when seasonably cold wind chill values, but not extremely cold values are expected or occurring. Be sure you and your loved one's dress appropriately and cover exposed skin when venturing outdoors.

Source: (NWS n.d.)

Worst-Case Scenario

An extreme temperature event could impact the entire population of Galveston County. The vulnerable populations (over 65 and under 5, below poverty threshold) would be more susceptible to warmer or colder temperatures. Extreme cold temperatures could result injuries associated with an interruption of energy supplies and lack of access to medical care caused by snow or ice. Extreme heat worst-case scenario would be a multi-day event of temperatures with a heat index reaching 113°F, like that experienced in June 2019. Those that are outside could be more vulnerable to heat-related illnesses. Extreme cold worst-case scenario would be a multi-day event of temperatures only reaching 34°F, like that experienced during the February 2021 snow/cold event. Another event like this could lead to power outages, no running water, frozen pipes, and minimal heat sources.



Location

Extreme temperature events can occur in any area of Galveston County. Metropolitan areas could experience more extreme heat events due to urban heat islands. Heat island describes built up areas that are hotter than nearby rural areas (Figure 4-19). According to the U.S. EPA, the annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F warmer than its surroundings. In the evening, the difference can be as high as 22°F. Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water pollution (EPA 2021).

Figure 4-19. Urban Heat Island



Source: (NASA/JPL-Caltech 2021)

Previous Occurrences and Losses

Many sources have provided historical information regarding previous occurrences and losses associated with extreme temperatures in Galveston County. According to the NOAA-NCEI Storm Events Database, Galveston County has been impacted by one extreme temperature event between 1996 and 2021.

Table 4-20. Extreme Temperature Events in Galveston County, 1996-2021

Hazard Type	Number of Occurrences Between 1996 and 2021	Total Fatalities	Total Injuries	Total Property Damage (\$)	Total Crop Damage (\$)
Heat	8	3	0	\$0	\$0
Cold	1	9	0	\$12 million	\$0

Source: NOAA-NCEI 2021, Galveston HMP 2017

Note: Due to limitations in data, not all extreme temperature events occurring between 1996 and 2021 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated

Between 1953 and 2021, the State of Texas was included in two extreme temperature-related disaster declarations related to cold temperatures. Of those declarations, Galveston County was included in the February 2021 Severe Winter Storm declaration (DR-4586).



According to the Houston/Galveston NWS Station, the local weather data collection center with comprehensive data in the County, the mean number of days between 2000 and 2021 with a daily maximum temperature equal to or greater than 90°F was 67 days. The greatest number of days which the County experienced extreme heat is 31 in 2016, while the highest temperature recorded was 104°F on September 5, 2000.

Table 4-21. Monthly Number of Days with Maximum Temperature ≥ 90°F

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2000	0	0	0	0	0	0	27	26	9	0	0	0	62
2001	0	0	0	0	0	2	18	19	1	0	0	0	40
2002	0	0	0	0	0	1	11	22	6	1	0	0	41
2003	0	0	0	0	1	5	5	21	1	0	0	0	33
2004	0	0	N/A	0	0	1	12	17	12	0	0	0	N/A
2005	0	0	0	0	2	17	27	29	23	1	0	0	99
2006	0	0	0	0	0	11	12	22	9	1	0	0	55
2007	0	0	0	0	0	1	2	22	7	0	0	0	32
2008	0	0	0	0	0	28	26	19	N/A	0	0	0	N/A
2009	0	0	0	0	0	16	27	30	6	N/A	0	0	N/A
2010	0	0	0	0	1	10	10	31	13	0	0	0	65
2011	0	0	0	1	4	25	30	30	13	0	0	0	103
2012	0	0	0	0	2	11	20	26	8	0	0	0	67
2013	0	0	0	0	0	19	24	19	9	0	0	0	71
2014	0	0	0	0	0	4	22	24	8	0	0	0	58
2015	0	0	0	0	0	5	30	23	5	1	0	0	64
2016	0	0	0	0	0	3	29	19	17	0	0	0	68
2017	0	0	0	0	1	2	22	19	14	5	0	0	63
2018	0	0	0	0	1	18	19	28	4	0	0	0	70
2019	0	0	0	0	0	12	28	30	22	7	0	0	99
2020	0	0	0	1	1	11	26	30	15	0	0	0	84
2021	0	0	0	0	0	15	20	26	16	1	0	N/A	N/A
Mean	0	0	0	0	1	10	20	24	10	1	0	0	67
Max	0	0	0	1	4	28	30	31	23	7	0	0	103
	2021	2021	2021	2020	2011	2008	2015	2010	2005	2019	2021	2020	2011
Min	0	0	0	0	0	0	2	17	1	0	0	0	32
	2021	2021	2021	2021	2021	2000	2007	2004	2003	2020	2021	2020	2007

Source: (NWS 2021)

Note: N/A = indicates that there is no available data

According to the Houston/Galveston NWS Station, the local weather data collection center with comprehensive data in the County, the mean number of days between 2000 and 2021 with a daily maximum temperature equal to or less than 32°F was 2 days. The greatest number of days which the County experienced extreme cold is 8 in 2011, while the lowest temperature recorded was 20°F on February 16, 2021.

Table 4-22. Monthly Number of Days with Maximum Temperature ≤ 32°F

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	2	0	0	0	0	0	0	0	0	0	0	0	2
2002	1	1	2	0	0	0	0	0	0	0	0	0	4
2003	1	0	0	0	0	0	0	0	0	0	0	0	1
2004	0	0	N/A	0	0	0	0	0	0	0	0	1	N/A
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	N/A	0	0	0	N/A
2009	0	0	0	0	0	0	0	0	0	N/A	0	0	N/A
2010	5	0	0	0	0	0	0	0	0	0	0	0	5



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2011	1	8	0	0	0	0	0	0	0	0	0	0	9
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	6	0	0	0	0	0	0	0	0	0	0	0	6
2015	1	0	0	0	0	0	0	0	0	0	0	0	1
2016	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	1	0	0	0	0	0	0	0	0	0	0	0	1
2018	5	0	0	0	0	0	0	0	0	0	0	0	5
2019	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	3	0	0	0	0	0	0	0	0	0	N/A	N/A
Mean	1	1	0	0	0	0	0	0	0	0	0	0	2
Max	6 2014	8 2011	2 2002	0 2021	0 2021	0 2021	0 2021	0 2021	0 2021	0 2021	0 2021	1 2004	9 2011
Min	0 2021	0 2020	0 2021	0 2021	0 2021	0 2021	0 2021	0 2021	0 2021	0 2021	0 2021	0 2020	0 2020

Source: (NWS 2021)

Note: N/A = indicates that there is no available data

Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. Seventy years from now, Texas is likely to have three or four times as many days per year above 100°F as it has today (EPA 2016). With the increase in temperatures, heat waves will become more frequent and intense, increasing heat-related illness and death, and posing new challenges to the energy system, air quality and agriculture.

Probability of Future Occurrences

It is anticipated that the County will experience extreme temperature events each year, with a majority of the days being extreme heat days. The probability of future occurrences for extreme temperatures can be determined by assessing historical averages. Based on the information provided by the National Weather Service, the County can expect, on average, approximately 52 days a year with temperatures greater than or equal to 90°F. Additionally, the County can expect, on average, approximately eight days each year with temperatures less than or equal to 32°F.

Table 4-23. Probability of Occurrences of Extreme Temperature Events

Hazard Type	Number of Occurrences Between 2000 and 2021	% chance of occurrence in any given year
Temperature $\geq$ 90°F	1,084	100%
Temperature $\leq$ 32°F	35	100%
Total	1,119	100%

Source: (NWS 2021)

Notes: Probability was calculated using the available data provided in the National Weather Service data for the Houston/Galveston Station. Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act and selected extreme temperature events since 1968. Due to limitations in data, not all extreme temperature events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Based on historical records and input from the Steering Committee, the probability of occurrence for extreme temperatures in Galveston County is considered *frequent* (100% chance occurring; occurs multiple times a year). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.



Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed and vulnerable. For the extreme temperature hazard, the entire County has been identified as exposed; therefore, all assets are potentially vulnerable. The following text estimated potential impacts of extreme temperatures on the Galveston County.

Impact on Life, Health and Safety

The entire population (350,682) of Galveston County is exposed to the extreme temperature hazard. Extreme temperature events have potential health impacts including injury and death. According to the Centers for Disease Control and Prevention, populations most at risk to extreme cold and heat events include the following: 1) the elderly, who are less able to withstand temperatures extremes due to their age, health conditions, and limited mobility to access shelters; 2) infants and children up to four years of age; 3) individuals with chronic medical conditions (e.g., heart disease, high blood pressure), 4) low-income persons that cannot afford proper heating and cooling; and 5) the general public who may overexert during work or exercise during extreme heat events or experience hypothermia during extreme cold events (CDC 2017a). The number of people vulnerable to extreme temperatures are presented in Table 4-24.

Table 4-24. Vulnerable Populations in Galveston County

Jurisdiction	Over 65	Percent of Jurisdiction Total	Under 5	Percent of Jurisdiction Total	Poverty Level	Percent of Jurisdiction Total
Bayou Vista (C)	619	35.1%	17	1.0%	64	3.6%
Clear Lake Shores (C)	304	24.2%	22	1.7%	8	0.6%
Dickinson (C)	2,786	13.4%	1,055	5.1%	3,402	16.3%
Friendswood (C)	5,648	13.7%	2,517	6.1%	1,611	3.9%
Hitchcock (C)	1,054	14.4%	728	10.0%	1,505	20.6%
Jamaica Beach (C)	175	16.2%	20	1.9%	90	8.3%
Kemah (C)	358	19.8%	152	8.4%	271	15.0%
La Marque (C)	2,377	13.2%	767	4.3%	2,227	12.4%
League City (C)	10,973	9.6%	7,980	7.0%	5,693	5.0%
Santa Fe (C)	2,495	19.6%	792	6.2%	1,501	11.8%
Tiki Island (V)	361	32.6%	5	0.5%	57	5.2%
Galveston County (Total)	46,103	13.1%	21,140	6.0%	37,264	10.6%

Source: 2015-2019 American Community Survey Estimates

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Exposure to excessive heat can pose a number of health risks to individuals. Table 4-25 and Table 4-26 identify different health hazards related to extreme heat conditions.

Table 4-25. Health Effects of Extreme Cold

Health Hazard	Symptoms
Wind Chill	Wind chill is not the actual temperature but rather how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. Animals are also affected by wind chill; however, cars, plants and other objects are not.
Frostbite	Frostbite is damage to body tissue caused by extreme cold. A wind chill of -20°F will cause frostbite in just 30 minutes. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as fingers, toes, ear lobes or the tip of the nose. If symptoms are detected, get medical help immediately! If you must wait for help, slowly re-warm affected areas. However, if the person is also showing signs of hypothermia, warm the body core before the extremities.



Health Hazard	Symptoms
Hypothermia	Hypothermia is a condition brought on when the body temperature drops to less than 95°F. It can kill. For those who survive, there are likely to be lasting kidney, liver, and pancreas problems. Warning signs include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion.

Source: CDC 2020

Table 4-26. Health Effects of Extreme Heat

Health Hazard	Symptoms
Sunburn	Redness and pain. In severe cases: swelling of skin, blisters, fevers, and headaches
Dehydration	Excessive thirst, dry lips, and slightly dry mucous membranes
Heat Cramps	Painful spasms, usually in muscles of legs and abdomen, and possible heavy sweating
Heat Exhaustion	Heavy sweating; weakness; cold, pale, and clammy skin; weak pulse; possible fainting and vomiting
Heat Stroke	High body temperature (104°F or higher), hot and dry skin, rapid and strong pulse, and possible coma

Source: CDC 2020

Meteorologists can accurately forecast extreme heat and cold event development and the severity of the associated conditions with several days of lead time. These forecasts provide an opportunity for public health and other officials to notify vulnerable populations, implement short-term emergency response actions, and focus on surveillance and relief efforts on those at greatest risk. Adhering to extreme temperature warnings can significantly reduce the risk of temperature-related deaths.

Impact on General Building Stock

All the building stock in the County is exposed to the extreme temperature hazard. Extreme heat generally does not impact buildings; however, elevated summer temperatures increase the energy demand for cooling. Losses can be associated with the overheating of heating, ventilation, and air conditioning (HVAC) systems. Extreme cold temperature events can damage buildings through freezing/bursting pipes and freeze/thaw cycles, as well as increasing vulnerability to home fires. Additionally, manufactured homes (mobile homes) and antiquated or poorly constructed facilities can have inadequate capabilities to withstand extreme temperatures.

Impact on Critical Facilities

All critical facilities in the County are exposed to the extreme temperature hazard. Impacts to critical facilities are the same as described for general building stock. Additionally, it is essential that critical facilities remain operational during natural hazard events. Extreme heat events can sometimes cause short periods of utility failures, commonly referred to as *brown-outs*, due to increased usage from air conditioners and other energy-intensive appliances. Similarly, heavy snowfall and ice storms, associated with extreme cold temperature events, can cause power interruption. Backup power is recommended for critical facilities and infrastructure.

Impact on Economy

Extreme temperature events also have impacts on the economy, including loss of business function and damage to and loss of inventory. Business-owners can be faced with increased financial burdens due to unexpected repairs caused to the building (e.g., pipes bursting), higher than normal utility bills, or business interruption due to power failure (i.e., loss of electricity, telecommunications).

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.



- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development and Change in Population

The ability of new development to withstand extreme temperature impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. New development will change the landscape where buildings, roads, and other infrastructure potentially replace open land and vegetation. Surfaces that were once permeable and moist are now impermeable and dry. These changes cause urban areas to become warmer than the surrounding areas forming an *island* of higher temperatures (EPA 2009).

Climate Change

As the climate warms, extreme cold events might decrease in frequency, while extreme heat events might increase in frequency; the shift in temperatures could also result in hotter extreme heat events. With increased temperatures, vulnerable populations could face increased vulnerability to extreme heat and its associated illnesses, such as heatstroke and cardiovascular and kidney disease. Additionally, as temperatures rise, more buildings, facilities, and infrastructure systems may exceed their ability to cope with the heat.

Change of Vulnerability Since the 2017 HMP

Overall, the entire County remains vulnerable to extreme temperatures. As existing development and infrastructure continue to age, they can be at increased risk to failed utility systems (e.g., HVAC) if they are not properly maintained. Similarly, an increase in the elderly population remaining in the County increases the vulnerable population.

4.3.6 Flood

The following section provides the hazard profile and vulnerability assessment for the flood hazard in Galveston County.

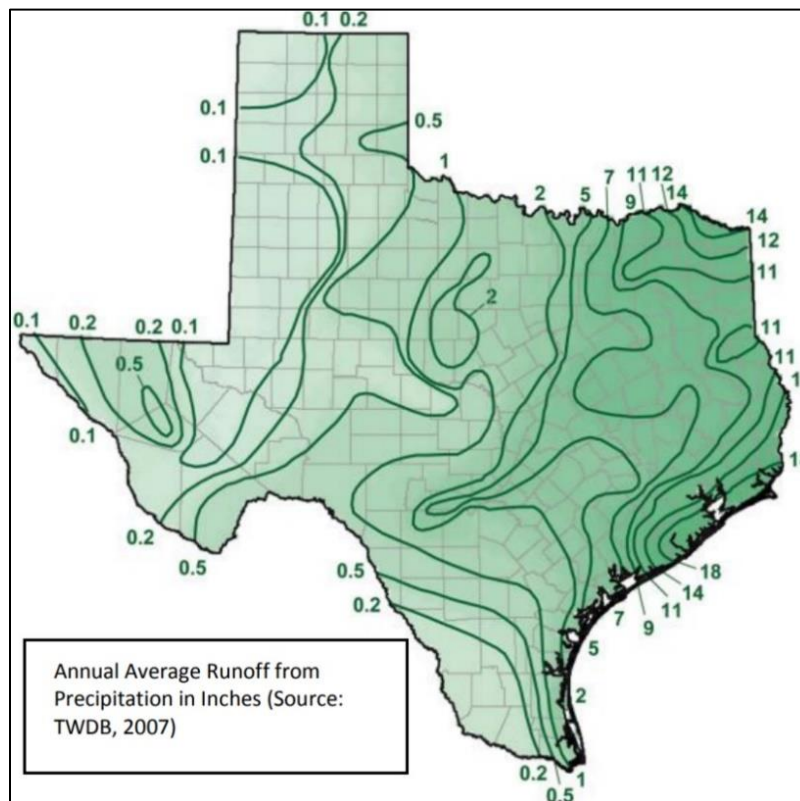
Profile

Hazard Description

Floods are one of the most common natural hazards in the U.S. They can develop slowly over a period of days or develop quickly, with disastrous effects that can be local (impacting a neighborhood or community) or regional (affecting entire river basins, coastlines and multiple counties or states) (FEMA 2017). As defined in the State of Texas HMP, floods are the accumulation of water within a water body and the overflow of excess water into adjacent floodplain lands (Texas Division of Emergency Management 2013).

In hydrologic analysis, runoff is that portion of rainfall which, in combination with other factors, contributes to the stream flow of any surface drainage way. When runoff exceeds the carrying capacity of the stream or drainage, flooding occurs. Runoff is a product of two major groups of factors, climate and physiographic. Climatic factors may include precipitation, evaporation, transpiration, and interception. Physiographic factors would include the characteristics of the watershed such as size, shape and slope of the basin's drainage area, the general land use within the basin. Average annual runoff decreases unevenly moving east to west across Texas, the localized variations based on these factors listed above (Texas Division of Emergency Management 2013). Figure 4-20 illustrates the annual average runoff from precipitation across the State. In Galveston County, the average runoff is fourteen to eighteen inches.

Figure 4-20 Annual Average Runoff from Precipitation, in Inches



Source: (Texas Division of Emergency Management 2013)

When surface water runoff enters into streams, rivers, or dry creek beds, riverine flooding conditions occurs whenever the water carrying capacity of the water channel is compromised by excess runoff (Texas Division of Emergency Management 2013).

If the local basin drainage area is relatively flat, shallow, slow-moving floodwater can last for days. In drainage areas with substantial slope, or the channel is narrow and confined, rapidly moving and extreme high water conditions, called a flash flood, can occur (Texas Division of Emergency Management 2013).

Types of Flooding

Flooding generally takes one of the following forms:

- **Riverine Flooding**—Riverine flooding occurs when rivers overflow their banks in response to excessive precipitation levels and water runoff volumes within the watershed. Riverine floodplains may be broad, as when a river crosses an extensive flat landscape, or narrow, as when a river is confined in a canyon.
- **Coastal Flooding**—Coastal flooding is primarily caused by storm surge, a cascading effect of hurricanes and coastal storms that pushes water toward the shore. The result can be waves that extend further inland, causing damage to development that would not normally be subject to wave action. Storm surge heights, and associated waves, are dependent upon the local width of the continental shelf and the depth of the ocean bottom. A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. Due to the high risk and vulnerability to this flood specific hazard, it was analyzed independently in this chapter rather than as a cascading effect of hurricanes.

- **Flash Flooding**—Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. However, flash flooding events can also occur from accelerated snow melt due to heavy rains, a dam or levee failure within minutes or hours of heavy amounts of rainfall, or from a sudden release of water held by an ice jam. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces. Flash flood waters move at very high speeds, uprooting trees, destroying buildings, and obliterating bridges and roads.
- **Urban Flooding**—Urban flooding occurs when development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff.

Location

Flooding potential is influenced by climatology, meteorology, and topography (elevations, latitude, and water bodies and waterways). Flooding potential for each type of flooding that affects the County is described in the subsections below.

Coastal Flooding

Coastal flooding and storm surge are most likely to affect the southwestern part of the planning area closest to the coastline, including Galveston Island and the Bolivar Peninsula.

Riverine Flooding

The bayous and creeks are susceptible to riverine flooding during heavy rainfall events.

Flash Flooding

Flash floods can occur anywhere in the planning area depending on intensity of rainfall, but areas below streams or other bodies of water are more susceptible to flash floods if an embankment fails suddenly.

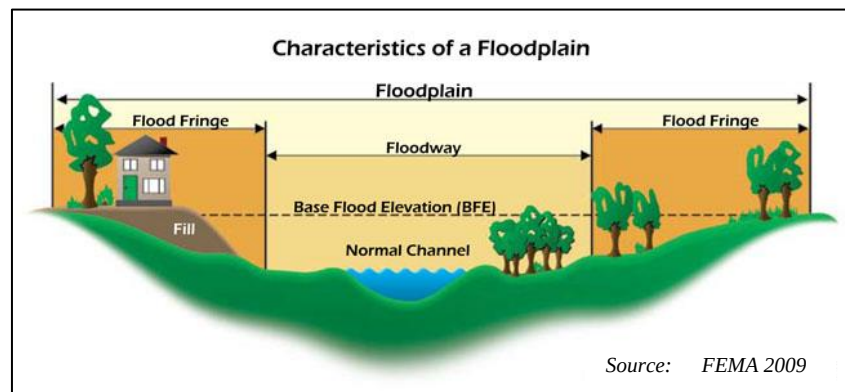
Urban/Stormwater Flooding

The entire built planning area may be affected by urban flooding during heavy rainfall events, especially where stormwater drainage infrastructure is aging or becomes blocked.

Floodplains

A floodplain is defined as the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that becomes inundated with water during a flood. In Galveston County, floodplains line the rivers, streams, and bayous of the County. The boundaries of the floodplains are altered as a result of changes in land use, the amount of impervious surface, placement

of obstructing structures in floodways, changes in precipitation and runoff patterns, impr





Flood Map Terms

- Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA).
- SFHA = the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year.
- 1-percent annual chance flood = the base flood or 100-year flood.
- SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30.
- Zone B or Zone X (shaded) = Moderate flood hazard areas and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood.
- Zone C or Zone X (unshaded) = Areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled

Source: (FEMA 2020)

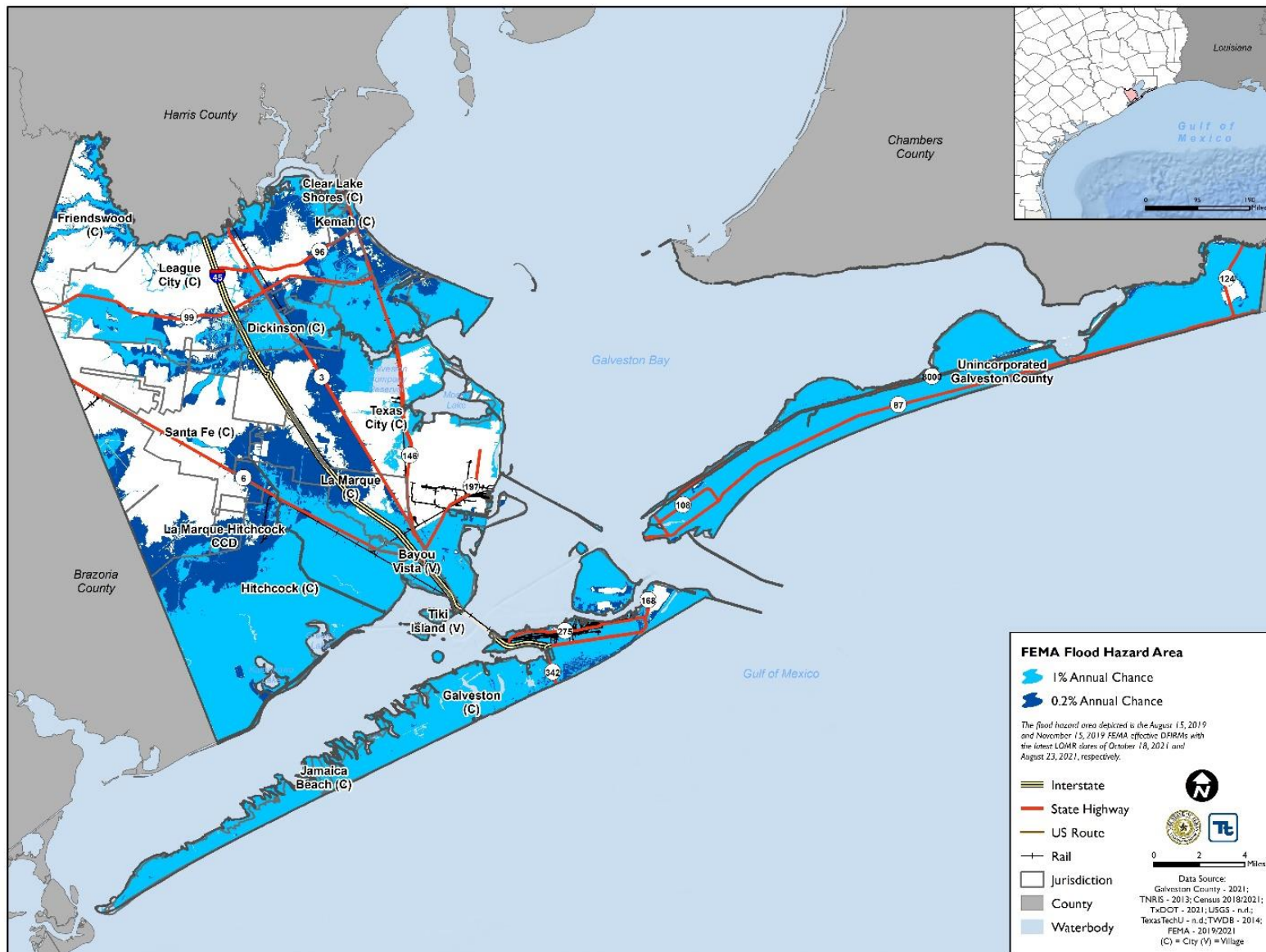
Flood hazard areas are identified as Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1 percent chance of being equaled to or exceeded in any given year. The 1 percent annual chance flood is also referred to as the base flood or 100-year flood. A 100-year floodplain is not a flood that will occur once every 100 years; the designation indicates a flood that has a 1-percent chance of being equaled or exceeded each year. Thus, the 100-year flood could occur more than once in a relatively short period of time. Similarly, the moderate flood hazard area (500-year floodplain) will not occur every 500 years but is an event with a 0.2-percent chance of being equaled or exceeded each year (FEMA 2020). The 1-percent annual chance floodplain establishes the area that has flood insurance and floodplain management requirements.

Locations of flood zones in the County as depicted on the FEMA preliminary Digital Flood Insurance Rate Map (DFIRM) are illustrated in Figure 4-21. Flood hazard zones occur throughout the County, with the largest areas along the bay areas. The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for the County show the following flood hazard areas:

- 1-Percent Annual Chance Flood Hazard: Areas subject to inundation by the 1-percent-annual-chance flood event. This includes Zone AE, and Zone. Mandatory flood insurance requirements and floodplain management standards apply. Base flood elevations are provided in Zone AE. Zone VE (coastal areas) has associated flood depths derived from detailed analyses.
- 0.2-Percent Annual Chance Flood Hazard: Area of moderate flood hazard, usually depicted on FIRMs as the 500-year flood level or Shaded X Zone.
- 0.2-Percent Annual Chance Flood Hazard: Area of minimal flood hazard, usually depicted on FIRMs as the 500-year flood level or Unshaded X Zone.



Figure 4-21. FEMA Flood Hazard Areas in Galveston County





Flood Insurance in Galveston County National Flood Insurance Program

The unincorporated areas of Galveston County and most the incorporated areas participating in this plan update also participate in the NFIP with nearly 59,000 insurance policies in force providing over \$17.2 billion in insurance coverage. According to FEMA statistics, 52,601 flood insurance claims were paid between May 26, 1970 and September 30, 2021, for a total of over \$2.1 billion, an average of \$40,997 per claim. Table 4-27 lists flood insurance statistics that help identify vulnerability in the planning area.

Table 4-27 Flood Insurance Statistics

Community	Date of Entry Initial FIRM Effective Date	# of Flood Insurance Policies as of 09/30/2021	Insurance in Force	Total Annual Premium	Claims, as of 09/30/2021	Value of Claims paid, as of 09/30/2021
Bayou Vista	04/09/1971	532	\$139,915,400	\$639,285	137	\$3,425,622
Clear Lake Shores	10/23/1970	545	\$141,502,700	\$442,823	1,199	\$26,600,777
Dickinson	04/08/1971	3,911	\$1,167,363,200	\$2,773,504	2,595	\$239,101,802
Friendswood	04/08/1971	6,308	\$2,083,467,400	\$3,164,154	4,005	\$255,175,550
Galveston County (Unincorporated Areas)	03/03/1972	7,518	\$2,100,837,400	\$9,503,247	16,433	\$669,668,372
Galveston (City)	04/09/1971	17,235	\$4,255,763,500	\$24,979,053	18,072	\$770,374,418
Hitchcock	05/26/1970	1,089	\$281,539,900	\$1,028,541	1,461	\$39,676,284
Jamaica Beach	11/17/1970	912	\$250,219,900	\$970,015	1,573	\$22,541,508
Kemah	04/08/1971	634	\$194,966,900	\$556,068	1,350	\$42,403,304
La Marque	06/05/1970	2,007	\$567,441,500	\$1,167,140	1,640	\$32,414,112
League City	05/26/1970	19,704	\$6,480,149,700	\$9,883,972	5,375	\$250,669,561
Santa Fe	06/05/1970	2,029	\$623,079,800	\$1,018,853	716	\$37,010,820
Tiki Island	04/08/1971	443	\$120,537,100	\$1,752,113	640	\$6,519,690
Total	-	58,956	\$17,239,421,200	\$55,105,264	52,601	\$2,156,480,018

Properties constructed after a FIRM has been adopted are eligible for reduced flood insurance rates. Such structures are less vulnerable to flooding since they were constructed after regulations and codes were adopted to decrease vulnerability. Properties built before a FIRM is adopted are more vulnerable to flooding because they do not meet code or are located in hazardous areas. The first FIRMs in Galveston County were available in 1971.

Repetitive Loss and Severe Repetitive Loss Properties

A high priority in Texas and nationwide is the reduction of structures with repetitive losses. These structures strain NFIP. They increase the NFIP's annual losses and the need for borrowing and, more importantly, they drain resources needed to prepare for catastrophic events. The NFIP defines a repetitive loss property (RL) as "any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period since 1978. At least, two of the claims must be more than 10-days apart."

The Flood Insurance Reform Act of 2004 identified another category of repetitive loss. Severe repetitive loss (SRL) is defined as "a single family property (consisting of one-to-four residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which four or more separate claim payments (building and contents) have been paid under flood insurance coverage with the amount of each claim payment exceeding \$5,000 and with cumulative amount of such claims payments exceeding \$20,000; or for which at least two separate claim payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the reported value of the property."



The resolution of the RL data accessible by the County to support this planning effort was limited by FEMA's Privacy Act Policies and the time associated with processing the requisite Information Sharing Access Agreement (ISAA). Therefore, data from September 2014 was used to determine how many properties that remain unmitigated are in the program compared to how many have been mitigated (Table 4-28).

Table 4-28. Summary of Repetitive Flood Properties by Occupancy Type and Number of Properties Mitigated

Community	2-4 Family	Assmd. Condo	Non-Resident	Other Resident	Single Family	Total RF Properties	No. of Mitigated Properties
Bayou Vista	0	0	0	0	45	45	9
Clear Lake Shores	1	2	13	1	86	103	53
Dickinson	N/A	N/A	N/A	N/A	N/A	253	N/A
Friendswood	1	4	5	2	295	307	129
Hitchcock	0	1	4	0	100	105	34
Jamaica Beach	0	1	0	0	44	45	4
Kemah	2	3	30	3	74	112	79
La Marque	0	1	5	0	69	75	6
League City	1	3	7	2	220	233	111
Santa Fe	0	0	7	1	114	122	11
Tiki Island	0	0	0	0	2	2	0
Total*	5	15	71	9	1,049	1,149	436

**includes totals for participating jurisdictions in the 2022 HMP update; City of Dickinson did not participate in the last plan and data is incomplete. A Countywide action is included in this plan to obtain RL and SRL data for jurisdictions.*

Community Rating System

The CRS is a voluntary program within the NFIP that encourages floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premiums are discounted to reflect the reduced flood risk resulting from community actions meeting the following three goals of the CRS:

- Reduce flood losses.
- Facilitate accurate insurance rating.
- Promote awareness of flood insurance.

For participating communities, flood insurance premium rates are discounted in increments of 5 percent. For example, a Class 1 community would receive a 45 percent premium discount, and a Class 9 community would receive a 5 percent discount. (Class 10 communities are those that do not participate in the CRS; they receive no discount.) The discount partially depends on location of the property. Properties outside the SFHA receive smaller discounts: a 10-percent discount if the community is at Class 1 to 6 and a 5-percent discount if the community is at Class 7 to 9. The CRS classes for local communities are based on 18 creditable activities in the following categories:

- Public information
- Mapping and regulations
- Flood damage reduction
- Flood preparedness

CRS activities can help to save lives and reduce property damage. Communities participating in the CRS represent a significant portion of the nation's flood risk; over 66 percent of the NFIP's policy base is located in these communities. Communities receiving premium discounts through the CRS range from small to large and represent a broad mixture of flood risks, including both coastal and riverine flood risks.



Seven cities in the County currently participate in the CRS program, representing 96.3 percent of the planning area policy base. Their CRS status is summarized in Table 4-29. The total annual savings on flood insurance premiums within the planning area is \$33.65 million. Many of the mitigation actions identified in this plan are creditable activities under the CRS program. Therefore, successful implementation of this plan offers the potential for these communities to enhance their CRS classifications and for currently non-participating communities to join the program.

Table 4-29 CRS Community Status in the Planning Area

Community	NFIP Community #	CRS Entry Date	Current CRS Classification	% Premium Discount, SFHA/non-SFHA	Total Premium Savings
Dickinson	481569	10/01/2012	8	10/5	\$277,350/\$138,675
Friendswood	485468	10/01/1991	7	15/5	\$126,963/\$158,208
Jamaica Beach	481271	10/01/2018	8	10/5	\$97,002/\$48,501
Kemah	485481	10/01/1992	8	10/5	\$55,607/\$27,803
League City	485488	10/01/1992	5	25/10	\$2,470,993/\$988,397
Tiki Island	481585	10/01/2001	7	15/5	\$262,817/\$87,606

Extent

The severity of a flood event is typically determined by a combination of several factors including stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and degree of vegetative clearing and impervious surface. Generally, floods are long-term events that may last for several days. Regarding the riverine flood hazard, once a river reaches flood stage, flood extent or severity categories used by the NWS include minor flooding, moderate flooding, and major flooding. Each category is defined as follows, based on property damage and level of public threat:

- Minor Flooding – minimal or no property damage, but possibly some public threat or inconvenience.
- Moderate Flooding – some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.
- Major Flooding – extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations (NWS 2011).

USGS uses stream gages to determine the severity of flood at different points along a body of water. There are eight gages in or near Galveston County. The flood stage is identified for one gage; however, flood stages were not identified for the other gages. The County relies on the gages to determine the height of the river during heavy rain events and to determine whether or not residents need to evacuate. Table 4-30 shows the gages in the County with their determined flood stage and their record flood event. The USGS website provides details about each of the gages (<https://waterwatch.usgs.gov/index.php>) and the gage heights of flooding events. The NWS provides the different flood stages for the gages (<https://water.weather.gov/ahps/>).

Table 4-30. Stream Gage Statistics for the Vicinity of Galveston County

Gage Site Number	Site Name	Action Stage (feet)	Minor Flood Stage (feet)	Moderate Flood Stage (feet)	Major Flood Stage (feet)	Record Flood
HCCT2	Clear Creek at Friendswood	7	12	16	21	24.25 ft on 08/29/2017
EPTT2	Tide Station (HGX) at San Leon	3.75	4	4.5	5	N/A
GRRT2	Tide Station (HGX) at Galveston Railroad Bridge	3.25	3.5	4	4.5	N/A
LUIT2	Tide Station (HGX) at San Luis Pass	3.25	3.5	4	4.5	N/A
GTOT2	Tide Station (HGX) at Nos Station Pier 21 Galveston	3.75	4	4.5	5	N/A
GNJT2	Tide Station (HGX) at Galveston Bay Entrance North Jetty	3.25	3.5	4	4.5	N/A



Gage Site Number	Site Name	Action Stage (feet)	Minor Flood Stage (feet)	Moderate Flood Stage (feet)	Major Flood Stage (feet)	Record Flood
RLOT2	Tide Station (HGX) at Rollover Pass	3.25	3.5	4.5	5	N/A

Source: (NWS 2021)

N/A: Not Available

Worst-Case Scenario

Galveston County experienced its worst-case flood scenario in 2017 during Hurricane Harvey. Hurricane Harvey was identified as a 500-year and even a 1,000-year event. Meaning, a storm of this magnitude has a 0.2-annual chance to 0.1-percent annual chance of occurring in any given year. About 7,000 homes and 125 businesses were impacted by flood waters across the county. Many roads were inundated with water. There were numerous water rescues. Stormwater systems were inundated, and pump stations were not able to function properly because their limits were exceeded. This led to closed roadways, damaged infrastructure, ingress, and egress issues, etc. The damages from Hurricane Harvey and the lessons learned from the response and recovery will play a significant role in the County's preparedness for future events.

Previous Occurrences and Losses

Many sources have provided historical information regarding previous occurrences and losses associated with flooding in Galveston County. Between 1953 and 2020, FEMA included the State of Texas in 53 flood-related major disaster (DR) or emergency (EM) declarations. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Galveston County was included in ten of these flood-related declarations; refer to Table 4-31.

Table 4-31. Flood-Related FEMA Declarations for Galveston County, 1953 to 2021

FEMA Declaration Number	Date(s) of Event	Incident Type	Incident Title
DR-398	July 11, 1973	Flood	Severe Storms, Flooding
DR-595	July 28, 1979	Flood	Storms, Flash Floods
DR-603	September 25, 1979	Flood	Severe Storms, Flooding
DR-1041	October 14-November 8, 1994	Flood	Severe Thunderstorms and Flooding
DR-1257	October 17-November 15, 1998	Flood	Severe Storms, Flooding and Tornadoes
DR-1245	September 9-October 5, 1998	Severe Storm	Hurricane Georges, Tropical Storm Frances
DR-1379	June 5-9, 2001	Coastal Storm	Tropical Storm Allison
DR-1791	September 12-14	Hurricane	Hurricane Ike
DR-4245	October 22-31, 2015	Severe Storm	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
DR-4332	August 26-30, 2017	Hurricane	Hurricane Harvey

Source: FEMA 2021

This HMP update includes known flood events that have impacted Galveston County between 2016 and 2021. These events are shown in Table 4-32. The events listed in Table 4-32 represent only those that were reported to the NOAA-NCEI Storm Events Database, FEMA, and the 2017 Galveston County HMP, and may not represent all flood events that have occurred since 2016. For events prior to 2016, refer to the 2017 Galveston County HMP.



Table 4-32. Flood Events in Galveston County, 2016 to 2021

Dates of Event	Event Type	FEMA Declaration Number (if applicable)	Fatalities	Injuries	Damages	Event Details*
April 18, 2016	Flash Flood	-	-	-	-	Numerous flooded roadways in League City. Flood waters were inundating numerous roads within the city of Galveston.
May 19, 2016	Flash Flood	-	-	-	-	Flash flooding occurred near the intersection of Interstate 45 and 61st Street in Galveston.
June 4, 2016	Flash Flood	-	-	-	-	Harborside Drive was closed due to high water.
December 3, 2016	Flash Flood	-	-	-	\$50,000	Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection. There were also reports of flooded streets in the town of La Marque.
March 29, 2017	Flash Flood	-	-	-	-	Street flooding was reported across the Friendswood area.
April 18, 2017	Flash Flood	-	-	-	\$104,000	Street flooding was causing vehicles to stall around the College of the Mainland. The Amburn Street and Monticello Drive intersection was flooded and impassable. High flood water was also reported in La Marque at the Gulf Freeway and FM 519 intersection. Water reported in homes at Avenue M 1/2 and 24th Street, north of 32nd Street and on Ave P at 28th Street in Santa Fe. Sections of O and P Avenue near the 28th Street intersection were closed due to flooding. Street flooding was also reported along R, S and T Avenues at the 32nd and 33rd street intersections. Approximately 8 roads were closed and impassable due to flood waters within town limits.
May 9, 2016	Coastal Flood	-	-	-	-	The was minor water over wash at the intersection of Highway 87 and Highway 124 due to the combination of above normal tides and wave run up.
December 3, 2016	Coastal Flood	-	-	-	\$20,000	A prolonged period of easterly winds south of a near coastal warm front produced elevated water levels that inundated sections of Galveston Island, including downtown. Impassable roads due to high water included the intersection of 38th and Winnie Street, 39th and Church Street and the intersection of 51st Street and Harborside Drive.
June 21-22, 2017	Tropical Storm	-	-	-	-	Due to Tropical Storm Cindy, water and debris covered a low lying section of Highway 87 near its intersection with Highway 124 which is an area that is especially vulnerable to coastal flooding. Elsewhere, channels were elevated



Dates of Event	Event Type	FEMA Declaration Number (if applicable)	Fatalities	Injuries	Damages	Event Details*
						around Jamaica Beach and other west end communities of Galveston Island, but there was little impact.
August 26-30, 2017	Flash Flood	DR-4332	3	-	\$10,000,011,000	Due to Hurricane Harvey, approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Many roads were inundated with water. There were numerous water rescues.
October 20, 2017	Flash Flood	-	-	-	-	Multiple roadways were flooded and impassable.
September 3, 2018	Flash Flood	-	-	-	\$200,000	Significant flooding occurred on Galveston Island from Jamaica Beach up into the city of Galveston as over 10 inches of rain fell in some spots. There were numerous road closures with at least one washed out roadway in the town of Jamaica Beach. There were reports of water within some structures.
September 11, 2018	Flash Flood	-	-	-	\$100,000	Flooding was reported on the College of the Mainland campus. A few flooded residences had a half of a foot of water in them along Meadowlark Lane in western Texas City and western La Marque. There were numerous street flooding reports.
September 11, 2018	Flash Flood	-	-	-	-	Some roads along Dickinson Bayou were flooded.
September 12, 2018	Flash Flood	-	-	-	-	There was flooding along the Gulf Freeway-Interstate 45 that closed sections of the freeway between the FM 518 and Highway 96 exits.
September 14, 2018	Flash Flood	-	-	-	-	There were flooded roads, with reports of water as high as two feet, around Ball High School. Sections of Harborside Drive-SH 275 from Interstate 45 east to Ferry Road were closed due to high water.
September 29, 2018	Flash Flood	-	-	-	\$50,000	Roads were impassable from the Downtown Galveston area to across parts of the Port Bolivar area.
October 24, 2018	Flash Flood	-	-	-	-	There were reports of water near homes with flooded cars and roadways in Santa Fe, Dickinson, and League City. Some of the flooding occurred as Dickinson Bayou went out of banks at SH 3 near Hughes Road.
October 24, 2018	Flash Flood	-	-	-	-	There were numerous reports of street flooding on the east end of Galveston Island from Scholes Field eastward towards Ferry Road. High water encroached the dorms at Texas A&M-Galveston on Pelican Island with flooding inundating the Strand and points along Harborside Road towards Ferry Road.



Dates of Event	Event Type	FEMA Declaration Number (if applicable)	Fatalities	Injuries	Damages	Event Details*
December 8, 2018	Flash Flood	-	-	-	-	There was high flood water that caused the intersection of the Gulf Freeway and Highway 96 to become impassable.
December 8, 2018	Flash Flood	-	-	-	-	There were sections of Harborside Drive that became impassable due to high flood waters.
December 27, 2018	Coastal Flood	-	-	-	-	High water impacted several SH 87 locations on the east end of Bolivar.
May 7, 2019	Flash Flood	-	-	-	-	There were numerous reports of either high water in low lying locations or impassable roadways due to flooding. There were flooded roads around Friendswood, League City at the Gulf Freeway and Highway 96, the I-45 feeder roads near FM 646 in Dickinson and in Texas City near the high school.
May 9-10, 2019	Flash Flood	-	-	-	\$20,000	Flash flooding lead to impassable roads that extended from Friendswood and League City down the Gulf Freeway to include, Dickinson, Texas City, and the city of Galveston. One house flooded in Dickinson with some vehicle flooding. Approximately 25 vehicles were flooded in Texas City with some water entering the Heights Elementary School.
May 22, 2019	Coastal Flood	-	-	-	-	Some low-lying beach front roads had some water on them, and water was up to the seawall at some locations. Water was also over parts of the Highway 87 and Highway 124 intersection on the Bolivar Peninsula.
September 18, 2019	Flash Flood	-	-	-	-	Flooding occurred on many roads in the Strand area as water flowed over the curbs and sidewalks. Ferry Road near UTMB became inundated and impassable due to floodwaters.
October 24, 2019	Coastal Flood	-	-	-	-	Frenchtown Road on extreme western Bolivar peninsula near the ferry dock became impassable due to bay water run up during high tide.
May 15, 2020	Flash Flood	-	-	-	-	Numerous roadways were flooded in western Dickinson and southern League City including, but not limited to, the Bayou Lakes, Brentwood Estates and Bay Colony neighborhoods.
August 26-27, 2020	Storm Surge/Tide	-	-	-	-	Flooding of low-lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.
September 21-23, 2020	Tropical Storm Beta	-	-	-	-	Widespread coastal flooding occurred across coastal Galveston County. Flooding was observed in San Leon,



Dates of Event	Event Type	FEMA Declaration Number (if applicable)	Fatalities	Injuries	Damages	Event Details*
						Bayou Vista, Clear Lake Shores, and Kemah. The Kemah Boardwalk was flooded. Numerous instances of street flooding and road closures were reported. Heavy rain from the storm resulted in bayou and creek flooding, including Clear Creek.
October 9, 2020	Hurricane	-	-	-	-	Due to Hurricane Delta, high surf and elevated tides lead to mainly minor coastal flooding along Gulf facing beaches and around Galveston Bay.

Sources: NOAA-NCEI 2021; State of Texas HMP 2018; Galveston County HMP 2017

* Many sources were consulted to provide an update of previous occurrences and losses; event details and loss/impact information may vary and has been summarized in the above table
- Not available/not recorded



Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016).

Probability of Future Occurrences

Table 4-33 summarizes data regarding the probability of occurrences of flood events in Galveston County based on the historic record. The information used to calculate the probability of occurrences is based on the 2017 Galveston County HMP, the NOAA-NCEI Storm Events Database, and FEMA.

Table 4-33. Probability of Future Occurrence of Flood Events

Hazard Type	Number of Occurrences Between 1954 and 2021	% chance of occurrence in any given year
Flood	96	100%

Source: NOAA-NCEI 2021; FEMA 2021; Galveston County HMP 2017

Note: The total number of events used to calculate the probability of occurrence for flooding in Galveston County includes those listed in the NOAA-NCEI database and FEMA disaster declarations. Any recorded event type that resulted in flooding was including in the number of occurrences. Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected flood events since 1968. Due to limitations in data, not all flood events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Galveston County is expected to continue experiencing the direct and indirect impacts of flood each year. Ninety-six flood events in 24 years were recorded in Galveston County, giving the County a 100% chance of being impacted by a flood in any given year, with four events occurring each year. Based on historical records and input from the Steering Committee, the probability of occurrence for flood events in the City is considered *frequent* (100% chance occurring; occurs multiple times a year). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To assess Galveston County's risk to the flood hazard, a spatial analysis was conducted using the best available spatially delineated flood hazard areas. A quantitative assessment of exposure to the flood hazard was conducted using the asset inventory developed for this plan and two mapped flood areas:

- The 1% annual chance flood hazard area; and
- The 0.2% annual chance flood hazard area

Impact on Life, Health and Safety

Impacts of flooding on life, health, and safety depend on several factors including severity of the event and whether adequate warning time is provided to residents. Vulnerable populations are all populations residing or located in the floodplain or downstream of dam failures that are incapable of escaping the area within the required timeframe to reach safety. However, exposure should not be limited only to those who reside within a defined hazard zone, but everyone who may be affected by a hazard event (e.g., people are considered at risk if they are traveling in flooded areas, or their access to emergency services is compromised during an event). Flash floods can be localized events that affect areas outside of the floodplain due to localized drainage issues and can directly impact populations and comprise access to emergency services. The degree of that impact varies and is not strictly measurable.



An estimated 103,507 people reside in the 1-percent annual chance event boundary, and 179,463 people within the 0.2-percent annual chance flood boundary. These residents may be displaced by the flooding of their homes, requiring them to seek temporary shelter with friends and family or in emergency shelters. Table 4-34 lists population estimates within flood hazard zones in the County.

Table 4-34. Estimated Population Exposed to the Flood Hazard

Jurisdiction	Total Population	1-Percent Chance Event		0.2-Percent Chance Event	
		Total Number	Percent of Total	Total Number	Percent of Total
Bayou Vista (C)	1,763	1,763	100.0%	1,763	100.0%
Clear Lake Shores (C)	1,258	1,258	100.0%	1,258	100.0%
Dickinson (C)	20,847	13,938	66.9%	19,334	92.7%
Friendswood (C)	41,213	2,741	6.6%	7,431	18.0%
Hitchcock (C)	7,301	5,440	74.5%	7,254	99.4%
Jamaica Beach (C)	1,078	1,078	100.0%	1,078	100.0%
Kemah (C)	1,807	1,091	60.4%	1,692	93.6%
La Marque (C)	18,030	1,772	9.8%	11,775	65.3%
League City (C)	114,392	14,301	12.5%	41,106	35.9%
Santa Fe (C)	12,735	543	4.3%	2,112	16.6%
Tiki Island (V)	1,106	1,106	100.0%	1,106	100.0%
Galveston County (Total)	350,682	103,507	29.5%	176,463	50.3%

Sources: American Community Survey 2019 (5-year estimates 2015-2019), FEMA 2018; February 16, 2018 FEMA Effective DFIRM

Of the population exposed, the most vulnerable include the economically disadvantaged and the population over age 65. Economically disadvantaged populations are more vulnerable because they are likely to evaluate their risk and make decisions to evacuate based on net economic impacts to their families. The population over age 65 is also more vulnerable because available medical services may be disrupted, and they are more likely to seek or need medical attention that may not be available due to isolation during a flood event. They also may have more difficulty evacuating. Table 4-35 presents the estimated potential sheltering needs as a result of the 1-percent and 0.2-percent flood events.

Table 4-35. Estimated Population Displaced or Seeking Short-Term Shelter from Flood Events

Jurisdiction	Total Population	1-Percent Annual Chance Flood Event		0.2-Percent Annual Chance Flood Event	
		Displaced Population	Persons Seeking Short-Term Sheltering	Displaced Population	Persons Seeking Short-Term Sheltering
Bayou Vista (C)	1,763	0	0	0	0
Clear Lake Shores (C)	1,258	70	7	102	9
Dickinson (C)	20,847	3,736	452	11,566	1,253
Friendswood (C)	41,213	2,838	1,061	6,123	1,237
Hitchcock (C)	7,301	241	59	4,590	700
Jamaica Beach (C)	1,078	0	0	27	2
Kemah (C)	1,807	0	0	1,131	229
La Marque (C)	18,030	708	106	8,241	742
League City (C)	114,392	5,555	1,608	31,547	4,946
Santa Fe (C)	12,735	661	189	2,456	431



Jurisdiction	Total Population	1-Percent Annual Chance Flood Event		0.2-Percent Annual Chance Flood Event	
		Displaced Population	Persons Seeking Short-Term Sheltering	Displaced Population	Persons Seeking Short-Term Sheltering
Tiki Island (V)	1,106	0	0	205	15
Galveston County (Total)	350,682	17,125	4,447	100,532	14,409

Source: American Community Survey 2019 (5-year estimates 2015-2019), FEMA 2018; February 16, 2018 FEMA Effective DFIRM

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Total numbers of injuries and casualties resulting from typical riverine flooding are generally limited based on advance weather forecasting, blockades, and warnings. Injuries and deaths generally are not anticipated if proper warning and precautions occur. In contrast, warning time for dam failure events or flash flooding is limited. These events are frequently associated with other natural hazard events such as earthquakes, landslides, or severe weather, which limits their predictability and compounds the hazard. Populations without adequate warning of the event are highly vulnerable to this hazard; this includes populations downstream of a dam failure event that cannot evacuate within the allowable time frame. The population adversely affected by a dam failure event can also include those beyond the disaster area that rely on the dam for providing potable water. Like riverine flooding, economically disadvantaged populations and the elderly are more vulnerable to impacts from a sudden dam failure event or flash flooding.

Cascading impacts may also include exposure to pathogens such as mold. After flood events, excess moisture and standing water contribute to the growth of mold in buildings. Mold may present a health risk to building occupants, especially those with already compromised immune systems such as infants, children, the elderly and pregnant women. The degree of impact will vary and is not strictly measurable. Molds can grow in as short a period as 24-48 hours in wet and damaged areas of buildings that have not been properly cleaned. Very small mold spores can easily be inhaled, creating the potential for allergic reactions, asthma episodes, and other respiratory problems. Buildings should be properly cleaned and dried out to safely prevent mold growth (CDC 2017).

Molds and mildews are not the only public health risk associated with flooding. Floodwaters can be contaminated by pollutants such as sewage, human and animal feces, pesticides, fertilizers, oil, asbestos, and rusting building materials. Common public health risks associated with flood events also include:

- Unsafe food
- Contaminated drinking and washing water and poor sanitation
- Mosquitos and animals
- Carbon monoxide poisoning
- Secondary hazards associated with re-entering/cleaning flooded structures
- Mental stress and fatigue (CDC 2012)

Current loss estimation models such as Hazus v4.2 cannot measure public health impacts. The best ways to mitigate these impacts are to be aware that they can occur, educate the public on prevention, and be prepared to deal with these vulnerabilities in responding to flood events.

Impact on General Building Stock

To assess potential impacts on buildings, both exposure (located in the hazard area) and estimated loss to the exposed inventory generated by Hazus v4.2 were examined for the three flood scenarios. Table 4-36 and Table 4-37 summarizes the results.


Table 4-36. Estimated General Building Stock Exposure to a 1-Percent Annual Chance Flood Event

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located in the Flood Hazard Area			
			Number of Buildings Located in the Hazard Area	Percent of Total	Total RCV of Buildings Located in the Hazard Area	Percent of Total
Bayou Vista (C)	1365	\$445,354,087.33	1,365	100.0%	\$445,354,087	100.0%
Clear Lake Shores (C)	1155	\$904,562,368.66	1,153	99.8%	\$724,937,594	80.1%
Dickinson (C)	10351	\$6,601,710,645.63	6,848	66.2%	\$4,296,054,522	65.1%
Friendswood (C)	14891	\$10,815,456,384.12	983	6.6%	\$698,448,414	6.5%
Hitchcock (C)	5452	\$4,592,036,651.86	3,854	70.7%	\$2,857,796,355	62.2%
Jamaica Beach (C)	1291	\$458,205,838.82	1,291	100.0%	\$458,205,839	100.0%
Kemah (C)	1634	\$2,631,702,105.60	940	57.5%	\$1,977,207,949	75.1%
La Marque (C)	10749	\$7,927,292,522.28	1,015	9.4%	\$593,214,455	7.5%
League City (C)	46742	\$31,237,974,594.10	5,887	12.6%	\$4,443,465,559	14.2%
Santa Fe (C)	7942	\$4,831,628,162.13	390	4.9%	\$225,325,480	4.7%
Tiki Island (V)	868	\$365,209,145.44	868	100.0%	\$365,209,145	100.0%
Galveston County (Total)	209947	\$166,321,604,688.46	81,490	38.8%	\$73,043,916,760	43.9%

Source: Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021, FEMA 2018; February 16, 2018 FEMA Effective DFIRM
Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County

Table 4-37. Estimated General Building Stock Exposure to a 0.2-Percent Annual Chance Flood Event

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located in the Flood Hazard Area			
			Number of Buildings in Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings in Hazard Area	Percent of Total
Bayou Vista (C)	1365	\$445,354,087.33	1,365	100.0%	\$445,354,087	100.0%
Clear Lake Shores (C)	1155	\$904,562,368.66	1,155	100.0%	\$904,562,369	100.0%
Dickinson (C)	10351	\$6,601,710,645.63	9,656	93.3%	\$6,240,616,132	94.5%
Friendswood (C)	14891	\$10,815,456,384.12	2,677	18.0%	\$2,128,680,168	19.7%
Hitchcock (C)	5452	\$4,592,036,651.86	5,380	98.7%	\$4,453,984,059	97.0%
Jamaica Beach (C)	1291	\$458,205,838.82	1,291	100.0%	\$458,205,839	100.0%
Kemah (C)	1634	\$2,631,702,105.60	1,533	93.8%	\$2,582,447,999	98.1%
La Marque (C)	10749	\$7,927,292,522.28	6,857	63.8%	\$4,355,120,524	54.9%
League City (C)	46742	\$31,237,974,594.10	17,035	36.4%	\$12,600,904,732	40.3%
Santa Fe (C)	7942	\$4,831,628,162.13	1,318	16.6%	\$687,674,130	14.2%
Tiki Island (V)	868	\$365,209,145.44	868	100.0%	\$365,209,145	100.0%
Galveston County (Total)	209947	\$ 166,321,604,688	124,067	59.1%	\$104,723,627,795	63.0%

Source: Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021, FEMA 2018; February 16, 2018 FEMA Effective DFIRM



Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County

NFIP Statistics

A property is considered a repetitive loss (RL) property when there are “two or more losses reported which were paid more than \$1,000 for each loss. The two losses must be within 10 years of each other and be at least 10 days apart. Only losses from (*sic* since) 1/1/1978 that are closed are considered. A severe repetitive loss (SRL) property is defined as a residential property covered under an NFIP flood insurance policy, and satisfying either of conditions 1 and 2, as well as condition 3 (Section 1361A of the National Flood Insurance Act 42 *United States Code* 4102a):

1. “At least four NFIP claim payments for the property (including building and contents) over \$5,000 each have occurred, and the cumulative amount of such claims payments exceeded \$20,000.
2. At least two separate claims payments for the property (building payments only) have occurred, and the cumulative amount of the building portion of such claims exceeded the market value of the building.
3. For either of the above, at least two of the referenced claims must have occurred within any 10-year period and must have occurred more than 10 days apart”.

Table 4-38 summarizes the NFIP policies, losses, and claims statistics in Galveston County. In total, 62,867 residents are NFIP policy holders in the County, and there have been 55,196 claims totaling over \$2.3 billion. These statistics show the economic benefits of participating in the NFIP to insure homes in flood hazard areas of the County.

Table 4-38. NFIP Policies, Claims and Repetitive Loss Statistics

Jurisdiction	Total Policies (Direct + Write Your Own)	Total Losses (Direct + Write Your Own)	Total Claims Paid (Direct + Write Your Own)
Bayou Vista (C)	532	137	\$3,425,622
Clear Lake Shores (C)	545	1,199	\$26,600,777
Dickinson (C)	3,911	2,595	\$239,101,802
Friendswood (C)	6,308	4,005	\$255,175,550
Hitchcock (C)	1,089	1,461	\$39,676,284
Jamaica Beach (C)	912	1,573	\$22,541,508
Kemah (C)	634	1,350	\$42,403,304
La Marque (C)	2,007	1,640	\$32,414,112
League City (C)	19,704	5,375	\$250,669,561
Santa Fe (C)	2,029	716	\$37,010,820
Tiki Island (V)	443	640	\$6,519,690
Galveston County (Total)	62,867	55,196	\$2,395,581,821

Source: FEMA 2022

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on Critical Facilities

It is important to determine the critical facilities and infrastructure within the County that may be at risk to flooding (riverine, dam failure, flash/stormwater flooding), and who may be impacted should damage occur. Critical services during and after a flood event may not be available if critical facilities are directly damaged or transportation routes to access these critical facilities are impacted. Roads that are blocked or damaged can isolate residents and can prevent access throughout the planning area to many service providers needing to get



to vulnerable populations or to make repairs. Utilities such as overhead power, cable, and phone lines could also be vulnerable due to utility poles damaged by standing water or the surge of water from a dam failure event. Loss of these utilities could create additional isolation issues for the inundation zones.

Critical facility exposure to the flood hazard was examined. In addition, Hazus v4.2 was used to estimate the flood loss potential to critical facilities exposed to the flood risk. Table 4-39 and Table 4-40 summarizes these results.

Table 4-39. Critical Facility Types Located in the 1% Annual Chance Flood Hazard Area and Damages

Jurisdiction	Total Critical Facilities Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located in the 1-Percent Annual Chance Flood Event Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Bayou Vista (C)	5	5	5	100.0%	5	100.0%
Clear Lake Shores (C)	24	24	22	91.7%	22	91.7%
Dickinson (C)	91	83	63	69.2%	59	71.1%
Friendswood (C)	96	82	20	20.8%	20	24.4%
Hitchcock (C)	214	212	143	66.8%	142	67.0%
Jamaica Beach (C)	11	11	11	100.0%	11	100.0%
Kemah (C)	15	14	12	80.0%	11	78.6%
La Marque (C)	121	107	30	24.8%	30	28.0%
League City (C)	321	283	94	29.3%	94	33.2%
Santa Fe (C)	135	128	9	6.7%	9	7.0%
Tiki Island (V)	7	7	7	100.0%	7	100.0%
Galveston County (Total)	2,437	2,317	1,346	55.2%	1,324	57.1%

Source: Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021, FEMA 2018; February 16, 2018 FEMA Effective DFIRM

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Table 4-40. Critical Facility Types Located in the 0.2% Annual Chance Flood Hazard Area and Damages

Jurisdiction	Total CFs Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located in the 0.2-Percent Annual Chance Flood Event Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Bayou Vista (C)	5	5	5	100.0%	5	100.0%
Clear Lake Shores (C)	24	24	24	100.0%	24	100.0%
Dickinson (C)	91	83	87	95.6%	79	95.2%
Friendswood (C)	96	82	30	31.3%	30	36.6%
Hitchcock (C)	214	212	207	96.7%	205	96.7%
Jamaica Beach (C)	11	11	11	100.0%	11	100.0%
Kemah (C)	15	14	15	100.0%	14	100.0%
La Marque (C)	121	107	74	61.2%	66	61.7%



Jurisdiction	Total CFs Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located in the 0.2-Percent Annual Chance Flood Event Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
League City (C)	321	283	161	50.2%	149	52.7%
Santa Fe (C)	135	128	33	24.4%	33	25.8%
Tiki Island (V)	7	7	7	100.0%	7	100.0%
Galveston County (Total)	2,437	2,317	1,748	71.7%	1,696	73.2%

Source: Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021, FEMA 2018; February 16, 2018 FEMA Effective DFIRM

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County

Impact on the Economy

Flood events can significantly impact the local and regional economy. This includes but is not limited to general building stock damages and associated tax loss, impacts to utilities and infrastructure, agricultural losses, business interruption, and effects on tourism.

In areas that are directly flooded, renovations of commercial and industrial buildings may be necessary, disrupting associated services. Refer to the section earlier which discusses direct impacts to buildings in the County.

Flooding can cause extensive damage to public utilities and disruptions to delivery of services. Loss of power and communications may occur and drinking water and wastewater treatment facilities may be temporarily out of operation.

Debris management may also be a large expense after a flood event. Hazus v4.2 estimates the amount of structural debris generated during a flood event. The model breaks down debris into three categories: (1) finishes (dry wall, insulation, etc.); (2) structural (wood, brick, etc.); and (3) foundations (concrete slab and block, rebar, etc.). These distinctions are necessary because of the different types of equipment needed to handle debris. Table 4-41 and Table 4-42 summarize the Hazus v4.2 countywide debris estimates for the 1-percent and 0.2-percent annual chance flood events. Please note that this table only estimates structural debris generated by flooding and does not include non-structural debris or additional potential damage and debris possibly generated by wind that may be associated with a flood event or storm that causes flooding.

Table 4-41. Estimated Debris Generated from a 1-Percent Chance Annual Flood

Jurisdiction	1-Percent Annual Chance Flood Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Bayou Vista (C)	0	0	0	0
Clear Lake Shores (C)	4,030	710	1,689	1,630
Dickinson (C)	9,834	7,351	868	1,615
Friendswood (C)	22,367	11,295	5,162	5,910
Hitchcock (C)	4,113	1,269	1,835	1,009
Jamaica Beach (C)	0	0	0	0
Kemah (C)	0	0	0	0
La Marque (C)	2,745	1,613	603	529
League City (C)	58,291	20,090	17,576	20,626
Santa Fe (C)	2,195	1,524	312	360
Tiki Island (V)	0	0	0	0
Galveston County (Total)	141,754	58,635	40,584	42,536



Source: Hazus v4.2

*Calculated using a Census block level, general building stock (GBS) analysis in Hazus 4.2 SP03

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Table 4-42. Estimated Debris Generated from a 0.2-Percent Chance Annual Flood

Jurisdiction	0.2-Percent Annual Chance Flood Event			
	Total (tons)	Finish (tons)	Structure (tons)	Foundation (tons)
Bayou Vista (C)	0	0	0	0
Clear Lake Shores (C)	13,729	2,523	6,207	5,000
Dickinson (C)	23,199	17,746	2,263	3,190
Friendswood (C)	24,423	13,370	5,154	5,898
Hitchcock (C)	16,060	8,858	3,996	3,206
Jamaica Beach (C)	3,260	785	1,481	994
Kemah (C)	79,700	13,835	44,548	21,317
La Marque (C)	15,049	12,425	1,382	1,242
League City (C)	120,544	61,619	27,403	31,522
Santa Fe (C)	3,792	2,812	436	545
Tiki Island (V)	15,246	3,288	6,848	5,110
Galveston County (Total)	681,783	260,427	244,604	176,753

Source: Hazus v4.2

*Calculated using a Census block level, general building stock (GBS) analysis in Hazus 4.2 SP03

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on the Environment

Floodplains serve beneficial and natural functions on ecological, environmental, social, and economic levels. Areas in the floodplain that typically provide these natural functions and benefits are wetlands, riparian areas, sensitive areas, and habitats for rare and endangered species. Floods, however, can also lead to negative impacts on the environment. Disruption of natural systems and the benefits they provide can have long-term consequences for entire regions. According to FEMA, well-known, water-related functions of floodplains include the following:

- Natural flood and erosion control
- Provide flood storage and conveyance
- Reduce flood velocities
- Reduce flood peaks
- Reduce sedimentation
- Surface water quality maintenance
- Process organic wastes
- Moderate temperatures of water
- Groundwater recharge
- Filter nutrients and impurities from runoff
- Promote infiltration and aquifer recharge
- Reduce frequency and duration of low-surface flows

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change

Projected Development

Any areas of growth could be impacted by the flood hazard if located in the floodplain. The Flood Damage Prevention Ordinance regulates not only how land in designated floodplain areas may be used or altered, but the location and types of structures that are permitted in those areas as well as the specifications to which they must



build. All structures, including residential and commercial properties, manufactured homes, and the developments of subdivisions are regulated.

Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. The increase in population will expose more people to the flood hazard, especially those living in and around flood hazard areas.

Climate Change

Increases in precipitation may alter and expand the floodplain boundaries and runoff patterns, resulting in the exposure of populations, buildings, and critical facilities and infrastructure that were previously outside the floodplain. This increase in exposure would result in an increased risk to life and health, an increase in structural losses, a diversion of additional resources to response and recovery efforts, and an increase in business closures affected by future flooding events due to loss of service or access.

Change of Vulnerability Since the 2017 HMP

Galveston County continues to be vulnerable to flood storms. While flood models were run for the 2017 HMP, the population has increased since then. Furthermore, the vulnerability of the building stock was not assessed. The 2022 update therefore provides more accurate estimated exposure and potential losses due to flooding for Galveston County.

4.3.7 Hail

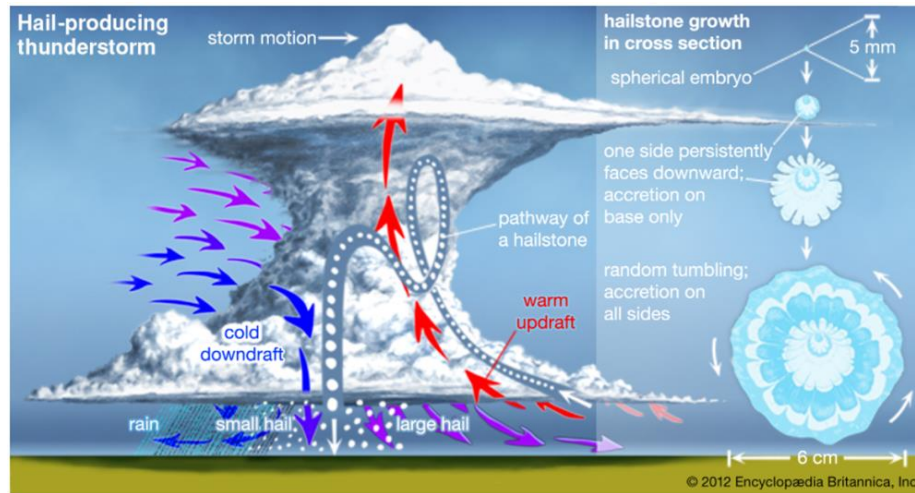
The following section provides the hazard profile and vulnerability assessment for the hail hazard in Galveston County.

Profile

Hazard Description

Hail forms inside a thunderstorm where there are strong updrafts of warm air and downdrafts of cold water. If a water droplet is picked up by the updrafts, it can be carried well above the freezing level. Water droplets freeze when temperatures reach 32 °F or colder. As the frozen droplet begins to fall, it might thaw as it moves into warmer air toward the bottom of the thunderstorm, or the droplet might be picked up again by another updraft and carried back into the cold air to re-freeze. With each trip above and below the freezing level, the frozen droplet adds another layer of ice. The frozen droplet, with many layers of ice, falls to the ground as hail. Figure 4-22 shows the hail formation process. Most hail is small and typically less than two inches in diameter (NOAA NWS 2009)

Figure 4-22 Hail Formation



Source: Encyclopedia Britannica 2012

Figure 4-23 shows the annual frequency of hailstorms in the United States as recorded from 2003 to 2012. Hailstorms have been observed in almost every location where thunderstorms occur throughout the United States. They are most frequent in the southern and central plain states where the climate produces violent thunderstorms. The figure shows that Galveston County experiences between one and five severe hail days each year. Severe hail day is defined as a day with at least one report of one-inch or more hail within 25 miles.

Location

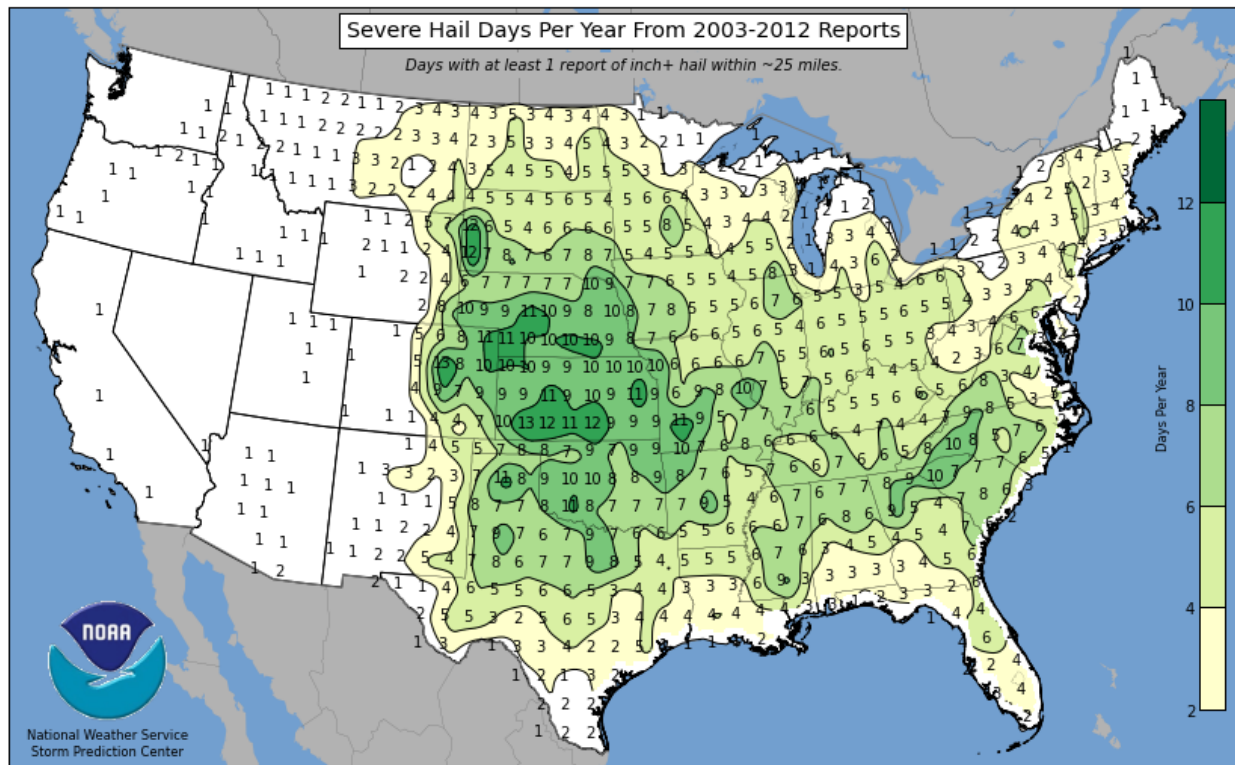
All of Galveston County is exposed and vulnerable to hail.

Extent

The severity of hail is measured by duration, hail size, and geographic extent. Most hail stones from hail events are made up of variety of sizes. Only the very largest hail stones pose serious risk to people, if exposed. The size of hail is estimated by comparing it to a known object. Table 4-43 shows the different sizes of hail and the comparison to real-world objects.



Figure 4-23. Severe Hail Days Per Year from 2003-2012



Source: SPC 2020

Table 4-43 Hail Size

Size	Inches in Diameter
Pea	0.25 inch
Small Marble	0.50 inch
Penny or Large Marble	0.75 inch
Nickel	0.875 inch
Quarter	1.0 inch
Ping-Pong Ball	1.5 inches
Golf Ball	1.75 inches
Hen Egg	2.5 inches
Tennis Ball	2.75 inches
Baseball	3.0 inches
Teacup	4.0 inches
Grapefruit	inches

Source: NOAA 2021

The Tornado and Storm Research Organisation (TORRO) Hailstorm Intensity Scale (H0 to H10) relates typical damage and hail sizes.

Table 4-44. TORRO Hailstorm Intensity Scale

TORRO Hailstorm Intensity Scale	Intensity Category	Typical Hail Diameter (mm)	Typical Damage Impacts
H0	Hard Hail	5	No damage
H1	Potentially Damaging	5-15	Slight general damage to plants, crops
H2	Significant	10-20	Significant damage to fruit, crops, vegetation



TORRO Hailstorm Intensity Scale	Intensity Category	Typical Hail Diameter (mm)	Typical Damage Impacts
H3	Severe	20-30	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60	Bodywork of grounded aircraft dented; brick walls pitted
H7	Destructive	50-75	Severe roof damage, risk of serious injuries
H8	Destructive	60-90	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: TORRO 2021

Worst-Case Scenario

Hail usually occurs with a thunderstorms. A worst-case scenario would be a severe thunderstorm producing large hail (quarter-size [1-inch] and larger). This event would be a H3 (severe) hailstorm event on the TORRO intensity scale. An event like this can cause severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored, and damage to roofs. The aftermath of a severe hail event could lead to millions of dollars in damages.

Previous Occurrences and Losses

Many sources have provided historical information regarding previous occurrences and losses associated with hail events in Galveston County. According to the NOAA-NCEI Storm Events Database, Galveston County has been impacted by 120 hail events between 1950 and 2020 that caused more than \$3 million in property damage (refer to Table 4-45).

Table 4-45. Hail Events in Galveston County, 1950-2021

Hazard Type	Number of Occurrences Between 1957 and 2020	Total Fatalities	Total Injuries	Total Property Damage (\$)	Total Crop Damage (\$)
Hail	120	0	0	\$3,022,510	\$0

Source: NOAA-NCEI 2021

Note: Due to limitations in data, not all thunderstorm wind events occurring between 1950 and 2021 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated

Between 1953 and 2021, the State of Texas was included in five hail-related major disaster (DR) or emergencies (EM) declarations. Of those declarations, Galveston County was not included in any of those declarations. This HMP update includes known hail events that have impacted Galveston County between 2016 and 2021. These events are shown in Table 4-46. The events listed in Table 4-46 represent only those that were reported to the NOAA-NCEI Storm Events Database, FEMA, and the 2017 Galveston County HMP, and may not represent all hail events that have occurred in the County. For events prior to 2016, refer to the 2017 Galveston County HMP.

Table 4-46. Hail Events in Galveston County, 2016 to 2021

Date(s) of Event	Event Type	Magnitude	Fatalities	Injuries	Damages	Event Details*
January 8, 2016	Hail	0.75	-	-	\$0	Penny sized hail occurred to the northwest of La Marque.



Date(s) of Event	Event Type	Magnitude	Fatalities	Injuries	Damages	Event Details*
April 13, 2016	Hail	1.0	-	-	\$0	The quarter size hail was reported in Friendswood.
April 13, 2016	Hail	0.75	-	-	\$0	The dime size hail was reported in League City.
May 2, 2016	Hail	1.0	-	-	\$0	Quarter size hail was reported near the intersection of 67th Street and Heards Lane.
February 26, 2019	Hail	0.88	-	-	\$0	There were various reports of pea to nickel sized hail.
May 28, 2020	Hail	0.7	-	-	\$10	Dime sized hail was observed in Texas City.
January 6, 2021	Hail	1.0	-	-	-	Severe hail (1 in.) was observed by a member of the public as a squall line moved through Galveston County.

Source(s): FEMA 2021; NOAA-NCEI 2021; Galveston County 2017

* Many sources were consulted to provide an update of previous occurrences and losses; event details and loss/impact information may vary and has been summarized in the above table

FEMA Federal Emergency Management Agency

HMP Hazard Mitigation Plan

NCEI National Centers for Environmental Information

Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016). While predicting the trends of hail as a result of climate change is difficult, it is anticipated that more frequent and intense will occur. Some of these storms can bring hail.

Probability of Future Occurrences

Table 4-47 summarizes data regarding the probability of occurrences of hail events in Galveston County based on the historic record. The information used to calculate the probability of occurrences is based on the NOAA-NCEI Storm Events Database, FEMA, and the 2017 Galveston HMP, including only those events that identified hail occurring in the County.

Table 4-47. Probability of Future Occurrence of Hail Events

Hazard Type	Number of Occurrences Between 1954 and 2021	% chance of occurrence in any given year
Hail	120	100%

Source: NOAA-NCEI 2021; FEMA 2021; Galveston HMP 2017

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected hail events since 1968. Due to limitations in data, not all hail events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Galveston County is expected to continue experiencing the direct and indirect impacts of hail events each year. The County experienced 120 hail incidents in 67 years, giving the County a 100% chance of being impacted by a hail incident in any given year. Based on historical records and input from the Steering Committee, the probability of occurrence for hail events in the County is considered *frequent* (100% chance occurring; occurs multiple times a year). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.



Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entirety of Galveston County is exposed and vulnerable to the hail hazard; therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in Section 3 (County Profile), are potentially vulnerable to a hail event. The following text evaluates and estimates the potential impact of the hail hazard in the County.

Impact on Life, Health and Safety

The impact of hail events on life, health, and safety is dependent upon several factors including the severity of the event and whether adequate warning time was provided to residents. The entire population of Galveston County (350,682) is assumed to be exposed to this hazard (U.S. Census 2017 ACS 5-Year Population Estimate).

People are vulnerable to the effects of hail events, including injuries, power outages, impacts on transportation routes, damage to homes, and damage to vehicles. First responders are also at risk of being injured during a significant hail event if they are responding to an incident. People located outdoors (e.g. recreational activities, farming, emergency responders) are considered most vulnerable to hailstorms because there is little to no warning time, and shelter might not be available. Moving to a lower risk location can decrease a person's vulnerability.

Impact on General Building Stock

Depending on the size of the hail and severity of the storm, the County could see damage from hail impacting structures. While damage to the building stock is possible as a result of hail, it is difficult to estimate and would not have as wide of an impact as a high wind or tornado event.

Impact on Critical Facilities

All critical facilities in Galveston County are vulnerable to being affected by hail events.

Impact on Economy

Hail-producing severe storms impact the economy; impacts include loss of business function, damage to inventory, relocation costs, wage loss, and rental loss due to the repair or replacement of buildings. Additionally, vehicles parked outdoors are vulnerable to hail damage and could increase economic impacts of a storm. The 2016 HMP predicted that annual property losses due to hail would amount to \$31,554 (Galveston County 2016 HMP).

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

Any areas of growth could be potentially impacted by the hail hazard because the entire County is exposed and vulnerable.



Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to further increase over the next few years. The increase in population will expose more people to the hail hazard.

Climate Change

The entire State of Texas is projected to experience an increase in the frequency and severity of extreme storms and rainfall. Major clusters of summertime thunderstorms in North America will grow larger, more intense, and more frequent later this century in a changing climate, unleashing far more rain and posing a greater threat of flooding across wide areas (UCAR 2017). Section 4.3.7 (Flood) provides a discussion related to the impact of climate change due to increases in rainfall. An increase in storms will produce more wind events and can increase tornado activity (refer to Section 4.3.3 [Tornadoes]). With an increased likelihood of strong storms, all of the County's assets will experience additional risk for losses as a result of hail-producing storm events.

Changes in Vulnerability Since the 2017 HMP

Galveston County's population increased since the last plan; increasing the number of people impacted during a hail event. Therefore, the entire County remains vulnerable to hail events.

4.3.8 Hurricane and Tropical Storm

The following section provides the hazard profile and vulnerability assessment for the hurricane and tropical storm hazard in Galveston County.

Profile

Hazard Description

Tropical cyclones are fueled by a different heat mechanism than other cyclonic windstorms, such as Nor'easters and polar lows. The characteristic that separates tropical storms from other cyclonic systems is that at any height in the atmosphere, the center of a tropical storm will be warmer than its surroundings, a phenomenon called *warm core* storm systems (NOAA n.d.). Tropical cyclones strengthen when water evaporated from the ocean is released as the saturated air rises, resulting in condensation of water vapor contained in the moist air. Tropical cyclones begin as disturbed areas of weather, often referred to as tropical waves. As the storm organizes, it is designated as a tropical depression.

A tropical storm system is characterized by a low-pressure center and numerous thunderstorms that produce strong winds of 39 to 73 mph and heavy rain. A hurricane is a tropical storm that attains hurricane status when its wind speed reaches 74 mph or higher. Tropical systems can develop in the Atlantic between the Lesser Antilles and the African coast or in the warm tropical waters of the Caribbean Sea and Gulf of Mexico. These storms can move up the Atlantic coast of the United States, impacting the eastern seaboard, or move into the United States through the states along the Gulf Coast, bringing wind and rain as far north as New England before moving eastward offshore.

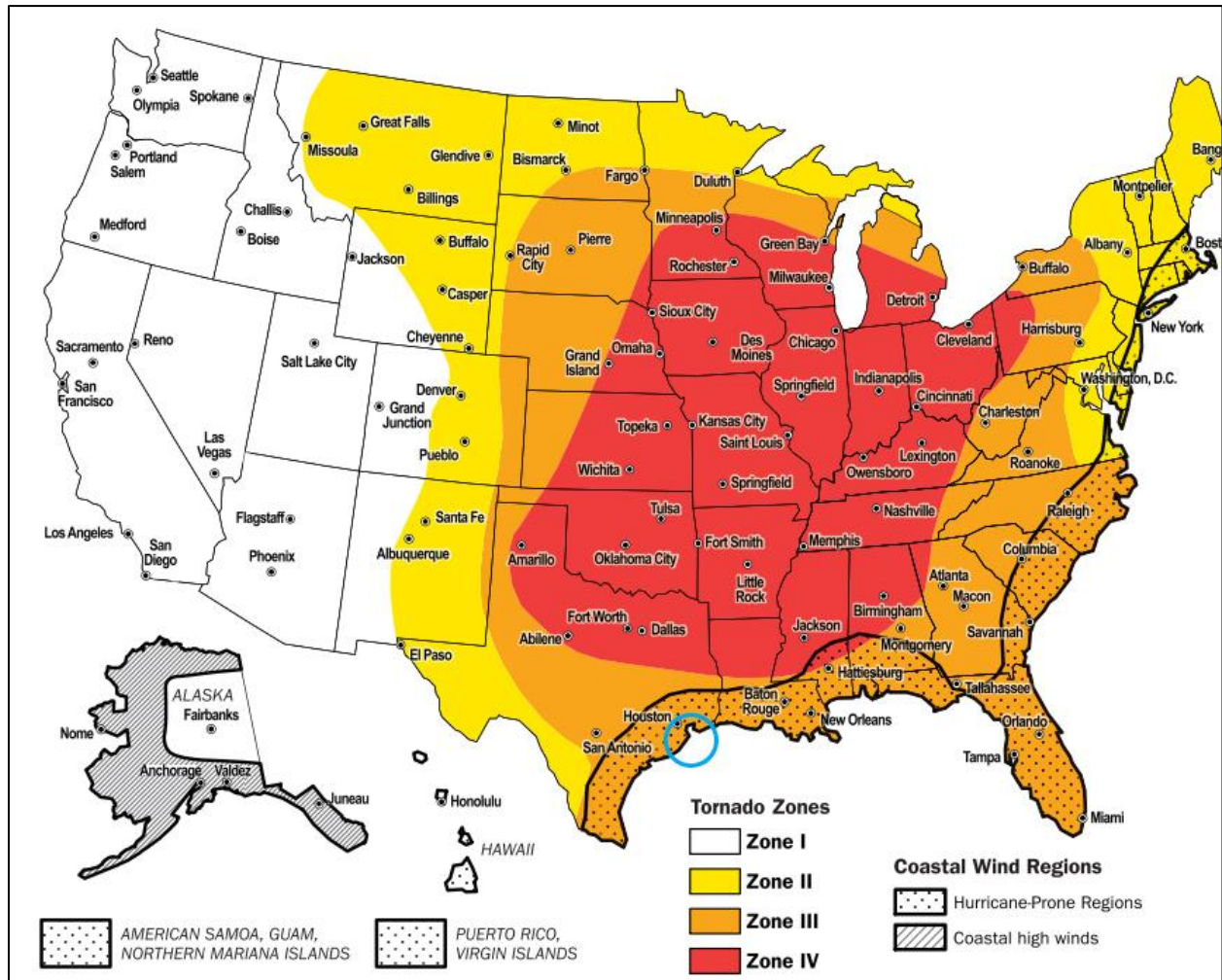
Location

Similar to that of severe weather events (e.g. tornadoes, thunderstorms), hurricanes and tropical storms do not have any specific geographic boundary and can occur anywhere in the County. According to the FEMA Winds Zones of the United States map, Galveston County is located in Wind Zone III, where wind speeds can reach up to 200 mph. Additionally, the County is located in the hurricane-susceptible region. Figure 4-24 illustrates wind zones across the United States, which indicate the impacts of the strength and frequency of wind activity per



region. The information on the figure is based on 70 years of tornado data and 160 years of hurricane data collected by FEMA (FEMA 2021).

Figure 4-24. Wind Zones in the United States



Source: FEMA 2021

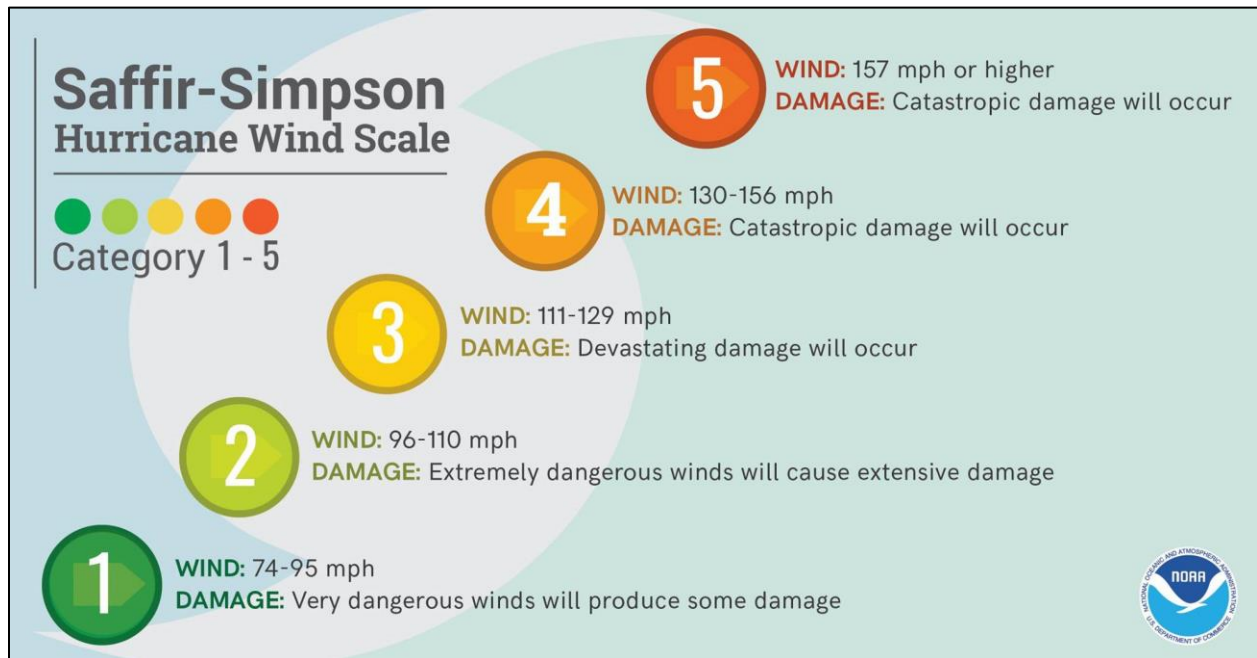
Note: The blue circle indicates the approximate location of Galveston County.

Extent

The extent of a hurricane or tropical storm is commonly categorized in accordance with the Saffir-Simpson Hurricane Wind Scale, which assigns a designation of tropical storm for storms with sustained wind speeds below 74 mph and a hurricane category rating of 1–5 based on a hurricane’s increasing sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered *major hurricanes* because of their potential for significant loss of life and damage. Tropical Storms and Category 1 and 2 storms are still dangerous and require preventative measures (NWS NOAA n.d.). Figure 4-25 presents this scale, which is used to estimate the potential property damage and flooding expected when a hurricane makes landfall.



Figure 4-25. The Saffir-Simpson Scale



Source: Disaster Readiness Portal 2020

The NWS issues hurricane and tropical storm watches and warnings. These watches and warnings are issued or will remain in effect after a tropical cyclone becomes post-tropical, when such a storm poses a significant threat to life and property. The NWS allows the National Hurricane Center (NHC) to issue advisories during the post-tropical stage. The following are the definitions of the watches and warnings:

- *Hurricane/Typhoon Warning* is issued when sustained winds of 74 mph or higher are expected somewhere within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the warning is issued 36 hours in advance of the anticipated onset of tropical storm-force winds. The warning can remain in effect when dangerously high water or combination of dangerously high water and waves continue, even though winds may be less than hurricane force.
- *Hurricane Watch* is issued when sustained winds of 74 mph or higher are possible within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the hurricane watch is issued 48 hours prior to the anticipated onset of tropical storm-force winds.
- *Tropical Storm Warning* is issued when sustained winds of 39 to 73 mph are expected somewhere within the specified area within 36 hours in association with a tropical, subtropical, or post-tropical storm.
- *Tropical Storm Watch* is issued when sustained winds of 39 to 73 mph are possible within the specified area within 48 hours in association with a tropical, sub-tropical, or post-tropical storm (NHC NOAA 2010).

Mean Return Period

In evaluating the potential for hazard events of a given magnitude, a mean return period (MRP) is often used. The MRP provides an estimate of the magnitude of an event that may occur within any given year based on past recorded events. The MRP is the average period of time, in years, between occurrences of a particular hazard event, equal to the inverse of the annual frequency of exceedance.



Peak wind speed projections were generated using Hazus v5.0. Hazus v5.0 estimated the maximum 3-second gust wind speeds for Galveston County:

- 100-year MRP – between 111 and 129 mph (Category 3 Hurricane)
- 500-year MRP – between 130 and 156 mph (Category 4 Hurricane).



Figure 4-26. Wind Speeds for the 100-Year MRP Event

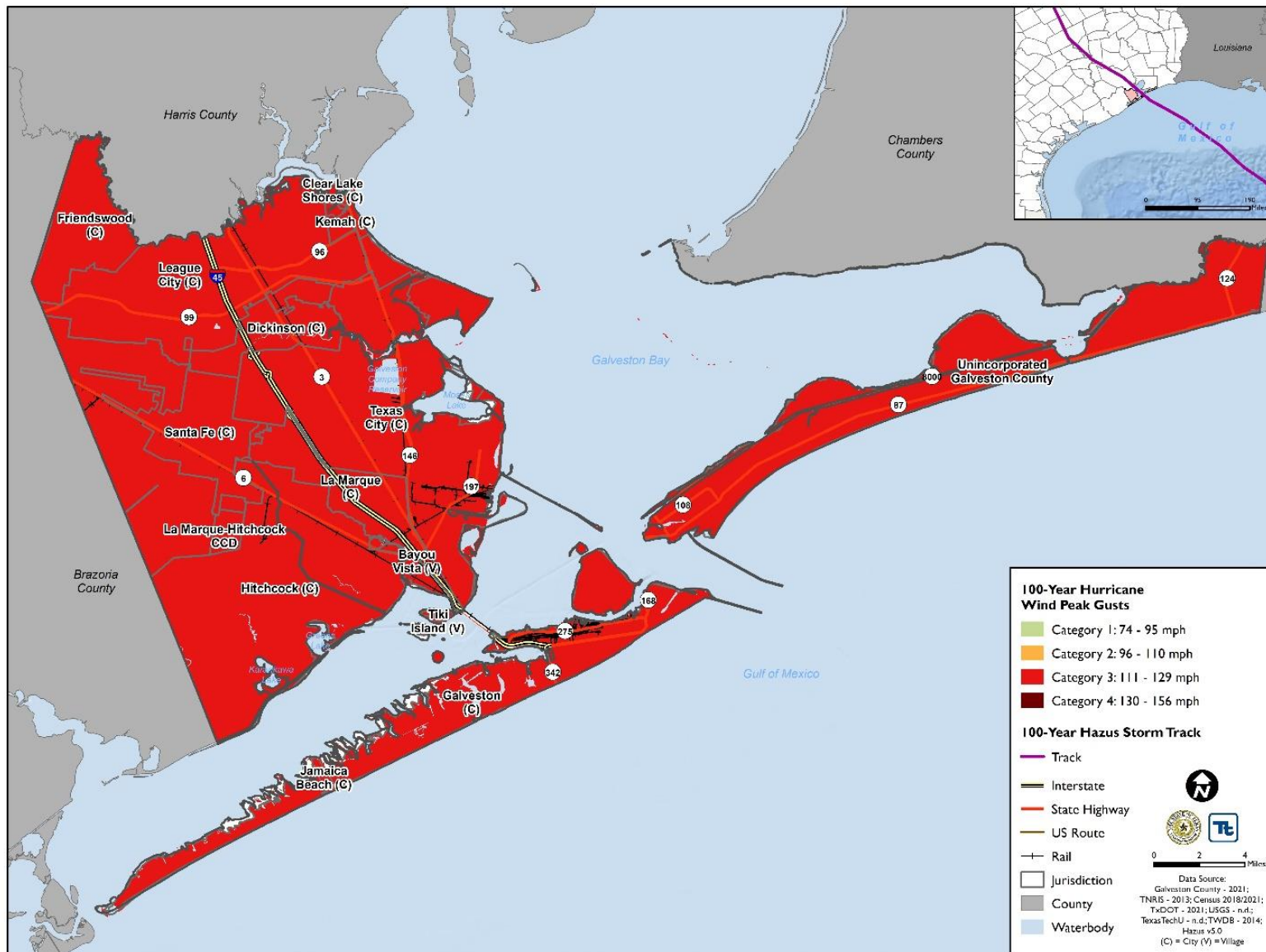
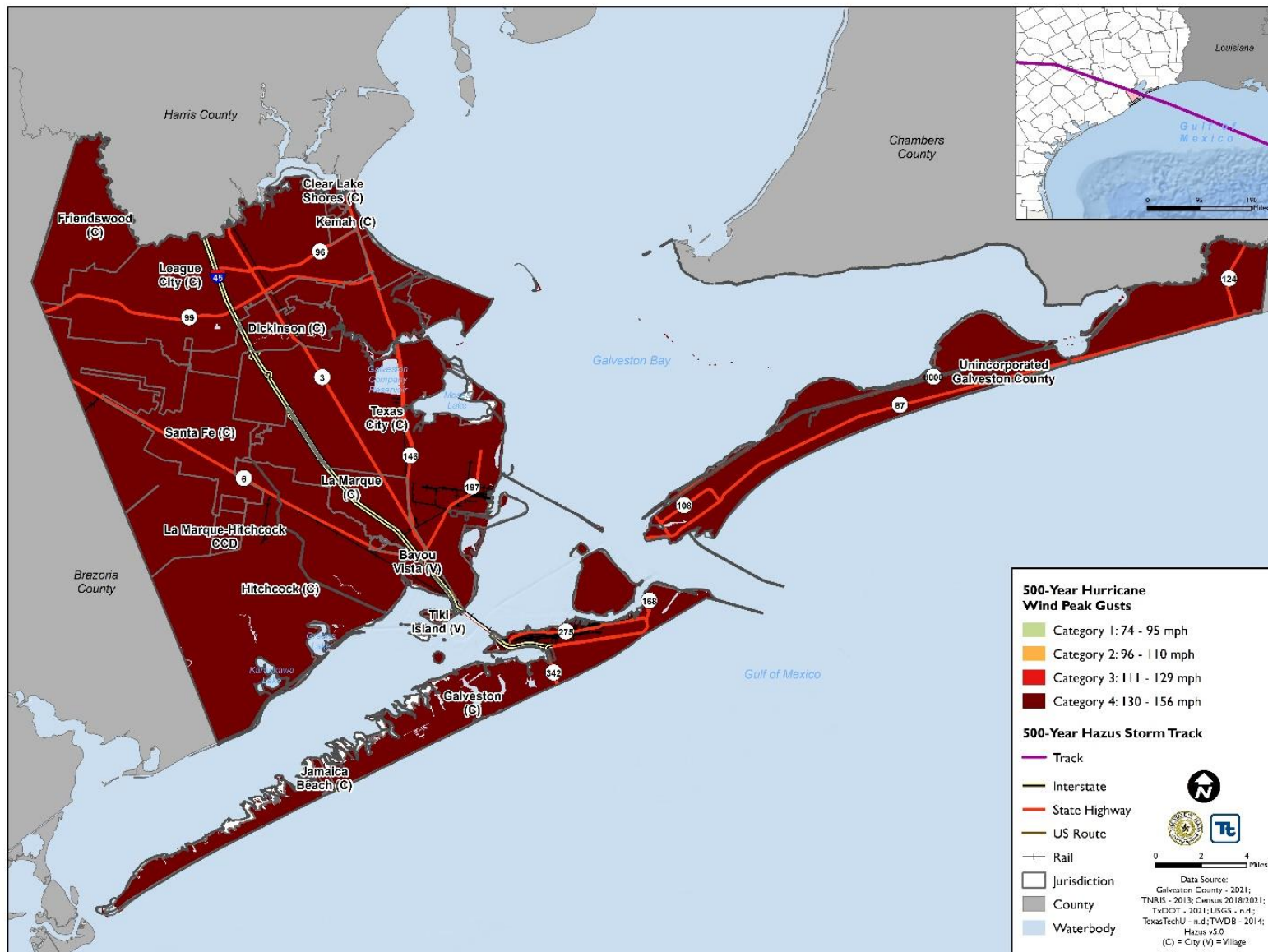




Figure 4-27. Wind Speeds for the 500-Year MRP Event





Worst-Case Scenario

A category 4 hurricane would be the worst-case scenario hurricane for the County. A storm of this magnitude could cause over \$22 billion in building damages, displacing 25,021 households, forcing 16,068 people to seek short-term housing, and causing over 42,000 tons of debris. The extreme winds associated with a category 4 (speeds between 130 and 156 mph) would cause catastrophic damages, leading to downed trees, downed power lines, widespread power outages, significant damage to buildings and infrastructure, and limited access to areas of the County. Heavy rains from a hurricane could lead to significant flooding and associated damages. Additionally, storm surge associated with a category 4 hurricane would lead to potentially damaging over 170,000 buildings and over \$138 billion in damages. Over 1,800 critical facilities/lifelines would be exposed and vulnerable as well.

Previous Occurrences and Losses

Many sources have provided historical information regarding previous occurrences and losses associated with hurricanes and tropical storms in Galveston County. Between 1953 and 2020, FEMA included the State of Texas in 29 hurricane-related major disaster (DR) or emergency (EM) declarations. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Galveston County was included in 14 of these hurricane-related declarations; refer to Table 4-48.

Table 4-48 Hurricane-Related FEMA Declarations for Galveston County, 1953 to 2021

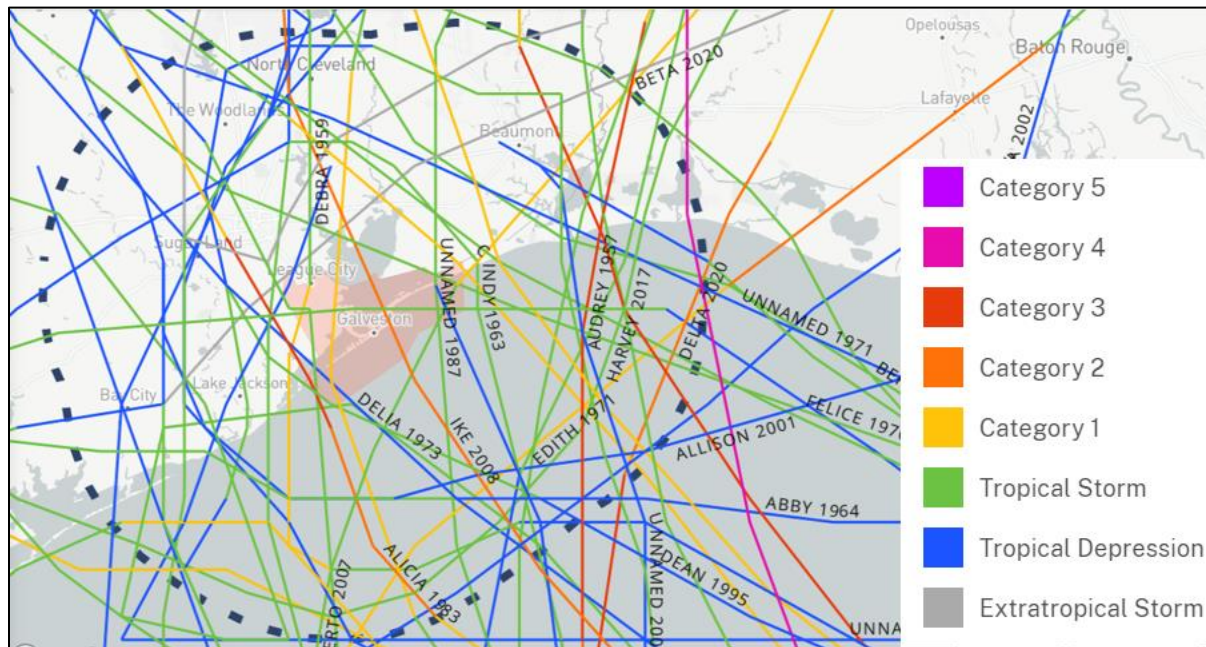
FEMA Declaration Number	Date(s) of Event	Incident Type	Incident Title
DR-689	August 18-20, 1983	Hurricane	Hurricane Alicia
DR-1239	August 22-31, 1998	Severe Storm	Tropical Storm Charley
DR-1245	September 9-October 5, 1998	Severe Storm	Tropical Storm Frances
DR-1379	June 5-20, 2001	Coastal Storm	Tropical Storm Allison
DR-1434	September 6-30, 2002	Coastal Storm	Tropical Storm Fay
DR-1479	July 15-28, 2003	Hurricane	Hurricane Claudette
EM-3261 and DR-1606	September 20-October 14, 2005	Hurricane	Hurricane Rita
EM-3277	August 17-September 5, 2007	Hurricane	Hurricane Dean
EM-3290	August 27-September 7, 2008	Hurricane	Hurricane Gustav
EM-3294 and DR-1791	September 7-October 2, 2008	Hurricane	Hurricane Ike
DR-4332	August 23-September 15, 2017	Hurricane	Hurricane Harvey
EM-3530	July 25-31, 2020	Hurricane	Hurricane Hanna
EM-3540	August 23-27, 2020	Hurricane	Tropical Storms Marco and Laura
DR-4572	August 23-27, 2020	Hurricane	Hurricane Laura

Source: FEMA 2021

Figure 4-28 from the NOAA Historical Hurricane Tracker illustrates the tracks of storms between 1950 and 2020 within 60 nautical miles of Galveston County. NOAA showed 45 hurricanes or tropical storms being tracked within 60 nautical miles of the County. As the figure depicts, the County is frequently impacted by hurricanes, tropical storms, and tropical depressions.



Figure 4-28 Historical Hurricane Tracks within 65 nautical miles of Galveston County, 1950 to 2020



Source: NOAA 2021

Note: Category refers to tropical cyclone strength.

This HMP update includes known hurricane and tropical storm events that have impacted Galveston County between 2016 and 2021. These events are shown in Table 4-49. The events listed in Table 4-49 represent only those that were reported to the NOAA-NCEI Storm Events Database, FEMA, and the 2017 Galveston County HMP, and may not represent all hurricane and tropical storm events that have occurred since 2016. For events prior to 2016, refer to the 2017 Galveston County HMP.



Table 4-49. Hurricane and Tropical Storm Events in Galveston County, 2016 to 2021

Dates of Event	Event Type	FEMA Declaration Number (if applicable)	County Designated?	Fatalities	Injuries	Damages	Event Details*
June 21-22, 2017	Tropical Storm Cindy	N/A	N/A	-	-	-	Water and debris covered a low-lying section of Highway 87 near its intersection with Highway 124 which is an area that is especially vulnerable to coastal flooding. Elsewhere, channels were elevated around Jamaica Beach and other west end communities of Galveston Island, but there was little impact.
August/September 2017	Hurricane Harvey	DR-4332	Yes	3	-	\$10 billion	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. Numerous roads were flooded and impassable across northern and western Galveston County. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson, and Santa Fe. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads.
July 25-31, 2020	Hurricane Hanna	EM-3530	Yes	-	-	-	-
August 23-27, 2020	Tropical Storms Marco and Laura	EM-3540	Yes	-	-	-	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from August 26 th through 27 th leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.
August 23-27, 2020	Hurricane Laura	DR-4572	Yes	-	-	-	
October 8-9, 2020	Hurricane Delta	N/A	N/A	-	-	-	Hurricane Delta produced a long duration of sustained tropical storm force winds across coastal areas. Delta also produced high surf and elevated tides leading to mainly minor coastal flooding along Gulf facing beaches and around Galveston Bay.

Source(s): FEMA 2021; NOAA-NCEI 2021; Galveston County HMP 2017

* Many sources were consulted to provide an update of previous occurrences and losses; event details and loss/impact information may vary and has been summarized in the above table

- Not reported/not available

FEMA Federal Emergency Management Agency

HMP Hazard Mitigation Plan



Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016). Major clusters of summertime storms in North America will grow larger, more intense, and more frequent later this century in a changing climate, leading to increased rainfall and posing a greater threat of flooding across wide areas (UCAR 2017).

Probability of Future Occurrences

Using the NOAA-NCEI database, NWS, FEMA, and the 2017 Galveston County HMP, Table 4-50 summarizes data regarding the probability of occurrences of hurricane and tropical storm events in Galveston County based on the historic record. It should be noted that many of these events impact a region. The information used to calculate the probability of occurrences is based on the NWS's Historic Hurricane Tracker and includes events that were tracked within 60 nautical miles of the County.

Table 4-50. Probability of Future Occurrence of Hurricane/Tropical Storm Events

Hazard Type	Number of Occurrences Between 1954 and 2021*	% chance of occurrence in any given year
Tropical Storms*	36	52.9%
Hurricanes (Categories 1 and 2)*	12	17.6%
Major Hurricanes (Categories 3, 4, and 5)*	5	7.3%
TOTAL*	45	66.1%

Source: NOAA 2021

Note: * Individual storm category may have changed during the event, therefore the number of occurrences for each storm category will be greater than the total number of individual storms.
Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected hurricane events since 1968. Due to limitations in data, not all hurricane events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Galveston County is expected to continue experiencing the direct and indirect impacts of hurricanes and tropical storms each year. Based on historical records and input from the Steering Committee, the probability of occurrence for hurricanes and tropical storm events in the County is considered *occasional* (between 10 and 100% annual chance of occurring). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

A probabilistic assessment was conducted for the 100- and 500-year MRPs through a Level 2 analysis in Hazus to analyze the wind hazard associated with hurricanes and tropical storms and provide a range of loss estimates due to wind impacts. Storm surge was also assessed using 2014 SLOSH (Sea, Lake, and Overland Surges from Hurricanes) data from NOAA's National Hurricane Center. Refer to Section 4.1 (Methodology and Tools) for additional details on the methodology used to assess hurricane and tropical storm risk.

Impact on Life, Health and Safety

The impact of hurricanes and tropical storms on life, health, and safety is dependent upon several factors including the severity of the event and whether or not adequate warning time was provided to residents. All Galveston County residents are exposed to the hurricane storm and tropical storm hazard; however 18.9-percent, 36.8-percent, 60.1-percent, and 75.8-percent of the population is exposed to the SLOSH Category 1, Category 2, Category 3, and Category 4 inundation areas, respectively (2019 American Community Survey 5-year



Estimate). Table 4-51 for a summary of the number of persons exposed to the SLOSH Categories 1 through 4 by jurisdiction. Overall, the Cities of Clear Lake Shores and Dickinson have the great number of persons exposed to the SLOSH Category 4 inundation areas.

Research has shown that some populations, while they may not have more hazard exposure, may experience exacerbated impacts and prolonged recovery if/when impacted. This is due to many factors including their physical and financial ability to react or respond during a hazard. Economically disadvantaged populations are vulnerable because they are likely to evaluate their risk and make decisions based on the major economic impact to their family and may not have funds to evacuate. The population over the age of 65 is also vulnerable and, physically, they may have more difficulty evacuating. Additionally, the elderly are considered vulnerable because they require extra time or outside assistance during evacuations and are more likely to seek or need medical attention which may not be available due to isolation during a storm event. According to the 5-year population estimates from the American Community Survey, Galveston County has a total of 37,264 persons living in poverty and 46,103 over the age of 65 years old. Please refer to Section 3 (County Profile) for the statistics of these populations.

Residents may be displaced or require temporary to long-term sheltering. In addition, downed trees, damaged buildings, and debris carried by high winds can lead to injury or loss of life. Socially vulnerable populations are most susceptible, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. Hazus estimates that 5,769 and 25,021 households will be displaced during the 100-year and 500-year MRP hurricane wind events, respectively. Hazus also estimates that 3,725 and 16,068 persons will be seeking short-term shelter during the 100-year and 500-year MRP hurricane wind events, respectively. Refer to Table 4-52 for a summary of the displaced households by jurisdiction. Please note that estimates are only based on wind speed and do not account for sheltering needs associated with flooding and storm surge that may accompany hurricane and tropical storm events.

Table 4-51. Estimated Population Exposed to the Hurricane Storm Surge SLOSH Category 1 through Category 4 Hurricane Inundation Hazard Areas

Jurisdiction	Total Population (American Community Survey 2015-2019)	Number of Persons Located in the SLOSH Category 1 Storm Surge Hazard Area		Number of Persons Located in the SLOSH Category 2 Storm Surge Hazard Area		Number of Persons Located in the SLOSH Category 3 Storm Surge Hazard Area		Number of Persons Located in the SLOSH Category 4 Storm Surge Hazard Area	
		Number of Persons	Percent of Total	Number of Persons	Percent of Total	Number of Persons	Percent of Total	Number of Persons	Percent of Total
Bayou Vista (C)	1,763	1,702	96.6%	1,712	97.1%	1,710	97.0%	1,710	97.0%
Clear Lake Shores (C)	1,258	265	21.1%	1,250	99.3%	1,250	99.3%	1,252	99.5%
Dickinson (C)	20,847	595	2.9%	5,676	27.2%	19,349	92.8%	20,788	99.7%
Friendswood (C)	41,213	0	0.0%	108	0.3%	1,334	3.2%	6,721	16.3%
Hitchcock (C)	7,301	252	3.4%	5,259	72.0%	7,145	97.9%	7,254	99.4%
Jamaica Beach (C)	1,078	908	84.2%	1,015	94.2%	1,016	94.3%	1,007	93.4%
Kemah (C)	1,807	79	4.4%	569	31.5%	1,756	97.2%	1,771	98.0%
La Marque (C)	18,030	10,211	56.6%	10,816	60.0%	14,845	82.3%	17,548	97.3%
League City (C)	114,392	757	0.7%	11,013	9.6%	53,474	46.7%	86,750	75.8%
Santa Fe (C)	12,735	0	0.0%	4	0.0%	961	7.5%	3,075	24.1%
Tiki Island (V)	1,106	808	73.1%	899	81.3%	899	81.3%	899	81.3%
Galveston County (Total)	350,682	66,290	18.9%	129,076	36.8%	210,755	60.1%	265,843	75.8%

Source: NOAA 2014

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.



Table 4-52. Estimated Hurricane Impact on Persons and Households

Jurisdiction	100-Year Mean Return Period Hurricane		500-Year Mean Return Period Hurricane	
	Displaced Households	Persons Seeking Short-Term Sheltering	Displaced Households	Persons Seeking Short-Term Sheltering
Bayou Vista (C)	36	15	125	52
Clear Lake Shores (C)	52	21	231	94
Dickinson (C)	284	207	1,458	1,054
Friendswood (C)	270	145	1,410	756
Hitchcock (C)	88	62	409	286
Jamaica Beach (C)	9	4	30	13
Kemah (C)	72	44	236	139
La Marque (C)	239	164	1,137	790
League City (C)	1,152	638	6,500	3,697
Santa Fe (C)	218	130	1,042	618
Tiki Island (V)	23	10	80	33
Galveston County (Total)	5,769	3,725	25,021	16,068

Source: American Community Survey 2019 (5-year estimates 2015-2019), Hazus v4.2

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on General Building Stock

To estimate potential building exposure, the SLOSH inundation zones were overlaid upon the building stock created for Galveston County. The estimated total number of buildings and replacement cost value located in Categories 1 through 4 SLOSH inundation zones are summarized in Table 4-53 through Table 4-54 by municipality. Overall, 50,086, 98,585, 144,078, and 170,325 buildings are exposed to the SLOSH Category 1, Category 2, Category 3, and Category 4 inundation hazard areas, respectively. Up to 81.1-percent of the total building stock in the County is exposed to the Category 4 inundation area, which is equal to approximately \$138.6 billion.



Table 4-53. Number of Buildings in the SLOSH Category 1 through 2 Hurricane Inundation Hazard Areas

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Storm Surge Category 1				Storm Surge Category 2			
			Number of Buildings	Percent of Total	Total Replacement Cost Value	Percent of Total	Number of Buildings	Percent of Total	Total Replacement Cost Value	Percent of Total
Bayou Vista (C)	1365	\$445,354,087.33	1,317	96.5%	\$424,749,186	95.4%	1,324	97.0%	\$425,921,023	95.6%
Clear Lake Shores (C)	1155	\$904,562,368.66	274	23.7%	\$223,767,630	24.7%	1,144	99.0%	\$695,917,340	76.9%
Dickinson (C)	10351	\$6,601,710,645.63	288	2.8%	\$171,527,463	2.6%	2,686	25.9%	\$1,555,280,586	23.6%
Friendswood (C)	14891	\$10,815,456,384.12	0	0.0%	\$0	0.0%	38	0.3%	\$17,305,383	0.2%
Hitchcock (C)	5452	\$4,592,036,651.86	181	3.3%	\$145,732,443	3.2%	3,713	68.1%	\$2,617,513,474	57.0%
Jamaica Beach (C)	1291	\$458,205,838.82	1,076	83.3%	\$365,369,401	79.7%	1,217	94.3%	\$433,145,729	94.5%
Kemah (C)	1634	\$2,631,702,105.60	126	7.7%	\$910,699,063	34.6%	555	34.0%	\$1,617,313,325	61.5%
La Marque (C)	10749	\$7,927,292,522.28	6,169	57.4%	\$4,615,552,789	58.2%	6,505	60.5%	\$4,747,244,710	59.9%
League City (C)	46742	\$31,237,974,594.10	313	0.7%	\$271,823,631	0.9%	4,450	9.5%	\$2,733,061,369	8.7%
Santa Fe (C)	7942	\$4,831,628,162.13	0	0.0%	\$0	0.0%	2	0.0%	\$683,161	0.0%
Tiki Island (V)	868	\$365,209,145.44	624	71.9%	\$242,284,194	66.3%	708	81.6%	\$305,474,558	83.6%
Galveston County (Total)	209947	\$166,321,604,688.46	50,086	23.9%	\$45,671,691,795	27.5%	98,585	47.0%	\$87,001,755,597	52.3%

Sources: NOAA 2014; Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Table 4-54. Number of Buildings in the SLOSH Category 3 through 4 Hurricane Inundation Hazard Areas

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Storm Surge Category 3				Storm Surge Category 4			
			Number of Buildings	Percent of Total	Total Replacement Cost Value	Percent of Total	Number of Buildings	Percent of Total	Total Replacement Cost Value	Percent of Total
Bayou Vista (C)	1365	\$445,354,087.33	1,323	96.9%	\$426,025,064	95.7%	1,323	96.9%	\$426,025,064	95.7%
Clear Lake Shores (C)	1155	\$904,562,368.66	1,147	99.3%	\$899,559,394	99.4%	1,149	99.5%	\$900,188,943	99.5%
Dickinson (C)	10351	\$6,601,710,645.63	9,668	93.4%	\$6,241,423,825	94.5%	10,324	99.7%	\$6,594,840,170	99.9%
Friendswood (C)	14891	\$10,815,456,384.12	474	3.2%	\$282,516,903	2.6%	2,492	16.7%	\$2,379,152,704	22.0%
Hitchcock (C)	5452	\$4,592,036,651.86	5,269	96.6%	\$4,099,893,161	89.3%	5,407	99.2%	\$4,505,169,550	98.1%
Jamaica Beach (C)	1291	\$458,205,838.82	1,218	94.3%	\$433,511,885	94.6%	1,207	93.5%	\$430,756,581	94.0%
Kemah (C)	1634	\$2,631,702,105.60	1,583	96.9%	\$2,579,015,109	98.0%	1,601	98.0%	\$2,590,925,240	98.5%



Section 4.3.8 - Hurricane and Tropical Storm

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Storm Surge Category 3				Storm Surge Category 4			
			Number of Buildings	Percent of Total	Total Replacement Cost Value	Percent of Total	Number of Buildings	Percent of Total	Total Replacement Cost Value	Percent of Total
La Marque (C)	10749	\$7,927,292,522.28	8,883	82.6%	\$6,511,093,962	82.1%	10,421	96.9%	\$7,545,708,277	95.2%
League City (C)	46742	\$31,237,974,594.10	21,998	47.1%	\$14,955,152,012	47.9%	35,640	76.2%	\$24,290,366,490	77.8%
Santa Fe (C)	7942	\$4,831,628,162.13	562	7.1%	\$263,374,449	5.5%	1,850	23.3%	\$813,519,970	16.8%
Tiki Island (V)	868	\$365,209,145.44	708	81.6%	\$305,322,200	83.6%	708	81.6%	\$305,875,137	83.8%
Galveston County (Total)	209947	\$166,321,604,688.46	144,078	68.6%	\$119,703,104,280	72.0%	170,325	81.1%	\$138,655,890,684	83.4%

Sources: NOAA 2014; Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.



Impact on Critical Facilities

Critical facilities are at risk of being impacted by high winds associated with structural damage, or falling tree limbs/flying debris, which can result in the loss of power. Power loss can greatly impact households, business operations, public utilities, and emergency personnel. For example, vulnerable populations in Galveston County are at risk if power loss results in interruption of heating and cooling services, stagnated hospital operations, and potable water supplies. Emergency personnel such as police, fire, and EMS will not be able to effectively respond in a power loss event to maintain the safety of its citizens.

Hazus estimates that critical facilities in Galveston County has a 47.7-percent probability of sustaining minor to moderate damages from the 100-year MRP hurricane wind event. Hazus also estimates that there are critical facilities that have a 65.8-percent probability of sustaining severe damage from the 500-year MRP hurricane wind event. Refer to Section 4.3.13 (Thunderstorm Wind) for details on the impacts of winds on critical facilities.

The critical facilities and lifelines located in the Category 1 through 4 inundation zones are summarized in Table 4-55. Over 78-percent of the critical facilities in the County are exposed to the Category 4 SLOSH inundation area.

Table 4-55. Damage Level to Critical Facilities Exposed to Category 1 through 4 SLOSH Hazard Areas

FEMA Lifeline Category	Number of Lifelines	Number of Lifelines Located in the Storm Surge SLOSH Category 1 Hazard Area	Number of Lifelines Located in the Storm Surge SLOSH Category 2 Hazard Area	Number of Lifelines Located in the Storm Surge SLOSH Category 3 Hazard Area	Number of Lifelines Located in the Storm Surge SLOSH Category 4 Hazard Area
Communications	111	20	35	68	87
Energy	598	219	336	422	491
Food, Water, Shelter	162	66	131	145	150
Hazardous Materials	68	33	62	66	66
Health and Medical	91	15	51	68	81
Safety and Security	405	89	200	321	358
Transportation	882	211	373	511	590
Galveston County (Total)	2,317	653	1,188	1,601	1,823

Source: Hazus v4.2

At this time, Hazus does not estimate losses to transportation lifelines and utilities as part of the hurricane model. Transportation lifelines are not considered particularly vulnerable to the wind hazard; they are more vulnerable to cascading effects such as flooding, falling debris etc. Impacts to transportation lifelines affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting) transportation needs. Furthermore, evacuation routes are vulnerable to coastal storm surge events and hurricane wind events.

Impact on Economy

Damage to structures from flooding and wind can be the most immediate result of coastal storm events; however, this damage can have long-lasting impacts on the economy. When a business is closed during storm recovery, there is lost economic activity in the form of day-to-day business and wages to employees. Overall, economic impacts include the loss of business function (e.g., tourism, recreation), damage to inventory, relocation costs, wage loss and rental loss due to the repair/replacement of buildings. As evidenced by Hurricane Harvey, the State of Texas, including Galveston County, lost millions of dollars in wages and economic activity.

Hazus estimates the total economic loss associated with each storm scenario (direct building losses and business interruption losses). Direct building losses are the estimated costs to repair or replace the damage caused to the



building. This is reported in the “Impact on General Building Stock” section discussed earlier. Business interruption losses are the losses associated with the inability to operate a business because of the wind damage sustained during the storm or the temporary living expenses for those displaced from their home because of the event.

Debris management can be costly and may also impact the local economy. Hazus estimates the amount of building and tree debris that may be produced as result of the 100- and 500-year MRP wind events. Because the estimated debris production does not include flooding, this is likely a conservative estimate and may be higher if multiple impacts occur. According to the Hazus Hurricane User Manual, estimates of weight and volume of eligible tree debris consist of downed trees that would likely be collected and disposed at public expense. Refer to the User Manual for additional details regarding these estimates.

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

Any areas of growth could be potentially impacted by the hurricane and tropical storm hazard because the entire County is exposed and vulnerable; however, due to increased standards and codes, new development can be less vulnerable to the hazard compared with the aging building stock in the County.

Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. The increase in population will expose more people to the hurricane and tropical storm hazard.

Climate Change

The entire State of Texas is projected to experience an increase in the frequency and severity of extreme storms and rainfall. Major clusters of summertime thunderstorms in North America will grow larger, more intense, and more frequent later this century in a changing climate, unleashing far more rain and posing a greater threat of flooding across wide areas (UCAR 2017). An increase in storms will produce more wind events and may increase hurricane and tropical storm activity (Climate Central 2016). Overall, Galveston County will continue to remain vulnerable to the hurricane and tropical storm hazard.

Changes in Vulnerability Since the 2017 HMP

Galveston County continues to be vulnerable to hurricanes and tropical storms. Hurricane models on population exposed and debris created were not run for the 2017 HMP; therefore, estimated losses were not populated. Furthermore, the building stock has increased significantly, from \$17 billion exposed in 2016 to over \$96 billion in this update. Overall, the vulnerability assessment presented in this update uses Hazus v4.2 and a more accurate and updated building inventory. This provides more accurate estimated exposure and potential losses for Galveston County.



4.3.9 Land Subsidence

The following section provides the hazard profile and vulnerability assessment for the land subsidence hazard in Galveston County.

Hazard Profile

Description

Land subsidence is the gradual lowering of land-surface elevation. In the Houston-Galveston region, land subsidence is caused by compaction of fine-grained aquifer sediments (silts and clays) below the land surface due to groundwater withdrawals. Removing water from fine-grained aquifer sediments compresses the aquifer leaving less pore space available to store water resulting in the lowering (sinking or settling) of the land-surface. Most compaction that occurs as a result of groundwater withdrawals is irreversible; even if groundwater levels rise, compacted sediments and the associated land-surface lowering would remain (USGS n.d.).

Consequences of land subsidence in the Houston-Galveston Region:

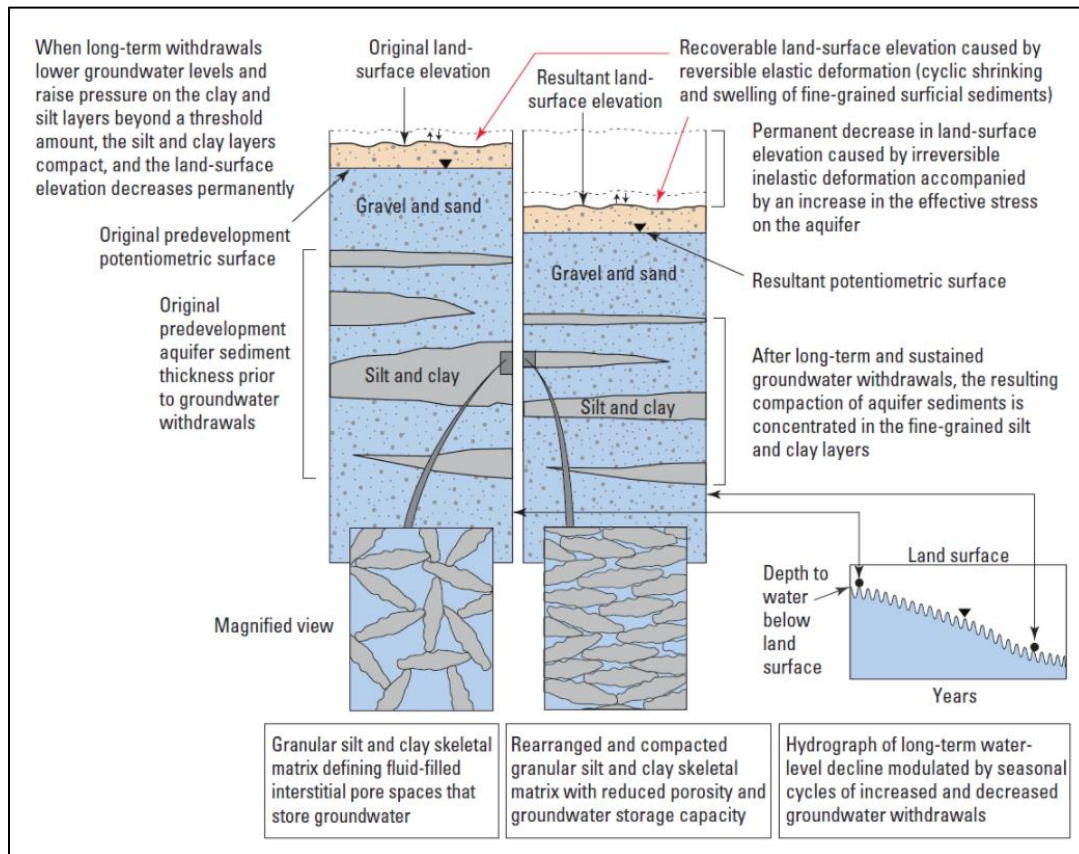
- Reduces the ability to store water in an aquifer.
- Partially or completely submerges land.
- Collapses water well casings.
- Disrupts collector drains and irrigation ditches.
- Alters the flow of creeks and bayous which may increase the frequency and severity of flooding.
- Damages roadways, bridges, building foundations, and other infrastructure.

Location

USGS measures over groundwater levels in over 700 wells in an 11-county area annually in the Houston-Galveston area in order to develop a regional depiction of groundwater levels. The cumulative compaction in the Chicot and Evangeline aquifers are measured at 13 extensometer stations in the 11-county area (USGS n.d.). An extensometer is a device that measures the deformation of the ground in these areas.

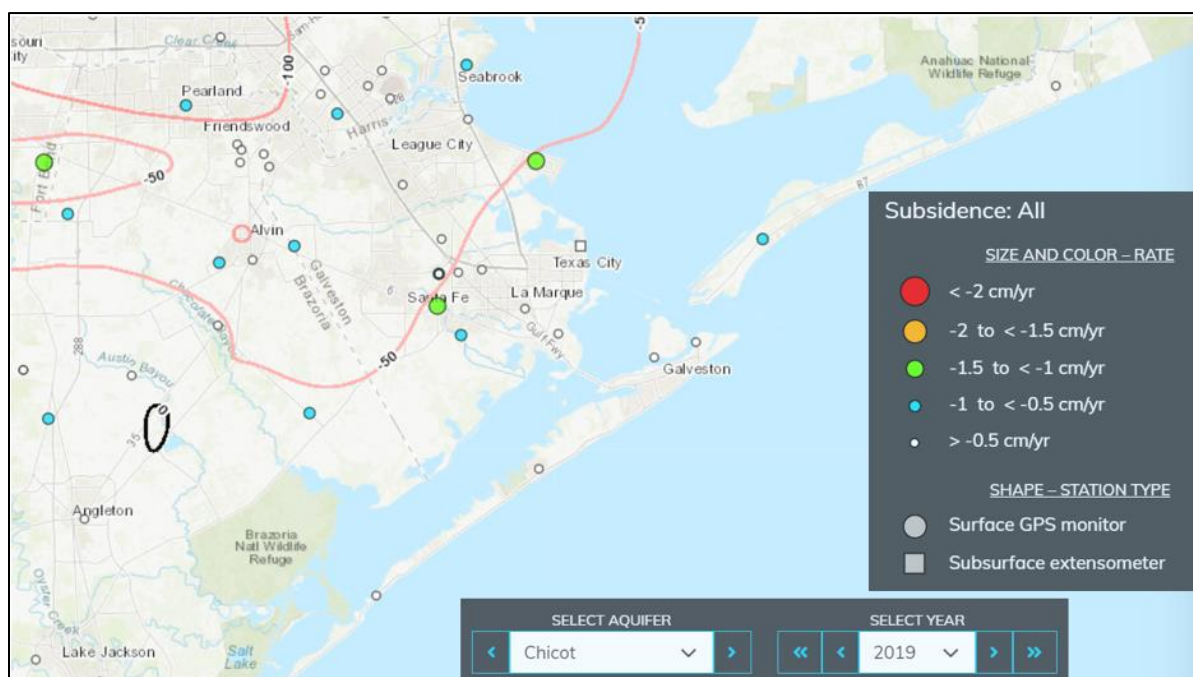
Water-level altitude contours, wells, and compaction data have been combined in an interactive map that allows users to view annual water-level altitudes from 1977 through the present, water-level changes over time, and historical time series of compaction data (See Figure 4-30). As depicted by the green circles on the map in Figure 4-30, the areas with the greatest rate of land subsidence are near Santa Fe and San Leon.

Figure 4-29 The Subsidence Process



Source: (USGS n.d.)

Figure 4-30 Annual Land Subsidence Rates



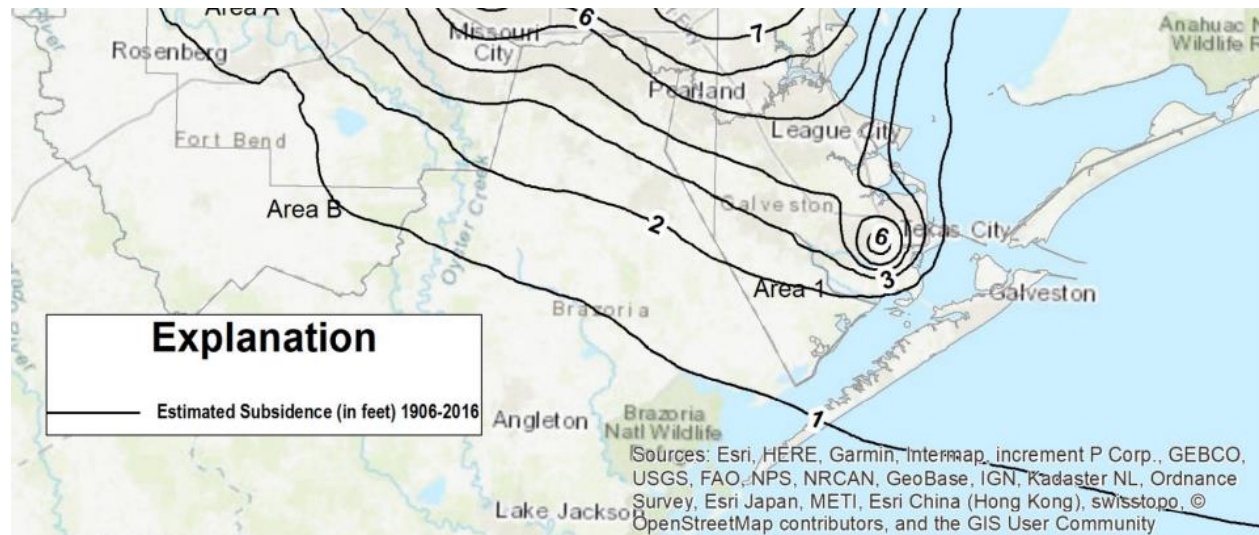
Source: (USGS 2021)



Extent

Land subsidence is measured by rates of elevation loss. Figure 4-30 shows the areas near Santa Fe and San Leon are shown to experience annual subsidence of 1 to 1.5 cm, while other areas in the County experience subsidence at a rate of 0.5 cm to 1 cm per year. Figure 4-31 shows the estimated subsidence in total feet in 110 years from 1906 to 2016.

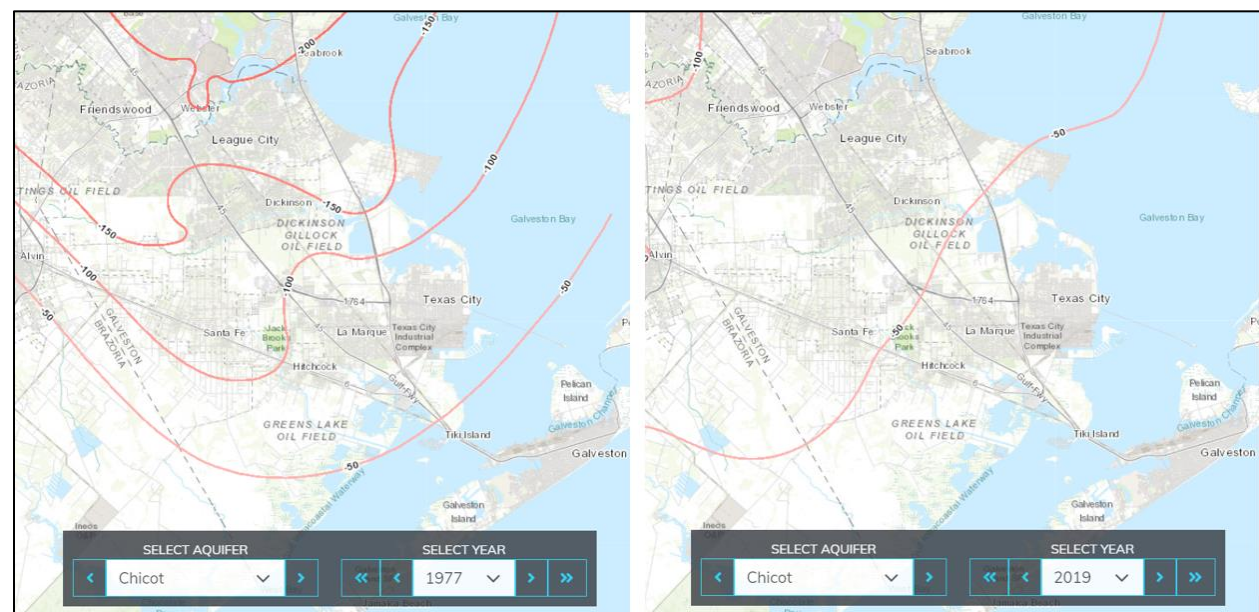
Figure 4-31 Estimated Subsidence Between 1906 and 2016



Source: (Harris-Galveston Subsidence District 2018)

Groundwater levels also decline as aquifer sediments are compacted and groundwater storage capability is reduced. Figure 4-32 shows the receded water level contours of the Chicot Aquifer between 1977 and 2019.

Figure 4-32 Groundwater Contour Change Between 1977 and 2019



Source: (USGS 2021)



Worst-Case Scenario

A worse-case scenario for land subsidence is that it would continue at its current rates of between >-0.5 and -1.5 centimeters per year according to USGS surface GPS monitors and over time, impact the integrity of the built environment and worsen the effects of coastal flooding. Impacts from land subsidence include road closures, damage to infrastructure and buildings, and inaccessible areas that can disrupt emergency response.

Previous Occurrences and Losses

Subsidence is a continuous hazard, and its effects are intimately intertwined with those of other natural forces and episodic hazardous events. Rates of subsidence have decreased across Galveston County, but its effects continue to compound.

Climate Change Projections

While there is no established connection that climate change increases land subsidence, secondary impacts of climate change such as drought and flood may have a greater impact on areas experiencing land subsidence. As drought levels increase, the need to pump water from aquifers also increases which exacerbates subsidence. As sea levels rise, coastal areas that have lost elevation due to subsidence will experience more frequent coastal flooding (Shirzaei and Bürgmann 2018).

Probability of Future Events

It is anticipated that land subsidence will continue to occur in Galveston County. As the frequency of drought conditions continues to increase, the probability for future subsidence events will likely increase as well. Due to the gradual nature of this hazard and the lack of data on individual land subsidence events, the probability of future events is based on previous events and input from the Steering Committee. The probability of occurrence for land subsidence in the planning area is considered rare (between 1 and 10% annual chance of occurring). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entire County is vulnerable to land subsidence hazards; however, the eastern portion of the Harris-Galveston Subsidence District along the Houston Bay Ship Channel is especially vulnerable. This location is near Bayou Vista, Clear Lake Shores, Hitchcock, Kemah, and unincorporated areas of Galveston County.

Impact on Life, Health and Safety

Land subsidence is not generally considered an imminent threat to public safety then the changes are gradual over many years. However, land subsidence has many negative secondary consequences. The decrease in land surface elevation contributes to an increase in the frequency and extent of flooding, damage to infrastructure, activation of acceleration of the movement of geologic faults resulting in property damage, erosion, and loss of submerged aquatic vegetation, all of which have negative effects on human life, health, and safety (Galveston County 2016 HMP). The entire population of the County is vulnerable to this hazard, however, the populations of Bayou Vista, Clear Lake Shores, Hitchcock, Kemah, are especially vulnerable.

Impact on General Building Stock and Critical Facilities

Estimates of the impact on general building stock and critical facilities are vague. An estimate of the average annual cost to property owners from 1969 to 1974 for the HGSD was \$31,000,000 (measured in 1975 dollars). Due to the decrease in rates of subsidence, this cost may be much lower today. Costs to relocate or fortify industrial facilities would likely exceed those estimates (Galveston County 2016 HMP).



Impact on the Economy

Estimates of the financial impact of subsidence are vague. “Many millions of dollars” are spent reclaiming land submerged by tidal water, elevating structures such as buildings, wharves, and roadways, constructing levees to protect against tidal inundation and to repair damage due to fault movement (Galveston County 2016 HMP). For estimates of the economic impacts on the building stock, see the above section.

Future Changes that May Impact Vulnerability

Understanding future changes that affect vulnerability can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change

Projected Development

As discussed, and illustrated in Section 3 (County Profile), areas targeted for future growth and development have been identified across the County. Any areas of growth could be affected by erosion if the growth areas are within identified hazard areas. Areas targeted for potential future growth and development could be potentially impacted by land subsidence if they are located within areas prone to land subsidence

Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2019 American Community Survey estimated population of 350,682. Furthermore, the populations of the most vulnerable jurisdictions have increased. The population of the county is expected to increase over the next few years. The increase in population will expose more people to the land subsidence hazard.

Climate Change

While there is no established connection that climate change increases land subsidence, secondary impacts of climate change such as drought and flood may have a greater impact on areas experiencing land subsidence. As drought levels increase, the need to pump water from aquifers also increases which exacerbates subsidence. As sea levels rise, coastal areas that have lost elevation due to subsidence will experience more frequent coastal flooding (Shirzaei and Bürgmann 2018).

Change of Vulnerability

Galveston County’s population increased since the last plan, increasing the number of people at risk to a land subsidence event. Therefore, the entire County remains vulnerable to land subsidence events.

4.3.10 Lightning

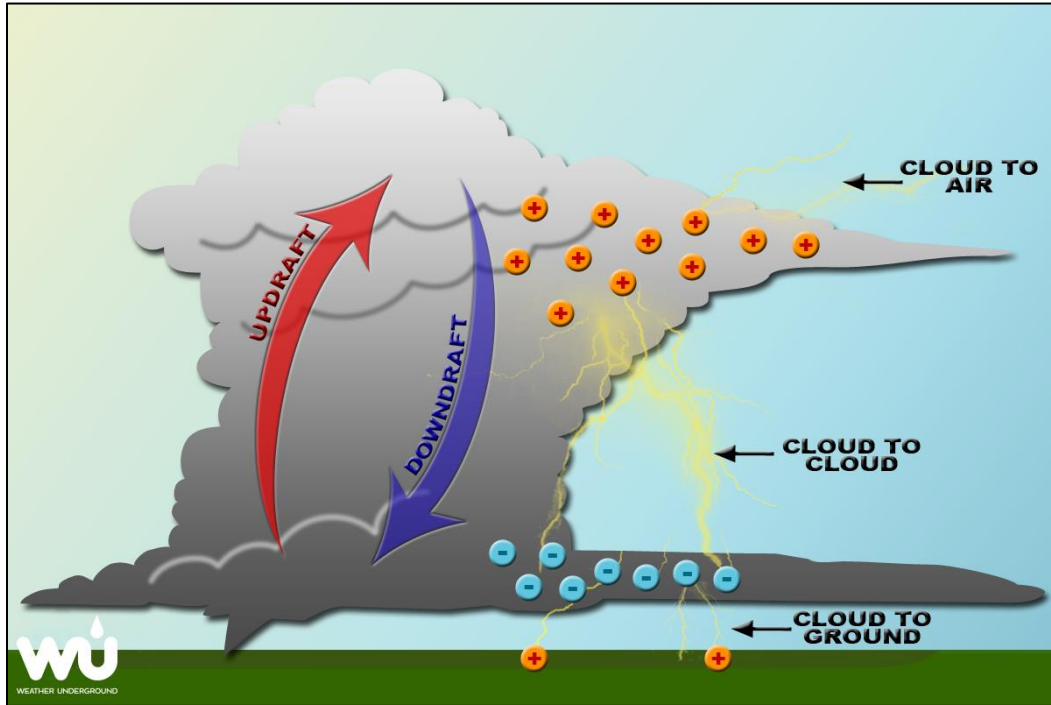
The following section provides the hazard profile and vulnerability assessment for the lightning hazard in Galveston County.

Profile

Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground, produced by a thunderstorm. Energy from lightning channel heats the air to around 18,000°F. This causes the air to rapidly expand, creating a sound wave known as thunder. Thunder can be heard up to 25 miles away from the lightning discharge (NOAA n.d.). Figure 4-33 illustrates how lightning develops. Lightning is a major cause of storm-

related deaths in the United States, with an average of 43 reported fatalities and 243 injuries each year (NWS n.d.). Between 1990 and 2003, 52 lightning-related deaths was reported in the State of Texas, ranking second in the United States for deaths associated with lightning strikes (National Lightning Safety Institute 2021).

Figure 4-33. How Lightning Develops

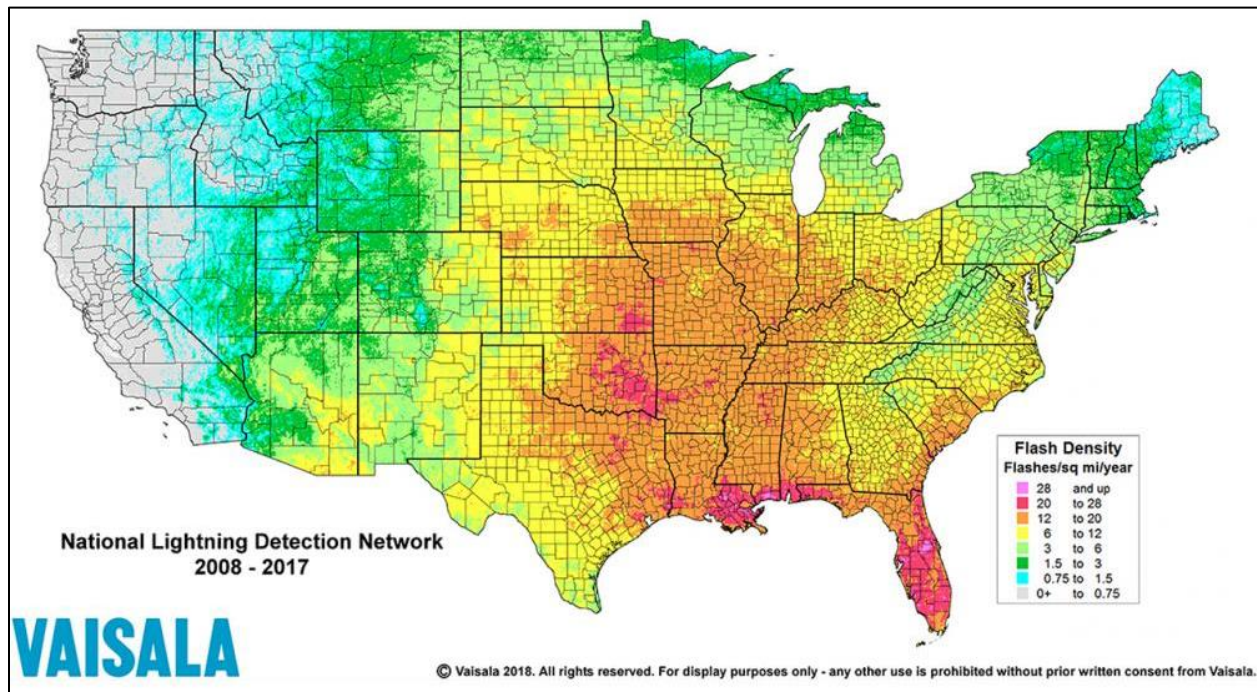


Source: Weather Underground 2021

Location

Lightning occurs with thunderstorms, making all of Galveston County susceptible to the lightning hazard. The National Lightning Detection Network (NLDN) collects cloud-to-ground lightning data for the continental United States. Figure 4-34 illustrates the cloud-to-lightning incidence across the United States. The figure shows that Galveston County experienced 12 to 20 flashes per square mile each year.

Figure 4-34. Cloud-to-Lightning Incidence, 2008 to 2017



Source: Vaisala 2021

Extent

Lightning is most often associated with moderate to severe thunderstorms. The severity of lightning refers to the frequency of lightning strikes during a storm. The Lightning Activity Level (LAL) is a scale which describes lightning activity. The scale is part of the National Fire Danger Rating System. The scale is a range of numbers, from one to six, which reflects frequency and character of cloud-to-ground lightning (National Wildfire Coordinating Group n.d.) (NWS n.d.).

Table 4-56. Lightning Activity Level

Lightning Activity Level (LAL)	Conditions
1	No thunderstorms
2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five-minute period.
3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5-minute period.
4	Scattered thunderstorms. Moderate rain is commonly produced Lightning is frequent, 11 to 15 cloud to ground strikes in a 5-minute period.
5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5-minute period.
6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.

Sources: National Wildfire Coordinating Group 2021; NWS 2021

Worst-Case Scenario

A worst-case scenario for lightning strikes would be an event with multiple strikes that result in injury and death like the September 2003 event, or major structural damage like the August 2018 event. This type of event would be a 4 or 5 on the LAL scale. An event with frequent lightning strikes could lead to power outages, structural



fires, injuries, and deaths. Countywide power outages would disrupt operations, inundate shelters, increase emergency response calls, and impact critical services that relies on power to assist the community.

Previous Occurrences and Losses

Many sources have provided historical information regarding previous occurrences and losses associated with lightning strikes in Galveston County. According to the NOAA-NCEI Storm Events Database, Galveston County has been impacted by 19 lightning events between 1996 and 2020 that resulted in 5 deaths and caused almost \$3.3 million in property damage (refer to Table 4-57).

Table 4-57. Lightning Events 1996-2020

Hazard Type	Number of Occurrences Between 1996 and 2020	Total Fatalities	Total Injuries	Total Property Damage (\$)	Total Crop Damage (\$)
Lightning	19	5	3	\$3,259,000	-

Sources: NOAA-NCEI 2021; Galveston County HMP 2017

Note: Due to limitations in data, not all thunderstorm wind events occurring between 1950 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated

As stated earlier, lightning occurs with thunderstorms. Between 1953 and 2021, the State of Texas was included in five thunderstorm or hail-related FEMA major disaster (DR) or emergency (EM) declarations. Of those declarations, Galveston County was included in one declaration. Table 4-58 lists FEMA DR and EM declarations for Galveston County.

Table 4-58. Thunderstorm-Related FEMA Declarations for Galveston County, 1953 to 2021

FEMA Declaration Number	Date(s) of Event	Incident Type	Incident Title
DR-1041	October 14-November 8, 1994	Flood	Severe Thunderstorms and Flooding

Source: FEMA 2021

This HMP update includes known lightning strikes that have impacted Galveston County between 2016 and 2021. These events listed in Table 4-59 represent only those that were reported in the NOAA-NCEI Storm Events Database, FEMA, and the Galveston County 2017 HMP. However, local knowledge indicates more instances of lightning strikes occurring in the County. Therefore, Table 4-59 may not represent all lightning strikes that have occurred prior to or since 2016.



Table 4-59. Lightning Events in Galveston County, 2016 to 2021

Date of Event	Event Type	FEMA Declaration Number (if applicable)	County Designated?	Deaths	Injuries	Damages	Event Details*
June 28, 2016	Lighting	N/A	N/A	-	-	\$8,000	A lightning strike caused electrical damage to the League City's City Hall's parking lot lights.
August 29, 2018	Lighting	N/A	N/A	-	-	\$745,000	Lightning struck a home and caused a fire that destroyed the property.
August 29, 2018	Lighting	N/A	N/A	-	-	\$1,000	Lightning struck and damaged a house.
August 29, 2021	Lightning	N/A	N/A	-	-	\$250,000	Lightning strike initiated a fire which severely damaged a two story home. Family and pets were able to evacuate in time with no injuries.

Source(s): FEMA 2021; NOAA-NCEI 2021; Galveston County HMP 2017

* Many sources were consulted to provide an update of previous occurrences and losses; event details and loss/impact information may vary and has been summarized in the above table

- Not available/not recorded

FEMA Federal Emergency Management Agency

NCEI National Centers for Environmental Information



Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016).

Climate change may lead to an increase in the number of lightning-producing storms. Major clusters of summertime thunderstorms in North America will grow larger, more intense, and more frequent later this century in a changing climate, unleashing far more rain and posing a greater threat of flooding across wide areas (UCAR 2017). At century's end, the number of summertime storms that produce extreme downpours could increase by more than 400% across parts of the United States, including sections of the Gulf Coast, Atlantic Coast, and the Southwest. In addition, the intensity of individual extreme rainfall events could increase by as much as 70% in some areas (National Science Foundation 2016).

Probability of Future Occurrences

Table 4-60 summarizes data regarding the probability of occurrences of lightning events in Galveston County based on the historic record. The information used to calculate the probability of occurrences is based on the 2017 Galveston HMP, the NOAA-NCEI Storm Events Database, and FEMA.

Table 4-60. Probability of Future Occurrence of Lightning Events

Hazard Type	Number of Occurrences Between 1954 and 2021	% chance of occurrence in any given year
Lightning	20	29.4%

Source: NOAA-NCEI 2021; FEMA 2021; Galveston County HMP 2017

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected lightning events since 1968. Due to limitations in data, not all lightning events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated

Galveston County will continue experiencing the direct and indirect impacts of lightning events each year. Based on information from the 2017 Galveston County HMP, FEMA and the NOAA-NCEI Storm Events Database, there have been fifteen reported lightning strikes in the County in 20 years. However, as stated earlier, local knowledge indicates many more instances of lightning strikes occurring in the County. Therefore, the calculated probability based on recorded incidents might not represent the actual probability of occurrence. Based on historical records and input from the Steering Committee, the probability of occurrence for thunderstorm events in Galveston County is considered *occasional* (between 10 and 100% annual chance of occurring). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entirety of Galveston County is exposed and vulnerable to the lightning hazard; therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in Section 3 (County Profile), are potentially vulnerable to a thunderstorm event. The following text evaluates and estimates the potential impact of the lightning hazard in the County.

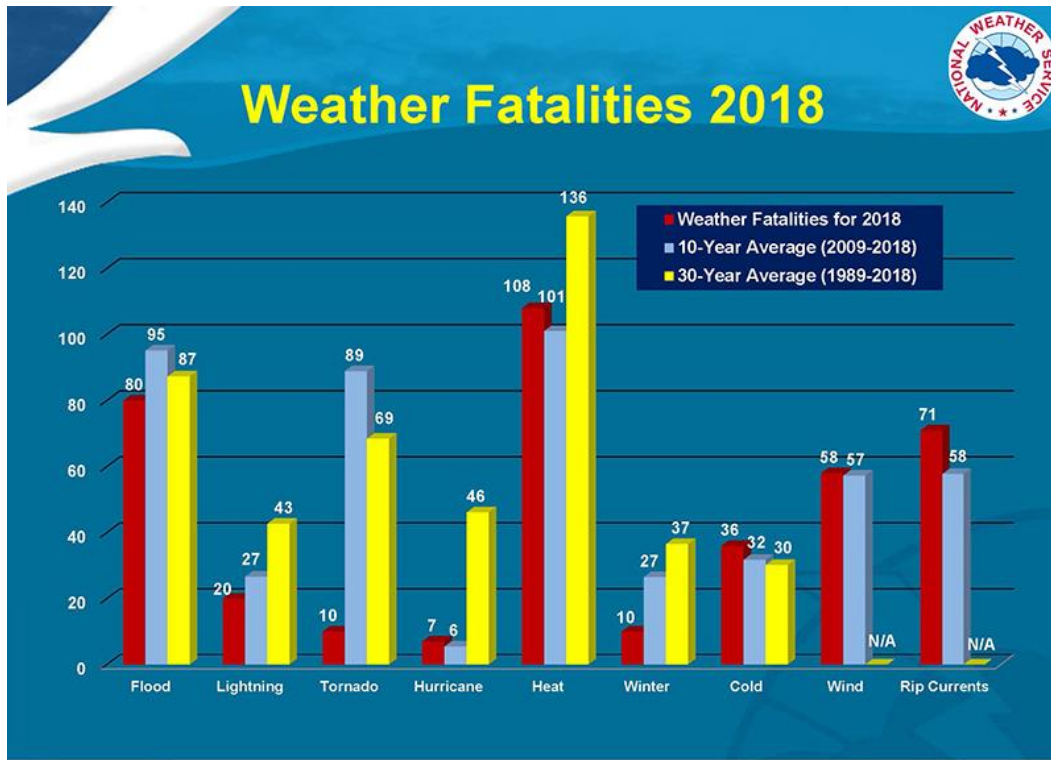
Impact on Life, Health and Safety

Across the United States, the 10-year average (2009 to 2018) for lightning-caused fatalities is 27, while the 30-year average (1989 to 2018) is 43 (NWS 2020). Refer to Figure 4-35 for an illustration of these statistics.



According to the NOAA-NCEI Storm Events Database, there has been five fatalities and three injuries as a result of lightning events from 1996 to 2021.

Figure 4-35. Weather Fatalities in the United States, 2018



Source: NOAA 2020

The impact of a lightning on life, health, and safety is dependent upon several factors including the severity of the event and whether adequate warning time was provided to residents. The entire population of Galveston County is assumed to be exposed to this hazard.

Lightning can be responsible for deaths, injuries, and property damage. Lightning-based deaths and injuries typically involve heart damage, inflated lungs, or brain damage, as well as loss of consciousness, amnesia, paralysis, and burns, depending on the severity of the strike. Additionally, most people struck by lightning survive, although they may have severe burns and internal damage. People located outdoors (i.e., recreational activities and farming) are considered most vulnerable to lightning strikes because there is little to no warning, and shelter might not be available. Moving to a lower risk location will decrease a person's vulnerability.

Impact on General Building Stock

For the purpose of this plan update, the entire general building stock and all infrastructure in Galveston County are considered exposed to the lightning hazard. Lightning can spark wildfires or building fires, especially if structures are not protected by surge protectors on critical electronic, lighting, or information technology systems. While damage to the building stock is possible as a result of lightning, it is difficult to estimate and would not have as wide of an impact as a high wind or tornado event.

Impact on Critical Facilities

For the purpose of this plan update, all critical facilities in Galveston County are considered exposed to the lightning hazard.



Impact on Economy

According to NOAA's Technical Paper on *Lightning Fatalities, Injuries, and Damage Reports in the United States from 1959 - 1994*, monetary losses for lightning events range from less than \$50 to greater than \$5 million (larger losses associated with forest fires with homes destroyed and crop loss) (NOAA 1997).

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. Areas targeted for potential future growth and development could be potentially impacted by thunderstorms since the entire County is exposed to the lightning hazard. However, due to increased standards and codes, new development can be less vulnerable to the lightning hazard compared with the aging building stock in the County.

Projected Changes in Population

The County experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. The increase in population will expose more people to the lightning hazard.

Climate Change

Climate change may lead to an increase in the number of lightning strikes and lightning-producing storms. Major clusters of summertime thunderstorms in North America will grow larger, more intense, and more frequent later this century in a changing climate, leading to increased rainfall and posing a greater threat of flooding across wide areas (University Corporation for Atmospheric Research [UCAR] 2017). The changing climate may also increase the frequency of lightning flashes could rise by an estimated 50-percent across the continental United States over the next century. A warmer atmosphere can hold more moisture and moisture is one of the key ingredients for triggering a lightning strike (Lee 2014).

Changes in Vulnerability Since the 2017 HMP

Galveston County's population increased since the last plan; increasing the number of people impacted during a lightning. Therefore, the entire County remains vulnerable to lightning.

4.3.11 Pandemic

This section provides the hazard profile and vulnerability assessment for the pandemic hazard for Galveston County.

Profile

Hazard Description

An outbreak or an epidemic occurs when new cases of a certain disease, in a given population, substantially exceed what is expected. An epidemic may be restricted to one locale, or it may be global, at which point it is called a pandemic. Pandemic is defined as a disease occurring over a wide geographic area and affecting a high



proportion of the population. A disease outbreak can cause sudden, pervasive illness in all age groups on a local or global scale. A pandemic is a novel virus to which humans have no natural immunity that spreads from person-to-person. A pandemic will cause both widespread and sustained effects and is likely to stress the resources of both the State and federal government (Madhav, et al. 2017). In addition to health impacts, disease outbreaks reaching pandemic proportions can cause social and economic impacts on a global scale (Shang, Li and Zhang 2021).

Coronavirus

Coronavirus disease (COVID-19) is an infectious disease first identified in 2019. The virus rapidly spread into a global pandemic by spring of 2020. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness (World Health Organization n.d.). With the virus being relatively new, information regarding transmission and symptoms of the virus is still new. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Reported illnesses have ranged from mild symptoms to severe illness. Reported symptoms include fever or chills, cough, shortness of breath or difficulty breathing and fatigue. Symptoms may appear 2-14 days after exposure to the virus (CDC 2021).

In an effort to slow the spread of the virus, the federal government and states have urged the public to avoid touching of the face, properly wash hands often, and use various social distancing measures. At the time of this plan update, there are three approved and authorized vaccines available in the United States to reduce risk of severe illness (CDC 2021).

Influenza

The risk of a global influenza pandemic has increased over the last several years. This disease is capable of claiming thousands of lives and adversely affecting critical infrastructure and key resources. An influenza pandemic has the ability to reduce the health, safety, and welfare of the essential services workforce; immobilize core infrastructure; and induce fiscal instability.

Pandemic influenza is different from seasonal influenza (or "the flu") because outbreaks of seasonal flu are caused by viruses that are already among people. An influenza pandemic is a global outbreak of a new influenza A virus. Pandemics happen when new (novel) influenza A viruses emerge which are able to infect people easily and spread from person to person in an efficient and sustained way (CDC n.d.).

At the national level, the CDC's Influenza Division has a long history of supporting the World Health Organization (WHO) and its global network of National Influenza Centers (NIC). With limited resources, most international assistance provided in the early years was through hands-on laboratory training of in-country staff, the annual provision of WHO reagent kits (produced and distributed by CDC), and technical consultations for vaccine strain selections. The Influenza Division also conducts epidemiologic research including vaccine studies and serologic assays and provided international outbreak investigation assistance (CDC n.d.).

West Nile Virus

West Nile Virus (WNV) encephalitis is a mosquito-borne viral disease, which can cause an inflammation of the brain. WNV is commonly found in Africa, West Asia, the Middle East, and Europe. West Nile Virus was first reported in Texas in 2002. In a small number of cases, WNV has been spread by blood transfusion, which has resulted in the screening of blood donations for the virus in the US, or by organ transplantation. WNV can also be spread from mother to baby during pregnancy, delivery, or breast-feeding in a small number of cases. The symptoms of severe infection (West Nile encephalitis or meningitis) can include headache, high fever, neck stiffness, muscle weakness, stupor, disorientation, tremors, seizures, paralysis, and coma. WNV can cause serious illness, and in some cases, death. Usually, symptoms occur from two to 14 days after being bitten by an infected mosquito (Texas Department of State Health Services n.d.).



Location

Disease outbreaks can occur without regard for location. However, factors such as density, visitation, and the length of time in which the public spends in a location all contribute to the spread of infectious diseases. For example, COVID-19 is more likely spread by persons in close contact. Indoor areas in which people are in close contact with each other appear to be significant vectors for the disease, which is spread through respiratory droplets. Infectious diseases spread by insects may be subject to other types of location hazards. For example, the prevalence of standing water can provide breeding grounds for diseases such as West Nile Virus. Diseases that can infect humans are variable in nature and methods of transmission. Ultimately, residents need to be vigilant about diseases altogether in order to better understand and respond to disease outbreak hazards.

Extent

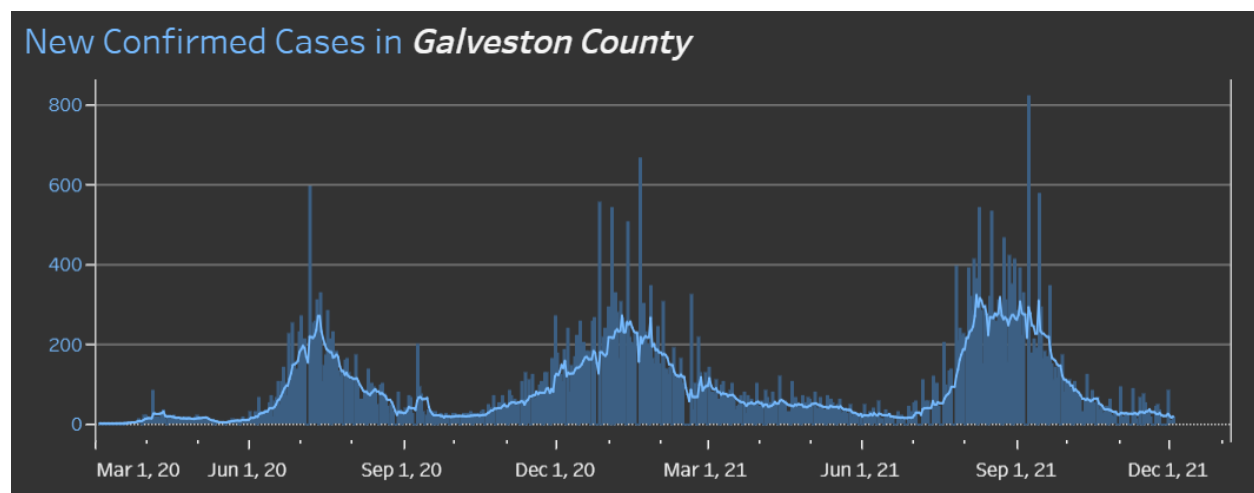
The exact size and extent of an infected population depends on how easily the illness is spread, the mode of transmission, and the amount of contact between infected and uninfected individuals. The transmission rates of pandemic illnesses are often higher in more densely populated areas. The transmission rate of infectious diseases will depend on the mode of transmission of a given illness.

Coronavirus

The most recent large-scale disease outbreak is COVID-19, which is ongoing at the time of this report's publication.

Texas's first COVID-19 cases were reported on March 6th, 2020. By mid-April, hundreds of new cases were being confirmed each day. Beginning in May, daily new cases in excess of 1,000 were reported, with the number of daily new cases growing near-exponentially beginning in mid-June. On a county-wide basis, there have been 55,166 confirmed cases as of December 2, 2021 (Galveston County Health District 2021). The graph in Figure 4-36 shows the rate of confirmed cases in Galveston County through December 3, 2021 (Texas Department of State Health Services 2021).

Figure 4-36. COVID-19 Confirmed Case Rate in Galveston County, Texas

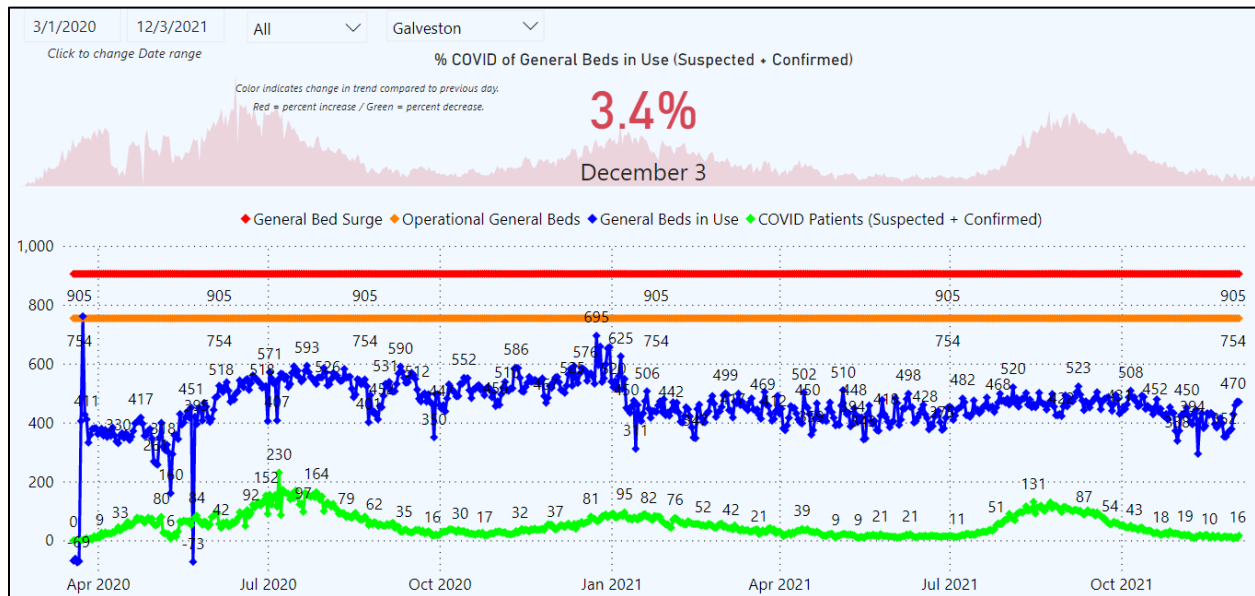


Source: Texas Department of State Health Services, 2021

A significant metric of COVID-19 has been hospital bed utilization. Efforts to “flatten the curve” of new reported cases are meant to avoid overwhelming medical systems by heading off hospital over-capacity issues. Figure 4-37 shows that as of December 3, 2021, COVID-19 cases account for 3.4 percent of general beds in use and hospital bed use is below capacity in Galveston County.



Figure 4-37. Hospital Census Data, Galveston County, Texas



Source: SETRAC

Previous Occurrences and Losses

Between 1953 and 2021, FEMA issued a disaster (DR) or emergency (EM) declaration for the State of Texas for one pandemic-related event. Galveston County was included in this declaration for COVID-19. For the 2022 HMP update, known disease outbreaks that have impacted Galveston County between 2003 and 2021 are identified in Table 4-61 below.

Table 4-61. Public Health Events in Galveston County, 2014 to December 3, 2021

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Galveston County Designated?	Description
2003-Present	West Nile Virus	None	N/A	Between 2003 and 2021, 22 human cases of West Nile Virus were reported in Galveston County.
2015-Present	Zika Virus	None	N/A	Nine Galveston County residents were reported to contract Zika in 2016, a mosquito-borne illness. All cases were associated with travel, and none were reported to have been contracted locally. The vast majority of cases in Texas were determined to have not been contracted locally.
March 2020-Present	Novel Coronavirus	DR-4485 EM-3458	Yes	As of December 3, 2021, there were 55,166 confirmed COVID-19 cases in Galveston County.

Sources: FEMA 2021; Galveston County Health District 2021; CDC 2021

Climate Change Projections

Climate change will likely have significant indirect impacts on disease outbreaks. In Texas, higher temperatures, decreased water availability, and more severe storm events are anticipated due to climate change. According to the World Health Organization, changing climatic conditions are being studied for impacts upon disease transmission. Seasonal infectious diseases that are influenced by meteorological conditions may see significant variability in recurrence and duration. The World Health Organization concludes that variations in infectious disease transmission patterns are likely major consequences of climate change.



Probability of Future Occurrences

Though occurrences of disease outbreaks overall are often difficult to predict at the local level, it is anticipated that Galveston County will continue to be impacted by disease outbreaks for the foreseeable future. Seasonality for cold and flu is well established and anticipated in Texas on an annual basis.

Based on the recent disease outbreak cases shown in Table 4-62, the future occurrence of disease outbreak cases in the planning area can be considered frequent (100% chance of occurring; occurs multiple times a year). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Table 4-62 Probability of Pandemic Cases

Hazard Type	Number of Occurrences Between 2014 and December 3, 2021	% chance of occurrence in any given year
Pandemic Cases	55,197	100%

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected events since 1968. Due to limitations in data, not all pandemic events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable to the identified hazard. The following discusses Galveston's vulnerability, in a qualitative nature, to the disease outbreak hazard.

Impact on Life, Health and Safety

The entire population of Galveston County is vulnerable to the disease outbreak hazard. Due to a lack of quantifiable loss information, a qualitative assessment was conducted to evaluate the assets exposed to this hazard and the potential impacts associated with this hazard. Healthcare providers and first responders have an increased risk of exposure due to their frequent contact with infected populations. Areas with a higher population density also have an increased risk of exposure or transmission of disease to do the closer proximity of population to potentially infected people.

Most recently with COVID-19, the Centers for Disease Control and Prevention have indicated that persons over 65 years and older, persons living in a nursing home or long-term care facility, and persons with underlying medical conditions such as diabetes, severe obesity, serious heart conditions, etc. are at a higher risk of getting severely ill (CDC 2020). According to the 2019 American Community Survey, 13.1% of Galveston County residents (or approximately 46,103 people) are over the age of 65. As of January 13, 2022, there have been 68,933 positive COVID-19 cases in Galveston County (GCHD 2022).

Impact on General Building Stock

No structures are anticipated to be directly affected by pandemic events.

Impact on Critical Facilities

No critical facilities are anticipated to be affected by disease outbreaks. Hospitals and medical facilities will likely see an increase in patients, but it is unlikely that there will be damages or interruption of services. However, large rates of infection may result in an increase in the rate of hospitalization which may overwhelm hospitals and medical facilities and lead to decreased services for those seeking medical attention. The 2020 coronavirus pandemic has led to overwhelmed hospitals in numerous hotspots.



Impact on Economy

Disease outbreaks impacts on the economy and estimated dollar losses are difficult to measure and quantify. Costs associated with the activities and programs implemented to conduct surveillance and address disease outbreaks have not been quantified in available documentation. As evidenced in the COVID-19 outbreak, quarantines, shutdowns, and social distancing measures can have outsized economic impacts, particularly on the leisure, tourism, and food/accommodations sectors.

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

Any areas of growth could be potentially impacted by the disease outbreak hazard because the entire planning area is exposed and vulnerable. Additional development of structures in close proximity to waterbodies or areas with high population density are at an increased risk.

Projected Changes in Population

The County experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase in the near future. The increase in population will expose more people to the pandemic hazard as residents move into area and the population exposed increases. Population density changes when households move throughout the County could influence the number of persons exposed to disease outbreaks. Higher density jurisdictions are not only at risk of greater exposure to disease outbreak, density may also reduce available basic services provided by critical facilities such as hospitals and emergency facilities for persons that are not affected by a disease.

Climate Change

The relationship between infectious diseases occurrence and climate change is difficult to predict with certainty. However, there may be linkages between the two. Changes in the environment may create a more livable habitat for vectors carrying disease as suggested by the Centers for Disease Control and Prevention (CDC n.d.). Localized changes in climate and human interaction may also be a factor in the spread of disease. For example, in the wake of Hurricane Harvey prolonged and intense precipitation provided breeding grounds for mosquitos that necessitated mosquito control measures.

The relationship between climate change and infectious diseases is not universally agreed upon. Climate change may affect the spread of disease, while others are not convinced. However, research indicates that the only force at work in increasing the spread of infectious diseases into the future. Other factors, such as expanded rapid travel and evolution of resistance to medical treatments, are already changing the ways pathogens infect people, plants, and animals. As climate change accelerates it is likely to work synergistically with many of these factors, especially in populations increasingly subject to massive migration and malnutrition (Harmon 2010).



Changes in Vulnerability Since the 2017 HMP

Pandemic is a new hazard profile for the 2022 HMP update. The occurrence and prevalence of COVID-19 in the County underscores the need to address disease outbreak as part of the hazard mitigation planning process. The County will continue to be exposed and vulnerable to pandemic events.

4.3.12 Severe Winter Storm

The following section provides the hazard profile and vulnerability assessment for the severe winter storm hazard in Galveston County.

Profile

Hazard Description

Severe winter storms bring the threat of snow, freezing rain, and ice storms to Galveston County. A winter storm is a weather event in which the main types of precipitation are snow, sleet, or freezing rain. They can be a combination of heavy snow, blowing snow, and dangerous wind chills. According to the National Severe Storms Laboratory, the three basic components needed to make a winter storm include the following:

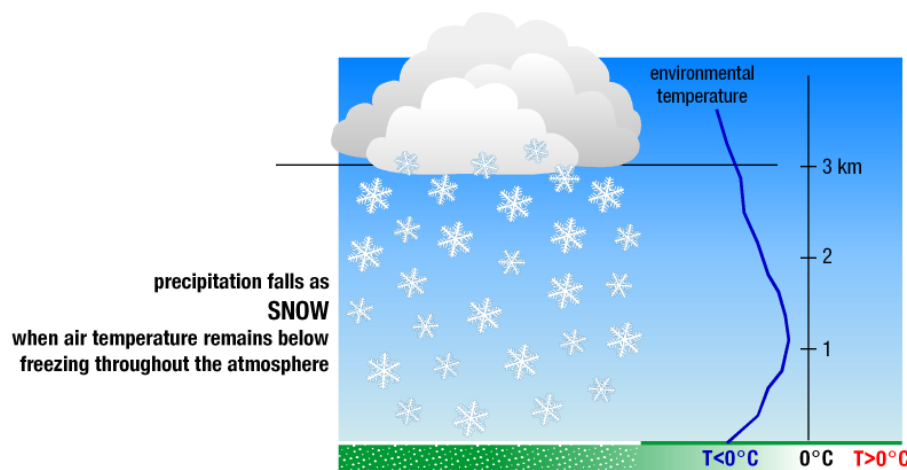
- Below freezing temperatures (cold air) in the clouds and near the ground to make snow and ice.
- Lift, something to raise the moist air to form clouds and cause precipitation, such as warm air colliding with cold air and being forced to rise over the cold dome or air flowing up a mountainside (orographic lifting).
- Moisture to form clouds and precipitation, such as air blowing across a large lake or the ocean.

Some winter storms are large enough to immobilize an entire region while others might only affect a single community. Winter storms typically are accompanied by low temperatures, high winds, freezing rain or sleet, and heavy snowfall. The aftermath of a winter storm can have an impact on a community or region for days, weeks, or even months; potentially causing cold temperatures, flooding, storm surge, closed and blocked roadways, downed utility lines, and power outages. In Galveston County, winter storms include snowstorms, blizzards, and ice storms. Extreme cold temperatures and wind chills are associated with winter storms; however, they are discussed in Section 4.3.6 (Extreme Temperature).

Heavy Snow

According to the National Snow and Ice Data Center (NSIDC), snow is precipitation in the form of ice crystals. It originates in clouds when temperatures are below the freezing point (32 °F) and water vapor in the atmosphere condenses directly into ice without going through the liquid stage. Once an ice crystal has formed, it absorbs and freezes additional water vapor from the surrounding air, growing into snow crystals or a snow pellet, which then falls to the earth. Snow falls in different forms: snowflakes, snow pellets, or sleet. Snowflakes are clusters of ice crystals that form from a cloud. Figure 4-38 depicts snow creation.

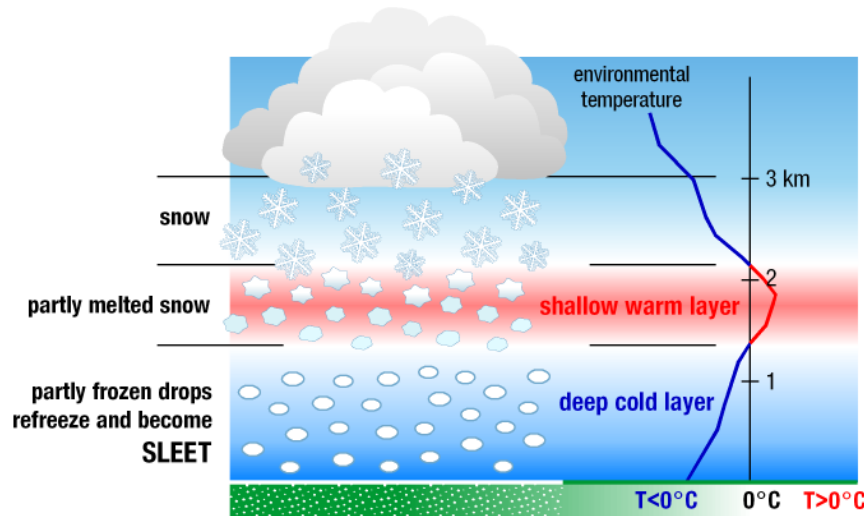
Figure 4-38. Snow Creation



Source: (NOAA NSSL n.d.)

Snow pellets are opaque ice particles in the atmosphere. They form as ice crystals fall through super-cooled cloud droplets, which are below freezing but remain a liquid. The cloud droplets then freeze to the crystals. Sleet is made up of drops of rain that freeze into ice as they fall through colder air layers. They are usually smaller than 0.30 inches in diameter (NSIDC 2020).

Figure 4-39. Sleet Creation



Source: (NOAA NSSL n.d.)

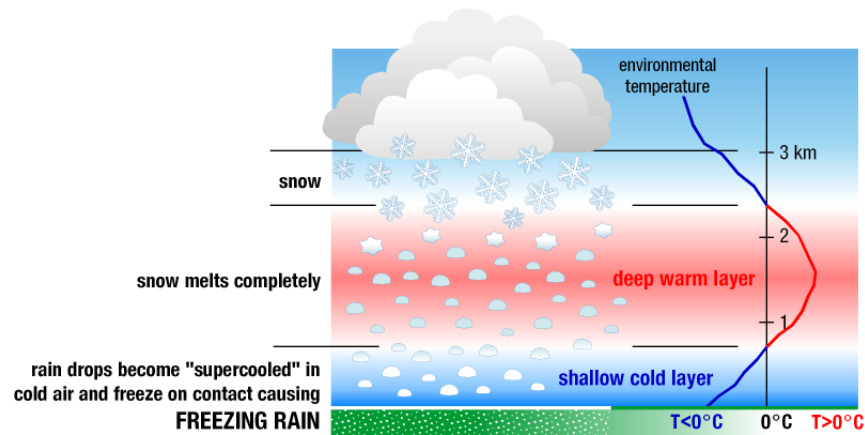
Blizzards

A blizzard is a winter snowstorm with sustained or frequent wind gusts of 35 miles per hour (mph) or more, accompanied by falling or blowing snow reducing visibility to or below 0.25 mile, as the predominant conditions over a 3-hour period. Extremely cold temperatures often are associated with blizzard conditions but are not a formal part of the definition. The hazard, created by the combination of snow, wind, and low visibility, significantly increases when temperatures are below 20 °F. A severe blizzard is categorized as having temperatures near or below 10 °F, winds exceeding 45 mph, and visibility reduced by snow to near zero. Storm systems powerful enough to cause blizzards usually form when the jet stream dips far to the south, allowing cold air from the north to clash with warm, moister air from the south. Blizzard conditions often develop on the northwest side of an intense storm system. The difference between the lower pressure in the storm and the higher pressure to the west creates a tight pressure gradient, resulting in strong winds and extreme conditions caused by the blowing snow (NWS n.d.).

Ice Storms

An ice storm describes those events when damaging accumulations of ice are expected during freezing rain situations. Significant ice accumulations typically are accumulations of 0.25-inches or greater. Heavy accumulations of ice can bring down trees, power lines, utility poles, and communication towers. Ice can disrupt communications and power for days. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians (NWS 2018).

Figure 4-40. Freezing Rain Creation



Source: (NOAA NSSL n.d.)

Location

Winter storms occur on a regional scale and can happen anywhere in the State of Texas; therefore, all of Galveston County can experience winter storm events.

Extent

The magnitude or severity of a severe winter storm depends on several factors, including a region's climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, time of occurrence during the day and week (e.g., weekday versus weekend), and time of season.

The extent of a severe winter storm can be classified by meteorological measurements and by evaluating its societal impacts. The National Oceanic and Atmospheric Administration's (NOAA's) National Climatic Data Center (NCDC) is currently producing the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two-thirds of the United States. The RSI ranks snowstorm impacts on a scale from 1 to 5 and is based on the spatial extent of the storm, the amount of snowfall, and the interaction of the extent and snowfall totals with population (based on the 2000 Census). The NCDC has analyzed and assigned RSI values to over 500 storms since 1900 (NOAA NCEI n.d.). Table 4-63 presents the five RSI ranking categories.

Table 4-63. RSI Ranking Categories for the South Climate Region

Category	Description	RSI Value	Snowfall Thresholds
1	Notable	1–3	<2
2	Significant	3–6	>2
3	Major	6–10	>5
4	Crippling	10–18	>10
5	Extreme	18.0+	>15

Source: (NOAA NCEI n.d.)

Note: RSI = Regional Snowfall Index

The NWS operates a widespread network of observing systems, such as geostationary satellites, Doppler radars, and automated surface observing systems that feed into the current state-of-the-art numerical computer models



to provide a look into what will happen next, ranging from hours to days. The models are then analyzed by NWS meteorologists who then write and disseminate forecasts (NOAA 2017).

According to the National Weather Service (part of NOAA), the magnitude of a severe winter storm can be qualified into five main categories by event type:

- Heavy Snowstorm – snowfall accumulating to 4 inches or more in 12 hours or less or snowfall accumulating to six inches or more in 24 hours or less.
- Sleet Storm – Significant accumulations of solid pellets that form from the freezing of raindrops or partially melted snowflakes causing slippery surfaces, posing a hazard to pedestrians and motorists.
- Ice Storm – Significant accumulation of rain or drizzle freezing on objects (trees, power lines, roadways) as it strikes them, causing slippery surfaces and damage from sheer weight of ice accumulations; significant ice accumulations are usually ¼” or greater.
- Blizzard – sustained winds or frequent gusts of 35 mph or more; considerable blowing snow with visibility frequently below one-quarter mile prevailing over an extended period.
- Severe Blizzard – Wind velocity of 45 mph, temperatures of 10°F or lower, a high density of blowing snow with visibility frequently measured in feet prevailing over an extended period.

The NWS uses winter weather watches, warnings, and advisories to ensure that people know what to expect in the coming hours and days.

- Watches
 - Blizzard – Conditions are favorable for blizzard conditions to be met in the next 12 to 48 hours.
 - Winter Storm - Issued when winter storm conditions, defined above, are possible within 24 to 48 hours.
- Warnings
 - Blizzard – Issued when sustained winds or frequent gusts ≥ 35 mph combined with blowing and or falling snow, reducing visibility below 1/4 mile for 3 hours or more, when imminent or expected within the next 36 hours. Temperatures are assumed below 32°F, and snow should accumulate at least one inch in 12 hours.
 - Winter Storm - Issued when the following conditions, capable of producing high impact and potentially life threatening conditions, are occurring or expected to occur within the 36 hours: snow - ≥ 1 inch in 12 hours; sleet - $\geq 1/2$ inch in 12 hours; and or a combination of snow, sleet, ice with snow or sleet meeting warning criteria
 - Ice Storm - Issued when $\geq 1/8$ inch of Ice is expected to accrete on trees, power lines, and bridges/overpasses for the entirety of the event. These conditions are capable of producing high impact and potentially life threatening conditions and are either occurring or expected to occur within the next 36 hours.
- Advisories
 - Winter Weather - Issued when the following conditions, capable of producing significant, but not necessarily life threatening, inconveniences, are occurring or expected to occur within the next 36 hours:
 - Snow: 1/2 to 1 inch in 12 hours
 - Sleet: $< 1/2$ inch in 12 hours
 - Ice: $< 1/8$ inch in 12 hours
 - Combination: Snow, sleet, and ice with snow or sleet meeting advisory criteria.



Worst-Case Scenario

Overall, the maximum winter weather extent that can be expected in Galveston County is an RSI Category 3 snowfall event. Because the County is located in the National Centers for Environmental Information's south climate region, the amount of snow that can fall for this category event is up to 10 inches; however, the area will most likely see lower amounts of snow based on history of occurrence. A winter storm of that magnitude has the potential to cause between \$16-166 billion in property damage countywide.

A worst-case severe winter storm scenario would be a storm similar to that of the February 2021 ice storm that brought extreme temperature lows, deaths and injuries, significant buildup of ice on structures and infrastructure including highway overpasses. A storm like this could lead to downed trees and power lines, power outages, closed roadways, and overall impact to the planning area. This would lead to disruption in emergency services and limited access to essentials (e.g. water, heat).

Previous Occurrences and Losses

Many sources have provided historical information regarding previous occurrences and losses associated with severe winter storm events in Galveston County. According to the NOAA-NCEI storm events database, Galveston County has been impacted by four winter weather events between 1950 and 2021. Table 4-64 and Table 4-65 summarize these statistics (NOAA-NCEI 2020).

Table 4-64. Severe Winter Events 1950-2021

Hazard Type	Number of Occurrences Between 1950 and 2021	Total Fatalities	Total Injuries	Total Property Damage (\$)	Total Crop Damage (\$)
Blizzard	0	0	0	\$0	\$0
Heavy Snow	1	0	0	\$0	\$0
Ice Storm	3	9	0	\$12 million	\$0
Sleet	0	0	0	\$0	\$0
Winter Storm	0	0	0	0	0
Winter Weather	0	0	0	\$0	\$0
Total	4	9	0	\$12 million	\$0

Source: NOAA-NCEI 2021

Note: NOAA-NCEI database includes winter-related events starting in 1996. Events that occurred prior to 1996 are not included in the table.

Between 1953 and 2021, FEMA included the State of Texas in one winter storm-related major disaster (DR) declaration classified as a severe ice storm. Generally, these disasters cover a wide region of the state; therefore, they may have impacted many counties. Galveston County was included that winter storm-related declaration (FEMA 2021). For the 2022 update, severe winter weather events were summarized from 2016 to 2021 (see Table 4-65). For events prior to 2016, refer to the 2016 Galveston County HMP.

Table 4-65. Severe Winter Weather Events in Galveston County, 2016 to 2021

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Event Details*
February 11-21, 2021	Ice Storm	DR-4586	Yes	Very cold air and gusty winds overspread SE Texas behind an Arctic front with wind chill indices from near zero to single digits for much the period from Sunday night to Tuesday morning. Increased power demand, wind and ice led to widespread power outages. Bursting pipes caused many to be without water as well. Numerous fatalities



Table 4-65. Severe Winter Weather Events in Galveston County, 2016 to 2021

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Event Details*
				resulted both from hypothermia, carbon monoxide poisoning and other effects.

Sources: FEMA 2021; NOAA-NCEI 2021

* Many sources were consulted to provide an update of previous occurrences and losses; event details and loss/impact information may vary and has been summarized in the above table

FEMA Federal Emergency Management Agency

NCEI National Centers for Environmental Information

Climate Change Projections

Changes in climate can affect how much snow falls and influence the timing of the winter snow season. Changes in the amount of snow covering the ground, and changes in how the snow melts in the spring, will affect the water supplies that people use for things like farming and making electricity (NSIDC 2010). With these projections, the County might not experience an increase in winter weather events, but the lack of snow could impact the water supply.

According to the National Climate Assessment, rising air and water temperatures and changes in precipitation are intensifying droughts, increasing heavy downpours, reducing snowpack, and causing declines in surface water quality, with varying impacts across regions. Future warming will add to the stress on water supplies and adversely impact the availability of water in parts of the United States (USGCRP 2018).

Probability of Future Occurrences

For the 2022 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of winter storm events, of all types, for Galveston County. Table 4-66 summarizes data regarding the probability of occurrences of severe winter storm events in the County based on the historic record. The information used to calculate the probability of occurrences is based on NOAA-NCEI storm events and FEMA database results.

Table 4-66. Probability of Future Occurrence of Severe Winter Weather Events in Galveston County

Hazard Type	Number of Occurrences Between 1950 and 2021	% chance of occurrence in any given year
Blizzard	0	0%
Heavy Snow	1	1.39%
Ice Storm	3	4.17%
Sleet	0	0%
Winter Storm	0	0%
Winter Weather	0	0%
Total	4	5.56%

Source: NOAA-NCEI 2021, FEMA 2021

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act and selected severe winter weather events since 1968. Due to limitations in data, not all severe winter weather events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Based on the number of winter weather events, the County averages less than one winter weather event each year. A winter weather event has a 5.56% chance of occurring in any given year. Based on the history of events and input from the Steering Committee, the probability for severe winter storm events occurring in Galveston



County is considered *rare* (between 1 and 10% annual chance of occurring). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entirety of Galveston County is exposed and vulnerable to the severe winter storm hazard; therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in Section 3 (County Profile), are potentially vulnerable to a winter weather event. The following text evaluates and estimates the potential impact of the severe winter storm hazard in the County.

Impact on Life, Health and Safety

For the purposes of this HMP, the entire population of the County (350,682) is exposed to winter storm events (U.S. Census 2015-2019 ACS 5-Year Population Estimate). The homeless and elderly are considered most susceptible to this hazard; the homeless due to their lack of shelter and the elderly due to their increased risk of injuries and death from falls and overexertion or hypothermia from attempts to clear snow and ice.

According to the 2019 ACS 5-Year Population Estimate, 13.1 percent of the population in Galveston County is 65 and over. Winter storm events can reduce the ability of these populations to access emergency services.

Winter weather can immobilize a region and paralyze a city. Additional impacts include stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse buildings and knock down trees and power lines. The cost of snow removal, repairing damages, and loss of business can have large economic impacts on cities and towns (NSSL 2006)

Impact on General Building Stock

The entire general building stock inventory in Galveston County is exposed and potentially vulnerable to the severe winter storm hazard; however, properties in poor condition or in particularly vulnerable locations may be at risk to the most damage. In general, structural impacts include damage to roofs and building frames rather than building content. Current modeling tools are not available to estimate specific losses for this hazard. As an alternate approach, the percent damage to structures that could result from severe winter storm conditions is considered. This allows planners and emergency managers to select a range of potential economic impact based on an estimate of the percent of damage to the general building stock. Table 4-67 summarizes the estimated loss to structures. Given professional knowledge and the currently available information, the potential loss for this hazard is considered to be overestimated because of varying factors (building structure type, age, load distribution, building codes in place). Therefore, the table's data should be used as estimates only for planning purposes with the knowledge that the associated losses for severe winter storm events vary greatly.

Table 4-67. General Building Stock Exposure and Estimated Losses from Severe Winter Storm Events

Jurisdiction	Total Replacement Cost Value (RCV)	1-Percent Exposure/Loss	5-Percent Exposure/Loss	10-Percent Exposure/Loss
Bayou Vista (C)	\$445,354,087.33	\$4,453,541	\$22,267,704	\$44,535,409
Clear Lake Shores (C)	\$904,562,368.66	\$9,045,624	\$45,228,118	\$90,456,237
Dickinson (C)	\$6,601,710,645.63	\$66,017,106	\$330,085,532	\$660,171,065
Friendswood (C)	\$10,815,456,384.12	\$108,154,564	\$540,772,819	\$1,081,545,638
Hitchcock (C)	\$4,592,036,651.86	\$45,920,367	\$229,601,833	\$459,203,665
Jamaica Beach (C)	\$458,205,838.82	\$4,582,058	\$22,910,292	\$45,820,584



Jurisdiction	Total Replacement Cost Value (RCV)	1-Percent Exposure/Loss	5-Percent Exposure/Loss	10-Percent Exposure/Loss
Kemah (C)	\$2,631,702,105.60	\$26,317,021	\$131,585,105	\$263,170,211
La Marque (C)	\$7,927,292,522.28	\$79,272,925	\$396,364,626	\$792,729,252
League City (C)	\$31,237,974,594.10	\$312,379,746	\$1,561,898,730	\$3,123,797,459
Santa Fe (C)	\$4,831,628,162.13	\$48,316,282	\$241,581,408	\$483,162,816
Tiki Island (V)	\$365,209,145.44	\$3,652,091	\$18,260,457	\$36,520,915
Galveston County (Total)	\$166,321,604,688.46	\$1,663,216,047	\$8,316,080,234	\$16,632,160,469

Source: Hazus 4.2, Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on Critical Facilities

Full functionality of critical facilities, such as police, fire, and medical facilities is essential for response during and after a severe winter storm event. These critical facility structures are largely constructed of concrete and masonry; therefore, they should only suffer minimal structural damage from severe winter storm events. Heavy accumulations of ice can bring down trees, electrical wires, telephone poles, utility lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair the extensive damage. Even small accumulations of ice can cause extreme hazards to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces (NSSL 2006). Winter weather events, such as ice storms, can lead to power outages. Therefore, it is recommended that critical facilities install backup power sources.

Infrastructure at risk for this hazard includes roadways that could be damaged due to salt application and intermittent freezing and warming conditions that can damage roads over time. Severe snowfall requires the clearing roadways and alerting citizens to dangerous conditions; following the winter season, resources for road maintenance and repair might be required.

Impact on Economy

The cost of snow and ice removal and repair of roads from the freeze/thaw process can drain local financial resources. Impacts on the economy also include commuter difficulties into or out of the area for work or school. The loss of power and closure of roads prevent commuters within the county.

Future Changes that May Impact Vulnerability

Understanding future changes that impact vulnerability in the county can assist in planning for future development and ensure that appropriate mitigation, planning, and preparedness measures are in place. The county considered the following factors to examine potential conditions that can affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

Any areas of growth could be potentially impacted by the severe winter storm hazard because the entire County is exposed and vulnerable. The ability of new development to withstand severe winter storm impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction.



Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. With an increase in population, more people will be exposed to winter weather events. Additionally, the age of the population, changes in their geography, and how climate change could alter the winter weather received (rain versus snow) will be important to continue to assess future changes in vulnerability.

Climate Change

Climate is defined not just as average temperature and precipitation, but also by type, frequency, and intensity of weather events. Both globally and at the local level, climate change can potentially alter prevalence and severity of weather extremes, such as winter storms. While predicting changes in winter storm events under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society, and the environment (U.S. EPA 2006). Based on the projections, the County can expect to experience more rain than snow during the winter months. In the immediate future, Galveston County can anticipate continuing to experience the impacts of winter weather events.

Change of Vulnerability Since 2017 HMP

Galveston County's population increased since the last plan; increasing the number of people impacted during a winter weather event. Therefore, the entire County remains vulnerable to severe winter storm events. Furthermore, the 2017 HMP did not include a quantitative analysis of impacts on building stock, considering it negligible. However, a 1-percent exposure can result in \$1.6 in damages. While winter weather is a rare occurrence, they can occur and cause impacts.

4.3.13 Thunderstorm Wind

The following section provides the hazard profile and vulnerability assessment for the wind-related events associated with thunderstorms in Galveston County.

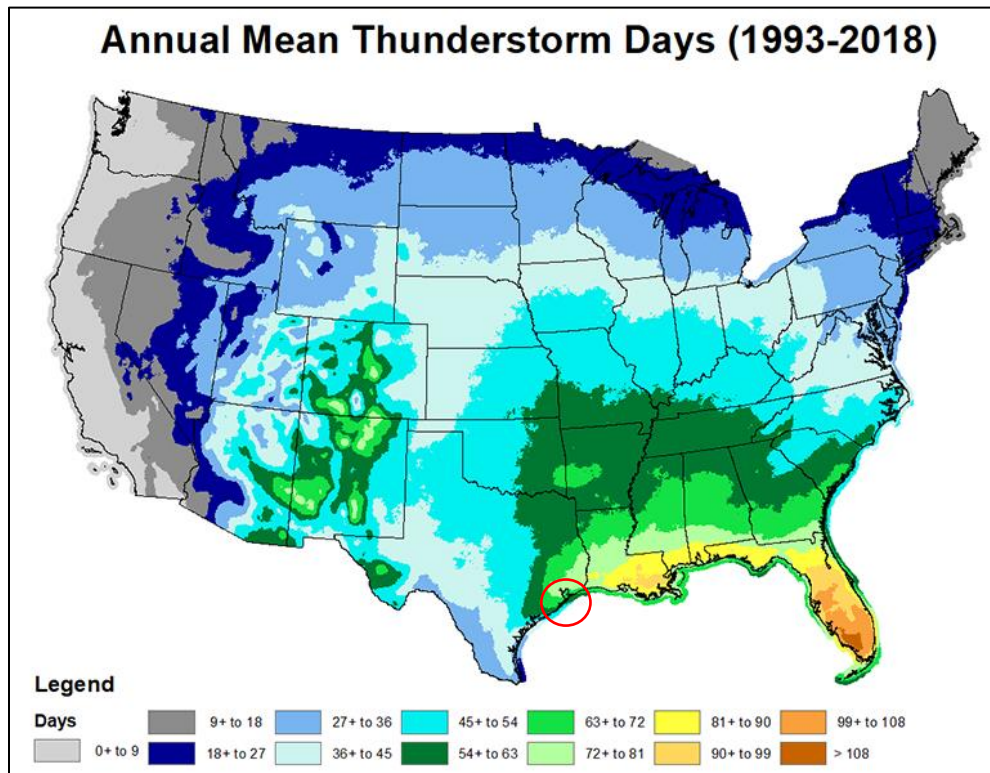
Profile

Hazard Description

A thunderstorm is a storm with lightning and thunder produced by cumulonimbus clouds, usually producing wind gusts, heavy rain, and sometimes hail or tornadoes (NWS n.d.). Thunderstorms are usually short-lived (less than two hours), but they can deliver strong winds and enough rain to cause urban or flash flooding. The NWS considers a thunderstorm severe only if it produces damaging wind gusts of 58 mph or higher or large hail one inch (quarter size) in diameter or larger or tornadoes (NWS n.d.). Thunderstorms can occur at any time. However, they usually occur during the spring and summer months and during the afternoon and evening. Severe thunderstorms are most common from Texas to southern Minnesota; however, severe storms can occur anywhere in the United States (NOAA n.d.).

It is estimated that each year there are 16 million thunderstorms worldwide. Approximately 100,000 thunderstorms occur in the United States each year (NSSL 2020). Figure 4-41 illustrates the average number of days with thunderstorms using data from 1993 to 2018. This figure shows that Galveston County experiences between 63 and 72 days of thunderstorms each year.

Figure 4-41. Annual Mean Thunderstorm Days, 1993-2018



Source: National Weather Service

Note: The approximate location of Galveston County is outlined in a red circle.

Thunderstorms can lead to flooding, landslides, strong winds, tornadoes, lightning, and hail. Roads could become impassable from flooding, downed trees or power lines, or a landslide. Strong straight-line winds (up to more than 12 mph) associated with thunderstorms can down trees and utility poles, causing utility outages. Thunderstorms can create tornadoes with winds of up to 300 mph. Lightning can damage homes and injure people. In the United States, an average of 300 people are injured and 80 people are killed by lightning each year. Thunderstorms can produce hail up to the size of softballs damaging cars and windows, and killing livestock caught out in the open (NOAA n.d.).

High winds are often associated by other severe weather events such as thunderstorms, tornadoes, hurricanes, and tropical storms. Wind begins with differences in air pressures. It is usually horizontal movement of air caused by the uneven heating of the Earth by the sun and the Earth's own rotation. Winds range from light breezes to natural hazards (National Geographic Society 2021).

Location

Since thunderstorms can develop anywhere in the United States, all of Galveston County is exposed and vulnerable to the impacts of thunderstorms.

Extent

Severe thunderstorm watches and warnings are issued by the local NWS office and the Storm Prediction Center (SPC). The NWS and SPC will update the watches and warnings and notify the public when they are no longer in effect. Watches and warnings for thunderstorms in Galveston County are as follows:



- Severe Thunderstorm Warnings are issued when there is evidence based on radar or a reliable spotter report that a thunderstorm is producing, or forecast to produce, wind gusts of 58 mph or greater, structural wind damage, or hail one inch in diameter or greater. A warning will include where the storm was located, what municipalities will be impacted, and the primary threat associated with the severe thunderstorm warning. After it has been issued, the NWS office will follow up periodically with Severe Weather Statements that contain updated information on the severe thunderstorm and advise the public when the warning is no longer in effect (NOAA NWS 2009).
- Severe Thunderstorm Watches are issued by the SPC when conditions are favorable for the development of severe thunderstorms over a larger-scale region for a duration of at least three hours. Tornadoes are not expected in such situations, but isolated tornado development can also occur. A Severe Thunderstorm Watch is issued when an organized episode of hail 1 inch diameter or larger and/or damaging thunderstorm winds are expected during a two-to-eight-hour period. During the watch, the NWS will keep the public informed on what is happening in the watch area and also advise public when the watch has expired or been cancelled (SPC 2021) (NOAA NWS 2009).

Figure 4-42 presents the severe thunderstorm risk categories, as provided by the SPC.

Figure 4-42. Severe Thunderstorm Risk Categories.

Understanding Severe Thunderstorm Risk Categories					
THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe storms expected
Lightning/flooding threats exist with <u>all</u> thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense
					
• Winds to 40 mph • Small hail	• Winds 40-60 mph • Hail up to 1" • Low tornado risk	• One or two tornadoes • Reports of strong winds/wind damage • Hail ~1", isolated 2"	• A few tornadoes • Several reports of wind damage • Damaging hail, 1 - 2"	• Strong tornadoes • Widespread wind damage • Destructive hail, 2" +	• Tornado outbreak • Derecho
* NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph, and/or hail to at least one inch in diameter, and/or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.					

Source: SPC 2020

Winds associated with thunderstorms are measured according to the Beaufort Wind Scale, as outlined in Table 4-68. This scale was one of the first to estimate wind speeds. It starts with 0 and goes to a force of 12.

Table 4-68. Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects on Land
0	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Dust, leaves, and loose paper lifted; small tree branches move



Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects on Land
5	17-21	Fresh Breeze	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Twigs breaking off trees, generally impedes progress
9	41-47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Seldom experienced on land, trees broken, or uprooted, considerable structural damage occurs
11	56-63	Violent Storm	If experienced on land, widespread damage
12	64+	Hurricane	Violence and destruction

Source: (NWS n.d.)

The NWS issues advisories and warnings for winds. Issuance is normally site-specific. High wind advisories, watches, and warnings are products issued by the NWS when wind speeds can pose a hazard or are life threatening. The criterion for each of these varies from state to state. According to the NWS, wind warnings and advisories for Galveston County are as follows:

- High Wind Warnings are issued when sustained wind speeds of 40 mph or greater lasting for one hour or longer or for wind gusts of 58 mph or greater for any duration.
- Wind Advisories are issued when sustained winds of 31 to 39 mph are forecast for one hour or longer, or wind gusts of 46 to 57 mph for any duration (NWS n.d.).

Worst-Case Scenario

A worst-case scenario would involve prolonged high winds of 85 mph, Force 12 on the Beaufort Wind Scale, during a thunderstorm event. This type of event would have both a short- and long-term effects on Galveston County. The strong winds would lead to downed trees and power lines, creating road closures and countywide power outages. Parts of the County could experience limited ingress and egress.

Previous Occurrences and Losses

Many sources have provided historical information regarding previous occurrences and losses associated with thunderstorms in Galveston County. According to the NOAA-NCEI Storm Events Database, there were 203 thunderstorm wind events recorded in Galveston County between 1950 and November 2021. Damages reported for these events totaled over \$53 million (refer to Table 4-69).

Table 4-69. Thunderstorm Wind Events in Galveston County, 1950-2021

Hazard Type	Number of Occurrences Between 1950 and 2021	Total Fatalities	Total Injuries	Total Property Damage (\$)	Total Crop Damage (\$)
Thunderstorm Wind	203	0	7	\$53,133,000	\$8,500

Source: NOAA-NCEI 2021

Note: Due to limitations in data, not all thunderstorm wind events occurring between 1950 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated

Between 1953 and 2021, the State of Texas was included in seven thunderstorm-related FEMA major disaster (DR) or emergency (EM) declarations. Of those declarations, Galveston County was included in two declarations. Table 4-70 lists FEMA DR and EM declarations for Galveston County.

Table 4-70. Thunderstorm-Related FEMA Declarations for Galveston County, 1953 to 2021

FEMA Declaration Number	Date(s) of Event	Incident Type	Incident Title
DR-1041	October 14-November 8, 1994	Flood	Severe Thunderstorms and Flooding



FEMA Declaration Number	Date(s) of Event	Incident Type	Incident Title
DR-4245	October 22-31, 2015	Severe Storm	Severe Storms, Tornadoes, Straight-line Winds, and Flooding

Source: FEMA 2021

For the 2022 HMP update, known thunderstorm wind events were summarized from 2016 to 2021 (see Table 4-71). For events prior to 2016, refer to the 2017 Galveston County HMP. For detailed information on damages and impacts to each municipality, refer to Section 9 (Jurisdictional Annexes). The events listed in Table 4-71 represent only those that were reported to the NOAA-NCEI Storm Events Database and FEMA and may not represent all events that occurred or impacted the County since 2016.



Table 4-71. Thunderstorm Wind in Galveston County, 2016 to 2021

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	County Designated?	Magnitude (wind speed in knots)	Fatalities	Injuries	Damages	Event Details*
February 14, 2017	Thunderstorm Wind	-	-	52	0	0	\$4000	Six power poles were blown down near the intersection of Highway 87 and Helen Blvd.
February 14, 2017	Thunderstorm Wind	-	-	53	0	0	\$12000	A couple of trees were downed (one on a house) along Avenue I between 21st Street and 24th Street.
February 14, 2017	Thunderstorm Wind	-	-	53	0	0	\$4000	Power poles were snapped at Crenshaw Elementary School.
October 20, 2017	Thunderstorm Wind	-	-	50	0	0	\$0	Damage was reported near the intersection of FM 646 and Highway 3.
March 29, 2018	Thunderstorm Wind	-	-	50	0	0	\$1000	There was some minor residential awning and tree limb damage.
March 29, 2018	Thunderstorm Wind	-	-	50	0	0	\$0	An oleander tree was knocked down and a wooden bench swing collapsed around the intersection of 15th Street and Avenue M.
March 29, 2018	Thunderstorm Wind	-	-	52	0	0	\$1000	A power pole was downed near an apartment complex on 21st Street.
June 9, 2018	Thunderstorm Wind	-	-	52	0	0	\$3000	Numerous trees were downed off of Gordy Road.
October 31, 2018	Thunderstorm Wind	-	-	56	0	0	\$0	Thunderstorm winds caused minor structure damage. Winds rolled over an exposed, non-anchored mobile trailer off of Dike Drive.
October 31, 2018	Thunderstorm Wind	-	-	50	0	0	\$0	Thunderstorm winds downed two palm trees on Harborside Drive and 29th Street.
October 31, 2018	Thunderstorm Wind	-	-	52	0	0	\$0	There was a report of a collapsed residence on Ave S and 47th street.
January 19, 2019	Thunderstorm Wind	-	-	50	0	0	\$15000	Trees and fences were downed and there were damaged and destroyed trampolines, gazebos, barn roofs and retail signs.
April 7, 2019	Thunderstorm Wind	-	-	53	0	0	\$0	There were trees blown down.
April 7, 2019	Thunderstorm Wind	-	-	52	0	0	\$0	There were trees downed.
April 7, 2019	Thunderstorm Wind	-	-	55	0	0	\$7000	Some travel trailers were flipped over.
May 9, 2019	Thunderstorm Wind	-	-	55	0	0	\$0	There were reports of trees and power lines downed along Highway 96 just west of Highway 3.
May 9, 2019	Thunderstorm Wind	-	-	55	0	0	\$0	Thunderstorm winds damaged the roof of the volunteer fire department.
June 29, 2019	Thunderstorm Wind	-	-	60	0	0	\$0	A large area of the Bolivar Peninsula was without power after strong thunderstorm wind gusts were observed.
May 27, 2020	Thunderstorm Wind	-	-	56	0	0	\$11000	There was some roof damage to a Texas City business.



Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	County Designated?	Magnitude (wind speed in knots)	Fatalities	Injuries	Damages	Event Details*
May 27, 2020	Thunderstorm Wind	-	-	56	0	0	\$5500	Large tree limbs and some fencing were blown down.
May 27, 2020	Thunderstorm Wind	-	-	61	0	0	\$0	The wind gust was measured at KGLS.
April 23, 2021	Thunderstorm Wind	-	-	50	0	0	\$0	Local emergency managers reported a travel trailer knocked over by strong thunderstorm wind gusts.

Source(s): FEMA 2021; NOAA-NCEI 2021

* Many sources were consulted to provide an update of previous occurrences and losses; event details and loss/impact information may vary and has been summarized in the above table

- Not available/not recorded

FEMA Federal Emergency Management Agency

NCEI National Centers for Environmental Information



Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016). Major clusters of summertime thunderstorms in North America will grow larger, more intense, and more frequent later this century in a changing climate, leading to increased rainfall and posing a greater threat of flooding across wide areas (UCAR 2017).

Probability of Future Occurrences

Table 4-72 summarizes data regarding the probability of occurrences of thunderstorm events in Galveston County based on the historic record. The information used to calculate the probability of occurrences is based on the 2017 Galveston County HMP, the NOAA-NCEI Storm Events Database, and FEMA.

Table 4-72. Probability of Future Occurrence of Thunderstorm Events

Hazard Type	Number of Occurrences Between 1950 and 2021	% chance of occurrence in any given year
Thunderstorm Wind	205	100%

Source: NOAA-NCEI 2021; FEMA 2021; Galveston County HMP 2017

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected thunderstorm wind events since 1968. Due to limitations in data, not all thunderstorm wind events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Galveston County is expected to continue experiencing the direct and indirect impacts of thunderstorms each year. Over 200 thunderstorm wind events were recorded in 71 years, giving the County a 100% chance of being impacted by a thunderstorm in any given year. However, based on historical records and input from the Steering Committee, the probability of occurrence for thunderstorm wind events in the County is considered *frequent* (100% chance occurring; occurs multiple times a year). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entirety of Galveston County is exposed and vulnerable to the thunderstorm hazard; therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in Section 3 (County Profile), are potentially vulnerable to a thunderstorm event. The following text evaluates and estimates the potential impact of the thunderstorm hazard in the County.

Impact on Life, Health and Safety

The most common problems associated with thunderstorms are immobility and loss of utilities. Although the entire population of the County is exposed to thunderstorms, some populations are more vulnerable. Vulnerable populations include the elderly, low income, linguistically isolated populations, people with life-threatening illnesses, and residents living in areas that are isolated from major roads. Power outages can be life threatening to those dependent on electricity for life support. In general, populations who lack adequate shelter during a thunderstorm, those who are reliant on sustained sources of power in order to survive, and those who live in isolated areas with limited ingress and egress options are the most vulnerable.

The impact of thunderstorms on life, health, and safety is dependent upon several factors including the severity of the event and whether adequate warning time was provided to residents. The entire population of Galveston County (350,682) is assumed to be exposed to this hazard (2015-2019 ACS 5-Year Population Estimate).



People located outdoors (i.e., recreational activities and farming) are considered most vulnerable to hailstorms, thunderstorms, and tornadoes because there is little to no warning, and shelter might not be available. Moving to a lower risk location will decrease a person's vulnerability.

As a result of severe weather events, residents can be displaced or require temporary to long-term sheltering. The HAZUS-MH results for the 100-year and 500-year MRP hurricane wind events are able to show displaced households and people requiring short-term sheltering. 5,769 households will be displaced, and 3,725 people will require short-term sheltering in the 100-year event. 25,021 households will be displaced, and 16,068 people will require short-term sheltering in the 500-year event.

Table 4-73. Displaced Households and Short-Term Sheltering

Jurisdiction	100-Year Mean Return Period Hurricane		500-Year Mean Return Period Hurricane	
	Displaced Households	Persons Seeking Short-Term Sheltering	Displaced Households	Persons Seeking Short-Term Sheltering
Bayou Vista (C)	36	15	125	52
Clear Lake Shores (C)	52	21	231	94
Dickinson (C)	284	207	1,458	1,054
Friendswood (C)	270	145	1,410	756
Hitchcock (C)	88	62	409	286
Jamaica Beach (C)	9	4	30	13
Kemah (C)	72	44	236	139
La Marque (C)	239	164	1,137	790
League City (C)	1,152	638	6,500	3,697
Santa Fe (C)	218	130	1,042	618
Tiki Island (V)	23	10	80	33
Galveston County (Total)	5,769	3,725	25,021	16,068

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Economically disadvantaged populations are more vulnerable because they often evaluate evacuation needs and make decisions based on the economic impact to their family. The population over the age of 65 (46,103) is also vulnerable, can physically have difficulty evacuating, and are more likely to seek or need medical attention, which may not be available due to isolation during a storm event (U.S. Census 2019 ACS 5-Year Population Estimate). Section 3 (County Profile) provides for the statistics for these populations for Galveston County.

Impact on General Building Stock

Damage to buildings is dependent upon several factors, including wind speed, storm duration, and path of the storm track. Building construction also plays a major role in the extent of damage resulting from a storm. Due to differences in construction, residential structures are generally more susceptible to wind damage than commercial and industrial structures. Wood and masonry buildings, in general, regardless of their occupancy class, tend to experience more damage than concrete or steel buildings.

To better understand these risks, Hazus was used to estimate the expected wind-related building damages. Specific types of wind damages are also summarized in Hazus at the following wind damage categories: no damage/very minor damage, minor damage, moderate damage, severe damage, and total destruction. Table 4-74 summarizes the definition of the damage categories.



Table 4-74. Description of Damage Categories

Qualitative Damage Description	Roof Cover Failure	Window Door Failures	Roof Deck	Missile Impacts on Walls	Roof Structure Failure	Wall Structure Failure
No Damage or Very Minor Damage Little or no visible damage from the outside. No broken windows, or failed roof deck. Minimal loss of roof over, with no or very Limited water penetration.	≤2%	No	No	No	No	No
Minor Damage Maximum of one broken window, door, or garage door. Moderate roof cover loss that can be covered to prevent additional water entering the building. Marks or dents on walls requiring painting or patching for repair.	>2% and ≤15%	One window, door, or garage door failure	No	<5 impacts	No	No
Moderate Damage Major roof cover damage, moderate window breakage. Minor roof sheathing failure. Some resulting damage to interior of building from water.	>15% and ≤50%	> one and ≤ the larger of 20% & 3	1 to 3 panels	Typically 5 to 10 impacts	No	No
Severe Damage Major window damage or roof sheathing loss. Major roof cover loss. Extensive damage to interior from water.	>50%	> the larger of 20% & 3 and ≤50%	>3 and ≤25%	Typically 10 to 20 impacts	No	No
Destruction Complete roof failure and/or, failure of wall frame. Loss of more than 50% of roof sheathing.	Typically >50%	>50%	>25%	Typically >20 impacts	Yes	Yes

Table 4-75. Estimated Losses for the 100-Year MRP Hurricane Wind Events

Jurisdiction	Building Replacement Cost Value	Estimated Building Losses Caused by the 100-Year Mean Return Period Hurricane	Percent of Total	Estimated Building Losses Caused by the 100-Year Mean Return Period Hurricane for Residential Structures Only	Estimated Building Losses Caused by the 100-Year Mean Return Period Hurricane for Commercial Structures Only
Bayou Vista (C)	\$287,902,599.47	\$36,983,852	12.8%	\$30,661,401	\$4,810,433
Clear Lake Shores (C)	\$519,006,216.88	\$53,521,768	10.3%	\$44,602,868	\$8,161,448
Dickinson (C)	\$3,924,480,999.53	\$288,661,121	7.4%	\$200,469,958	\$56,870,394
Friendswood (C)	\$6,532,042,745.35	\$406,504,909	6.2%	\$336,560,004	\$53,763,471
Hitchcock (C)	\$2,606,611,538.31	\$158,617,043	6.1%	\$91,124,991	\$49,025,770
Jamaica Beach (C)	\$292,462,937.69	\$31,500,492	10.8%	\$26,697,522	\$4,078,968
Kemah (C)	\$1,410,211,778.23	\$96,243,976	6.8%	\$54,140,360	\$37,997,929
La Marque (C)	\$4,518,194,733.81	\$312,776,831	6.9%	\$194,440,522	\$70,454,482
League City (C)	\$18,876,791,173.65	\$1,389,159,281	7.4%	\$1,127,306,904	\$201,230,703
Santa Fe (C)	\$2,826,459,977.04	\$252,241,130	8.9%	\$171,659,441	\$38,509,804
Tiki Island (V)	\$240,413,556.57	\$23,596,649	9.8%	\$19,570,959	\$3,059,031
Galveston County (Total)	\$96,229,561,611.86	\$8,513,160,224	8.8%	\$5,339,350,583	\$2,253,000,595

Source: Hazus-MH 4.2

Notes: MRP = Mean return period

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.



Impact on Critical Facilities

Overall, all critical facilities in Galveston County are vulnerable to being affected by thunderstorms. Utility infrastructure could suffer damage from high winds associated with falling tree limbs or other debris, resulting in the loss of power or other utility service. Loss of service can impact residents, critical facilities, and business operations alike. Interruptions in heating or cooling utilities can affect populations, such the young and elderly, who are particularly vulnerable to temperature-related health impacts. Loss of power can impact other public utilities, including potable water, wastewater treatment, and communications. In addition to public water services, property owners with private wells might not have access to potable water until power is restored. Lack of power to emergency facilities, including police, fire, EMS, and hospitals, will inhibit a community's ability to effectively respond to an event and maintain the safety of its citizens.

Hazus estimates that critical facilities in Galveston County have a low percent probability of sustaining minor to moderate damages from the 100-year MRP hurricane wind event. Hazus also estimates that there are critical facilities that have a 65.8-percent probability of sustaining severe damage from the 500-year MRP hurricane wind event. These probabilities can be found in Table 4-76 and Table 4-77 by facility type.

Table 4-76. Estimated Impacts to Critical Facilities for the 100-Year MRP Hurricane Wind Event

Facility Type	Loss of Days	100-Year Mean Return Period Hurricane			
		Percent-Probability of Sustaining Damage			
		Minor	Moderate	Severe	Complete
EOC	0	18.1% - 23.3%	24.1% - 30.6%	10.2% - 29.8%	0.0%
Medical Facilities	1 - 6	10.3% - 15.1%	29.7% - 41.8%	3.4% - 17.3%	<0.1% - 1.3%
Police Stations	0	16.3% - 23.4%	22.4% - 30.7%	9.0% - 35.1%	0.0% - <0.1%
Fire Stations/EMS	0	11.0% - 14.9%	16.5% - 30.1%	4.3% - 23.3%	0.1% - 2.1%
Schools	7 - 70	3.7% - 10.2%	38.3% - 47.7%	5.3% - 33.3%	<0.1% - 0.1%

Source: Hazus-MH v4.2

Table 4-77. Estimated Impacts to Critical Facilities for the 500-Year MRP Hurricane Wind Event

Facility Type	Loss of Days	500-Year Mean Return Period Hurricane			
		Percent-Probability of Sustaining Damage			
		Minor	Moderate	Severe	Complete
EOC	0 - 4	12.0% - 15.3%	29.2% - 31.1%	38.0% - 47.0%	<0.1%
Medical Facilities	6 - 31	4.2% - 10.5%	35.5% - 42.0%	16.8% - 40.6%	1.0% - 5.7%
Police Stations	0 - 1	7.9% - 19.6%	24.2% - 31.2%	26.6% - 60.6%	0.0% - 0.1%
Fire Stations/EMS	0 - 1	2.5% - 12.2%	20.8% - 32.6%	17.1% - 50.3%	1.1% - 19.4%
Schools	35 - 310	2.1% - 5.8%	10.7% - 46.1%	22.5% - 65.8%	0.3% - 16.5%

Source: Hazus-MH v4.2

Impact on Economy

Thunderstorm events can impact the economy of the County. Impacts include loss of business function, damage to inventory, relocation costs, wage loss, and rental loss due to the repair or replacement of buildings. Business interruption losses include losses associated with the inability to operate a business because of the wind damage sustained during a storm or the temporary living expenses for those displaced from their home because of an event.



Impacts to transportation lifelines affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) transportation needs. Utility infrastructure (power lines, gas lines, electrical systems) could suffer damage and impacts can result in the loss of power, which can impact business operations and can impact heating or cooling provision to the population.

Hazus estimates the total economic loss associated with each storm scenario (direct building losses and business interruption losses). Direct building losses are the estimated costs to repair or replace the damage caused to the building. This is reported in the “Impact on General Building Stock” section discussed earlier. Business interruption losses are the losses associated with the inability to operate a business because of the wind damage sustained during the storm or the temporary living expenses for those displaced from their home because of the event.

Debris management can be costly and may also impact the local economy. Hazus estimates the amount of building and tree debris that may be produced as result of the 100- and 500-year MRP wind events. Because the estimated debris production does not include flooding, this is likely a conservative estimate and may be higher if multiple impacts occur. According to the Hazus Hurricane User Manual, estimates of weight and volume of eligible tree debris consist of downed trees that would likely be collected and disposed at public expense. Refer to the User Manual for additional details regarding these estimates. Table 4-78 and Table 4-79 summarizes debris production estimates for the 100- and 500-year MRP wind events.

Table 4-78. Estimated Debris Created During the 100-Year Mean Return Period Hurricane Wind Event

Jurisdiction	Estimated Debris Created During the 100-Year Mean Return Period Hurricane Wind Event**			
	Brick and Wood (Tons)	Concrete and Steel (Tons)	Tree (Tons)	Eligible Tree Volume (Cubic Yards)
Bayou Vista (C)	13,342	57	0	0
Clear Lake Shores (C)	3,843	17	0	0
Dickinson (C)	234,729	732	0	0
Friendswood (C)	11,300	50	0	0
Hitchcock (C)	3,733	18	0	0
Jamaica Beach (C)	18,206	75	0	0
Kemah (C)	16,447	73	0	0
La Marque (C)	17,982	83	0	0
League City (C)	3,426	14	0	0
Santa Fe (C)	4,377	18	0	0
Tiki Island (V)	8,748	40	0	0
Galveston County (Total)	21,256	85	0	0

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Table 4-79. Estimated Debris Created During the 500-Year Mean Return Period Hurricane Wind Event

Jurisdiction	Estimated Debris Created During the 500-Year Mean Return Period Hurricane Wind Event**			
	Brick and Wood (Tons)	Concrete and Steel (Tons)	Tree (Tons)	Eligible Tree Volume (Cubic Yards)
Bayou Vista (C)	19,524	115	0	0
Clear Lake Shores (C)	7,120	52	0	0
Dickinson (C)	1,078,099	7,295	0	0
Friendswood (C)	17,059	106	0	0
Hitchcock (C)	12,292	125	0	0



Jurisdiction	Estimated Debris Created During the 500-Year Mean Return Period Hurricane Wind Event**			
	Brick and Wood (Tons)	Concrete and Steel (Tons)	Tree (Tons)	Eligible Tree Volume (Cubic Yards)
Jamaica Beach (C)	31,113	191	0	0
Kemah (C)	29,188	196	0	0
La Marque (C)	57,036	526	0	0
League City (C)	6,632	43	0	0
Santa Fe (C)	7,104	44	0	0
Tiki Island (V)	29,359	272	0	0
Galveston County (Total)	42,147	265	0	0

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on the Environment

The impact of thunderstorm wind events on the environment varies, but researchers are finding that the long-term impacts of more severe events can be destructive to the natural and local environment. National organizations such as USGS and NOAA have been studying and monitoring the impacts of extreme weather phenomena as it impacts long term climate change, streamflow, river levels, reservoir elevations, rainfall, floods, landslides, erosion, etc. (USGS 2017). For example, severe weather that creates longer periods of rainfall can erode natural banks along waterways and degrade soil stability for terrestrial species. Tornadoes can tear apart habitats causing fragmentation across ecosystems. Researchers also believe that a greater number of diseases will spread across ecosystems because of impacts that severe weather and climate change will have on water supplies (NOAA 2013c). Overall, as the physical environment becomes more altered, species will begin to contract or migrate in response, which may cause additional stressors to the entire ecosystem within Galveston County.

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. Areas targeted for potential future growth and development could be potentially impacted by thunderstorms since the entire County is exposed to the thunderstorm hazard. However, due to increased standards and codes, new development can be less vulnerable to the thunderstorm hazard compared with the aging building stock in the County.

Projected Changes in Population

The County experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. The increase in population will expose more people to the thunderstorm hazard.



Climate Change

Major clusters of summertime thunderstorms in North America will grow larger, more intense, and more frequent later this century in a changing climate, unleashing far more rain and posing a greater threat of flooding across wide areas (UCAR 2017). An increase in storms will produce more wind events and may increase tornado activity. Additionally, an increase in temperature will provide more energy to produce storms that generate tornadoes (Climate Central 2016). Overall, Galveston County will continue to remain vulnerable to the thunderstorm hazard.

Changes in Vulnerability Since the 2017 HMP

Overall, the County's vulnerability has not changed, and the entire County will continue to be exposed and vulnerable to thunderstorm wind events. As existing development and infrastructure continue to age, they can be at increased risk to failed utility and transportation systems if they are not properly maintained and do not adapt to the changing environment.

4.3.14 Tornadoes

The following section provides the hazard profile and vulnerability assessment for the tornado hazard in Galveston County.

Profile

Hazard Description

A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be greater than 1 mile wide and 50 miles long. Tornadoes typically develop from either a severe thunderstorm or hurricane as cool air rapidly overrides a layer of warm air. Tornadoes typically move at speeds between 30 and 125 mph and can generate combined wind speeds (forward motion and speed of the whirling winds) exceeding 300 mph. Most tornadoes are on the ground for less than 15 minutes (NWS n.d.). Tornadoes can occur at any time of the year, with peak season for Texas from May into early June (NOAA n.d.). An average of 1,141 tornadoes occur in the United States each year, based on tornadoes recorded between 1985 and 2014. The State of Texas averages 140 tornadoes each year.



Average Annual Number of Tornadoes per State (1985-2014)

State	Abbreviation	Average Annual Number of Tornadoes
Alabama	AL	42
Alaska	AK	0
Arizona	AZ	4
Arkansas	AR	32
California	CA	10
Colorado	CO	46
Connecticut	CT	>120
Delaware	DE	1
Florida	FL	59
Hawaii	HI	0
Idaho	ID	5
Illinois	IL	47
Indiana	IN	24
Iowa	IA	47
Kansas	KS	80
Kentucky	KY	21
Louisiana	LA	37
Maine	ME	2
Massachusetts	MA	1
Michigan	MI	16
Minnesota	MN	36
Mississippi	MS	43
Missouri	MO	39
Montana	MT	9
Nebraska	NE	54
Nevada	NV	2
New Hampshire	NH	1
New Jersey	NJ	3
New Mexico	NM	10
New York	NY	10
North Carolina	NC	28
North Dakota	ND	30
Ohio	OH	19
Oklahoma	OK	56
Oregon	OR	2
Oklahoma	OK	56
Pennsylvania	PA	15
Rhode Island	RI	0
South Carolina	SC	21
South Dakota	SD	31
Tennessee	TN	25
Texas	TX	140
Utah	UT	3
Vermont	VT	1
Virginia	VA	16
Washington	WA	2
West Virginia	WV	2
Wisconsin	WI	22
Wyoming	WY	11

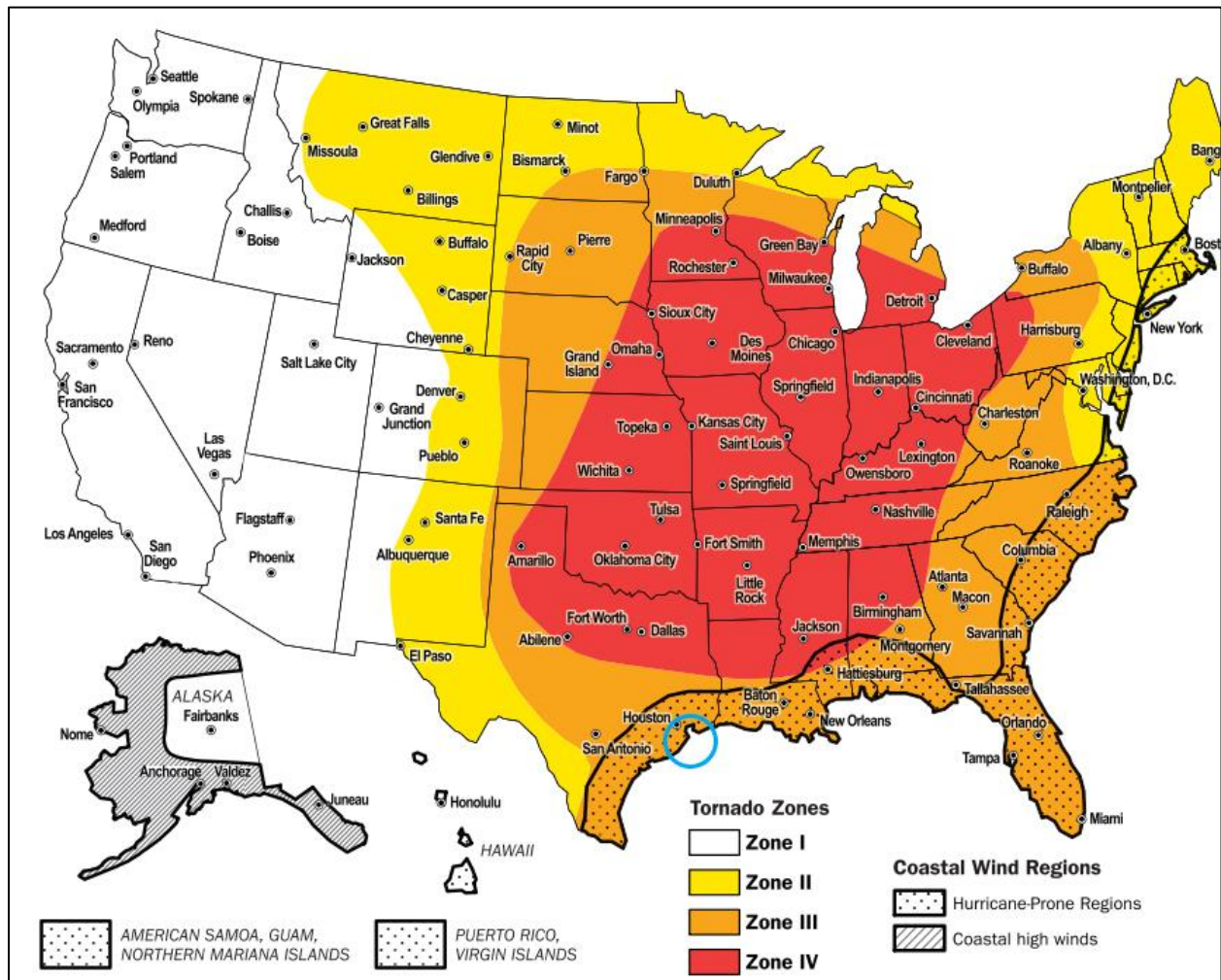
U.S. Annual Average (1985-2014): 1141

NOAA
National Weather Service
Storm Prediction Center

Location

Figure 4-44 illustrates wind zones across the United States, which indicate the impacts of the strength and frequency of wind activity per region. The information on the figure is based on 70 years of tornado data and 160 years of hurricane data collected by FEMA (FEMA 2021).

Figure 4-44. Wind Zones in the United States



Source: FEMA 2021

Note: The blue circle indicates the approximate location of Galveston County.

Extent

Damage from tornadoes can vary from minor damage that break tree limbs to massive damage demolishing homes in its path. The type of damage depends on the intensity, size, and duration of the tornado. The magnitude or severity of a tornado is categorized using the Enhanced Fujita Tornado Intensity Scale (EF Scale). This is the scale now used exclusively for determining tornado ratings by comparing wind speed and actual damage. Figure 4-45 illustrates the relationship between EF ratings, wind speed, and expected tornado damage. Galveston County can experience tornadoes ranking from EF0 to EF4.

Figure 4-45. Explanation of EF-Scale Ratings

EF Rating	Wind Speeds	Expected Damage	
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.	
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.	
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.	
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.	
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.	
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.	

Source: (NWS n.d.)

The NWS issues tornado watches and warnings. A tornado watch is issued by the SPC in Norman, Oklahoma. They are issued when conditions are favorable for the development of tornadoes in and close to the watch area. Their size can vary depending on the weather situation. Watches are typically issued for a duration of four to eight hours. A tornado warning is issued by the local NWS office and will include where the tornado was located and what municipalities will be in its path. It is issued when a tornado is indicated by a radar or spotters. Warnings are issued for a duration of 30 minutes (NWS 2020). The current average lead time for tornado warnings is 13 minutes. Occasionally, tornadoes develop so rapidly, that little, if any, advance warning is possible (NOAA 2011).

Worst-Case Scenario

A worst-case scenario would be an EF3 tornado crossing through Galveston County with 3-second wind gusts ranging from 136 to 165 mph, causing severe damage. A tornado of this magnitude would tear off roofs and tear down walls, uproot trees, and lift vehicles off the ground. This could lead to downed utility poles, street signals, and debris on roadways, disrupting normal operations and impacting emergency response times. Critical and essential facilities could also be impacts, resulting in periods of service disruption to residents due to facility damages or lack of back-up power.



Previous Occurrences and Losses

Many sources have provided historical information regarding previous occurrences and losses associated with tornadoes events in Galveston County. According to NOAA-NCEI Storm Events Database, Galveston County has been impacted by 94 tornado events that caused one fatality, 9 injuries, and more than \$3.4 million in property damage.

Table 4-80. Tornado Events in Galveston County, 1996-2020

Hazard Type	Number of Occurrences Between 1996 and 2020	Total Fatalities	Total Injuries	Total Property Damage (\$)	Total Crop Damage (\$)
Funnel Cloud	52	0	0	\$0	\$0
Tornado	42	0	9	\$3,413,500	\$0
TOTAL	94	0	9	\$3,413,500 million	\$0

Source: NOAA-NCEI 2021

Between 1953 and 2021, the State of Texas was included in 15 tornado-related FEMA major disaster (DR) or emergency (EM) declarations. Of those declarations, Galveston County was not included in any of the declarations. For the 2022 update, tornado events were summarized from 2016 to 2021 (see Table 4-81). For events prior to 2016, refer to the 2017 Galveston County HMP. For detailed information on damages and impacts to each municipality, refer to Section 9 (Jurisdictional Annexes).



Table 4-81 Tornado Events in Galveston County, 2016 to 2021

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	County Designated?	Fatalities	Injuries	Damages	Event Details*
April 24, 2016	Tornado (EF0)	N/A	N/A	0	0	\$100,000	An EF-0 tornado produced intermittent damage that began southwest of a Cabela's parking lot then continued east across Interstate 45 and then on toward the NE across a Candlewood Suites hotel and an assisted living center. The tornado continued north-northeast through the Victory Lakes subdivision then to near Lynn Nursery along Pecan Orchard Road where they were some minor tree damage. Vehicles were damaged by swirling winds and debris around the Cabela's and the Candlewood Suites sustained roof damage. In area neighborhoods, damage was mostly minor with numerous fences down and loose objects like basketball goals and trampolines knocked over. One storage shed in Victory Lakes was picked up and thrown approximately 300 yards.
July 17, 2016	Tornado (EF0)	N/A	N/A	0	0	0	A waterspout moved onshore and became a weak tornado just east of the Galveston Fishing Pier at 61st Street. The tornado moved across Seawall Boulevard and dissipated. There was no damage.
July 20, 2016	Funnel Cloud	N/A	N/A	-	-	-	A League City area funnel cloud lasted around fifteen minutes.
February 17, 2017	Funnel Cloud	N/A	N/A	-	-	-	A funnel cloud that was sighted over the city became a waterspout when it moved into Galveston Bay.
May 22, 2017	Tornado (EF0)	N/A	N/A	0	0	\$20,000	An EF0 tornado damaged a Holiday Inn along Termini-San Luis Pass Road. Damage included blown out windows and lattice damage. Witnesses indicated this was a waterspout that moved onshore.
August 18, 2017	Funnel Cloud	N/A	N/A	-	-	-	A funnel cloud was observed near Harborside Drive on Galveston Island.
August 18, 2017	Funnel Cloud	N/A	N/A	-	-	-	A second funnel cloud was observed near Harborside Drive on Galveston Island.
August 25, 2017	Tornado (EF0)	N/A	N/A	0	0	\$500	Funnel cloud sighting with fence damage near Ferry Road.
August 27, 2017	Tornado (EF0)	N/A	N/A	0	0	\$200,000	Trees down, minor roof damage in Bacliff. Fences down.
October 20, 2017	Tornado (EF0)	N/A	N/A	0	0	\$50,000	An EF0 tornado downed trees and branches along either side of Benson's Bayou. Damage included home and vehicle windows along with residential fences.
May 4, 2019	Tornado (EF0)	N/A	N/A	0	0	\$10,000	Brief touchdown. Peeled off tin roof, damaged manufactured home and storage shed.
May 27, 2020	Funnel Cloud	N/A	N/A	-	-	-	A funnel cloud was sighted.



Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	County Designated?	Fatalities	Injuries	Damages	Event Details*
May 29, 2020	Funnel Cloud	N/A	N/A	-	-	-	A funnel cloud was observed over the Bolivar Peninsula.

Source(s): FEMA 2021; NOAA-NCEI 2021; Galveston County HMP 2017

* Many sources were consulted to provide an update of previous occurrences and losses; event details and loss/impact information may vary and has been summarized in the above table

- Not reported/not available

FEMA Federal Emergency Management Agency

HMP Hazard Mitigation Plan

NCEI National Centers for Environmental Information



Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016). An increase in storms will produce more wind events and may increase tornado activity. However, the link between tornadoes and climate change is unclear (Center for Climate and Energy Solutions n.d.).

Probability of Future Occurrences

Table 4-82 summarizes data regarding the probability of occurrences of tornado events in Galveston County based on the historic record. The information used to calculate the probability of occurrences is based on the 2017 Galveston County HMP, the NOAA-NCEI storm events database, and FEMA.

Table 4-82. Probability of Future Occurrence of Tornado Events

Hazard Type	Number of Occurrences Between 1996 and 2021	% chance of occurrence in any given year
Funnel Cloud	52	100%
Tornado (all magnitudes)	42	100%
TOTAL	94	100%

Source: NOAA-NCEI 2021; Galveston County HMP 2017, FEMA

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected tornado events since 1968. Due to limitations in data, not all tornado events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Galveston County is expected to continue experiencing the direct and indirect impacts of tornadoes each year. The County experienced ninety-four tornado and funnel cloud incidents in 24 years, giving the County a 100% chance of being impacted by a tornado of any magnitude in any given year. Based on historical records and input from the Steering Committee, the probability of occurrence for tornadoes in Galveston County is considered *frequent* (100% chance occurring; occurs multiple times a year). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entirety of Galveston County is exposed and vulnerable to the tornado hazard; therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in Section 3 (County Profile), are potentially vulnerable to a thunderstorm event. The following text evaluates and estimates the potential impact of the tornado hazard in the County.

Impact on Life, Health and Safety

Impacts of a tornado on life, health, and safety depend on several factors, including severity of the event and whether adequate warning time was provided to residents. All residents in Galveston County are exposed to the tornado hazard.

Residents impacted by tornadoes may be displaced or require temporary to long-term sheltering. In addition, downed trees, damaged buildings, and debris carried by winds associated with tornadoes can lead to injury or loss of life. Similar to other natural hazards, socially vulnerable populations are most susceptible, based on a number of factors including their physical and financial ability to react or respond during a hazard and locations and construction quality of their housing. Economically disadvantaged populations are more vulnerable because



they are likely to evaluate their risk and make decisions based on the major economic impact on their family and may not have funds to evacuate. The population over the age of 65 is also more vulnerable and, physically, they may have more difficulty evacuating. The elderly are considered most vulnerable because they require extra time or outside assistance during evacuations and are more likely to seek or need medical attention that may not be available due to isolation during a storm event. Section 3 (County Profile) presents the statistical information regarding these populations in the County.

Impact on General Building Stock

The entire County's building stock is exposed to the tornado hazard. Damage to buildings depends on several factors, including wind speed, storm duration, path of the storm track or tornado, and distance from the tornado funnel.

Manufactured housing (i.e. mobiles homes) is particularly vulnerable to high winds and tornadoes. The U.S. Census Bureau defines manufactured homes as "movable dwellings, 8 feet or wider and 40 feet or more long, design to be towed on its own chassis, with transportation gear integral to the unit when it leaves the factory, and without need of a permanent foundation (Census, 2010)." They can include multi-wides and expandable manufactured homes but exclude travel trailers, motor homes, and modular housing. Due to their light-weight and often unanchored design, manufactured housing is extremely vulnerable to high winds and will generally sustain the most damage.

Impact on Critical Facilities

Utility infrastructure could suffer damage from tornadoes associated with falling tree limbs or other debris, resulting in the loss of power or other utility service. Loss of service can impact residents, critical facilities, and business operations alike. Interruptions in heating or cooling utilities can affect populations, such the young and elderly, who are particularly vulnerable to temperature-related health impacts. Loss of power can impact other public utilities, including potable water, wastewater treatment, and communications. In addition to public water services, property owners with private wells might not have access to potable water until power is restored. Lack of power to emergency facilities, including police, fire, EMS, and hospitals, will inhibit a community's ability to effectively respond to an event and maintain the safety of its citizens.

Impact on Economy

Tornados also impact the economy, including loss of business function (e.g., tourism, recreation), damage to inventory, relocation costs, and wage loss and rental loss due to repair/replacement of buildings. Impacts on transportation lifelines affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) transportation needs. Utility infrastructure (power lines, gas lines, electrical systems) could sustain damage, and impacts could result in loss of power, which can affect business operations and provision of heating or cooling to the population.

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.



Projected Development

Any areas of growth could be potentially impacted by the tornado hazard because the entire County is exposed and vulnerable. Residential development, specifically manufactured homes, may be considered more vulnerable to the tornado hazard.

Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. The increase in population will expose more people to the tornado hazard.

Climate Change

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. In the eastern two-thirds of the State, average annual rainfall is increasing; however, the soil is becoming drier. Rainstorms are more intense, and floods are becoming more severe. In the coming decades, storms are likely to become more severe in Texas (EPA 2016). An increase in storms will produce more wind events and may increase tornado activity. Additionally, an increase in temperature will provide more energy to produce storms that generate tornadoes (Climate Central 2018). With an increased likelihood of strong winds and tornado events, all of the County's assets will experience additional risk for losses as a result of extreme wind events.

Changes in Vulnerability Since the 2017 HMP

The County's population increased since the last plan, increasing the number of people vulnerable during a tornado. Therefore, the entire County remains vulnerable to tornado events.

4.3.15 Tsunami

The following section provides the hazard profile and vulnerability assessment for the tsunami hazard for Galveston County.

Profile

Hazard Description

A tsunami is a series of high-energy waves that radiate outward like pond ripples from an area where a generating event occurs, arriving at shorelines over an extended period. Tsunamis can be induced by earthquakes, landslides, and submarine volcanic explosions. Tsunamis are typically classified as local or distant, depending on the location of their source in comparison to where waves occur:

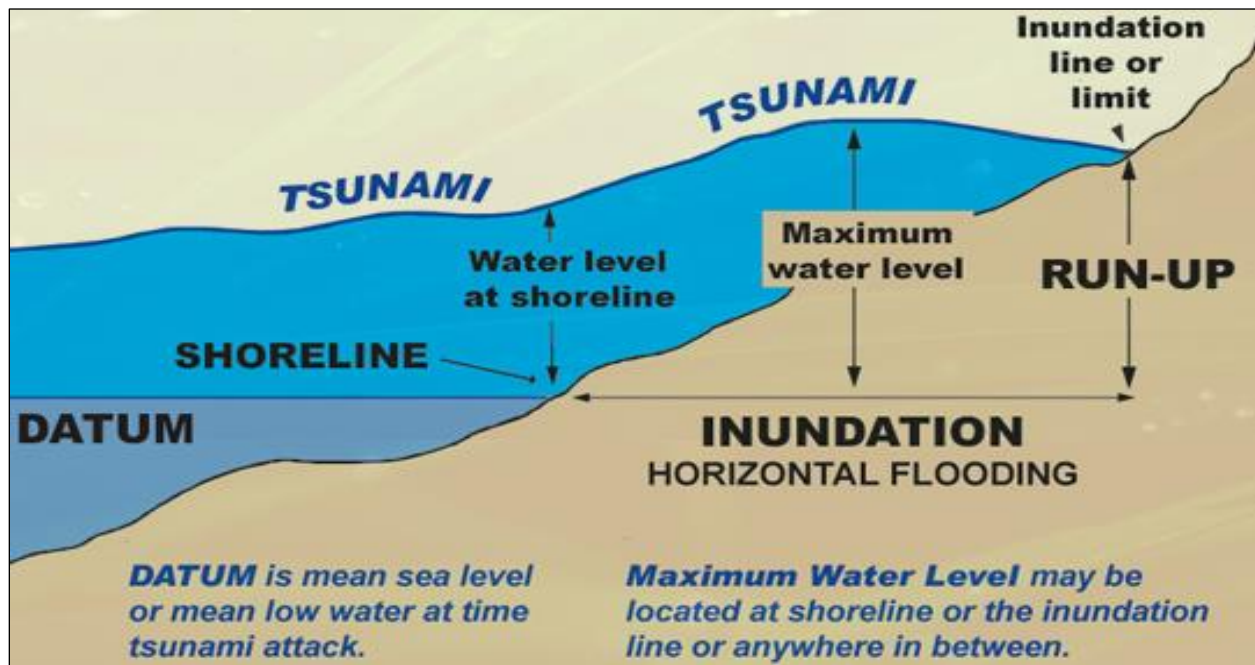
- The waves nearest to the generating source represent a local tsunami. Such events have minimal warning time, leaving few options except to run to high ground after a strong, prolonged local earthquake. Damage from the tsunami adds to damage from the triggering earthquake due to ground shaking, surface faulting, liquefaction, and landslides.
- The waves far from the generating source represent a distant tsunami. Distant tsunamis may travel for hours before striking a coastline, giving a community a chance to implement evacuation plans if a warning is received.

In the open ocean, a tsunami may be only a few inches or feet high, but it can travel with speeds approaching 600 miles per hour. As a tsunami enters the shoaling waters near a coastline, its speed diminishes, its wavelength decreases, and its height increases greatly. At the shoreline, tsunamis may take the form of a fast-rising tide, a cresting wave, or a bore (a large, turbulent wall-like wave). The bore phenomenon resembles a step-like change

in the water level that advances rapidly (from 10 to 60 miles per hour). The first wave is usually followed by several larger and more destructive waves.

The configuration of the coastline, the shape of the ocean floor, and the characteristics of advancing waves play important roles in the destructiveness of the waves. Bays, sounds, inlets, rivers, streams, offshore canyons, islands, and flood control channels may alter the level of damage. Offshore canyons can focus tsunami wave energy, and islands can filter the energy. A tsunami wave entering a flood control channel could reach a mile or more inland, especially if it enters at high tide. The orientation of the coastline determines whether the waves strike head-on or are refracted from other parts of the coastline. A wave may be small at one point and much larger at others. The inundation area for a tsunami event is often described as runup as illustrated in Figure 4-46.

Figure 4-46 Runup Distance and Height in Relation to the Datum and Shoreline



Source: (UNESCO 2007)

Location

Galveston County is not at a high risk from tsunami due to the local rarity of the geologic events that most often generate these dangerous waves. However, according to the *Regional Assessment of Tsunami Potential in the Gulf of Mexico* (USGS 2009), there is sufficient evidence to consider submarine landslides in the Gulf of Mexico as a present-day tsunami hazard, as there are clear observations of large landslides along the continental margin of the Gulf. In this study hydrodynamic modeling of potential maximum tsunamis from landslide sources were conducted for the East Breaks (EB) slide (south Texas) and for hypothetical slides along the Florida/Campeche margin. Wave propagation yielded potential maximum tsunami run-up of approximately 4 meters or 13 feet, relative to mean sea level (Galveston County 2017). All of coastal Galveston County is exposed and vulnerable to the potential impacts of tsunamis.

Extent

A tsunami's size and speed, as well as the coastal area's form and depth, affect the impact of the tsunami. At some locations, the advancing turbulent wave front will be the most destructive part of the tsunami wave. In other situations, the greatest damage will be caused by the outflow of water back to the sea between crests,



sweeping away items on the surface and undermining roads, buildings, bulkheads, and other structures. This outflow action can carry enormous amounts of highly damaging debris, resulting in further destruction. Ships and boats, unless moved away from shore, may be forced against breakwaters, wharves, and other craft, or be washed ashore and left grounded after the withdrawal of the seawater (National Tsunami Warning Center 2021).

Worst-Case Scenario

While the probability of a tsunami is very low, a worst-case scenario would be a locally generated tsunami with little warning time to evacuate. If such an event were to occur, low-lying coastal properties would be inundated and the potential for injury or death would be significant, similar to a hurricane storm surge event.

Previous Occurrences and Losses

According to available records from the State of Texas 2018 HMP Update and FEMA, there have been no reported tsunami incidents recorded for Galveston County, however a verified tsunami event exists in the NGDC database. Resulting from an aftershock of an earthquake near Puerto Rico on October 11, 1918, a small wave was recorded at the Galveston, Texas tide gage on October 24, 1918. The magnitude of the tsunami runup was not reported (NRC n.d.).

Climate Change Projections

The impacts of global climate change on tsunami probability are unknown. Some scientists say that melting glaciers could induce tectonic activity, inducing earthquakes. Other scientists have indicated that underwater avalanches (also caused by melting glaciers), may also result in tsunamis. Even if climate change does not increase the frequency with which tsunamis occur, it may result in more destructive waves. As sea levels continue to rise, tsunami inundation areas would likely reach further into communities than current mapping indicates.

Probability of Future Occurrences

An analysis of historical data indicates a very low risk for future occurrences of a tsunami for Galveston County. The probability of the future occurrence of a tsunami is unlikely, with the last definite occurrence in 1918, more than 100 years ago. Based on the one historical occurrence, the probability of a future event is considered *low* (not likely to occur in 100 years). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. Tsunami-related vulnerability data was generated using a GIS analysis for the tsunami hazard. A probabilistic assessment was conducted for a 322-foot buffer from evacuation routes to analyze the tsunami hazard and provide a range of loss estimates.

Impact on Life, Health and Safety

The impact of a tsunami on life, health and safety is dependent upon several factors including the severity of the event and whether or not adequate warning time was provided to residents. The populations in Galveston County that would be most exposed to this type of hazard are those along beaches and low lying coastal areas. The Cities of Hitchcock, Kemah, La Marque, and Santa Fe are considered at risk, as with the highest percentage of their populations exposed to the tsunami hazard area (Table 4-83). Tsunamis can cause great loss of life and property damage where they come ashore, and most deaths are the result of drowning. Associated risks include water pollution, damaged gas lines, and flooding.

**Table 4-83. Population Located within the Tsunami Hazard Area**

Jurisdiction	Total Population (American Community Survey 2015-2019)	Estimated Population Located Within the Tsunami Hazard Area	
		Number of People Within 322 Feet of Tsunami Evacuation Route	Percent of Total
Bayou Vista (C)	1,763	11	0.6%
Clear Lake Shores (C)	1,258	0	0.0%
Dickinson (C)	20,847	16	0.1%
Friendswood (C)	41,213	0	0.0%
Hitchcock (C)	7,301	583	8.0%
Jamaica Beach (C)	1,078	0	0.0%
Kemah (C)	1,807	23	1.3%
La Marque (C)	18,030	241	1.3%
League City (C)	114,392	3	0.0%
Santa Fe (C)	12,735	247	1.9%
Tiki Island (V)	1,106	0	0.0%
Galveston County (Total)	350,682	1,255	0.4%

Source: Galveston County GIS 2021, American Community Survey 2019 (5-year estimates 2015-2019)

Note (1): The Tsunami hazard area is (evacuation areas plus high tide – 300 ft plus 22 ft). The tidal buffer area was 322 ft from the mapped shoreline

Note (2): The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on General Building Stock

Similar to the population exposed, for the purposes of this planning effort, all general building stock, critical facilities, and infrastructure are considered vulnerable to the tsunami hazard. However, the areas with the highest vulnerability are those areas that are low-lying along the coastline located in the County, including the Cities of Hitchcock, Kemah, La Marque, and Santa Fe. The impact of the waves and the scouring associated with debris that may be carried in the water could be very damaging to structures located in the tsunami's path. Structures that would be most vulnerable are those located in the front line of tsunami impact and those that are structurally unsound.

Roads are the primary resource for evacuation to higher ground before and during the course of a tsunami event. Flooding caused by a tsunami will greatly impact this important component in the management of tsunami related emergencies. Bridges exposed to tsunami events can be extremely vulnerable due to the forces transmitted by the wave run up and by the impact of debris carried by the wave action. The forces of tsunami waves can also impact above ground utilities by knocking down power lines and radio/cellular communication towers. Power generation facilities can be severely impacted by both the velocity impact of the wave action and the inundation of floodwaters (Humboldt County Hazard Mitigation Plan 2008).

Tsunamis may induce secondary hazards such as water quality and supply concerns, and public health concerns. Impacts on the economy are difficult to quantify. As discussed above, losses include but are not limited to general building stock damages, business interruption/closure, impacts to tourism and tax base to Galveston County.

Table 4-84 provides a summary of the building stock exposed to the tsunami hazard area in the County. The City of Hitchcock's building stock is most vulnerable to the tsunami hazard, as it has almost 19% of its building stock located in the tsunami hazard area. However, most municipalities in the County could experience secondary impacts from a tsunami.

**Table 4-84. Building Stock Located within the Tsunami Hazard Area**

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located in the Tsunami Hazard Area			
			Number of Buildings Located Within 322 Feet of Tsunami Evacuation Route	Percent of Total	Total RCV of Buildings Within 322 Feet of Tsunami Evacuation Route	Percent of Total
Bayou Vista (C)	1,365	\$445,354,087.33	30	2.2%	\$27,811,590	6.2%
Clear Lake Shores (C)	1,155	\$904,562,368.66	1	0.1%	\$203,406	0.0%
Dickinson (C)	10,351	\$6,601,710,645.63	25	0.2%	\$50,113,058	0.8%
Friendswood (C)	14,891	\$10,815,456,384.12	0	0.0%	\$0	0.0%
Hitchcock (C)	5,452	\$4,592,036,651.86	528	9.7%	\$867,463,601	18.9%
Jamaica Beach (C)	1,291	\$458,205,838.82	0	0.0%	\$0	0.0%
Kemah (C)	1,634	\$2,631,702,105.60	70	4.3%	\$241,918,493	9.2%
La Marque (C)	10,749	\$7,927,292,522.28	192	1.8%	\$209,195,400	2.6%
League City (C)	46,742	\$31,237,974,594.10	33	0.1%	\$197,929,274	0.6%
Santa Fe (C)	7,942	\$4,831,628,162.13	335	4.2%	\$499,193,162	10.3%
Tiki Island (V)	868	\$365,209,145.44	0	0.0%	\$0	0.0%
Galveston County (Total)	209,947	\$166,321,604,688.46	1,722	0.8%	\$3,204,780,207	1.9%

Source: Galveston County GIS 2021, Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note (1): The Tsunami hazard area is (evacuation areas plus high tide – 300 ft plus 22 ft). The tidal buffer area was 322 ft from the mapped shoreline

Note (2): The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on Critical Facilities

Utility infrastructure could suffer damage to high waves associated with tsunamis, resulting in the loss of power or other utility service. Loss of service can impact residents, critical facilities, and business operations alike. Interruptions in heating or cooling utilities can affect populations, such the young and elderly, who are particularly vulnerable to temperature-related health impacts. Loss of power can impact other public utilities, including potable water, wastewater treatment, and communications. In addition to public water services, property owners with private wells might not have access to potable water until power is restored. Lack of power to emergency facilities, including police, fire, EMS, and hospitals, will inhibit a community's ability to effectively respond to an event and maintain the safety of its citizens. Furthermore, tsunamis can restrict transportation routes, preventing residents from evacuating or emergency equipment from helping those in need. According to Table 4-85, there are 234 lifelines in the County located within the 322-foot tsunami evacuation route.

Table 4-85. Critical Facilities Located within the Tsunami Hazard Area

FEMA Lifeline Category	Number of Lifelines	Number of Lifelines Located Within 322 Feet of Tsunami Evacuation Route
Communications	111	13
Energy	598	4
Food, Water, Shelter	162	6
Hazardous Materials	68	1
Health and Medical	91	4
Safety and Security	405	13
Transportation	882	193
Galveston County (Total)	2,317	234



Source: Galveston County GIS 2021 (322 buffer from evacuation routes)

Note: The Tsunami hazard area is (evacuation areas plus high tide – 300 ft plus 22 ft). The tidal buffer area was 322 ft from the mapped shoreline

Impact on the Economy

Tsunamis impact the economy; with impacts including loss of business function, damage to inventory, relocation costs, wage loss, and rental loss due to the repair or replacement of buildings. While a tsunami is expected to negatively impact infrastructure, it is not a significant amount, only 1.9% of the replacement cost value of the building stock. It is expected that the loss of life from a tsunami event would be much more damaging.

Table 4-86. Estimated Critical Facilities and Lifelines within 322 Feet of Tsunami Evacuation Route

Jurisdiction	Total CFs Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located Within 322 Feet of Tsunami Evacuation Route			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Bayou Vista (C)	5	5	5	100.0%	5	100.0%
Clear Lake Shores (C)	24	24	0	0.0%	0	0.0%
Dickinson (C)	91	83	9	9.9%	9	10.8%
Friendswood (C)	96	82	0	0.0%	0	0.0%
Hitchcock (C)	214	212	38	17.8%	36	17.0%
Jamaica Beach (C)	11	11	0	0.0%	0	0.0%
Kemah (C)	15	14	6	40.0%	6	42.9%
La Marque (C)	121	107	29	24.0%	29	27.1%
League City (C)	321	283	29	9.0%	29	10.2%
Santa Fe (C)	135	128	42	31.1%	41	32.0%
Tiki Island (V)	7	7	0	0.0%	0	0.0%
Galveston County (Total)	2,437	2,317	237	9.7%	234	10.1%

Source: Galveston County GIS 2021, Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note (1): The Tsunami hazard area is (evacuation areas plus high tide – 300 ft plus 22 ft). The tidal buffer area was 322 ft from the mapped shoreline

Note (2): The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on the Environment

All waterways and beaches would be exposed to the effects of a tsunami; inundation of water and introduction of foreign debris could be hazardous to the environment. All wildlife inhabiting the area also is exposed.

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.



Projected Development

Any areas of growth could be potentially impacted by the tsunami hazard because the entire County is exposed and vulnerable; however, due to increased standards and codes, new development can be less vulnerable to the hazard compared with the aging building stock in the County.

Projected Changes in Population

The County has experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. The increase in population will expose more people to the tsunami hazard.

Climate Change

The impacts of global climate change on tsunami probability are unknown. Some scientists say that melting glaciers could induce tectonic activity, inducing earthquakes. Other scientists have indicated that underwater avalanches (also caused by melting glaciers), may also result in tsunamis. Even if climate change does not increase the frequency with which tsunamis occur, it may result in more destructive waves. As sea levels continue to rise, tsunami inundation areas would likely reach further into communities than current mapping indicates.

Change of Vulnerability Since the 2017 HMP

Galveston County continues to be vulnerable to tsunamis. Tsunami models on building stock were not run for the 2017 HMP; therefore, estimated losses were not populated. Furthermore, the population of the County has increased, therefore exposing more people the hazard.

4.3.16 Utility Failure

The following section provides the hazard profile and vulnerability assessment for the utility failure hazard for Galveston County.

Profile

Hazard Description

Power failure is defined as any interruption or loss of electrical service caused by disruption of power transmission caused by accident, sabotage, natural hazards, or equipment failure (also referred to as a loss of power or power outage). A significant power failure is defined as any incident of a long duration, which would require the involvement of the local and/or state emergency management organizations to coordinate provision of food, water, heating, cooling, and shelter.

Widespread power outages can occur without warning or as a result of a natural disaster. Generally warning times will be short in the case of technological failure, such as a fire at a sub-station, traffic accident, human error, or terrorist attack. In cases where a power failure is caused by natural hazards, greater warning time is possible. For example, high wind events such as tornados and hurricanes often cause widespread power failure and are often forecasted before they affect a community. Additionally, severe winter weather conditions such as ice storms, blizzards, and snowstorms often cause power failure. Incidents such as these often have plenty of warning time, thus power response crews can stage resources to prepare for power failure.

Power failures can lead to secondary hazards as well, leading to negative impacts on the health and safety of residents.



- During periods of extreme heat or extreme cold, vulnerable populations such as the elderly and medically frail can be affected and are susceptible to hypothermia or heat stroke. Additionally, power failure can lead to food spoilage, which has negative impacts on public health.
- Residents who rely on electric medical devices such as home oxygen machines, medication nebulizers, home dialysis, infusion pumps, and electric wheelchairs may face life-threatening situations if power failure extends beyond the battery backup timeframe of their device (Huff 2021).
- Another secondary hazard that can result from power failure is a loss of communications capability by first responders, which may in turn have negative impacts on public safety. Power outages can also lead to instances of civil disturbance, including looting.
- Power interruptions at chemical handling plants are of particular concern because of the potential for a chemical spill during restart (EPA 2001). Chemical spills in turn can have significant health and environmental impacts.
- Wastewater and potable water utility interruption may occur as a result of a power failure. These critical utilities are essential to community continuity and recovery. Their interruption of service may have cascading economic and environmental impacts. Lack of power can prevent fuel pumps from operating and lead to fuel shortages.
- Power failure may also lead to an increase in traffic accidents. Traffic accidents may increase because of the lack of traffic control devices such as stoplights and railroad crossing advisory signals. Power outages lasting a long duration will force law enforcement officials to man traffic control points to prevent accidents.

Location

Power failures in Galveston County are usually localized and are usually the result of a natural hazard event involving high winds. Power failure is particularly problematic for homes that are cooled or heated with electricity. Widespread power outages during the summer and winter months can directly impact vulnerable populations such as the elderly and medically frail. According to the 2019 American Community Survey 5-Year Estimates, 51.6 percent of homes across Galveston County are heated with electricity.

Wastewater treatment for most municipalities is provided by municipal or private treatment facilities. Many areas of Galveston County rely on on-site sewage facilities (septic systems) since they do not have access to municipal sewer systems.

Galveston County is served by a variety of communications systems. In addition to land line, cellular, and broadband communications systems, Galveston County has an extensive radio communications network that is utilized by emergency services agencies, hospitals, law enforcement, public works, transportation, and other supporting organizations.

The most common sources of potable water within Galveston County are municipal and private sources. According to the *Texas Commission on Environmental Quality Water Well Report Viewer*, Galveston County has 175 plotted and non-plotted water well reports. Municipal water supplies are provided by municipal utility districts.

Extent

The extent and severity of a power outage depends on the cause, location, duration, and time of year. It can range from a small, localized event to a countywide power outage. Impacts from an outage can be significant to the county and its residents.

Power failures often result from damage to or electrical hazards within an electric power system. System components include power generation plants, substations, circuits, switches, transformers, power lines, and



power poles. Due to the varied nature of power outage causes ranging from vehicle accidents to severe weather, utility interruptions can happen at any time.

Power failures lead to the inability to use electric-powered equipment, such as: lighting; heating, ventilation, and air conditioning (HVAC) and necessary equipment; communication equipment (telephones, computers, etc.); fire and security systems; small appliances such as refrigerators, sterilizers, etc.; and medical equipment. This all can lead to food spoilage, loss of heating and cooling, basement flooding due to sump pump failure, and loss of water due to well pump failure.

Worst-Case Scenario

A wide-spread utility failure could impact the entire population of Galveston County. The vulnerable populations (over 65 and under 5, below poverty threshold) and those who rely on power for home medical devices would be more susceptible to utility failures. Another event like the snow/cold event of February 2021 would present a worst-case scenario with power outages lasting multiple days combined with temperatures dropping to near-freezing levels.

Previous Occurrences

Many sources provided power outage information regarding previous occurrences and losses associated with events that caused outages throughout Galveston County. With so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Between 1954 and 2021, FEMA included the State of Texas in one disaster declaration (DR) that included widespread power outages.

For this plan update, power outage events were summarized from 2013 to 2021. Table 4-87 includes power outage events that occurred between 2013 and 2020. With documentation for Texas and Galveston County being so extensive, not all sources have been identified or researched. Therefore, Table 4-87 may not include all events that have occurred throughout the County.

Table 4-87 Power Failure Events in Galveston County, 2013 to 2021

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	County Designated?	Event Details*
May 27, 2014	Thunderstorm Wind	N/A	N/A	Severe thunderstorm winds blew down a utility pole and power lines in Galveston. Power poles were snapped at Crenshaw Elementary School.
February 14, 2017	Thunderstorm Wind	N/A	N/A	Six power poles were blown down near the intersection of Highway 87 and Helen Blvd.
March 29, 2018	Thunderstorm Wind	N/A	N/A	A power pole was downed near an apartment complex on 21st Street.
May 9, 2019	Thunderstorm Wind	N/A	N/A	Trees and power lines downed along Highway 96 just west of Highway 3.
June 29, 2019	Thunderstorm Wind	N/A	N/A	A large area of the Bolivar Peninsula was without power after strong thunderstorm wind gusts were observed.
February 15-16, 2021	Cold/Wind Chill	DR-4586	Yes	Very cold air and gusty winds overspread SE Texas behind an Arctic front with wind chill indices from near zero to single digits for much the period from Sunday night to Tuesday morning. Increased power demand, wind and ice led to widespread power outages. Bursting pipes caused many to be without water as well.
September 13, 2021	Tropical Storm	N/A	N/A	Hurricane Nicholas produced several hours of strong tropical storm force sustained winds and gusts. There were numerous power outages and minor to moderate damage to some structures and roofs. The storm also produced minor storm surge flooding.



Sources: National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) 2021; FEMA 2021 FEMA Federal Emergency Management Agency
K Thousand (\$)
N/A Not applicable

Climate Change Projections

The climate of Texas is changing. Most of the State has warmed between one half and one degree Fahrenheit in the past century. Storms are more intense, and floods are becoming more severe. In the coming decades, storms, including those causing utility failures, are likely to become more severe in Texas (EPA 2016).

Probability of Future Occurrences

While the probability of future power failure incidents in Galveston County is difficult to predict, historical records indicate that significant power failures have occurred as a result of high winds and winter weather. Data were not readily available on the frequency of smaller power outages across the county; however, it is reasonable to assume that power failure events of shorter duration will continue to occur in the future. In addition, future changes in climate may also impact the frequency and probability of future power failure occurrences.

Table 4-88 summarizes data regarding the probability of occurrences of utility failure events in Galveston County based on the historic record. The information used to calculate the probability of occurrences is based on the NOAA-NCEI Storm Events Database and FEMA.

Table 4-88. Probability of Future Occurrence of Utility Failure Events

Hazard Type	Number of Occurrences Between 1996 and 2021	% chance of occurrence in any given year
Utility Failure	34	100%

Source: NOAA-NCEI 2021; FEMA 2021

Note: Disaster occurrences include federally declared disasters since the 1950 Federal Disaster Relief Act, and selected utility failure events since 1968. Due to limitations in data, not all utility failure events occurring between 1954 and 1996 are accounted for in the tally of occurrences. As a result, the number of hazard occurrences is underestimated.

Galveston County is expected to continue experiencing the direct and indirect impacts of utility failures. Thirty-four recorded utility failure events in twenty-five years were recorded in Galveston County, giving the County a 100% chance of being impacted by a utility failure in any given year. Based on historical records and input from the Steering Committee, the probability of occurrence for utility failure events in the County is considered *frequent* (100% chance occurring; occurs multiple times a year). Refer to Section 4.4 for additional information on the hazard ranking methodology and probability criteria.

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entirety of Galveston County is exposed and vulnerable to the utility failure hazard; therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in Section 3 (County Profile), are potentially vulnerable to a utility failure event. The following text evaluates and estimates the potential impact of the utility failure hazard in the County.

Impact on Life, Health and Safety

The entire population of Galveston County is exposed to impacts from utility failures. However, vulnerable populations, including the elderly, low income, and people with life-threatening illnesses are more susceptible to negative impacts from utility failures. Power outages can be life threatening to those dependent on electricity for life support. The population over the age of 65 (46,103) are most likely to rely on electricity for life support.



Power outages can be especially harmful to life, health, and safety, during winter and summer months, when people rely on electricity to mitigate the harmful effects of extreme temperatures such as frostbite, hypothermia, heat exhaustion, and heat stroke. Power outages can also contribute to traffic accidents when streetlights and traffic signals are inoperable.

Power outages can also impact residents' access to water, as domestic wells require power to operate. Domestic wells are relatively common in Galveston County, with about 20-30 wells per square kilometer (USGS 2019). This can further exacerbate the impacts on health of extreme temperature events, where drinking water is essential in preventing heat exhaustion and heat stroke.

Impact on General Building Stock

All of the building stock in the County is exposed to the utility failure hazard. Refer to Section 3 (County Profile) which summarizes the building inventory in Galveston County. Impacts sustained from utility interruption are likely to be secondary impacts. Should potable water distribution be reduced or not available, then structures could be at increased risk for structural fire since current fire suppression is dependent accessing water supply from hydrants. Utility failure does not impact directly impact buildings, but it does impact business function. Utility failure can indirectly impact the building stock when coupled with extreme temperature events, leading to problems such as frozen and burst pipes.

Impact on Critical Facilities

All critical facilities in the County are exposed to the utility failure hazard. It is essential that critical facilities remain operational during natural hazard events, as many people rely on them to mitigate the effects of hazard events. Loss of power can have serious impacts on the health and welfare of residents, continuity of business, and the ability of public safety agencies to respond to emergencies. Interruption of utility gas or water distribution could also reduce the effectiveness of critical facilities to operate at full capacity. Backup power is recommended for critical facilities and infrastructure.

Impact on the Economy

During a utility interruption event, the County may experience losses because of an interruption of critical services. Further, increased costs such as providing shelters, and costs related to cooling and heating centers may be incurred. Extended power outages will require officials to shelter victims who require heat and power for activities of daily living.

A prolonged power failure in Galveston County may impact the County's economy. With major roadways, businesses, and tourist destinations, any disruption would mean that many workers, residents, and travelers would not be able to go where needed.

Power interruptions can cause economic impacts stemming from lost income, spoiled food and other goods, costs to the owners/operators of the utility facilities, and costs to government and community service groups. FEMA's benefit-cost analysis methodology measures the loss of electrical service on a per-person-per-day-of-lost-service basis for the service area affected.

Interruption of utility gas or potable water distribution could also cause significant economic impacts such as: additional costs for bringing in water tenders to maintain fire suppression capabilities; opening additional warming centers should electric and gas utility be interrupted to residential areas; and distribution of potable water for public consumption. There could be significant costs associated with reimbursing fire departments from other counties within Texas to travel, staff, and maintain water tenders within Galveston County during the duration of a water outage event.



Potential modeling of economic impacts from utility interruption would be calculating interruption of service costs which is derived from a standard value per person per day multiplied out by the number of customers served. This would help to provide an estimate of the impact of the interrupted utility service but may not be representative of the complete economic impact of a prolonged utility interruption. The FEMA BCA Toolkit version 5.3 uses the following standard values per person per day:

- Electric - \$148.00
- Potable water - \$105.00
- Wastewater - \$49.00

Impact on the Environment

Utility failure is not known to directly impact the environment. However, secondary impacts may occur when power is lost at sewage pump stations and treatment plants. Overflows can occur which contaminate the local environment and groundwater supply. When power failures occur at mechanized flood control infrastructure, the likelihood of flood damage to the natural environment increases, including streambed scour and topsoil erosion.

Future Changes that May Impact Vulnerability

Understanding future changes that effect vulnerability in the County can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

Understanding future changes that impact vulnerability in the County can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. With more development, more buildings and people will be exposed to the utility failure hazard.

Projected Changes in Population

The County experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. The increase in population will expose more people to the utility failure hazard.

Climate Change

Due to climate change, storms such as hurricanes, and thunderstorms are becoming more intense (EPA 2016). Therefore, the frequency and intensity of utility failures will most likely increase. Furthermore, increasing temperatures and frequencies of droughts are likely to exacerbate the effects of utility failures. Lastly, as temperatures rise and energy demands thus also increase, increasing the likelihood of utility failure due to brown-outs.

Change of Vulnerability Since the 2017 HMP

Utility failure was not included as a hazard in the 2017 HMP. However, it was discussed in the vulnerability assessments of natural events that cause utility failures. For the 2022 Update, the Planning Partnership agreed to have a standalone profile focusing on utility failures in the County.



4.3.17 Wildfire

The following section provides the hazard profile and vulnerability assessment for the wildfire hazard for Galveston County.

Profile

Hazard Description

Wildland fire is defined as any fire burning wildland vegetation-fuels; it includes prescribed fire, wildland fire use, and wildfire. Prescribed fires are planned fires started by land managers to accomplish specific natural resource objectives. Fires that occur from natural causes, such as lightning, that are then used to achieve management purposes under carefully controlled conditions with minimal suppression costs are known as wildland fire use (WFU).

Wildfires are unwanted and unplanned fires that result from natural ignition, unauthorized human-caused fire, escaped WFU, or escaped prescribed fire.

A wildland-urban interface (WUI) fire is a wildfire occurring in the wildland urban interface. The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfire.

Prescribed burning, also known as controlled burning, is the deliberate use of fire under specified and controlled conditions. Prescribed burning is used by forest management professionals and individual landowners to accomplish one or more of the following tasks:

- Fuel Reduction – The reduction of accumulated grass, weeds, pine needles, and hardwood leaves. This type of vegetation can encourage wildfires in young stands and hinder regeneration of older stands.
- Hardwood Control – Prevents hardwood trees from competing with pines for nutrients and moisture; impeding visibility and access through the stands; and interfering with natural regeneration in areas better suited for growing pines.

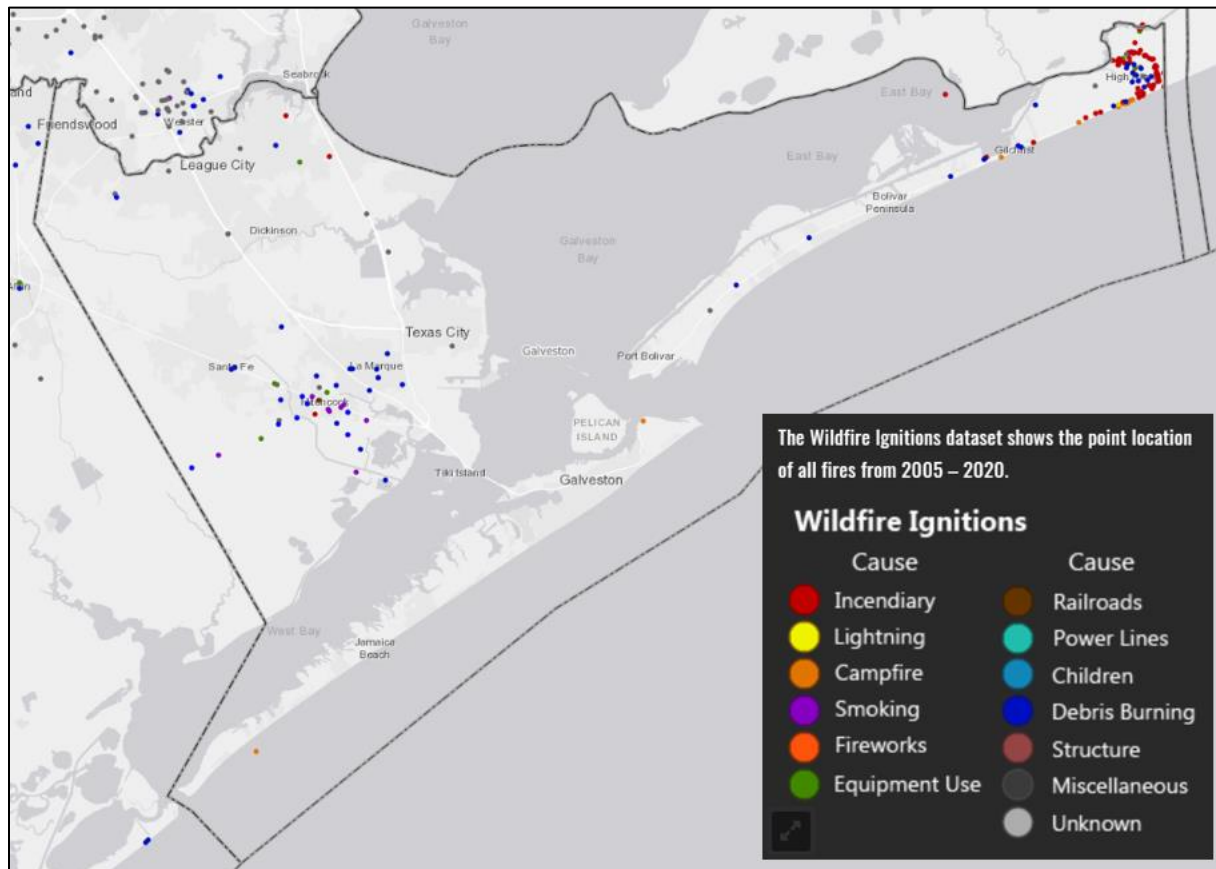
The wildland interface problem has grown due to increases in population, urban expansion, land management decisions, parks, greenbelts and the ever-present desire to intermingle with nature (Galveston County 2017).

Location

Wildfires can be a potentially damaging outgrowth of drought. While they are not confined to any specific geographic location, and can vary greatly in terms of size, location, intensity, and duration; they are most likely to occur in open grasslands. The threat to people and property is greater in the fringe areas where developed areas meet open grass lands. See Figure 4-47 for wildfire ignition locations in Galveston County. According to Texas A&M Forest Service, none of those wildfires were considered “large”, which means none of them reached 500 acres. Figure 4-48 shows the extent of the WUI in Galveston County. There are small areas of the intermix areas in the eastern and western portions of the County, with an area of interface and intermix in the La Marque-Hitchcock CCD.



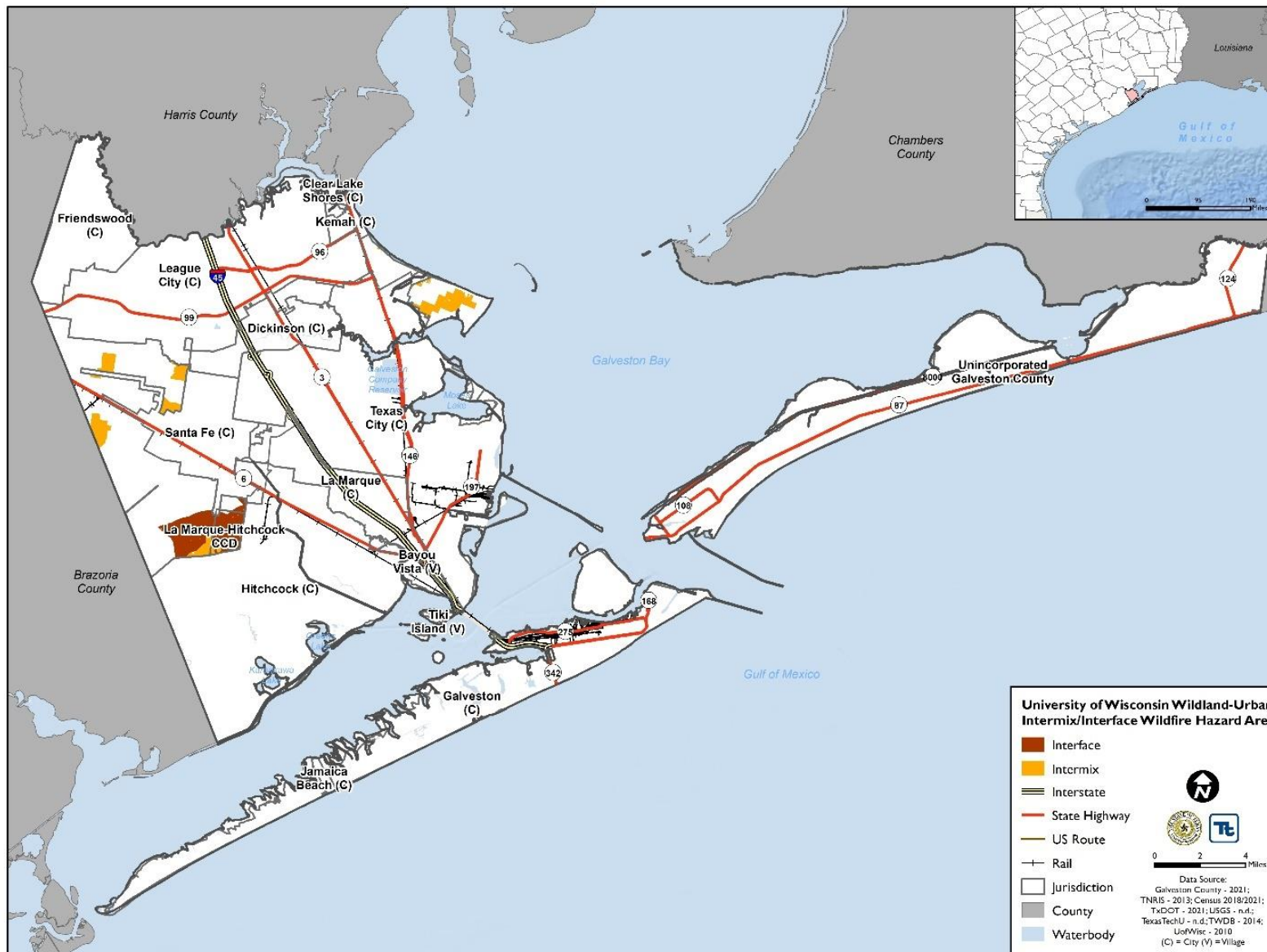
Figure 4-47 Wildfire Ignition Locations 2005-2020



Source: (Texas A&M Forest Service 2021)



Figure 4-48 WUI in Galveston County

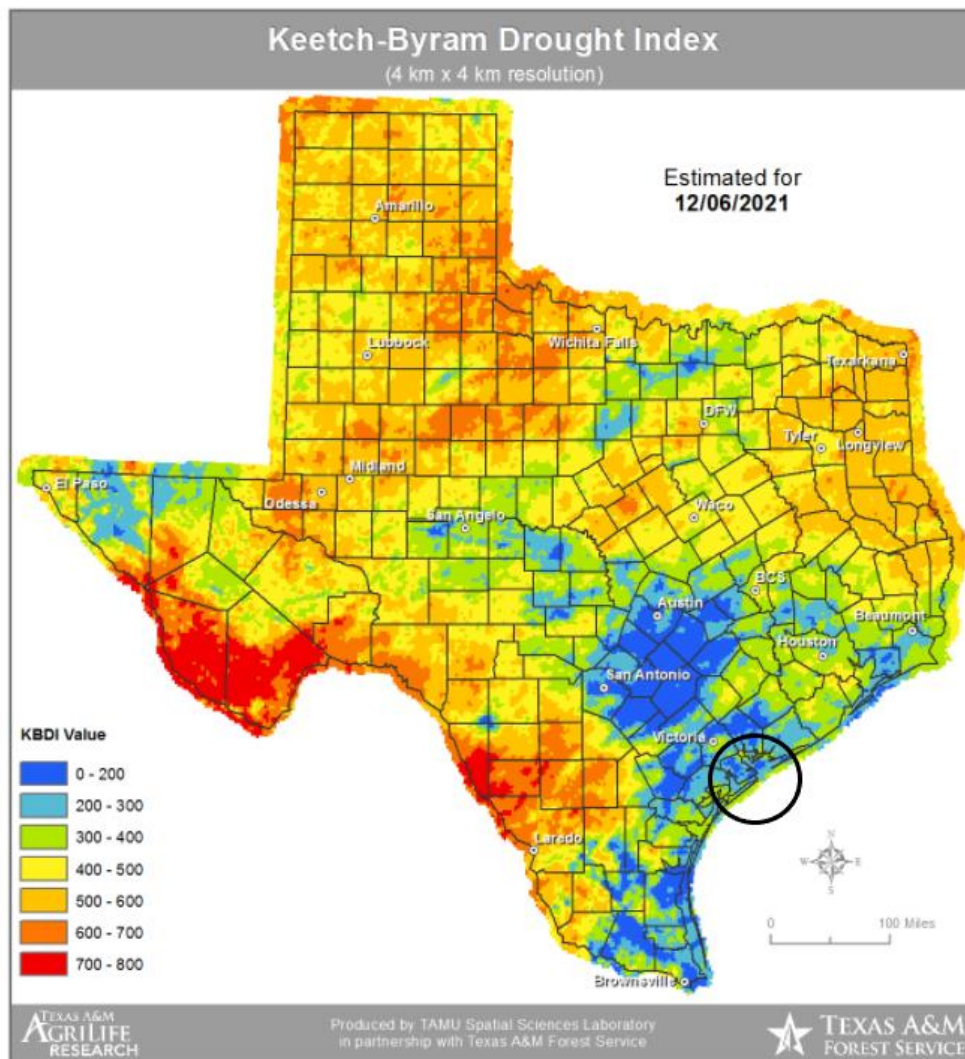


Extent

Fire risk is measured in terms of magnitude and intensity using the Keetch-Byram Drought Index (KBDI), a mathematical system for relating current and recent weather conditions to potential or expected fire behavior. The KBDI determines forest fire potential based on a daily water balance, where a drought factor is balanced with precipitation and soil moisture (assumed to have a maximum storage capacity of 8 inches) and is expressed in hundredths of an inch of soil moisture depletion.

Each color on the map represents the drought index at that location. The index ranges from zero, the point of no moisture deficiency, to 800, the maximum drought that is possible (NOAA NIDIS n.d.).

Figure 4-49 Keetch-Byram Drought Index for the State of Texas, December 6, 2021



Source: (Texas Weather Connection 2021)

Note: The black circle denotes the approximate location of Galveston County.

Fire behavior can be categorized at four distinct levels:

- 0-200 – Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.



- 200-400 – Fires more readily burn and will carry across an area with no gaps. Heavier fuels will still not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.
- 400-600 – Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
- 600-800 – Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

Using the KBDI index is a good measure of the readiness of fuels for wildland fire. Caution should be exercised in dryer, hotter conditions, and the KBDI should be referenced as the area experiences changes in precipitation and soil moisture.

Worst-Case Scenario

A worst-case scenario would involve a wildfire during a high wind event, preceded by prolonged elevated temperatures and drought, however since insufficient historical records exist, it is not possible to use previous records to project specific damages for a worst-case scenario in the future. Nevertheless, this type of event would have both a short- and long-term effects on the planning area. The fire could burn structures and infrastructure creating power and communication outages. Parts of the planning area could experience limited ingress and egress as transportation corridors are blocked by fire. Air quality would be affected and could pose serious risks for the elderly and those with compromised respiratory systems.

Previous Occurrences

Between 1988 and 2021, Texas had 250 FEMA disaster declarations for wildfire, however Galveston County was not included in any of those declarations. Likewise, between 1950 and 2021, the NCEI Storm Events Database did not include any wildfire events for Galveston County. For this HMP update, there was limited information regarding wildfire events in the planning area.

Climate Change Projections

Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot dry spells create the highest fire risk. Increased temperatures may intensify wildfire danger by warming and drying out vegetation.

Changes in climate patterns may impact the distribution and perseverance of insect outbreaks that create dead trees (increase fuel). When climate alters fuel loads and fuel moisture, forest susceptibility to wildfires changes. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

Probability of Future Occurrences

Due to the lack of data on past wildfire events in the planning area, the probability of future events is based on event history and input from the Steering Committee. The probability of occurrence for wildfire events in the planning area is considered occasional (between 10 and 100% annual chance of occurring).

Vulnerability Assessment

To understand risk, a community must evaluate assets exposed to and vulnerable to the identified hazard. The entirety of Galveston County is exposed and vulnerable to the wildfire hazard; therefore, all assets within the County (population, structures, critical facilities, and lifelines), as described in Section 3 (County Profile), are



potentially vulnerable to a wildfire event. The following text evaluates and estimates the potential impact of the wildfire hazard in the County.

Impact on Life, Health and Safety

All people exposed to the wildfire hazard are potentially vulnerable to wildfire impacts. Smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations, including children, the elderly and those with respiratory and cardiovascular diseases. In addition, wildfire may threaten the health and safety of those fighting the fires. First responders are exposed to dangers from the initial incident and after-effects from smoke inhalation and heat stroke. Persons with access and functional needs, the elderly and very young may be especially vulnerable to a wildfire if there is not adequate warning time before evacuation is needed. However, due to the humid climate of the Galveston County planning area, the number of previous occurrences and the potential property at risk, the impact of an event would be minor with few injuries. Furthermore, there is only a small percentage (1%) of Galveston County's population that is located within the wildfire hazard area (Table 4-89).

Table 4-89. Estimated Population Located Within the WUI

Jurisdiction	Total Population (American Community Survey 2015-2019)	Estimated Population Located Within the Wildland-Urban Interface/Intermix (WUI) Wildfire Hazard Areas			
		Number of People in the WUI Interface Wildfire Hazard Area	Percent of Total	Number of People in the WUI Intermix Wildfire Hazard Area	Percent of Total
Bayou Vista (C)	1,763	0	0.0%	0	0.0%
Clear Lake Shores (C)	1,258	0	0.0%	0	0.0%
Dickinson (C)	20,847	0	0.0%	0	0.0%
Friendswood (C)	41,213	0	0.0%	0	0.0%
Hitchcock (C)	7,301	0	0.0%	0	0.0%
Jamaica Beach (C)	1,078	0	0.0%	0	0.0%
Kemah (C)	1,807	0	0.0%	0	0.0%
La Marque (C)	18,030	0	0.0%	0	0.0%
League City (C)	114,392	0	0.0%	0	0.0%
Santa Fe (C)	12,735	0	0.0%	0	0.0%
Tiki Island (V)	1,106	0	0.0%	0	0.0%
Galveston County (Total)	350,682	1,254	0.4%	1,973	0.6%

Source: University of Wisconsin 2010, American Community Survey 2019 (5-year estimates 2015-2019)

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on General Building Stock

All property exposed to the wildfire hazard is vulnerable. Structures that were not constructed to standards designed to protect a building from a wildfire may be especially vulnerable. As of 2008, the International Building code requires minimum standards be met for new buildings in fire hazard severity zones. It is unknown how many buildings in the County were built to these standards. However, there is only a small percentage of buildings in the County that are located in the Wildland-Urban Interface/Intermix wildfire fuel hazard area, thus not many are vulnerable to wildfires (Table 4-90 and Table 4-91).



Table 4-90. Building Stock Located within the Wildland-Urban Interface Wildfire Hazard Area

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located Within the Wildland-Urban Interface (WUI) Wildfire Fuel Hazard Areas			
			Number of Buildings in the WUI Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings Located in the WUI Hazard Area	Percent of Total
Bayou Vista (C)	1365	\$445,354,087.33	0	0.0%	\$0	0.0%
Clear Lake Shores (C)	1155	\$904,562,368.66	0	0.0%	\$0	0.0%
Dickinson (C)	10351	\$6,601,710,645.63	0	0.0%	\$0	0.0%
Friendswood (C)	14891	\$10,815,456,384.12	0	0.0%	\$0	0.0%
Hitchcock (C)	5452	\$4,592,036,651.86	0	0.0%	\$0	0.0%
Jamaica Beach (C)	1291	\$458,205,838.82	0	0.0%	\$0	0.0%
Kemah (C)	1634	\$2,631,702,105.60	0	0.0%	\$0	0.0%
La Marque (C)	10749	\$7,927,292,522.28	0	0.0%	\$0	0.0%
League City (C)	46742	\$31,237,974,594.10	0	0.0%	\$0	0.0%
Santa Fe (C)	7942	\$4,831,628,162.13	0	0.0%	\$0	0.0%
Tiki Island (V)	868	\$365,209,145.44	0	0.0%	\$0	0.0%
Galveston County (Total)	209947	\$166,321,604,688.46	1,173	0.6%	\$599,635,507	0.4%

Source: University of Wisconsin 2010, Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Table 4-91. Building Stock Located within the Wildland-Urban Intermix Wildfire Hazard Area

Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located Within the Wildland-Urban Intermix (WUI) Wildfire Fuel Hazard Areas			
			Number of Buildings in the WUI Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings Located in the WUI Hazard Area	Percent of Total
Bayou Vista (C)	1365	\$445,354,087.33	0	0.0%	\$0	0.0%
Clear Lake Shores (C)	1155	\$904,562,368.66	0	0.0%	\$0	0.0%
Dickinson (C)	10351	\$6,601,710,645.63	0	0.0%	\$0	0.0%
Friendswood (C)	14891	\$10,815,456,384.12	0	0.0%	\$0	0.0%
Hitchcock (C)	5452	\$4,592,036,651.86	0	0.0%	\$0	0.0%
Jamaica Beach (C)	1291	\$458,205,838.82	0	0.0%	\$0	0.0%
Kemah (C)	1634	\$2,631,702,105.60	0	0.0%	\$0	0.0%
La Marque (C)	10749	\$7,927,292,522.28	0	0.0%	\$0	0.0%
League City (C)	46742	\$31,237,974,594.10	0	0.0%	\$0	0.0%
Santa Fe (C)	7942	\$4,831,628,162.13	0	0.0%	\$0	0.0%
Tiki Island (V)	868	\$365,209,145.44	0	0.0%	\$0	0.0%



Jurisdiction	Total Number of Buildings	Total Replacement Cost Value (RCV)	Estimated Building Stock Located Within the Wildland-Urban Intermix (WUI) Wildfire Fuel Hazard Areas			
			Number of Buildings in the WUI Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings Located in the WUI Hazard Area	Percent of Total
Galveston County (Total)	209947	\$166,321,604,688.46	1,812	0.9%	\$1,138,026,689	0.7%

Source: University of Wisconsin 2010, Galveston Central Appraisal District; Microsoft Bing 2018; RS Means 2021

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on Critical Facilities

Critical facilities not built to fire protection standards. Utility poles and lines, and facilities containing hazardous materials are most vulnerable to the wildfire hazard. Most roads and railroads would not sustain damage except in the worst scenarios, although roads and bridges can be blocked by debris or other wildfire-related conditions and become impassable. While Table 4-92 indicates that no critical facilities are located in the wildland-urban interface (WUI) wildfire hazard area, if a wildfire reached the following critical facilities, their vulnerability could complicate response and recovery efforts during and following an event:

- **Hazardous Materials and Fuel Storage**—During a wildfire event, these materials could rupture due to excessive heat and act as fuel for the fire, causing rapid spreading and escalating the fire to unmanageable levels. In addition, they could leak into surrounding areas, saturating soils, and seeping into surface waters, and have a disastrous effect on the environment.
- **Communication Facilities**—If these facilities are damaged and become inoperable, it would exacerbate already difficult communication in the planning area.
- **Fire Stations**—If fire stations were compromised during a wildfire event, it would make fire suppression and support services even more challenging.

Table 4-92. Estimated Critical Facilities and Lifelines Located within the Wildland-Urban Interface Wildfire Hazard Area

Jurisdiction	Total Critical Facilities Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located in the Wildland-Urban Interface Wildfire Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Bayou Vista (C)	5	5	0	0.0%	0	0.0%
Clear Lake Shores (C)	24	24	0	0.0%	0	0.0%
Dickinson (C)	91	83	0	0.0%	0	0.0%
Friendswood (C)	96	82	0	0.0%	0	0.0%
Hitchcock (C)	214	212	0	0.0%	0	0.0%
Jamaica Beach (C)	11	11	0	0.0%	0	0.0%
Kemah (C)	15	14	0	0.0%	0	0.0%
La Marque (C)	121	107	0	0.0%	0	0.0%
League City (C)	321	283	0	0.0%	0	0.0%



Jurisdiction	Total Critical Facilities Located in Jurisdiction	Total Lifelines Located in Jurisdiction	Number of Critical Facilities and Lifeline Facilities Located in the Wildland-Urban Interface Wildfire Hazard Area			
			Critical Facilities	Percent of Total Critical Facilities	Lifelines	Percent of Total Lifelines
Santa Fe (C)	135	128	0	0.0%	0	0.0%
Tiki Island (V)	7	7	0	0.0%	0	0.0%
Galveston County (Total)	2,437	2,317	0	0.0%	0	0.0%

Sources: Essential Government Functions Government Offices 2021; City of Galveston 2021; HIFLD 2020; Texas Commission on Environmental Quality 2021; Texas Tech University 2021; University of Wisconsin 2010

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on the Economy

Wildfire events can have major economic impacts on a community from the initial loss of structures and the subsequent loss of revenue from destroyed business and decrease in tourism. Wildfires can cost thousands of taxpayer dollars to suppress and control and can involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from working to fight these fires.

Table 4-93. Estimated Building Stock Located Within the WUI

Jurisdiction	Estimated Building Stock Located Within the Wildland-Urban Interface/Intermix (WUI) Wildfire Fuel Hazard Areas							
	Number of Buildings in the WUI Interface Wildfire Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings Located in the WUI Interface Wildfire Hazard Area	Percent of Total	Number of Buildings in the WUI Intermix Wildfire Hazard Area	Percent of Total	Total Replacement Cost Value of Buildings Located in the WUI Intermix Wildfire Hazard Area	Percent of Total
Bayou Vista (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Clear Lake Shores (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Dickinson (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Friendswood (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Hitchcock (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Jamaica Beach (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Kemah (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
La Marque (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
League City (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Santa Fe (C)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Tiki Island (V)	0	0.0%	\$0	0.0%	0	0.0%	\$0	0.0%
Galveston County (Total)	1,173	0.6%	\$599,635,507	0.4%	1,812	0.9%	\$1,138,026,689	0.7%

Sources: Essential Government Functions Government Offices 2021; City of Galveston 2021; HIFLD 2020; Texas Commission on Environmental Quality 2021; Texas Tech University 2021; University of Wisconsin 2010

Note: The County total includes non-participating jurisdictions, census county divisions, and unincorporated areas in the County.

Impact on the Environment

Fire is a natural and critical ecosystem process in most terrestrial ecosystems, affecting the types, structure, and spatial extent of native vegetation. However, it also can cause severe environmental impacts:

- **Damaged Fisheries**—Critical fisheries can suffer from increased water temperatures, sedimentation, and changes in water quality.



- **Soil Erosion**—The protective covering provided by foliage and dead organic matter is removed, leaving the soil fully exposed to wind and water erosion. Accelerated soil erosion occurs, causing landslides and threatening aquatic habitats.
- **Spread of Invasive Plant Species**—Non-native woody plant species frequently invade burned areas. When weeds become established, they can dominate the plant cover over broad landscapes, and become difficult and costly to control.
- **Disease and Insect Infestations**—Unless diseased or insect-infested trees are swiftly removed, infestations and disease can spread to healthy forests and private lands. Timely active management actions are needed to remove diseased or infested trees.
- **Destroyed Endangered Species Habitat**—Fire can have negative consequences for endangered species.
- **Soil Sterilization**—Some fires burn so hot that they can sterilize the soil. Topsoil exposed to extreme heat can become water repellant, and soil nutrients may be lost.
- **Reduced Timber Harvesting**—Timber can be destroyed and lead to smaller available timber harvests.
- **Reduced Agricultural Resources**—Wildfire can have disastrous consequences on agricultural resources, removing them from production and necessitating lengthy restoration programs.
- **Damaged Cultural Resources**—Scenic vistas can be damaged, access to recreational areas can be reduced and destruction of cultural resources may occur.

Future Changes that May Impact Vulnerability

Understanding future changes that affect vulnerability can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. The County considered the following factors to examine potential conditions that may affect hazard vulnerability:

- Potential or projected development
- Projected changes in population
- Other identified conditions as relevant and appropriate, including the impacts of climate change

Projected Development

As a highly urbanized planning area, wildfire risk exposure is low. Urbanization tends to alter the natural fire regime and can create the potential for the expansion of urbanized areas into wildland areas. The expansion of development toward wildfire hazard areas can be managed with strong land use and building codes. The International Building Code includes minimum standards related to the design and construction of buildings in fire hazard zones. The planning area is well equipped with these tools and this planning process has assessed capabilities with regards to the tools. As the planning area experiences future growth, it is anticipated that the exposure to this hazard will remain as assessed or even decrease over time due to these capabilities.

Projected Changes in Population

The County experienced an increase in population between the 2010 Census (291,309) and the estimated 2015-2019 American Community Survey estimated population of 350,682. The population of the County is expected to increase over the next few years. The increase in population will expose more people to the wildfire hazard.

Climate Change

Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot dry spells create the highest fire risk. Increased temperatures may intensify wildfire danger by warming and drying out vegetation. Changes in climate patterns may impact the distribution and perseverance of insect outbreaks that create dead trees (increase fuel). When climate alters fuel



loads and fuel moisture, forest susceptibility to wildfires changes. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

Change of Vulnerability Since the 2017 HMP

For this hazard mitigation plan update, the 2010 Wildland-Urban Interface/Intermix data from the University of Wisconsin was referenced to determine areas within Galveston County that are vulnerable to wildfires. Population statistics have also been updated using the 5-Year 2015-2019 American Community Survey Population Estimates. The 2017 general building stock was updated using RS Means 2021 replacement cost values and updated parcel and tax assessment information from the Galveston Central Appraisal District. Additionally, the critical facility inventory was updated by Galveston County.

Overall, this vulnerability assessment uses a more accurate and updated building inventory which provides more accurate estimated exposure and potential losses for Galveston County.

4.4 RISK RANKING

A comprehensive range of hazards that pose a significant risk to Galveston County were selected and considered during the development of this plan; see Section 4.2 (Identification of Hazards of Concern). However, each community has differing levels of exposure and vulnerability to each of these hazards. It is important for each community participating in this plan to recognize those hazards that pose the greatest risk to their community and direct their attention and resources accordingly to manage risk and reduce losses most effectively and efficiently. The hazard ranking for the County and each participating jurisdiction can be found in their jurisdictional annexes in Volume II, Section 9 (Jurisdictional Annexes) of this plan.

To this end, a hazard risk ranking process was conducted for Galveston County and its jurisdictions using the method described below. This method includes four risk assessment categories—probability of occurrence, impact (population, property, and economy), adaptive capacity, and changing future conditions (i.e., climate change). Each was assigned a weighting factor to calculate an overall ranking value for each hazard of concern. Depending on the calculation, each hazard was assigned a high, medium, or low ranking. Details regarding each of these categories is described below.

4.4.1 Hazard Ranking Methodology

Estimates of hazard risk for the County were developed using methodologies promoted by FEMA's hazard mitigation planning guidance, generated by FEMA's Hazus risk assessment tool, and input from Galveston County and participating jurisdictions.

As described in Section 4.1 (Methodology and Tools), three different levels of analysis were used to estimate potential impacts: 1) historic loss/qualitative analysis; 2) exposure analysis; and 3) loss estimation. All three levels of analysis are suitable for planning purposes; however, with any risk analysis, there is underlying uncertainty resulting from assumptions used to describe and assess vulnerability and the methodologies available to model impacts. Impacts from any hazard event within the County will vary from the analysis presented here based on the factors described for each hazard of concern, namely location, extent, warning time, and mitigation measures in place at the time of an event.

The hazard ranking methodology for some hazards of concern is based on a scenario event, while others are based on their potential risk to the County as a whole. In order to account for these differences, the quantitative hazard ranking methodology was adjusted using professional judgement and subject-matter input; assumptions are included, as appropriate, in the following subsections. The limitations of this analysis are recognized given the scenarios do not have the same likelihood of occurrence; nonetheless, there is value in summarizing and



comparing the hazards using a standardized approach to evaluate relative risk. The following categories were considered when evaluating the relative risk of the hazards of concern.

- **Probability of Occurrence** - The probability of occurrence of the scenario evaluated was estimated by examining the historic record and/or calculating the likelihood of annual occurrence. When no scenario was assessed, an examination of the historic record and judgement was used to estimate the probability of occurrence of an event that will impact the County.
- **Impact**—The following three hazard impact subcategories were considered: impact to people; impact to buildings; and impact to the economy. The results of the updated risk assessment and/or professional judgement were used to assign the numeric values for these three impact subcategories. A factor was applied to each subcategory, giving impact on population the greatest weight.
 - Population—Numeric value x 3
 - Buildings—Numeric value x 2
 - Economy—Numeric value x 1
- **Adaptive Capacity** - Adaptive capacity describes a jurisdiction’s current ability to protect from or withstand a hazard event. This includes capabilities and capacity in the following areas: administrative, technical, planning/regulatory, and financial. Mitigation measures already in place increases a jurisdiction’s capacity to withstand and rebound from events (e.g. codes/ordinances with higher standards to withstand hazards due to design or location; deployable resources; or plans and procedures in place to respond to an event). In other words, assigning ‘weak’ for adaptive capacity means the jurisdiction does not have the capability to effectively respond, which increases vulnerability; whereas ‘strong’ adaptive capacity means the jurisdiction does have the capability to effectively respond, which decreases vulnerability. These ratings were assigned using the results of the core capability assessment with subject-matter input from each jurisdiction.
- **Climate Change (Changing Future Conditions)** - Current climate change projections were considered as part of the hazard ranking to ensure the potential for an increase in severity/frequency of the hazard was included. This was important to Galveston County to include because the hazard ranking helps guide and prioritize the mitigation strategy development, which should have a long-term future vision to mitigate the hazards of concern. The potential impacts climate change may have on each hazard of concern is discussed in Sections 4.3.1 through 4.3.17. The benchmark values in the methodology are similar to confidence levels outlined in the National Climate Assessment 2017.

Hazard Ranking Equation
[Probability of Occurrence x 0.3] + [(Impact on Population x 3) + (Impact on Property x 2) + (Impact on Economy x 1) x 0.3] + [Adaptive Capacity x 0.3] + [Climate Change x 0.1]

Table 4-94 summarizes the categories, benchmark values, and weights used to calculate the risk factor for each hazard. Using the weighting applied, the highest possible risk factor value is 6.9. The higher the number, the greater the relative risk. Based on the total for each hazard, a priority ranking is assigned to each hazard of concern (high, medium, or low). The rankings were categorized as follows: Low = Values less than 3.9; Medium = Values between 3.9 and 4.9; High = Values greater than 4.9.

Table 4-94. Summary of Hazard Ranking Approach

Category	Level / Category	Degree of Risk / Benchmark Value	Numeric Value	Weighted Value
Probability of Occurrence	Unlikely	A hazard event is not likely to occur or is unlikely to occur with less than a 1% annual chance probability.	0	30%



Category		Level / Category	Degree of Risk / Benchmark Value	Numeric Value	Weighted Value
		Rare	Between 1 and 10% annual probability of a hazard event occurring.	1	
		Occasional	Between 10 and 100% annual probability of a hazard event occurring.	2	
		Frequent	100% annual probability; a hazard event may occur multiple times per year.	3	
Impact (Sum of all 3)	Population (Numeric Value x 3)	Low	14% or less of your population is exposed to a hazard with potential for measurable life safety impact, due to its extent and location.	1	30%
		Medium	15% to 29% of your population is exposed to a hazard with potential for measurable life safety impact, due to its extent and location.	2	
		High	30% or more of your population is exposed to a hazard with potential for measurable life safety impact, due to its extent and location.	3	
	Property (Numeric Value x 2)	Low	Property exposure is 14% or less of the total number of structures for your community.	1	
		Medium	Property exposure is 15% to 29% of the total number of structures for your community.	2	
		High	Property exposure is 30% or more of the total number of structures for your community.	3	
	Economy (Numeric Value x 1)	Low	Loss estimate is 9% or less of the total replacement cost for your community.	1	
		Medium	Loss estimate is 10% to 19% of the total replacement cost for your community.	2	
		High	Loss estimate is 20% or more of the total replacement cost for your community.	3	
Adaptive Capacity		Weak	Weak/outdated/inconsistent plans, policies, codes/ordinances in place; no redundancies; limited to no deployable resources; limited capabilities to respond; long recovery.	1	30%
		Moderate	Plans, policies, codes/ordinances in place and meet minimum requirements; mitigation strategies identified but not implemented on a widespread scale; county/jurisdiction can recover but needs outside resources; moderate county/Jurisdiction capabilities.	0	
		Strong	Plans, policies, codes/ordinances in place and exceed minimum requirements; mitigation/protective measures in place; county/jurisdiction has ability to recover quickly because resources are readily available, and capabilities are high.	-1	
Climate Change		Low	No local data is available; modeling projections are uncertain on whether there is increased future risk; confidence level is low (inconclusive evidence).	1	10%
		Medium	Studies and modeling projections indicate a potential for exacerbated conditions due to climate change; confidence level is medium to high (suggestive to moderate evidence).	2	
		High	Studies and modeling projections indicate exacerbated conditions/increased future risk due to climate change; very high confidence level (strong evidence, well documented and acceptable methods).	3	

Note: A numerical value of zero is assigned if there is no impact.

*For the purposes of this exercise, "impacted" means exposed for population and property and estimated loss for economy. For non-natural hazards, although they may occur anywhere in the County, an event will not likely cause countywide impacts; therefore, impact to population was scored using an event-specific scenario.

In an attempt to summarize the confidence level regarding the input utilized to populate the hazard ranking, a gradient of certainty was developed. A certainty factor of high, medium, or low was selected and assigned to each hazard to provide a level of transparency and increased understanding of the data utilized to support the resulting ranking. The following scale was used to assign a certainty factor to each hazard:



- High—Defined scenario/event to evaluate; probability calculated; evidenced-based/quantitative assessment to estimate potential impacts through hazard modeling.
- Moderate—Defined scenario/event or only a hazard area to evaluate; estimated probability; combination of quantitative (exposure analysis, no hazard modeling) and qualitative data to estimate potential impacts.
- Low—Scenario or hazard area is undefined; there is a degree of uncertainty regarding event probability; majority of potential impacts are qualitative.

Table 4-95 summarizes the hazard scenario or hazard area evaluated; highlights key impacts to population, buildings/critical assets, and the economy; and lists the associated certainty factor assigned for each hazard to convey the level of confidence in the data used. This table is not intended to be a complete and comprehensive list of all hazard impacts determined in the risk assessment and considered for the hazard ranking exercise. Refer to Sections 4.3.1 to 4.3.17 for a complete summary of all estimated impacts for each hazard.



Table 4-95. Overview of the Hazard Scenario and Associated Estimated Impacts Considered in the Hazard Ranking

Hazard of Concern	Hazard/ Scenario Area Evaluated	Population		Buildings		Economy ^a		Certainty Factor
Coastal and Inland Erosion	Exposure to the Coastal Erosion Hazard Area	Coastal Erosion Hazard Area:	5,049	Coastal Erosion Hazard Area:	4,922	Coastal Erosion Hazard Area:	\$6,077,155,937	Moderate
	Exposure to Inland Erosion Hazard Area	Inland Erosion Hazard Area:	37,595	Inland Erosion Hazard Area:	21,966	Inland Erosion Hazard Area:	\$16,543,834,687	
Dam/ Levee Failure	Partial or complete failure of a dam or levee. There are 2 dams and five levee systems in the County.	Population impacted is dependent on the location and capacity of the dam or levee, the extent of the failure inundation area and the severity of the failure.		The number of buildings impacted is dependent on the capacity of the dam/levee, the extent of the dam/levee failure inundation area, and the severity of the failure.		Economic impacts include dam/levee/building/infrastructure repairs; debris removal/disposal; utility impacts.		Moderate
Drought	Prolonged drought event - the County is serviced water suppliers who primarily get water from surface water, reservoirs, and unconfined groundwater sources.	Entire population exposed. Population on surface water supplies may be impacted first; water restrictions/contamination; increased wildfire risk.		Droughts are not expected to cause direct damage to buildings.		Losses include aesthetic, landscape/nursery/agricultural industry impacts		Moderate
Expansive Soils	Soils (Linear Extensibility >6%) Hazard Area	Soils (Linear Extensibility >6%) Hazard Area:	167,514	Soils (Linear Extensibility >6%) Hazard Area:	85,766	Soils (Linear Extensibility >6%) Hazard Area:	\$62,998,467,572	Moderate
Extreme Temperature	Extreme hot and cold events	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident.		Business and commercial losses due to long-term utility outages; repairs to power and utility lines.		Moderate
Flood	1% annual chance (100-year) and 0.2% annual chance (500-year)	1% annual chance (100-year)	103,507	1% annual chance (100-year)	81,490	1% annual chance (100-year)	\$73,043,916,760	Moderate
Hail	Hail impacts from severe weather events	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident and condition of structures.		Economic losses can include building/infrastructure damage; power outages; repairs to utility and power lines		Moderate
Hurricane and Tropical Storm	Categories 1-4 Storm Surge Hazard Area	Category 1 Storm Surge:	66,290	Category 1 Storm Surge:	50,086	Category 1 Storm Surge:	\$45,671,691,795	Moderate
		Category 2 Storm Surge:	129,076	Category 2 Storm Surge:	98,585	Category 2 Storm Surge:	\$87,001,755,597	
		Category 3 Storm Surge:	210,755	Category 3 Storm Surge:	144,078	Category 3 Storm Surge:	\$119,703,104,280	
		Category 4 Storm Surge:	265,843	Category 4 Storm Surge:	170,325	Category 4 Storm Surge:	\$138,655,890,684	
Land Subsidence	Rates of Elevation Loss and Groundwater Levels	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident and condition of structures.		Economic losses can include building/infrastructure damage		Moderate
Lightning	Lightning impacts from severe weather events	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident and condition of structures.		Economic losses can include building/infrastructure damage; power outages; repairs to utility and power lines		Moderate
Pandemic	Pandemic include: Influenza, West Nile Virus, and Coronavirus.	Population impacted is dependent on the disease and severity of the outbreak; in some cases, immuno-compromised persons are more vulnerable.		Structural impacts due to a pandemic would be limited.		Economic losses can include County financial impacts to monitor/address outbreaks; lost wages or commercial interruptions; depends on the severity and type of pandemic.		Moderate



Hazard of Concern	Hazard/ Scenario Area Evaluated	Population		Buildings		Economy ^a		Certainty Factor
Severe Winter Storm	Blizzard, Snow, Ice	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident and condition of structures.		The cost of snow and ice removal and repair of roads/infrastructure can impact operating budgets.		Moderate
Thunderstorm Wind	100-Year and 500-MRP events	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident and condition of structures.		100-Year MRP Estimated Damages	\$8,513,160,224	Moderate
						500-Year MRP Estimated Damages	\$22,980,263,787	
Tornadoes	Tornadoes	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident and condition of structures.		Economic losses can include building/infrastructure damage; power outages; repairs to utility and power lines		Moderate
Tsunami	Tsunami Hazard Area (evacuation areas plus high tide – 300 ft plus 22 ft.)	Population located in Tsunami Hazard Area:	1,255	Buildings located in Tsunami Hazard Area:	1,722	RCV of buildings in Tsunami Hazard Area:	\$3,204,780,207	Moderate
Wildfire	Wildland-Urban Interface/Intermix (WUI) Wildfire Fuel Hazard Areas	Population residing in the WUI Interface:	1,254	Number of buildings the WUI Interface:	1,173	Replacement cost value of buildings located in the WUI Interface:	\$599,635,507	Moderate
		Population residing in the WUI Intermix:	1,973	Number of buildings the WUI Intermix:	1,812	Replacement cost value of buildings located in the WUI Intermix:	\$1,138,026,689	
Utility Failure	Utility Outages from Hazard Events	All residents/commuters/visitors are exposed; socially-vulnerable populations may be at increased risk.		All buildings are exposed; the degree of impact depends on the scale of the incident.		Business and commercial losses due to long-term utility outages; repairs to power and utility lines.		Moderate

Notes:

a Estimated loss in replacement cost values as available from HAZUS-MH.

b The impacts and vulnerability from a hazardous materials event are greatly dependent on the material and its physical and chemical properties, the quantity released, weather conditions, micro-meteorological effects of buildings and terrain, maintenance/mechanical failures, and distance and related response time for emergency response teams.

All totals for exposure values include all of Galveston County, including non-participating municipalities, CCDs, and unincorporated areas.

Exposed = This refers to the number of assets located in the hazard area; all of which may not incur losses as a result of the event.

MRP = Mean Return Period

SFHA = Special flood hazard area (1-percent annual chance flood event)

RCV = Replacement cost value based on 2021 RSMeans



4.4.2 Hazard Ranking Results

Using the process described above, the ranking for the identified hazards of concern was determined for Galveston County (refer to Table 4-96). The hazard ranking is detailed in the subsequent tables that present the stepwise process for the ranking. The countywide ranking includes the entire planning area and may not reflect the highest risk indicated for any of the participating jurisdictions. The resulting ranks of each municipality indicate the differing degrees of risk exposure and vulnerability. The results support the appropriate selection and prioritization of initiatives to reduce the highest levels of risk for each municipality. Both the County and the participating jurisdictions have applied the same methodology to develop the countywide risk and local rankings to ensure consistency in the overall ranking of risk; jurisdictions had the ability to alter rankings based on local knowledge and experience in handling each hazard.

This hazard ranking exercise serves four purposes: 1) to describe the probability of occurrence for each hazard; 2) to describe the impact each would have on the people, property, and economy; 3) to evaluate the capabilities a community has with regards to the hazards of concern; and 4) to consider changing future conditions (i.e., climate change) in Galveston County.



Table 4-96. Ranking for Hazards of Concern for Galveston County

Hazard of Concern	Probability		Population			Impact			Economy			Total Impact Value	Adaptive Capacity	Climate Change
	Category	Numeric Value	Impact	Numeric Value	Weighted Value (x3)	Impact	Numeric Value	Weighted Value (x2)	Impact	Numeric Value	Weighted Value (x1)			
Coastal and Inland Erosion	Occasional	2	L	1	1 x 3 = 3	L	1	1 x 2 = 2	M	2	2 x 1 = 2	9	M	H
Dam/ Levee Failure	Rare	1	M	2	2 x 3 = 6	M	2	2 x 2 = 4	L	1	1 x 1 = 1	12	M	M
Drought	Occasional	2	M	2	2 x 3 = 6	M	2	2 x 2 = 4	M	2	2 x 1 = 2	14	M	H
Expansive Soils	Rare	1	H	3	3 x 3 = 9	H	3	3 x 2 = 6	H	3	3 x 1 = 3	19	M	M
Extreme Temperature	Frequent	3	M	2	2 x 3 = 6	L	1	1 x 2 = 2	L	1	1 x 1 = 1	12	M	H
Flood	Frequent	3	M	2	2 x 3 = 6	L	1	1 x 2 = 2	H	3	3 x 1 = 3	14	M	H
Hail	Occasional	2	L	1	1 x 3 = 3	M	2	2 x 2 = 4	L	1	1 x 1 = 1	10	M	M
Hurricane and Tropical Storm	Occasional	2	H	3	3 x 3 = 9	H	3	3 x 2 = 6	H	3	3 x 1 = 3	20	M	H
Land Subsidence	Rare	1	L	1	1 x 3 = 3	L	1	1 x 2 = 2	M	2	2 x 1 = 2	8	M	M
Lightning	Occasional	2	L	1	1 x 3 = 3	L	1	1 x 2 = 2	L	1	1 x 1 = 1	8	M	M
Pandemic	Occasional	2	M	2	2 x 3 = 6	L	1	1 x 2 = 2	M	2	2 x 1 = 2	12	M	M
Severe Winter Storm	Rare	1	M	2	2 x 3 = 6	L	1	1 x 2 = 2	L	1	1 x 1 = 1	10	M	M
Thunderstorm Wind	Occasional	2	M	2	2 x 3 = 6	M	2	2 x 2 = 4	M	2	2 x 1 = 2	14	M	H
Tornadoes	Occasional	2	M	2	2 x 3 = 6	M	2	2 x 2 = 4	M	2	2 x 1 = 2	14	M	M
Tsunami	Rare	1	L	1	1 x 3 = 3	L	1	1 x 2 = 2	L	1	1 x 1 = 1	7	M	M
Wildfire	Rare	1	L	1	1 x 3 = 3	L	1	1 x 2 = 2	L	1	1 x 1 = 1	7	M	M
Utility Failure	Frequent	3	M	2	2 x 3 = 6	L	1	1 x 2 = 2	M	2	2 x 1 = 2	13	M	M



Table 4-97 presents the total calculations for each hazard ranking value for the hazards of concern.

Table 4-97. Total Hazard Ranking Values for the Hazards of Concern for Galveston County

Hazard of Concern	Probability x 30%	Total Impact x 30%	Adaptive Capacity x 30%	Changing Future Conditions x 10%	Total Hazard Ranking Value
Coastal and Inland Erosion	0.6	2.1	0	0.3	3.0
Dam/ Levee Failure	0.3	3.3	0	0.2	3.8
Drought	0.6	3.6	0	0.3	4.5
Expansive Soils	0.3	5.4	0	0.2	5.9
Extreme Temperature	0.9	2.7	0	0.3	3.9
Flood	0.9	3.3	0	0.3	4.5
Hail	0.6	2.4	0	0.2	3.2
Hurricane and Tropical Storm	0.6	5.4	0	0.3	6.3
Land Subsidence	0.3	2.1	0	0.2	2.3
Lightning	0.6	1.8	0	0.2	2.6
Pandemic	0.6	3	0	0.2	3.8
Severe Winter Storm	0.3	2.7	0	0.2	3.2
Thunderstorm Wind	0.6	3.6	0	0.3	4.5
Tornadoes	0.6	3.6	0	0.2	4.4
Tsunami	0.3	1.8	0	0.2	2.3
Wildfire	0.3	1.8	0	0.2	2.3
Utility Failure	0.9	3	0	0.2	4.1

Low = Values less than 3.9; **Medium** = Values between 3.9 and 4.9; **High** = Values greater than 4.9

These rankings have been used as one of the bases for identifying the jurisdictional hazard mitigation strategies included in Section 9 (Jurisdictional Annexes) of this plan. The summary rankings for the County reflect the results of the vulnerability analysis for each hazard of concern and vary from the specific results of each jurisdiction. For example, the severe storm hazard may be ranked low in one jurisdiction, but due to the exposure and impact countywide, it is ranked as a high hazard and is addressed in the County's mitigation strategy accordingly. Jurisdictional ranking results are presented in each local annex in Section 9 (Jurisdictional Annexes) of this plan.



SECTION 5. CAPABILITY ASSESSMENT

According to FEMA’s Mitigation Planning How-To Guide #3, a capability assessment is an inventory of a community’s missions, programs, and policies and an analysis of its capacity to carry them out. Each jurisdiction has a unique set of capabilities available to accomplish mitigation and reduce long-term vulnerable to future hazard events. Capabilities include authorities, policies, programs, staff, and funding. Reviewing existing capabilities helps identify capabilities that currently implement mitigation and leads to loss reductions or that have the potential to be implemented in the future.

This assessment is an integral part of the planning process. The assessment process enables identification, review, and analysis of current federal, state, and local programs, policies, regulations, funding, and practices that could either facilitate or hinder mitigation.

During the original planning process, the county and all jurisdictions identified and assessed their capabilities in the areas of planning and regulatory, administrative, and technical, and fiscal. By completing this assessment, the Planning Committee and each jurisdiction learned how or whether they would be able to implement certain mitigation actions by determining the following:

- Limitations that could exist on undertaking actions.
- The range of local and state administrative, programmatic, regulatory, financial, and technical resources available to assist in implementing their mitigation actions.
- Actions deemed infeasible, as they are currently outside the scope of capabilities.
- Types of mitigation actions that could be technically, legally (regulatory), administratively, politically, or fiscally challenging or infeasible.
- Opportunities to enhance local capabilities to support long term mitigation and risk reduction.

During the 2022 plan update process, all participating jurisdictions were tasked with developing or updating their capability assessment, paying particular attention to evaluating the effectiveness of these capabilities in supporting hazard mitigation and identifying opportunities to enhance local capabilities to integrate hazard mitigation into their plans, programs, and day-to-day operations.

County and municipal capabilities in the areas of planning and regulatory, administrative, and technical, and fiscal may be found in the Capability Assessment section of their jurisdictional annexes in Section 9 (Jurisdictional Annexes).

5.1 UPDATE PROCESS SUMMARY

The purpose of the capability assessment is to understand the planning, regulatory, administrative, technical, and financial capabilities present in Galveston County. This assessment helps the County and its jurisdictions identify strengths and opportunities that can be used to reduce losses from hazard events and reduce risks throughout Galveston County.

To complete the capability assessment, the contracted consultant met with Galveston County and each municipality virtually to review the capability assessment from the 2016 HMP and update accordingly. In addition to virtual meetings, the consultant reviewed plans and codes/ordinances to enhance the information provided by the jurisdictions.



A summary of the various federal and state capabilities available to promote and support mitigation and reduce risk in Galveston County are presented below. Information provided by the County and municipalities are presented in Volume II, Section 9 (Jurisdictional Annexes) of this plan update.

5.2 PLANNING AND REGULATORY CAPABILITY

Planning and regulatory capabilities are based on the implementation of ordinances, policies, local laws, and state statutes, and plans and programs that relate to guiding and management growth and development. Planning and regulatory capabilities refer not only to the current plans and regulations, but also to the jurisdiction's ability to change and improve those plans and regulations as needed. The following provides the planning and regulatory capabilities for Galveston County.

5.2.1 Planning and Regulatory Capabilities – County and Local

The following table summarizes the planning and regulatory capabilities available to Galveston County, at the county and local level.



Table 5-1. Planning and Regulatory Capabilities – County and Local

Capability	Details	
Building Code	Description:	The County is governed by the Texas Administrative Code § 5.4008 The 2018 International Building Code (IBC) The 2018 International Residential Code (IRC) NFPA. By using the IRC, IBC and NFPA, the highest standards are assured for County construction to reduce the risk of hazards and protect both lives and property
	Responsible Agency:	Texas Department of Insurance
	Provides Funding for Mitigation:	No
	Hazard:	All hazards
Subdivision Ordinance - Rules, Regulations and Requirements Relating to the Approval and Acceptance of Improvements in Subdivisions or Re-Subdivisions – 3/3/1997 – last revised – 10/3/2005	Description:	Major drainage ways through a subdivision shall be designed and constructed to accommodate the 100-year peak rate of runoff, in the manner prescribed by the applicable Galveston County Drainage District and the Galveston County Engineer. The following requirements shall apply to all developments planned within the 100-year flood plain: 1. Any construction and/or fill that would obstruct flow and cause any increase in flood levels must be fully offset with conveyance improvements. 2. Flood plain storage volumes shall not be reduced by way of fill. Where flood plain fill is proposed and is demonstrated not to adversely affect conveyance, compensatory storage equal in volume and effect shall be excavated.
	Responsible Agency:	County Engineer
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Stormwater Management - Storm Water MS4 Pollution Control Order 2012	Description:	Stormwater Management reduces the risk of pollutants that may have the potential to endanger local residents through inspection and enforcement of the MS4 regulations.
	Responsible Agency:	Galveston County Health Department
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Real Estate Disclosure - Texas Property Code Section § 5.008 - Seller's Disclosure of Property Condition	Description:	Real Estate Disclosure ensures that property owners are aware of historical disaster impacts and gives them information necessary to plan for and mitigate future disasters
	Responsible Agency:	Texas Real Estate Commission
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Flood Damage Prevention - Galveston County Floodplain Regulations August 2019	Description:	Floodplain regulations reduce risk to lives and property by ensuring mitigation measures are put into place for repetitive loss properties and new construction.
	Responsible Agency:	Galveston County Engineer
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Emergency Management - Texas Government Code Chapter 418	Description:	Emergency Management requirements provide for the planning, mitigation, preparedness, response, and recovery activities necessary for a high impact coastal community.
	Responsible Agency:	Texas Division of Emergency Management
	Provides Funding for Mitigation:	No
	Hazard:	All hazards
Capital Improvement Plan - Fiscal Year 2021 – Annual Operating Budget	Description:	The County encourages departments to submit two to five year capital plans for approval by the Commissioners Court. Approved plans shall be given priority during the annual budget process. Capital spending is reserved for major renovation, building, or road and bridge related projects that are planned for the fiscal year.
	Responsible Agency:	Commissioners Court
	Provides Funding for Mitigation:	Yes
	Hazard:	Flood, Severe Winter Storm, Hurricane, Utility Failure



Capability	Details	
Galveston County Debris Management Plan	Description:	Planning in advance for the removal and management of disaster related debris reduces the risk to lives and property from dangerous debris and vermin and begins the rebuilding process for the entire community.
	Responsible Agency:	County Road and Bridge Department
	Provides Funding for Mitigation:	No
	Hazard:	Flood, Hurricane
Open Space Plan - Parks, Recreation, Open Space, and Conservation/Natural Resource Master Plan – January 2012 – 2017 Draft	Description:	The destruction caused to much of Galveston County’s coastal wildlife habitat and recreation areas in September 2008, has enhanced the need to prepare a new Master Plan that reflects current circumstances. This Master Plan document establishes the guidelines which will direct the acquisition and development of parks, recreation areas, and open spaces for the next eight years. The Master Plan Drawing illustrates the general type and location of recommended parks and open spaces This document also includes specific recommendations for future land acquisition, park development and natural resources conservation initiatives to serve the growing population and needs of Galveston County residents.
	Responsible Agency:	County Parks and Recreation Department
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Galveston County Dune Protection and Beach Access Plan	Description:	Shoreline management reduces the risk to lives and property through regulations designed to minimize the impact of natural hazards and manmade activities to the coastal environment
	Responsible Agency:	General Land Office
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Texas Agri-Life Extension Service	Description:	Agricultural planning reduces the risk to the animals and community during times of disaster.
	Responsible Agency:	Galveston County Agricultural Extension
	Provides Funding for Mitigation:	No
	Hazard:	Flood, Hurricane, Severe Winter Storm
Galveston County Emergency Management Plan 2017	Description:	The Galveston County Emergency Management Plan details both short-term response and long-term recovery plans that address communications, evacuation, and housing necessary for a variety of hazards that impact the community.
	Responsible Agency:	Galveston County Office of Emergency Management.
	Provides Funding for Mitigation:	No
	Hazard:	All Hazards
Post-Disaster Recovery Plan – Annex J	Description:	By preparing for recovery in advance, potential impact from hazards can be mitigated through planned response and recovery activities
	Responsible Agency:	GCOEM and Long Term Recovery Group
	Provides Funding for Mitigation:	No
	Hazard:	All Hazards

5.2.2 Planning and Regulatory Capabilities – Federal and State

The following table summarizes the planning and regulatory capabilities available to Galveston County, at the federal and state level.

Table 5-2. Planning and Regulatory Capabilities – Federal and State

Capability	Details	
Disaster Mitigation Act (DMA)	Description:	The DMA is the current federal legislation addressing hazard mitigation planning. It emphasizes planning for disasters before they occur. It specifically addresses planning at the local level, requiring plans to be in place before Hazard Mitigation Assistance grant funds are available to communities. This plan is designed to meet the requirements of DMA, improving eligibility for future hazard mitigation funds.



Capability	Details	
National Flood Insurance Program (NFIP)	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	HMPs designed to meet the requirements of DMA will remain eligible for future FEMA Hazard Mitigation Assistance funds
	Hazard:	All-natural hazards
	Description:	The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. The Flood Hazard Profile in Section 4.3.6 (Flood) provides information on recent legislation related to reforms to the NFIP. All municipalities in Galveston County actively participate in the NFIP. As of September 2021, there were 62,867 policies in Galveston County. There have been 55,196 claims made, totaling over \$2 billion for damages to structures and contents.
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Full compliance and good standing under the NFIP are application prerequisites for all FEMA grant programs for which participating jurisdictions are eligible under this plan.
NFIP Community Rating System (CRS)	Hazard:	Flood
	Description:	As an additional component of the NFIP, CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses, (2) facilitate accurate insurance rating, and (3) promote the awareness of flood insurance. Municipalities, and the county as a whole, could expect significant cost savings on premiums if enrolled in the CRS program. As of October 2021, 7 communities in Galveston County participate in the CRS program. • City of Dickinson, Class 8 • City of Friendswood, Class 7 • City of Galveston, Class 6 • City of Jamaica Beach, Class 8 • City of Kemah, Class 8 • City of League City, Class 5 • Village of Tiki Island, Class 7 Other communities in Galveston County have noted they are exploring the possibility of participating in the program in the future.
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	CRS premium discounts on flood insurance range from 5 percent for Class 9 communities up to 45 percent for Class 1 communities.
Local Government Code Title 7. Regulation Of Land Use, Structures, Businesses, and Related Activities Subtitle A. Municipal Regulatory Authority Chapter 211. Municipal Zoning Authority	Hazard:	Flood
	Description:	The powers granted under this subchapter are for the purpose of promoting the public health, safety, morals, or general welfare and protecting and preserving places and areas of historical, cultural, or architectural importance and significance. The governing body of a municipality may regulate the size of buildings and other structures, lot coverage, size of open spaces, population density, the location and use of buildings and groundwater use. Zoning regulations must be adopted in accordance with a comprehensive plan and must be designed to: (1) lessen congestion in the streets. (2) secure safety from fire, panic, and other dangers. (3) promote health and the general welfare. (4) provide adequate light and air. (5) prevent the overcrowding of land. (6) avoid undue concentration of population; or



Capability	Details	
Subchapter A. General Zoning Regulations		(7) facilitate the adequate provision of transportation, water, sewers, schools, parks, and other public requirements. The governing body of a municipality may divide the municipality into districts of a number, shape, and size the governing body considers best for carrying out this subchapter. Within each district, the governing body may regulate the erection, construction, reconstruction, alteration, repair, or use of buildings, other structures, or land. Zoning regulations must be uniform for each class or kind of building in a district, but the regulations may vary from district to district. The regulations shall be adopted with reasonable consideration, among other things, for the character of each district and its peculiar suitability for particular uses, with a view of conserving the value of buildings and encouraging the most appropriate use of land in the municipality. .
	Responsible Agency:	State of Texas
	Provides Funding for Mitigation:	No
	Hazard:	All Hazards
Texas Silver Jackets	Description:	Silver Jackets is a program under National Flood Risk Management Program to support agency collaboration and coordination with interagency, state-led flood risk and multiple hazard management teams. Provides resources and develops tools to support information sharing and networking and promotes implementation of flood risk management efforts that improve flood risk awareness and result in actions to reduce risk. For more information: http://silverjackets.nfrmp.us/
	Responsible Agency:	US Army Corp of Engineers
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Texas General Land Office	Description:	The Texas General Land Office (GLO), through the Community Development and Revitalization division, works to rebuild Texas communities by putting Texans back in their homes, restoring critical infrastructure and mitigating future damage through resilient community planning. The GLO is setting a record pace administering both Community Development Block Grant Disaster Recovery (CDBG-DR) and Mitigation (CDBG-MIT) funds from the U.S. Department of Housing and Urban Development (HUD) on behalf of the state of Texas. More than \$14 billion have been allocated for recovery and mitigation following Hurricanes Rita, Dolly, and Ike, the 2011 wildfires, the 2015 and 2016 floods, Hurricane Harvey, the 2018 South Texas floods, and the 2019 disasters. These grants can be used for a wide variety of activities including housing redevelopment, infrastructure repair and long-term planning, depending on HUD guidance.
	Responsible Agency:	Texas General Land Office
	Provides Funding for Mitigation:	Yes
	Hazard:	Flood, Hurricane, Wildfire
Coastal Erosion Planning and Response Act (CEPRA)	Description:	The average erosion rate for the 367 miles of Texas coast is 4.1 feet per year. Sixty-four percent of the Texas coast is eroding at an average rate of about 6 feet per year, with some locations losing more than 30 feet per year. FEMA estimates that every dollar spent on erosion control and mitigation to preserve wetlands and other natural ecosystems, will provide a return on average of \$4 in future cost-savings. Since 2000, the GLO's Coastal Erosion Planning and Response Program has received \$111.4 million in state-appropriated funding. Project partners (local governments, non-profits, state, and federal entities) have contributed \$52 million in non-federal matching funds and in-kind contributions, along with \$165.2 million in federal funds and in-kind contributions that have resulted in more than 355 coastal erosion response projects.
	Responsible Agency:	General Land Office
	Provides Funding for Mitigation:	Yes
	Hazard:	Flood, Hurricane, Land Subsidence
Coastal Management Program (CMP)	Description:	Texas receives approximately \$2 million annually in grants from National Oceanic and Atmospheric Administration (NOAA) and 90% of the funds are passed through to local governments and entities to address environmental needs and promote sustainable economic development along the coast. Projects must improve the management of the state's coastal



Capability	Details	
		resources and ensure long-term ecological and economic productivity. Section 306 administrative funds can be used for non-construction, coastal planning and education, and research. Section 306A improvement funds can be utilized for construction and land acquisition projects and preservation and restoration. CMP funding categories include Coastal Natural Hazards Response, Critical Areas Enhancement, Public Access, Water/Sediment Quantity and Quality Improvements, Waterfront Revitalization and Ecotourism Development, Permit Streamlining/Assistance, Governmental Coordination and Local Government Planning Assistance.
	Responsible Agency:	Texas General Land Office
	Provides Funding for Mitigation:	Yes
	Hazard:	Flood, Hurricane
Gulf of Mexico Energy Security Act (GOMESA)	Description:	GOMESA significantly enhances oil and gas leasing activities and creates revenue sharing provisions for the oil- and gas-producing states of Alabama, Louisiana, Mississippi, and Texas, and their coastal political subdivisions (CPSs). GOMESA funds are used for coastal conservation, restoration, and hurricane protection. The second phase of GOMESA revenue sharing began in Fiscal Year 2017 and expands the definition of qualified Outer Continental Shelf revenues to include receipts from Gulf of Mexico leases subject to withdrawal or moratoria restrictions. A revenue-sharing cap of \$500 million per year for the four Gulf producing states, their CPSs and the Land and Water Conservation Fund applies from fiscal years 2016 through 2055. The \$500 million cap does not apply to qualified revenues generated in those areas associated with Phase I of the GOMESA program. From 2009 through 2016, the state of Texas received \$3,192,269 and its 18 CPSs received \$798,036. The goal of GOMESA funding is to conserve, restore, enhance, and protect the diversity, quality, quantity, functions, and values of the state's coastal natural resources. A primary focus for the GLO will be to protect coastal natural resources while facilitating multiple human uses of coastal resources. The GLO's priority for the expenditures of GOMESA funds include: 1. Restoring and enhancing coastal natural resources. 2. Providing hurricane protection for coastal public resources. 3. Improving water quality. 4. Enhancing the balance between the protection of coastal natural resources and public use of those resources. 5. Improving environmental management; and 6. Mitigating coastal erosion and stabilizing shorelines.
	Responsible Agency:	Texas General Land Office
	Provides Funding for Mitigation:	Yes
	Hazard:	Flood, Hurricane, Manmade Disasters
U.S. Army Corps of Engineers – Dam Safety Program	Description:	The U.S. Army Corps of Engineers (USACE) is responsible for safety inspections of some federal and non-federal dams in the United States that meet the size and storage limitations specified in the National Dam Safety Act. USACE has inventoried dams and has surveyed each state and federal agency's capabilities, practices, and regulations regarding design, construction, operation, and maintenance of the dams. USACE has also developed guidelines for inspection and evaluation of dam safety (USACE 1997).
	Responsible Agency:	USACE
	Provides Funding for Mitigation:	Yes
Natural Resources Damage Assessment (NRDA)	Hazard:	Flood
	Description:	The natural resource trustees are the designated federal, state, and tribal agencies who are responsible for the natural resources impacted by an oil spill or hazardous substance release. They have common interests in sharing information, ideas, and expertise necessary to compensate the public for harm to natural resources as a result of oil spills and hazardous substance releases. Three Texas state agencies have been designated by the Governor to
	Responsible Agency:	Texas Commission on Environmental Quality



Capability	Details	
Coastal and Estuarine Land Conservation Program (CELCP)	Provides Funding for Mitigation:	Yes
	Hazard:	Manmade Disasters
	Description:	Lands being targeted for protection through TCELCP include coastal and estuarine areas with significant ecologic, conservation, recreation, historic, and aesthetic values. Many of these lands are threatened by conversion from their natural state to other uses. This section describes the geographic extent of the TCELCP boundary, outlines the types of lands and values to be protected, and gives an assessment of their status and trends (when known), functions and values, and potential threats. When NOAA provides funding for CELCP, the GLO provides coastal communities an opportunity to apply for up to three projects per year, with federal grants for any single project not to exceed \$3 million.
	Responsible Agency:	NOAA, Texas General Land Office
	Provides Funding for Mitigation:	Yes
Texas Division of Emergency Management	Hazard:	Flood, Hurricane
	Description:	TDEM is charged with carrying out a comprehensive, all-hazard emergency management program for the state and assisting cities, counties, and state agencies in implementing their own emergency management programs
	Responsible Agency:	
	Provides Funding for Mitigation:	No
Community Health and Resource Management (CHARM)	Hazard:	All Hazards
	Description:	CHARM is directed by the Texas Coastal Watershed Program, a part of Texas A&M AgriLife Extension Service. It is a mapping application that gives local officials, stakeholders, and citizens the power to analyze growth with real-time feedback. Using the weTable tool that transforms an ordinary tabletop into an interactive computer interface, CHARM allows participants to engage the public and gather their input regarding the community's future. The mapping application is supported by a library of data about urbanization, storm surge, conservation, public facilities, and coastal resources. The CHARM application can leverage local knowledge for better long-term planning, and is an ideal tool for communities, watersheds, and environmental projects.
	Responsible Agency:	Texas A&M AgriLife Extension Service.
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Home Program	Description:	The Texas Department of Housing and Community Affairs (TDHCA) administers the HOME Program on behalf of the state. The purpose of the program is to expand the supply of 328 State of Texas Hazard Mitigation Plan 2018 TDEM decent, safe, affordable housing and strengthen public-private housing partnerships between units of local governments, public housing authorities, nonprofits, and for profit entities. TDHCA has set aside funding for Disaster Relief and Persons with Disabilities, among others.
	Responsible Agency:	TDHCA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Texas Water Development Board (TWDB) – Flood Insurance Program	Description:	TWDB is the state agency charged with collecting and disseminating water-related data, assisting with regional planning, preparing the State Water Plan, which addresses the development of the state's water resources. The agency also administers cost-effective financial assistance programs for the construction of water supply, wastewater treatment, flood control and agricultural water conservation projects. The TWDB has made great strides in floodplain management since the last update to the 2013 SHMP. Examples include hiring full time staff to manage the State's Cooperating Technical Partner floodplain mapping program, developing a State Flood Plan (see below for information on both), and creating a website to assist citizens and first responders during a flood event (www.TexasFloods.org). The following is a list of programs available which may assist with flooding and the mitigation of Repetitive and Severe Repetitive Loss properties.



Capability	Details	
		TWDB's National Flood Insurance Program group conducts Community Assistance Visits (CAV), Community Assistance Contacts (CAC), and floodplain management training to assist communities with maintaining NFIP compliance and sound floodplain management practices. The CAV is a scheduled visit to an NFIP community for the purpose of conducting a comprehensive assessment of the community's floodplain management program and evaluating its knowledge and understanding of the requirements of the NFIP. The purpose of the CAV is also to assist the community in understanding NFIP requirements when program deficiencies are discovered. Floodplain Management 101 workshops are offered to local officials and other interested parties which cover the NFIP and various flood loss reduction techniques and strategies, such as the Community Rating System (CRS). The workshops contain training modules on the Texas Water Code, Elevation Certificates, FEMA requirements, community awareness, map reading, permitting, and ordinance comprehension.
	Responsible Agency:	TWDB
	Provides Funding for Mitigation:	Yes
	Hazard:	Flood
Cooperation Technical Partners (CTP)	Description:	TWDB also administers the FEMA Cooperating Technical Partners (CTP) Program, which allows communities, tribal nations, universities, and regional and state agencies to be active partners in FEMA's flood hazard mapping program. The CTP program at the state level aims to produce flood risk information through leveraging state and local funds, updated flood risk products, and coordination between statewide cooperating technical partners.
	Responsible Agency:	TWDB
	Provides Funding for Mitigation:	No
	Hazard:	Flood
Fund Development Program	Description:	TWDB also administers the Fund Development Program to provide loans for the planning, design, and construction of water supply, wastewater, and flood control projects. Structural flood protection improvements may include construction of storm water retention basins, the enlargement of stream channels public beach re-nourishment, the control of coastal erosion, and the modification or reconstruction of bridges. Non-structural flood protection improvements may include the acquisition of floodplain properties for use as public open space, the acquisition and removal of buildings and residents located within a floodplain, flood warning systems, and the development of floodplain management plans. The agency conducts an environmental review for all construction projects.
	Responsible Agency:	TWDB
	Provides Funding for Mitigation:	Yes
	Hazard:	Flood
Texas Natural Resources Information System (TNRIS)	Description:	The Texas Natural Resources Information System (TNRIS) is a division of TWDB, and is responsible for producing, archiving, and distributing geographic data to agencies, businesses, and the public. TNRIS supports hazard mitigation planning and implementation in three ways: • Provides data to organizations for planning or response activities. • Develops, locates, and prepares data for specific needs and/or projects. • Updates the State Critical Facility Database.
	Responsible Agency:	TWDB
	Provides Funding for Mitigation:	No
	Hazard:	All Hazards
Texas Flash Flood Coalition	Description:	The TFFC is an organization dedicated to decreasing the number of deaths caused by flash flooding in Texas. More than 30 representatives of higher education, media, private industry, local, state, and federal governments participate in the coalition. Its strategy is to: • Brainstorm and share ideas, data, resources, and best practices • Include a diversity of folks from all levels of education, the public, private entities, and academia • Attack the flash flood problem with mitigation, research, technology, education, awareness, warning, and communication
	Responsible Agency:	Works with the Texas Floodplain Management Association



Capability	Details	
Community Hazard Analysis and Mitigation Planning Support (CHAMPS)	Provides Funding for Mitigation:	No
	Hazard:	Flood, Flash Flood
	Description:	The CHAMPS reports are summarized descriptions of historical hazard events and future hazard risks for each county in Texas. These have been developed by the Texas Geographic Society in a project funded by FEMA and administered by TDEM. CHAMPS reports have been developed to provide local mitigation planners with data, maps, and other information they can use to support the hazard assessment portion of the mitigation planning process. Each report includes information on county populations and built environments, historical losses from multiple hazards, and expected future likelihood of more hazard events. Also included with every hazard is a comparative display showing how the number of hazard events in that county compares with the number of events in other counties for that hazard over the same timeframe.
	Responsible Agency:	Texas Geographic Society
	Provides Funding for Mitigation:	No
Urban Tree Canopy Project – Resilient Landscapes Program	Hazard:	All Hazards
	Description:	TFS has programs and funding opportunities, such as the Urban Tree Canopy Project, that address mitigation by decreasing impact from summer heat, flooding, and erosion. The Fire-Adapted Communities Program provides cost-share funds to assist in informing and preparing citizens to safely co-exist with wildland fire. The Resilient Landscapes Program provides cost-share reimbursement funds to restore healthy, fire-adapted ecosystems. The Firewise USA Program provides cost-share funds in cooperation with the National Fire Protection Administration to encourage homeowners to take individual responsibility for protecting their homes from the risk of wildfire.
	Responsible Agency:	Texas A&M Forest Service
	Provides Funding for Mitigation:	No
	Hazard:	Wildfires
Texas Department of Licensing and Regulation	Description:	Licenses and regulates weather modification programs and hosts the Texas Weather Modification and Advisory Committee meetings. Cloud seeding projects designed to increase rainfall from convective cloud towers are conducted in nearly 31 million acres of Texas. In administering the Texas Weather Modification Act, TDLR's weather modification program issues license and permits for projects using specialized aircraft and sophisticated weather radar systems at sites near Amarillo, San Angelo, and Pleasanton. TDLR also issues permit for hail suppression projects.
	Responsible Agency:	TDLR
	Provides Funding for Mitigation:	No
	Hazard:	Drought
	Description:	TXDOT incorporates tornado safe rooms into their Safe Rest Stops program through a federally-funded Transportation Enhancement program (See Section 6.3). TXDOT also revises its design manual to include improved guidance on NFIP requirements. The agency supports the effort to certify floodplain managers by encouraging all their personnel to become certified. All engineers in TxDOT's central hydraulics branch are certified.
Texas Department of Transportation	Responsible Agency:	TxDOT
	Provides Funding for Mitigation:	No
	Hazard:	Flood
	Description:	TDEM, through the Hazard Mitigation Assistance (HMA) grants, began offering a rebate incentive for builders and homeowners to build or install residential safe rooms. This program is implemented by local units of government that choose to administer the program through a grant provided through the HMGP or PDM program. TDEM has also published a residential safe room handbook to assist local jurisdictions with the implementation of the program. This program has raised the viability and the visibility of safe rooms in high tornado/windstorm regions of Texas.
	Responsible Agency:	TDEM
Texas Residential Safe Room Rebate Program	Provides Funding for Mitigation:	Yes
	Hazard:	Tornado, Windstorm
	Description:	



5.3 ADMINISTRATIVE AND TECHNICAL CAPABILITIES

Table 6-3 summarizes the administrative and technical capabilities in Galveston County. Detailed information regarding administrative and technical capabilities in the County and the municipalities can be found in each jurisdictional annex found in Volume II, Section 9 (Jurisdictional Annexes).

Table 5-3. Administrative and Technical Capability – County and Local

Capability	Details	
Road and Bridge Department	Description:	The Road and Bridge Department is responsible for the maintenance of all county roads, road drainage, bridges and bridge class culverts and road signage. Road signs are maintained to the TMUTCD standard and inspections are completed regularly. The maintenance of county roads includes the reclamation of existing materials, placing new materials, surface treatments, and paving. The Road and Bridge Department is responsible for debris management for post disaster events and emergencies. The Department's administrative responsibilities include providing customer service, departmental budgeting and procurement, correspondence, maintenance documentation and other administrative services.
		Goals & Objectives • Provide the highest level of customer service by meeting the needs of the public traveling the county roads. • Provide the highest level of quality while controlling cost and expenditures, detail maintenance records for all roads, drainage systems, bridges, and signage. • Provide assistance within Galveston County to cities, villages and other entities for road rehabilitation and drainage work through Inter-local Agreements.
	Responsible Agency:	County
	Provides Funding for Mitigation:	No
Parks and Cultural Services Department	Hazard:	Flood, Hurricane, Severe Winter Storm
	Description:	Galveston County parks are host to more than a half-million residents and visitors each year and home to a wealth of wildlife. Within the Galveston County parks system there is approximately 1,500 wonderful acres of recreational parkland nestled in the county's neighborhoods for residents and visitors to enjoy. There are currently 20 parks and three undeveloped parkland areas, 10 public boat ramps, countless amenities and an impressive assortment of indoor and outdoor rental facilities that are easily accessible and expertly managed and maintained. The Parks Department also oversees the County's Senior Program.
	Responsible Agency:	County
	Provides Funding for Mitigation:	No
Facilities and Maintenance Department	Hazard:	Flood
	Description:	The Department's mission is to provide a safe and comfortable environment for all employees and visitors to the Galveston County facilities. To maximize the efficiency and life span of all equipment and building systems associated with the facilities.
	Responsible Agency:	County
	Provides Funding for Mitigation:	No
Office of Emergency Management	Hazard:	No
	Description:	Galveston County's state-of-the-art emergency operations facility came online in October 2005 and was the first in the nation to combine a National Weather Service office with an emergency management department of local government. The 23,500-square-foot building was designed to withstand a Category 5 hurricane. Each county is required to maintain an emergency management program or participate in an inter-jurisdictional emergency management program as defined in Section 418.102 of the Texas Government Code. Chapter 418 of the Texas Government Code is also referred to as the Texas Disaster Act of 1975. The county is selected to be the "first



Capability	Details	
		channel” through which municipalities request resources when their own resources have been depleted. The county forwards any resource requests beyond county capabilities to the state. The EMO facility provides Galveston County with a sustainable central location for the county during the emergency management cycle. Rather than operating from multiple facilities to get the job done, emergency operations and resource procurement can take place with county employees face-to-face rather than wasting time with phone calls and e-mails. Saving time during an emergency ultimately saves money.
	Responsible Agency:	County
	Provides Funding for Mitigation:	No
	Hazard:	All Hazards
Department of Engineering and Right of Way	Description:	The Engineering and Right of Way Department is responsible for reviewing building permit applications for consistency with the Building Code, Flood Regulations, Dune Protection, Drainage, and Erosion Response Plan. The Department enforces the Subdivision regulations and issues Road Crossing permits.
	Responsible Agency:	County
	Provides Funding for Mitigation:	No
	Hazard:	Flood, Hurricane

5.4 FISCAL CAPABILITIES

Fiscal capabilities are the resources that a jurisdiction has access to or is eligible to use to fund mitigation actions. The table below provides a list of programs, descriptions, and links for those jurisdictions seeking funding sources. This table is not intended to be a comprehensive list, but rather a tool to help begin identifying potential sources of funding.

Table 5-4. Fiscal Capabilities

Capability	Details	
Federal		
Hazard Mitigation Grant Program	Description:	The HMGP is a post-disaster mitigation program. It is made available to states by FEMA after each Federal disaster declaration. The HMGP can provide up to 75% funding for hazard mitigation measures. The HMGP can be used to fund cost-effective projects that will protect public or private property in an area covered by a federal disaster declaration or that will reduce the likely damage from future disasters. Examples of projects include acquisition and demolition of structures in hazard prone areas, flood-proofing, or elevation to reduce future damage, minor structural improvements, and development of state or local standards. Projects must fit into an overall mitigation strategy for the area identified as part of a local planning effort. All applicants must have a FEMA-approved Hazard Mitigation Plan (this plan).
		Applicants who are eligible for the HMGP are state and local governments, certain nonprofit organizations or institutions that perform essential government services, and Indian tribes and authorized tribal organizations. Individuals or homeowners cannot apply directly for the HMGP; a local government must apply on their behalf. Applications are submitted to TDEM and placed in rank order for available funding and submitted to FEMA for final approval. Eligible projects not selected for funding are placed in an inactive status and may be considered as additional HMGP funding becomes available.
		For additional information regarding HMGP, please refer to: https://www.fema.gov/hazard-mitigation-grant-program
	Responsible Agency:	FEMA



Capability	Details	
Flood Mitigation Assistance Program	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
	Description:	The FMA program combines the previous Repetitive Flood Claims and Severe Repetitive Loss Grants into one grant program. The FMA provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. The FMA is funded annually; no federal disaster declaration is required. Only NFIP insured homes and businesses are eligible for mitigation in this program. Funding for FMA is very limited and, as with the HMGP, individuals cannot apply directly for the program. Applications must come from local governments or other eligible organizations. The federal cost share for an FMA project is at least 75 percent. For the non-federal share, at most 25 percent of the total eligible costs must be provided by a non-federal source; of this 25 percent, no more than half can be provided as in-kind contributions from third parties. At minimum, a FEMA-approved local flood mitigation plan is required before a project can be approved. The FMA funds are distributed from FEMA to the state. TDEM serves as the grantee and program administrator for the FMA program. The FMA program is detailed on the FEMA website: https://www.fema.gov/flood-mitigation-assistance-grant-program .
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
Building Resilient Infrastructure and Communities Program	Hazard:	Flood, Severe Weather
	Description:	Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the existing Pre-Disaster Mitigation (PDM) program. The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency. For additional information regarding the BRIC program, please refer to: https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Extraordinary Circumstances	Description:	For PDM and FMA project subawards, the (FEMA) Region may apply extraordinary circumstances when justification is provided and with concurrence from FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) prior to granting an exception. If this exception is granted, a local mitigation plan must be approved by FEMA within 12 months of the award of the project subaward to that community. For HMGP, PDM, and FMA, extraordinary circumstances exist when a determination is made by the Applicant and FEMA that the proposed project is consistent with the priorities and strategies identified in the State (Standard or Enhanced) Mitigation Plan and that the jurisdiction meets at least one of the criteria below. If the jurisdiction does not meet at least one of these criteria, the Region must coordinate with FEMA Headquarters (Risk Reduction and Risk Analysis Divisions) for HMGP; however, for PDM and FMA the Region must coordinate and seek concurrence prior to granting an exception: •The jurisdiction meets the small, impoverished community criteria (see Part VIII, B.2). •The jurisdiction has been determined to have had insufficient capacity due to lack of available funding, staffing, or other necessary expertise to satisfy the mitigation planning requirement prior to the current disaster or application deadline.



Capability	Details	
		•The jurisdiction has been determined to have been at low risk from hazards because of low frequency of occurrence or minimal damage from previous occurrences as a result of sparse development. •The jurisdiction experienced significant disruption from a declared disaster or another event that impacts its ability to complete the mitigation planning process prior to award or final approval of a project award. •The jurisdiction does not have a mitigation plan for reasons beyond the control of the State, federally-recognized tribe, or local community, such as Disaster Relief Fund restrictions that delay FEMA from granting a subaward prior to the expiration of the local or Tribal Mitigation Plan. For HMGP, PDM, and FMA, the Applicant must provide written justification that identifies the specific criteria or circumstance listed above, explains why there is no longer an impediment to satisfying the mitigation planning requirement, and identifies the specific actions or circumstances that eliminated the deficiency. When an HMGP project funding is awarded under extraordinary circumstances, the Recipient shall acknowledge in writing to the Regional Administrator that a plan will be completed within 12 months of the subaward. The Recipient must provide a work plan for completing the local or Tribal Mitigation Plan, including milestones and a timetable, to ensure that the jurisdiction will complete the plan in the required time. This requirement shall be incorporated into the award (both the planning and project subaward agreements, if a planning subaward is also awarded).
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Individual Assistance	Description:	Individual Assistance (IA) provides help for homeowners, renters, businesses, and some non-profit entities after disasters occur. This program is largely funded by the U.S. Small Business Administration. For homeowners and renters, those who suffered uninsured or underinsured losses could be eligible for a Home Disaster Loan to repair or replace damaged real estate or personal property. Renters are eligible for loans to cover personal property losses. Individuals are allowed to borrow up to \$200,000 to repair or replace real estate, \$40,000 to cover losses to personal property, and an additional 20 percent for mitigation. For businesses, loans could be made to repair or replace disaster damages to property owned by the business, including real estate, machinery and equipment, inventory, and supplies. Businesses of any size are eligible. Non-profit organizations, such as charities, churches, and private universities are eligible. An Economic Injury Disaster Loan provides necessary working capital until normal operations resume after a physical disaster but are restricted by law to small businesses only. IA is detailed on the FEMA website: https://www.fema.gov/individual-disaster-assistance .
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Public Assistance	Description:	Public Assistance (PA) provides cost reimbursement aid to local governments (state, county, local, municipal authorities, and school districts) and certain non-profit agencies that were involved in disaster response and recovery programs or that suffered loss or damage to facilities or property used to deliver government-like services. This program is largely funded by FEMA with both local and state matching contributions required. PA is detailed on the FEMA website: https://www.fema.gov/public-assistance-local-state-tribal-and-non-profit .
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards



Capability	Details	
Department of Homeland Security Grant Program	Description:	The Homeland Security Grant Program (HSGP) plays an important role in the implementation of the National Preparedness System by supporting the building, sustainment, and delivery of core capabilities essential to achieving the National Preparedness Goal of a secure and resilient nation. In FY 2019, the total amount of funds available under HSGP was \$1.095 billion. HSGP is comprised of three interconnected grant programs including the State Homeland Security Program, Urban Areas Security Initiative (UASI), and the Operation Stonegarden. Together, these grant programs fund a range of preparedness activities, including planning, organization, equipment purchase, training, exercises, and management and administration. Additional information regarding HSGP is available on the website: https://www.fema.gov/homeland-security-grant-program .
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Fire Management Assistance Grant Program	Description:	Assistance for the mitigation, management, and control of fires on publicly or privately-owned forests or grasslands that threaten such destruction as would constitute a major disaster. Provides a 75% federal cost share and the state pays the remaining 25% for actual cost. Information on this program is available on the website: https://www.fema.gov/fire-management-assistance-grant-program .
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
	Hazard:	Wildfire
Assistance to Firefighters Grant Program	Description:	The primary goal of the Assistance to Firefighters Grants is to enhance the safety of the public and firefighters with respect to fire-related hazards by providing direct financial assistance to eligible fire departments, nonaffiliated Emergency Medical Services organizations, and State Fire Training Academies. This funding is for critically needed resources to equip and train emergency personnel to recognized standards, enhance operations efficiencies, foster interoperability, and support community resilience. Information regarding this grant program is available on the website: https://www.fema.gov/welcome-assistance-firefighters-grant-program .
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
	Hazard:	Wildfire
High Hazard Potential Dams Grant Program	Description:	The Rehabilitation of High Hazard Potential Dams Grant Program provides technical, planning, design, and construction assistance in the form of grants to non-Federal governmental organizations or nonprofit organizations for rehabilitation of eligible high hazard potential dams. Information regarding this program is available on the website: https://www.grants.gov/web/grants/view-opportunity.html?oppId=316238 .
	Responsible Agency:	FEMA
	Provides Funding for Mitigation:	Yes
	Hazard:	Flood
Small Business Administration Loan	Description:	The Small Business Administration (SBA) provides low-interest disaster loans to homeowners, renters, business of all sizes, and most private nonprofit organizations. SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.



Capability	Details	
		Homeowners could apply for up to \$200,000 to replace or repair their primary residence. Renters and homeowners could borrow up to \$40,000 to replace or repair personal property-such as clothing, furniture, cars, and appliances that were damaged or destroyed in a disaster. Physical disaster loans of up to \$2 million are available to qualified businesses or most private nonprofit organizations. Additional information regarding SBA loans is available on the SBA website: https://www.sba.gov/managing-business/running-business/emergency-preparedness/disaster-assistance .
	Responsible Agency:	SBA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Community Development Block Grant Program	Description:	CDBG are federal funds intended to provide low and moderate-income households with viable communities, including decent housing, a suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, roads and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, and planning and administration. Public improvements could include flood and drainage improvements. In limited instances and during the times of “urgent need” (e.g., post disaster) as defined by the CDBG National Objectives, CDBG funding could be used to acquire a property located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event. Additional information regarding CDBG is available on the website: https://www.hudexchange.info/programs/cdbg-entitlement/ .
	Responsible Agency:	HUD
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Federal Highway Administration-Emergency Relief	Description:	The Federal Highway Administration (FHWA) Emergency Relief is a grant program through the U.S. Department of Transportation (DOT) that can be used for repair or reconstruction of federal-aid highways and roads on federal lands that have suffered serious damage as a result of a disaster. New Jersey Department of Transportation serves as the liaison between local municipalities and FHWA. Additional information regarding the FHWA Emergency Relief Program is available on the website: https://www.fhwa.dot.gov/programadmin/erelief.cfm .
	Responsible Agency:	U.S. DOT
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Federal Transit Administration - Emergency Relief	Description:	The Federal Transit Authority (FTA) Emergency Relief is a grant program that funds capital projects to protect, repair, reconstruct, or replace equipment and facilities of public transportation systems. Administered by the Federal Transit Authority at the U.S. DOT and directly allocated to Metropolitan Transit Authority (MTA) and Port Authority, this transportation-specific fund was created as an alternative to FEMA PA. Currently, a total of \$5.2 billion has been allocated to New Jersey-related entities. Additional information regarding the FTA Emergency Relief Program is available on the website: https://www.transit.dot.gov/funding/grant-programs/emergency-relief-program/emergency-relief-program .
	Responsible Agency:	U.S. DOT
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards



Capability	Details	
Disaster Housing Program	Description:	Emergency assistance for housing, including minor repair of home to establish livable conditions, mortgage, and rental assistance available through the U.S. Department of Housing and Urban Development (HUD). Information on this program is available on the website: https://www.hud.gov/program_offices/public_indian_housing/publications/dhap .
	Responsible Agency:	HUD
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
HOME Investment Partnerships Program	Description:	Grants to local and state government and consortia for permanent and transitional housing, (including financial support for property acquisition and rehabilitation for low income persons). Information on this program is available on the website: https://www.hud.gov/program_offices/comm_planning/affordablehousing/programs/home/ .
	Responsible Agency:	HUD
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
HUD Disaster Recovery Assistance	Description:	Grants to fund gaps in available recovery assistance after disasters (including mitigation). Information on this program is available on the website: https://www.hud.gov/info/disasterresources .
	Responsible Agency:	HUD
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Section 108 Loan Guarantee	Description:	Enables states and local governments participating in the CDBG program to obtain federally guaranteed loans for disaster-distressed areas. Information on this program is available on the website: https://www.hudexchange.info/programs/section-108/ .
	Responsible Agency:	HUD
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Smart Growth Implementation Assistance program	Description:	The Smart Growth Implementation Assistance (SGIA) program through the U.S. Environmental Protection Agency (EPA) focuses on complex or cutting-edge issues, such as stormwater management, code revision, transit-oriented development, affordable housing, infill development, corridor planning, green building, and climate change. Applicants can submit proposals under 4 categories: community resilience to disasters, job creation, the role of manufactured homes in sustainable neighborhood design, or medical and social service facilities siting. Information on this program is available on the website: https://www.epa.gov/smartgrowth .
	Responsible Agency:	EPA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Partners for Fish and Wildlife	Description:	Financial and technical assistance to private landowners interested in pursuing restoration projects affecting wetlands and riparian habitats. Information on this program is available on the website: https://www.fws.gov/partners/ .
	Responsible Agency:	U.S. Fish and Wildlife Service
	Provides Funding for Mitigation:	Yes
	Hazard:	All Natural Hazards
	Description:	Investing in critical road, rail, transit, and port projects across the nation. Information on this program is available on the website: https://www.transportation.gov/tags/tiger-grants .



Capability	Details	
Transportation Investment Generating Economic Recovery (TIGER)	Responsible Agency:	U.S. DOT
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Community Facilities Direct Loan & Grant Program	Description:	This program provides affordable funding to develop essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area, and does not include private, commercial, or business undertakings. Information on this program is available on the website: https://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program .
	Responsible Agency:	USDA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Emergency Loan Program	Description:	USDA's Farm Service Agency provides emergency loans to help producers recover from production and physical losses due to drought, flooding, other natural disasters, or quarantine. Information on this program is available on the website: https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/emergency-farm-loans/index .
	Responsible Agency:	USDA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Natural Hazards
Emergency Watershed Protection program	Description:	The Emergency Watershed Protection (EWP) program provides assistance to relieve imminent hazards to life and property caused by floods, fires, drought, windstorms, and other natural occurrences through the Natural Resources Conservation Service. Information on this program is available on the website: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/ .
	Responsible Agency:	USDA
	Provides Funding for Mitigation:	Yes
	Hazard:	All Natural Hazards
Financial Assistance	Description:	Financial assistance to help plan and implement conservation practices that address natural resource concerns or opportunities to help save energy, improve soil, water, plant, air, animal and related resources on agricultural lands and non-industrial private forest land. Information on this program is available on the website: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/ .
	Responsible Agency:	NRCS
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Emergency Management Performance Grants (EMPG) Program	Description:	Assist local, tribal, territorial, and state governments in enhancing and sustaining all-hazards emergency management capabilities. Information on this program is available on the website: https://www.fema.gov/emergency-management-performance-grant-program .
	Responsible Agency:	U.S. DHS
	Provides Funding for Mitigation:	Yes
	Hazard:	All Hazards
Reimbursement for Firefighting on Federal Property	Description:	Provides reimbursement only for direct costs and losses over and above normal operating costs. Information on this program is available on the website: https://www.usfa.fema.gov/grants/firefighting_federal_property.html .
	Responsible Agency:	U.S. DHS



Capability	Details	
Land & Water Conservation Fund	Provides Funding for Mitigation:	Yes
	Hazard:	Wildfire
	Description:	Matching grants to states and local governments for the acquisition and development of public outdoor recreation areas and facilities (as well as funding for shared federal land acquisition and conservation strategies). Information on this program is available on the website: https://www.nps.gov/subjects/lwcf/index.htm .
	Responsible Agency:	National Park Service
	Provides Funding for Mitigation:	Yes
State	Hazard:	All Natural Hazards
	Description:	The TWDB offers a variety of cost-effective loan and grant programs that provide for the planning, acquisition, design, and construction of water related infrastructure and other water quality improvements
	Responsible Agency:	Texas Water Development Board
	Provides Funding for Mitigation:	Yes
	Hazard:	Flooding
Texas A&M Forest Service Prescribed Burn Grants	Description:	Texas A&M Forest Service offers grants to landowners to complete prescribed fires on private land. Each grant targets landowners in different priority areas across the state.
	Responsible Agency:	Texas A&M Forest Service
	Provides Funding for Mitigation:	Yes
	Hazard:	Wildfire
Flood Control Dam Infrastructure Projects - Supplemental Funding	Description:	Projects to repair and rehabilitate flood control structures across Texas will now be funded due to a \$150 million appropriations bill legislators passed this session.
	Responsible Agency:	Texas State Soil and Water Conservation Board
	Provides Funding for Mitigation:	Yes
	Hazard:	Flooding, Dam Failure
Flood Infrastructure Fund (FIF)	Description:	FIF program provides financial assistance in the form of loans and grants for flood control, flood mitigation, and drainage projects
	Responsible Agency:	Texas Water Development Board
	Provides Funding for Mitigation:	Yes
	Hazard:	Flooding
TEXAS COASTAL MANAGEMENT PROGRAM GRANT	Description:	Funding for projects that address environmental concerns and promote economic development within the Texas coastal zone.
	Responsible Agency:	Texas General Land Office
	Provides Funding for Mitigation:	Yes
	Hazard:	Erosion and Flooding
Texas Farm and Ranch Lands Conservation Program (TFRLCP)	Description:	Funding conserves natural resources by protecting working lands from fragmentation and development. TFRLCP maintains and enhances the ecological and agricultural productivity of these lands through Agricultural Conservation Easements.
	Responsible Agency:	Texas Parks and Wildlife



Capability	Details	
	Provides Funding for Mitigation:	Yes
	Hazard:	Flooding



5.5 PLAN INTEGRATION

Described earlier in this section and within each annex, participating jurisdictions identified integration of hazard risk management into their existing planning, regulatory, and operational/administrative framework (“integration capabilities”) and intended integration promotion (integration actions). Volume II, Section 9 (Jurisdictional Annexes) provides details on how each jurisdiction integrates hazard mitigation into their existing capabilities.

5.5.1 Integration Process

Hazard mitigation is a sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Integrating hazard mitigation into a community’s existing plans, policies, codes, and programs leads to development patterns that do not increase risk from known hazards or leads to redevelopment that reduces risk from known hazards. The Galveston County Planning Partnership was tasked with identifying how hazard mitigation is integrated into existing planning mechanisms. Section 9 (Jurisdictional Annexes) details how this is done for each participating municipality and the County. During this process, many municipalities recognized the importance and benefits of incorporating hazard mitigation into future municipal planning and regulatory processes and have added new mitigation actions to support this effort.

The Planning Partnership representatives will continue to incorporate mitigation planning as an integral component of daily government operations. Planning Partnership representatives will continue to work with local government officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. Further, the sample adoption resolution presented in Appendix A (Plan Adoption) includes a resolution item stating the intent of the local governing body to incorporate mitigation planning as an integral component of government and partner operations. By doing so, the Planning Partnership anticipates that:

1. Hazard mitigation planning will be formally recognized as an integral part of overall planning and emergency management efforts.
2. The Hazard Mitigation Plan, Master Plans, Emergency Management Plans, and other relevant planning mechanisms will become mutually supportive documents that work in concert to meet the goals and needs of County residents.

Section 7 (Plan Maintenance) provides for additional information on the implementation of the mitigation plan through existing programs.



SECTION 6. MITIGATION STRATEGY

6.1 INTRODUCTION

This section presents mitigation actions for Galveston County to reduce potential exposure and losses identified as concerns in the Risk Assessment (Section 5). The County and planning partnership reviewed the risk assessment to identify and develop these mitigation actions, which are presented herein.

This section includes:

- Background and Past Mitigation Accomplishments
- General Mitigation Planning Approach
- Strengths, Weaknesses, Obstacles, and Opportunities
- Review and Update of Mitigation Goals and Objectives
- Plan Integration
- Mitigation Strategy Development and Update

Hazard mitigation reduces the potential impacts of, and costs associated with, emergency and disaster-related events. Mitigation actions address a range of impacts, including impacts on the population, property, the economy, and the environment.

Mitigation actions can include activities such as: revisions to land-use planning, training and education, and structural and nonstructural safety measures.

6.2 BACKGROUND AND PAST MITIGATION ACCOMPLISHMENTS

In accordance with DMA 2000 requirements, a discussion regarding past mitigation activities and an overview of past efforts is provided as a foundation for understanding the mitigation goals, objectives, and activities outlined in this HMP. The County, through previous and ongoing hazard mitigation activities, has demonstrated that it is pro-active in protecting its physical assets and citizens against losses from natural and human-caused hazards. Examples of previous and ongoing actions, projects and capabilities include the following:

- The County participated in the development of the 2017 Mitigation Plan and facilitated the 2022 Update, which included the participation of all municipal governments in the County. The current planning process represents the regulatory five-year local plan update process.
- All 11 municipalities in Galveston County participate in the National Flood Insurance Program (NFIP), which requires the adoption of FEMA floodplain mapping and certain minimum construction standards for building within the floodplain.
- Currently, 7 of the 11 municipalities in Galveston County are participants in NFIP Community Rating System (CRS) program.
 - Dickinson, 8
 - Friendswood, 7
 - Galveston (City), 6
 - Jamaica Beach, 8
 - Kemah, 8
 - League City, 5
 - Tiki Island, 7
- Many municipalities in Galveston County have adopted regulatory standards regarding land-use and zoning that exceed minimum requirements and provide the communities with greater capability to manage development without increasing hazard risk and vulnerability.



- Municipalities have participated on a limited basis in available mitigation grant funding opportunities to implement mitigation projects, including the following:
 - Elevation of private properties located in riverine and coastal areas
 - Mitigation reconstruction
 - Stormwater management in League City – culverts, diversions, storage, and detention/retention basins
 - Generators
 - The County is a recipient of a 2019 PDM grant for preparation of the 2022 Hazard Mitigation Plan
- The County and municipalities have implemented mitigation actions to protect critical facilities and infrastructure throughout the planning area. These actions and others were identified in the County’s Participation in the 2017 Hazard Mitigation Plan.
- TDEM supports Galveston County communities reduce their risk and increase their resilience. They provide a comprehensive program to support local jurisdictions as they assess the risks they face, plan to mitigate them, and fund those plans to implement mitigation projects that reduce risk across the County.
- In 2020, the County and local municipalities responded to and worked to mitigate the impacts of the coronavirus pandemic through education of the public, enforcement of local and state social distancing and masking measures, and establishment of best practices to slow the spread of Covid-19.

These past and ongoing activities have contributed to the County’s understanding of its hazard preparedness and future mitigation activity needs, costs, and benefits. These efforts provide an ongoing foundation for the planning partnership to use in developing this HMP update.

6.3 GENERAL MITIGATION PLANNING APPROACH

The overall approach used to update the County and local hazard mitigation strategies are based on FEMA and State of Texas regulations and guidance regarding local mitigation plan development, including:

- DMA 2000 regulations, specifically 44 CFR 201.6 (local mitigation planning).
- FEMA Local Mitigation Planning Handbook, March 2013.
- FEMA Local Mitigation Plan Review Guide, October 1, 2011.
- FEMA Integrating Hazard Mitigation into Local Planning, March 1, 2013.
- FEMA Plan Integration: Linking Local Planning Efforts, July 2015.
- FEMA Mitigation Planning How-To Guide #3, Identifying Mitigation Actions, and Implementing Strategies (FEMA 386-3), February 2013.
- FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards, January 2013.

The mitigation strategy update approach includes the following steps that are further detailed in later subsections of this section:

- Section 6.4 – Strengths, Weaknesses, Obstacles, and Opportunities (SWOO) exercise
- Section 6.5 – Review and update mitigation goals and objectives.
- Section 6.6 - Develop and prepare a mitigation strategy, including:
 - Review of the 2017 HMP mitigation actions
 - Identification of progress on previous county and local mitigation strategies
 - 2022 HMP Mitigation Action Plan
 - Mitigation best practices
 - Mitigation strategy evaluation and prioritization; and



- Benefit/cost review.

6.4 STRENGTHS, WEAKNESSES, OBSTACLES, AND OPPORTUNITIES EXERCISE

A Strengths, Weakness, Obstacles and Opportunities exercise (SWOO) was completed by the planning partnerships. Participants were asked to fill out the SWOO for each of the hazards of concern for the 2022 HMP update. The Planning partnership was asked to begin the exercise by identifying county, local, and stakeholder strengths to mitigate the risk and potential future impacts of the hazards. Next, the weaknesses, challenges, and obstacles the planning area faces to reduce each hazard's risk were identified. To conclude the discussion of each high-ranked hazard, the meeting attendees were asked to identify potential opportunities for enhanced mitigation. The results were compiled and presented to the planning partnership at the risk assessment presentation. The results were also used by the participants to help identify capabilities and potential mitigation actions. The following summarizes the general categories of potential opportunities identified during the exercise:

- Conduct surveys and assessments to provide current conditions so existing problems can be addressed before they become more severe.
- Standardized public information and outreach for the County and municipalities.
- Shared services throughout the County.
- The need for training for county and municipal staff.

6.5 REVIEW AND UPDATE OF MITIGATION GOALS AND OBJECTIVES

This section documents the efforts to update the guiding principles, and hazard mitigation goals and objectives established to reduce or avoid long-term vulnerabilities to the identified hazards.

6.5.1 Goals and Objectives

FEMA defines **Goals** as general guidelines that explain what should be achieved. Goals are usually broad, long-term, policy statements, and represent a global vision.

FEMA defines **Objectives** as strategies or implementation steps to attain mitigation goals. Unlike goals, objectives are specific and measurable, where feasible.

FEMA defines **Mitigation Actions** as specific actions that help to achieve the mitigation goals and objectives.

According to CFR 201.6(c)(3)(i): “The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.” Further, FEMA mitigation planning guidance recommends establishing objectives to better tie mitigation goals to specific mitigation strategies (e.g. projects, activities, and initiatives).

The goals established in the 2017 Galveston County Multi-Jurisdictional Hazard Mitigation Plan were presented to the Steering Committee and Planning Partnership for review and amendment throughout the planning process. This review was made with consideration of the hazard events and losses since the 2017 plan, the updated hazard profiles and vulnerability assessment, and the goals and objectives established in the updated 2018 State HMP.

The Steering Committee met on December 2, 2021 to review the 2017 goals and objectives and provided input on updated goals and objectives. These updates were presented to the Planning Partnership during the August 2021 Mitigation Strategy Workshop. As a result of these efforts, Table 6-1 presents Galveston County's updated



goals and objectives for the 2022 HMP update. *Italicized* text indicates the updates made to the goals and objectives from the 2017 HMP.

Table 6-1. Galveston County 2022 Hazard Mitigation Plan Goals and Objectives

2022 HMP Update Goals	2022 HMP Update Objectives
Goal 1: Minimize loss of life, injury, damage to property, the economy, and natural systems <i>from natural and human-caused hazard events</i>	1.1: Protect the life, health, and safety of residents
	1.2: Protect existing/new critical facilities and <i>community lifelines</i>
	1.3: Enforce regulatory measures to ensure <i>that current and new development will not put people in harm's way or increase threats to existing properties.</i>
	1.4: Provide backup power to critical facilities and <i>community lifelines</i>
	1.5: Minimize impacts from all hazards
	1.6: Build, enhance, and support partnerships <i>to continuously become less vulnerable to hazards</i>
Goal 2: Maintain and enhance emergency management/mitigation capabilities	2.1: Update/develop plans, studies, and mapping for all hazards of concern for the County
	2.2: Incorporate/improve hazard mitigation strategies into ordinances, plans and policies
	2.3: Conduct/develop drills/training for <i>all hazards of concern for the County</i>
	2.4: Implement and maintain the Galveston County Multi-Jurisdictional Hazard Mitigation Plan
	2.5: Participate in programs that promote hazard mitigation strategies
	2.6: Build, obtain, and maintain critical facilities, <i>community lifelines</i> , and equipment
Goal 3: Enhance and Maintain public education and awareness activities	3.1: Expand Public Outreach Campaigns for all hazards
	3.2: Promote and <i>encourage</i> disaster preparedness planning of <i>appropriate hazard mitigation measures for families</i>
Goal 4: Address long-term vulnerabilities from high hazard dams	4.1: <i>Ensure dam infrastructure is routinely inspected and maintained.</i>
	4.2: <i>Ensure Emergency Action Plans are developed and updated.</i>
	4.3: <i>Support the identification and access to funding to repair, replace, or decommission dams.</i>

6.6 MITIGATION STRATEGY DEVELOPMENT AND UPDATE

As required by FEMA, the County and participating municipalities completed a comprehensive evaluation of the mitigation strategies and actions from the 2017 HMP and reported on the status of each. Their update may be found in each jurisdictional annex (Section 9). In addition, the County and participating municipalities were provided the opportunity to include new strategies or actions to include in the 2022 HMP Update. New actions were prioritized to ensure they are cost-effective, environmentally sound, and technically feasible using the methodology outlined below.

6.6.1 Review of the 2017 HMP Mitigation Action Plan

To evaluate progress on local mitigation actions, the planning consultant met with each participant to discuss the status of the mitigation actions identified in the 2017 plan. For each action, jurisdictions were asked to provide the status of each action (*No Progress*, *In Progress*, *Ongoing Capability*, *Discontinue*, or *Completed*) and provide review comments on each. Jurisdictions were requested to quantify the extent of progress and provide reasons for the level of progress or why actions were being discontinued. Each jurisdictional annex in Section 9 (Jurisdictional Annexes) provides a table identifying the jurisdiction's prior mitigation strategy, the status of those actions and initiatives, and their disposition within their updated strategy.

Local mitigation actions identified as *Complete*, and those actions identified as *Discontinued*, were removed from the updated strategies. Local mitigation actions identified as an *Ongoing Capability* were incorporated into the capability assessment of each jurisdictional annex. Those actions identified as *No Progress* or *In Progress* that remain a priority for the jurisdiction, have been carried forward into the updated mitigation strategy. Actions identified as *Ongoing Capabilities* which are fully integrated into the normal operational and



administrative framework of the community have been identified within the capabilities section of each annex and removed from the updated mitigation strategy.

At the September kick-off meeting and during subsequent local-level planning meetings (phone, email), all participating jurisdictions were requested to identify mitigation activities completed, ongoing, and potential/proposed. As new potential mitigation actions, projects, or initiatives became evident during the plan update process, including as part of the risk assessment update and as identified through the public and stakeholder outreach process detailed in Section 2 (Planning Process), jurisdictions were made aware of these either through direct communication (local meetings, email, phone), at Steering and Planning Committee meetings, or via their draft jurisdictional annexes.

Throughout the planning process, the planning consultant worked directly with each community (phone, email) to assist with the development and update of their annex and include mitigation strategies, focusing on identifying well-defined, implementable projects with a careful consideration of benefits (risk reduction, losses avoided), costs, and possible funding sources (including mitigation grant programs).

6.6.2 Identification and Analysis of Mitigation Techniques

Concerted efforts were made to assure that municipalities develop updated mitigation strategies that included activities and initiatives covering the range of mitigation action types described in recent FEMA planning guidance (FEMA “Local Mitigation Planning Handbook” March 2013), specifically:

- Local Plans and Regulations - These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Projects - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection - These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs - These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as the National Flood Insurance Program and Community Rating System, StormReady (NOAA) and Firewise (NFPA) Communities.

6.6.3 2022 HMP Mitigation Action Plan

To help support the selection of an appropriate, risk-based mitigation strategy, each annex provides a summary of hazard vulnerabilities identified during the plan update process, either directly by municipal representatives, through review of available county and local plans and reports, and through the hazard profiling and vulnerability assessment process.

In December 2021, the planning partnership participated in a mitigation strategy development workshop, supplemented by emails and phone calls between jurisdictions and the contract consultant, for all participating jurisdictions to support the development of focused problem statements based on the impacts of natural hazards in the county and their communities. These problem statements were intended to provide a detailed description of the problem area, including its impacts to the municipality/jurisdiction; past damages; loss of service; etc. An effort was made to include the street address of the property/project location, adjacent streets, water bodies, and well-known structures as well as a brief description of existing conditions (topography, terrain, hydrology) of



the site. These problem statements formed a bridge between the hazard risk assessment which quantifies impacts to each community with the development of actionable mitigation strategies.

As discussed within the hazard profiles in Section 4.3 (Risk Assessment), the long-term effects of climate change are anticipated to exacerbate the impacts of weather-related hazards including flood, hurricanes and tropical storm, nor'easter, severe weather, severe winter weather and wildfire. By way of addressing these climate change-sensitive hazards within their local mitigation strategies and integration actions, communities are working to evaluate and recognize these long-term implications and potential impacts, and to incorporate in planning and capital improvement updates.

To assist with the development of mitigation actions, municipalities were provided with the following:

- 2022 HMP goals and objectives
- 2017 HMP mitigation strategy
- Risk assessment results
- Outcome of the SWOO
- Mitigation catalog
- Stakeholder and public input (e.g. citizen and stakeholder survey results)
- FEMA resources

A strong effort has been made to better focus local mitigation strategies to clearly defined, readily implementable projects and initiatives that meet the definition or characteristics of mitigation. Broadly defined mitigation actions were eliminated from the updated strategy unless accompanied by discrete actions, projects, or initiatives. Certain continuous or ongoing strategies that represent programs that are fully integrated into the normal operational and administrative framework of the community have been identified within the capabilities section of each annex and removed from the updated mitigation strategy.

Overall, a comprehensive range of specific mitigation initiatives were considered by each plan participant to pursue in the future to reduce the effects of hazards. Some of these initiatives may be

previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Throughout the course of the plan update process, additional regional and county-level mitigation actions were identified by the following processes:

- Review of the results and findings of the updated risk assessment.
- Review of available regional and county plans reports and studies.
- Direct input from county departments and other county and regional agencies
- Input received through the public and stakeholder outreach process.

6.6.4 Mitigation Best Practices

Catalogs of hazard mitigation best practices were developed that present a broad range of alternatives to be considered for use in Galveston County, in compliance with 44 CFR Section 201.6(c)(3)(ii). One catalog was developed for each natural hazard of concern evaluated in this plan; referred to as Appendix F (Mitigation Strategy Supplementary Data). The catalogs present alternatives that are categorized in two ways:

- By whom would have responsibility for implementation:
 - Individuals – personal scale
 - Businesses – corporate scale
 - Government – government scale
- By what each of the alternatives would do:
 - Manipulate the hazard
 - Reduce exposure to the hazard



- Reduce vulnerability to the hazard
- Build local capacity to respond to or be prepared for the hazard

The alternatives presented include actions that will mitigate current risk from hazards and actions that will help reduce risk from changes in the impacts of these hazards resulting from climate change. Hazard mitigation actions recommended in this plan were selected from among the alternatives presented in the catalog, as well as other resources made available to all jurisdictions (i.e., FEMA's Mitigation Ideas). The catalog provides a baseline of mitigation alternatives that are backed by a planning process, are consistent with the established goals and objectives, and are within the capabilities of the planning partners to implement. Some of these actions may not be feasible based on the selection criteria identified for this plan. The purpose of the catalog was to provide a list of what could be considered to reduce risk from natural hazards within the planning area. Actions in the catalog that are not included for the partnership's action plan were not selected for one or more of the following reasons:

- The action is not feasible
- The action is already being implemented
- There is an apparently more cost-effective alternative
- The action does not have public or political support.

6.6.5 Mitigation Strategy Evaluation and Prioritization

Section 201.c.3.iii of 44 CFR requires an action plan describing how the actions identified will be prioritized. Recent FEMA planning guidance (March 2013) identifies a modified STAPLEE (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) mitigation action evaluation methodology that uses a set of 10 evaluation criteria suited to the purposes of hazard mitigation strategy evaluation. This method provides a systematic approach that considers the opportunities and constraints of implementing a particular mitigation action.

Based on this guidance, the Steering Committee has adopted and applied an action evaluation and prioritization methodology which includes an expanded set of 14 criteria to include the consideration of cost-effectiveness, availability of funding, anticipated timeline, and if the action addresses multiple hazards.

The 14 evaluation/prioritization criteria used in the 2022 update process are:

- 1) **Life Safety** – How effective will the action be at protecting lives and preventing injuries?
- 2) **Property Protection** – How significant will the action be at eliminating or reducing damage to structures and infrastructure?
- 3) **Cost-Effectiveness** – Are the costs to implement the project or initiative commensurate with the benefits achieved?
- 4) **Technical** – Is the mitigation action technically feasible? Is it a long-term solution? Eliminate actions that, from a technical standpoint, will not meet the goals.
- 5) **Political** – Is there overall public support for the mitigation action? Is there the political will to support it?
- 6) **Legal** – Does the municipality have the authority to implement the action?
- 7) **Fiscal** – Can the project be funded under existing program budgets (i.e., is this initiative currently budgeted for)? Or would it require a new budget authorization or funding from another source such as grants?
- 8) **Environmental** – What are the potential environmental impacts of the action? Will it comply with environmental regulations?



- 9) **Social** – Will the proposed action adversely affect one segment of the population? Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
- 10) **Administrative** – Does the jurisdiction have the personnel and administrative capabilities to implement the action and maintain it or will outside help be necessary?
- 11) **Multi-hazard** – Does the action reduce the risk to multiple hazards?
- 12) **Timeline** – Can the action be completed in less than 5 years (within our planning horizon)?
- 13) **Local Champion** – Is there a strong advocate for the action or project among the jurisdiction’s staff, governing body, or committees that will support the action’s implementation?
- 14) **Other Local Objectives** – Does the action advance other local objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of other plans and programs?

Specifically, for each mitigation action, the jurisdictions were asked to assign a numeric rank (-1, 0, or 1) for each of the 14 evaluation criteria, defined as follows:

- 1 = Highly effective or feasible
- 0 = Neutral
- -1 = Ineffective or not feasible

Further, jurisdictions were asked to provide a summary of the rationale behind the numeric rankings assigned, as applicable. The numerical results were totaled to assist each jurisdiction in selecting mitigation actions for the updated plan.

As step one in the prioritization process, actions that had a numerical value between 0 and 4 were initially prioritized as low; actions with numerical values between 5 and 9 were initially categorized as medium; and actions with numerical values between 10 and 14 were initially categorized as high. As step two, jurisdictions were then asked to consider the benefits and costs, as well as the desired timeline for implementation and project completion timeline when finalizing each action’s priority as high/medium/low. These attributes are included in the mitigation strategy table and for FEMA-eligible projects in the mitigation worksheets (Section 9 – Jurisdictional Annexes).

For the plan update there has been an effort to develop more clearly defined and action-oriented mitigation strategies. These local strategies include projects and initiatives that are seen by the community as the most effective approaches to advance their local mitigation goals and objectives within their capabilities. In addition, each jurisdiction was asked to develop problem statements. With this process, participating jurisdictions were able to develop action-oriented and achievable mitigation strategies.

6.6.6 Benefit/Cost Review

Section 201.6.c.3iii of 44CFR requires the prioritization of the action plan to emphasize the extent to which benefits are maximized according to a cost/benefit review of the proposed projects and their associated costs. Stated otherwise, cost-effectiveness is one of the criteria that must be applied during the evaluation and prioritization of all actions comprising the overall mitigation strategy.

The benefit/cost review applied in for the evaluation and prioritization of projects and initiatives in this HMP update process was qualitative; that is, it does not include the level of detail required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) and Pre-Disaster Mitigation (PDM) grant programs. For all actions identified in the local strategies, jurisdictions have identified both the costs and benefits associated with project, action, or initiative.



Costs are the total cost for the action or project, and may include administrative costs, construction costs (including engineering, design and permitting), and maintenance costs.

Benefits are the savings from losses avoided attributed to the implementation of the project, and may include life-safety, structure and infrastructure damages, loss of service or function, and economic and environmental damage and losses.

When possible, jurisdictions were asked to identify the actual or estimated dollar value for project costs and associated benefits. Having defined costs and benefits allows a direct comparison of benefits versus costs, and a quantitative evaluation of project cost-effectiveness. Often, however, numerical costs and/or benefits have not been identified or may be impossible to quantitatively assess.

For the purposes of this planning process, jurisdictions were tasked with evaluating project cost-effectiveness with both costs and benefits assigned to “High”, “Medium” and “Low” ratings. Where quantitative estimates of costs and benefits were available, ratings/ranges were defined as:

- Low = < \$10,000
- Medium = \$10,000 to \$100,000
- High = > \$100,000

Where quantitative estimates of costs and/or benefits were not available, qualitative ratings using the following definitions were used:

Table 6-2. Qualitative Cost and Benefit Ratings

Costs	
High	Existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (e.g., bonds, grants, and fee increases).
Medium	The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Low	The project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.
Benefits	
High	Project will have an immediate impact on the reduction of risk exposure to life and property.
Medium	Project will have a long-term impact on the reduction of risk exposure to life and property or will provide an immediate reduction in the risk exposure to property.
Low	Long-term benefits of the project are difficult to quantify in the short term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly. For some of the Galveston County initiatives identified, the planning partnership may seek financial assistance under FEMA’s HMGP or Hazard Mitigation Assistance (HMA) programs. These programs require detailed benefit/cost analysis as part of the application process. These analyses will be performed when funding applications are prepared, using the FEMA BCA model process. The planning partnership is committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the planning partnership reserves the right to define “benefits” according to parameters that meet its needs and the goals and objectives of this HMP.



SECTION 7. PLAN MAINTENANCE

This section details the formal process that will ensure that the HMP remains an active and relevant document and that the Planning Partnership maintains their eligibility for applicable funding sources. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every five years. In addition, this section describes how public participation will be integrated throughout the plan maintenance and implementation process. It explains how the mitigation strategies outlined in this plan update will be incorporated into existing planning mechanisms and programs, such as comprehensive land use planning processes, capital improvement planning, and building code enforcement and implementation. The plan's format allows sections to be reviewed and updated when new data become available, resulting in a plan that will remain current and relevant.

The plan maintenance matrix shown in Table 7-1 provides a synopsis of responsibilities for plan monitoring, evaluation, and update, which are discussed in further detail in the sections below.

Table 7-1. Plan Maintenance Matrix

Task	Approach	Timeline	Lead Responsibility	Support Responsibility
Monitoring	Preparation of status updates and action implementation tracking as part of submission for Annual Progress Report.	Meet annually or upon major update to comprehensive plan or major disaster declaration	Jurisdictional points of contact identified in Section 8 (Planning Partnership) and Section 9 (Jurisdictional Annexes)	Jurisdictional implementation lead identified in Section 8 (Planning Partnership) and Section 9 (Jurisdictional Annexes)
Integration	In order for integration of mitigation principles action to become an organic part of the ongoing county and municipal activities, the County will incorporate the distribution of the safe growth worksheet for annual review and update by all participating jurisdictions.	September each year with interim email reminders to address integration in county and municipal activities.	HMP Coordinator and jurisdictional points of contact identified in Section 8 (Planning Partnership) and Section 9 (Jurisdictional Annexes)	HMP Coordinator
Evaluation	Review the status of previous actions as submitted by the monitoring task lead and support to assess the effectiveness of the plan; compile and finalize the Annual Progress Report	Finalized progress report completed by October 14 of each year	Planning Partnership; Plan Maintenance element	Jurisdictional points of contacts identified in Section 9 (Jurisdictional Annexes)
Update	Reconvene the planning partners, at a minimum, every 5 years to guide a comprehensive update to review and revise the plan.	Every 5 years or upon major update to Master Plan or major disaster	Galveston County HMP Coordinator	Jurisdictional points of contacts identified in Section 9 (Jurisdictional Annexes)

7.1 MONITORING, EVALUATING AND UPDATING THE PLAN

The procedures for monitoring, evaluating, and updating the plan are provided below.

The HMP Coordinator is assigned to manage the maintenance and update of the plan during its performance period. The HMP Coordinator will chair the Planning Partnership and be the prime point of contact for questions



regarding the plan and its implementation as well as to coordinate incorporation of additional information into the plan.

The Planning Partnership shall fulfill the monitoring, evaluation and updating responsibilities identified in this section which is comprised of a representative from each participating jurisdiction. Each jurisdiction is expected to maintain a representative on the Planning Partnership throughout the plan performance period (five years from the date of plan adoption). As of the date of this plan, primary and secondary mitigation planning representatives (points-of-contact) are identified in each jurisdictional annex in Section 9 (Jurisdictional Annexes). Each jurisdiction will participate in an annual meeting to update the status of their action plan and incorporate information, ideas, and strategies into their individual action plans.

Regarding the composition of the committee, it is recognized that individual commitments change over time, and it shall be the responsibility of each jurisdiction and its representatives to inform the HMP Coordinator of any changes in representation. The HMP Coordinator will strive to keep the committee makeup as a uniform representation of planning partners and stakeholders within the planning area.

Currently, the Galveston County HMP Coordinator is designated as:

Laura M. Norman, Deputy Emergency Management Coordinator
Galveston County Office of Emergency Management
281-309-5013 | laura.norman@co.galveston.tx.us

7.1.1 Monitoring

The Planning Partnership will be responsible for monitoring progress on, and evaluating the effectiveness of, the plan, and documenting annual progress. Each year, beginning one year after plan development, the Galveston County and local Planning Partnership representatives will collect and process information from the departments, agencies and organizations involved in implementing mitigation projects or activities identified in their jurisdictional annexes (Section 9) of this plan, by contacting persons responsible for initiating and/or overseeing the mitigation projects.

In the first year of the performance period, this will be accomplished by utilizing an online performance progress reporting system, the BAToolSM which will enable municipal and county representatives to directly access mitigation initiatives to easily update the status of each project, document successes or obstacles to implementation, add or delete projects to maintain mitigation project implementation. It is anticipated that all participating partners will be prompted by the tool to update progress annually, providing an incentive for participants to refresh their mitigation strategies and to continue implementation of projects. It is expected that this reporting system will support the submittal of an increased number of project grant fund applications due to the functionality of the system which facilitates the sorting and prioritization of projects.

In addition to progress on the implementation of mitigation actions, including efforts to obtain outside funding; and obstacles or impediments to implementation of actions, the information that Planning Partnership representatives shall be expected to document, as needed and appropriate include:

- Any grant applications filed on behalf of the participating jurisdictions,
- Hazard events and losses occurring in their jurisdiction,
- Additional mitigation actions believed to be appropriate and feasible,
- Public and stakeholder input, and
- Plan monitoring for two years 2 through 4 of the plan performance period will be similarly addressed via the BAToolSM or manually.



7.1.2 Integration Process of the HMP into Municipal Planning Mechanisms

Hazard mitigation is sustained action taken to reduce or eliminate the long-term risk to human life and property from natural hazards. Integrating hazard mitigation into a community's existing plans, policies, codes, and programs leads to development patterns that do not increase risk from known hazards or leads to redevelopment that reduces risk from known hazards. The Galveston County HMP Planning Partnership was tasked with identifying how hazard mitigation is integrated into existing planning mechanisms. Refer to Section 9 (Jurisdictional Annexes) for how this is done for each participating municipality. During this process, many municipalities recognized the importance and benefits of incorporating hazard mitigation into future municipal planning and regulatory processes.

The Planning Partnership representatives will incorporate mitigation planning as an integral component of daily government operations. They will work with local government officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. Further, the sample adoption resolution (Appendix A) includes a resolution item stating the intent of the local governing body to incorporate mitigation planning as an integral component of government and partner operations. By doing so, the Planning Partnership anticipates that:

1. Hazard mitigation planning will be formally recognized as an integral part of overall planning and emergency management efforts.
2. The Hazard Mitigation Plan, Comprehensive Plans, Emergency Management/Operations Plans and other relevant planning mechanisms will become mutually supportive documents that work in concert to meet the goals and needs of County residents.

During the HMP annual review process, each participating municipality will be asked to document how they are utilizing and incorporating the Galveston County HMP 2022 update into their day-to-day operations and planning and regulatory processes. Additionally, the County will identify additional policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions and include these findings and recommendations in the Annual HMP Progress Report. The following checklist was adapted from FEMA's Local Mitigation Handbook (2013), Appendix A, Worksheet 4.2. This checklist will help a community analyze how hazard mitigation is integrated into local plans, ordinances, regulations, ordinances, and policies. By completing the checklist, it will help the County identify areas that integrate hazard mitigation currently and where to make improvements and reduce vulnerability to future development. In this manner, the integration of mitigation into municipal activities will evolve into an ongoing culture within the County.

Table 7-2. Safe Growth Check List

Planning Mechanisms	Do you Do This?		Notes: How is it being done or how will this be utilized in the future?
	Yes	No	
Operating, Municipal and Capital Improvement Program Budgets			
When constructing upcoming budgets, hazard mitigation actions will be funded as budget allows. Construction projects will be evaluated to see if they meet the hazard mitigation goals.			
Annually, during adoption process, the municipality will review mitigation actions when allocating funding.			
Do budgets limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?			
Do infrastructure policies limit extension of existing facilities and services that would			



Planning Mechanisms	Do you Do This?		Notes: How is it being done or how will this be utilized in the future?
	Yes	No	
encourage development in areas vulnerable to natural hazards?			
Do budgets provide funding for hazard mitigation projects identified in the County HMP?			
Human Resource Manual			
Do any job descriptions specifically include identifying and/or implementing mitigation projects/actions or other efforts to reduce natural hazard risk?			
Building and Zoning Ordinances			
Prior to, zoning changes, or development permitting, the municipality will review the hazard mitigation plan and other hazard analyses to ensure consistent and compatible land use.			
Does the zoning ordinance discourage development or redevelopment within natural areas including wetlands, floodways, and floodplains?			
Does it contain natural overlay zones that set conditions			
Does the ordinance require developers to take additional actions to mitigate natural hazard risk?			
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?			
Do the ordinances prohibit development within, of filling of, wetlands, floodways, and floodplains?			
Subdivision Regulations			
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?			
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?			
Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?			
Do the regulations allow density transfers where hazard areas exist?			
Comprehensive Plan			
Are the goals and policies of the plan related to those of the County HMP?			
Does the future land use map clearly identify natural hazard areas?			
Do the land use policies discourage development or redevelopment with natural hazard areas?			
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?			
Land Use			



Planning Mechanisms	Do you Do This?		Notes: How is it being done or how will this be utilized in the future?
	Yes	No	
• Does the future land use map clearly identify natural hazard areas?			
• Do the land use policies discourage development or redevelopment with natural hazard areas?			
• Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?			
Transportation Plan			
• Does the transportation plan limit access to hazard areas?			
• Is transportation policy used to guide growth to safe locations?			
• Are transportation systems designed to function under disaster conditions (e.g. evacuation)?			
Environmental Management			
• Are environmental systems that protect development from hazards identified and mapped?			
• Do environmental policies maintain and restore protective ecosystems?			
• Do environmental policies provide incentives to development that is located outside protective ecosystems?			
Grant Applications			
• Data and maps will be used as supporting documentation in grant applications.			
Municipal Ordinances			
• When updating municipal ordinances, hazard mitigation will be a priority			
Economic Development			
• Local economic development group will take into account information regarding identified hazard areas when assisting new businesses in finding a location.			
Public Education and Outreach			
• Does the municipality have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events?			

7.1.3 Evaluating

The evaluation of the mitigation plan is an assessment of whether the planning process and actions have been effective, if the HMP goals are being achieved, and whether changes are needed. The HMP will be evaluated on an annual basis to determine the effectiveness of the programs, and to reflect changes that could affect mitigation priorities or available funding.

The status of the HMP will be discussed and documented at an annual plan review meeting of the Planning Partnership, to be held either in person or via teleconference approximately one year from the date of local adoption of this update, and successively thereafter. At least two weeks before the annual plan review meeting,



the Galveston County HMP Coordinator will advise Planning Partnership members of the meeting date, agenda, and expectations of the members.

The Galveston County HMP Coordinator will be responsible for calling and coordinating the annual plan review meeting and Soliciting input regarding progress toward meeting plan goals and objectives. These evaluations will assess whether:

- Goals and objectives address current and expected conditions.
- The nature or magnitude of the risks has changed.
- Current resources are appropriate for implementing the HMP and if different or additional resources are now available.
- Actions were cost effective.
- Schedules and budgets are feasible.
- Implementation problems, such as technical, political, legal or coordination issues with other agencies are presents.
- Outcomes have occurred as expected.
- Changes in County resources impacted plan implementation (e.g., funding, personnel, and equipment)
- New agencies/departments/staff should be included, including other local governments as defined under 44 CFR 201.6.

Specifically, the Planning Partnership will review the mitigation goals, objectives, and activities using performance-based indicators, including:

- New agencies/departments
- Project completion
- Under/overspending
- Achievement of the goals and objectives
- Resource allocation
- Timeframes
- Budgets
- Lead/support agency commitment
- Resources
- Feasibility

Finally, the Planning Partnership will evaluate how other programs and policies have conflicted or augmented planned or implemented measures, and shall identify policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions (“Implementation of Mitigation Plan through Existing Programs” subsection later in this section discusses this process). Other programs and policies can include those that address:

- Economic development
- Environmental preservation
- Historic preservation
- Redevelopment
- Health and/or safety
- Recreation
- Land use/zoning
- Public education and outreach



- **Transportation**

The Planning Partnership should refer to the evaluation forms, Worksheets #2 and #4 in the FEMA 386-4 guidance document, to assist in the evaluation process (see Appendix F – Plan Maintenance). Further, the Planning Partnership should refer to any process and plan review deliverables developed by the County as a part of the plan review processes established for prior or existing local HMPs within the County.

The Galveston County HMP Coordinator shall be responsible for preparing an Annual HMP Progress Report for each year of the performance period, based on the information provided by the local Planning Partnership members, information presented at the annual Planning Partnership meeting, and other information as appropriate and relevant. These annual reports will provide data for the five-year update of this HMP and will assist in pinpointing any implementation challenges. By monitoring the implementation of the HMP on an annual basis, the Planning Partnership will be able to assess which projects are completed, which are no longer feasible, and what projects should require additional funding.

The Annual HMP Progress Report shall be posted on the Galveston County’s website to keep the public apprised of the plan’s implementation (located at GCOEM.org). Additionally, the website provides details on the HMP update planning process. As a community in the CRS program, Galveston County can use this report to meet annual CRS recertification requirements. To meet this recertification timeline, the Planning Partnership will strive to complete the review process and prepare an Annual HMP Progress Report by October 14th of each year.

The HMP will also be evaluated and revised following any major disasters, to determine if the recommended actions remain relevant and appropriate. The risk assessment will also be revisited to see if any changes are necessary based on the pattern of disaster damages or if data listed in the Section 4.3 (Hazard Profiles) of this plan has been collected to facilitate the risk assessment. This is an opportunity to increase the community’s disaster resistance and build a better and stronger community.

7.1.4 Updating

To facilitate the update process, the Galveston County HMP Coordinator, with support of the Planning Partnership, shall use the second annual meeting to develop and commence the implementation of a detailed plan update program. The Galveston County HMP Coordinator shall invite representatives from TDEM to this meeting to provide guidance on plan update procedures. This program shall, at a minimum, establish who shall be responsible for managing and completing the plan update effort, what needs to be included in the updated plan, and a detailed timeline with milestones to assure that the update is completed according to regulatory requirements.

At this meeting, the Planning Partnership shall determine what resources will be needed to complete the update. The Galveston County HMP Coordinator shall be responsible for assuring that needed resources are secured.

Following each five-year update of the mitigation plan, the updated plan will be distributed for public comment. After all comments are addressed, the HMP will be revised and distributed to all planning group members and the State of Texas State Hazard Mitigation Officer.

7.1.5 Grant Monitoring and Coordination

Galveston County recognizes the importance of having an annual coordination period that helps each planning partner become aware of upcoming mitigation grant opportunities and identifies multi-jurisdiction projects to pursue. Grant monitoring will be the responsibility of each municipal partner as part of their annual progress reporting. The Galveston County HMP Coordinator will keep the planning partners apprised of FEMA Hazard



Mitigation Assistance grant openings and assist in developing letters of intent for grant opportunities when practicable.

Galveston County intends to be a resource to the planning partnership in the support of project grant writing and development. The degree of this support will depend on the level of assistance requested by the partnership during open windows for grant applications. As part of grant monitoring and coordination, Galveston County intends to provide the following:

- Notification to planning partners about impending grant opportunities.
- A current list of eligible, jurisdiction-specific projects for funding pursuit consideration.
- Notification about mitigation priorities for the fiscal year to assist the planning partners in the selection of appropriate projects.

Grant monitoring and coordination will be integrated into the annual progress report or as needed based on the availability of non-HMA or post-disaster funding opportunities

7.2 IMPLEMENTATION OF MITIGATION PLAN THROUGH EXISTING PROGRAMS

Effective mitigation is achieved when hazard awareness and risk management approaches and strategies become an integral part of public activities and decision-making. Within the County there are many existing plans and programs that support hazard risk management, and thus it is critical that this hazard mitigation plan integrate and coordinate with, and complement, those existing plans, and programs.

Section 5 (Capability Assessment) provides a summary and description of the existing plans, programs, and regulatory mechanisms at all levels of government (federal, state, county and local) that support hazard mitigation within the County. Within each jurisdictional annex in Section 9 (Jurisdictional Annexes), the County and each participating jurisdiction identified how each capability reduces risk and how they are integrating hazard risk management into their existing planning, regulatory, and operational/administrative framework. If they are currently not showing this, they indicate how they intend to promote this integration.

It is the intention of Planning Partnership representatives to continue to incorporate mitigation planning as an integral component of daily government operations. The Planning Partnership representatives will work with local government officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. Further, the sample adoption resolution (Appendix A [Adoption Resolutions]) includes a resolution item stating the intent of the local governing body to incorporate mitigation planning as an integral component of government and partner operations. By doing so, the Steering Committee anticipates that:

- Hazard mitigation planning will be formally recognized as an integral part of overall emergency management efforts.
- The Hazard Mitigation Plan, Master Plans, Emergency Operations Plans and other relevant planning mechanisms will become mutually supportive documents that work in concert to meet the goals and needs of county residents.

Other planning processes and programs to be coordinated with the recommendations of the hazard mitigation plan include the following:

- Emergency operations and response plans.



- Training and exercise of emergency response plans.
- Debris management plans.
- Recovery plans.
- Capital improvement programs.
- Municipal codes.
- Community design guidelines.
- Water-efficient landscape design guidelines.
- Stormwater management programs.
- Water system vulnerability assessments.
- Community Wildfire Protection Plans.
- Comprehensive Flood Hazard Management Plans.
- Resiliency plans.
- Community Development Block Grant-Disaster Recovery action plans; and
- Public information/education plans.

Some action items do not need to be implemented through regulation. Instead, these items can be implemented through the creation of new educational programs, continued interagency coordination, or improved public participation.

During the annual plan evaluation process, the Planning Partnership representatives will identify additional policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions and include these findings and recommendations in the Annual HMP Progress Report. See Table 7-3 for integration opportunities individual jurisdictions will utilize to incorporate the information, strategies, and actions of this HMP into their existing plans.

Table 7-3. Integration of the HMP into Other Planning Mechanisms, By Jurisdiction

Jurisdiction	Plan or Program	Last Update (if known)	How will this HMP be incorporated in the plan?
Galveston County	Disaster Debris Management Plan		Use hazard mapping to determine potentially large areas with debris after natural disasters.
	Galveston County Floodplain Regulations	August 2019	Incorporate flood risk assessment and hazard mapping in regulations.
	Galveston County Dune Protection and Beach Access Plan	September 2006	Incorporate coastal erosion, flood, tsunami and hurricane/tropical storm risk assessments and hazard mapping in future plan updates.
	Galveston County Agricultural Plan		Incorporate flood, drought, hail, and severe winter storm risk assessments and available hazard mapping in future plan updates.
	Galveston County Emergency Management Plan	2017	Use risk assessments, hazard mapping, and mitigation initiatives to develop plan updates.
	Continuity of Operations Plan		Use risk assessments, hazard mapping, and mitigation initiatives to develop plan updates.
	Galveston County Health Plan, Annex H		Incorporated pandemic risk assessment and actions into future plan updates.
Bayou Vista (C)	Capital Improvement Plan	2021-2022 City Budget	Include applicable mitigation initiatives in annual CIP budgetary allotments. Plan major infrastructure improvements in areas suitable for safe growth and avoid capital expenditures in hazard areas.



Jurisdiction	Plan or Program	Last Update (if known)	How will this HMP be incorporated in the plan?
	Emergency Management Plan		Use risk assessments, hazard mapping, and mitigation initiatives to develop plan updates.
Clear Lake Shores (C)	Clear Lake Shores Strategic Plan	5-year (2019-2024)	Incorporate all risk assessments, hazard mapping, and mitigation initiatives in the update of the safety and land use elements, as applicable. Target growth for low hazard areas.
	Flood Damage Prevention (Chapter 38 of the City Code)	September 2021	Incorporate flood risk assessment and hazard mapping in future code revisions. Seek to acquire high hazard areas for public open space.
	Stormwater Ordinance		Incorporate flood risk assessment and hazard mapping in future revisions.
	Open Space Ordinance		Incorporate flood and wildfire risk assessment and hazard mapping in future revisions.
	Town Center Master Plan	March 2009	Incorporate flood and erosion risk assessments and hazard mapping in future plan updates.
	Town Center Overlay	February 2010	Incorporate flood, erosion, and pandemic risk assessments and available hazard mapping in future updates.
	Emergency Management Ordinance	August 2012	Use risk assessments, hazard mapping, and mitigation initiatives in future revisions.
	Windstorm Protection Program		Incorporate thunderstorm wind, tornado, and hurricane/tropical storm risk assessments and hazard mapping in future program updates.
Dickinson (C)	Comprehensive Community Plan 2015-2030	September 2016	Incorporate all risk assessments, hazard mapping, and mitigation initiatives in the update of the safety and land use elements, as applicable. Target growth for low hazard areas.
	Capital Improvement Plan	November 2021	Include applicable mitigation initiatives in annual CIP budgetary allotments. Plan major infrastructure improvements in areas suitable for safe growth and avoid capital expenditures in hazard areas.
	Flood Damage Prevention and Protection Ordinance		Incorporate flood risk assessment and hazard mapping in future revisions. Seek to acquire high hazard areas for public open space.
	Stormwater Management Plan		Incorporate flood risk assessment and hazard mapping in future plan revisions.
	City of Dickinson Basic Plan	2020	Use risk assessments, hazard mapping, and mitigation initiatives to develop plan updates.
Friendswood (C)	Comprehensive Plan	July 1998; Future Land Use Map 2008	Incorporate all risk assessments, hazard mapping, and mitigation initiatives in the update of the safety and land use elements, as applicable. Target growth for low hazard areas.
	Capital Improvement Plan 2017-2020	5-year plan	Include applicable mitigation initiatives in CIP budgetary allotments. Plan major infrastructure improvements in areas suitable for safe growth and avoid capital expenditures in hazard areas.
	Disaster Debris Management Plan	2014	Use hazard mapping to determine potentially large areas with debris after natural disasters.
	City of Friendswood Flood Vulnerability and Mitigation Study	April 2019	Incorporate flood and hurricane/tropical storm risk assessments and hazard mapping in future revisions.



Jurisdiction	Plan or Program	Last Update (if known)	How will this HMP be incorporated in the plan?
	Master Drainage Plan	2018	Incorporate flood risk assessment and hazard mapping in future revisions.
	Transportation Plan	2018	In future updates, use hazard mapping to determine potential evacuation routes before and after natural disaster events. Use transportation planning to guide growth to safer areas.
	Downtown District Improvement Plan	2017	Incorporate risk assessments and hazard mapping in future revisions.
	Civil Emergency Management Ordinance		Use risk assessments, hazard mapping, and mitigation initiatives in future revisions.
	Continuity of Operations Plan	2014	Use risk assessments, hazard mapping, and mitigation initiatives to develop plan updates.
Hitchcock (C)	Comprehensive Plan 2020-2040		Incorporate all risk assessments, hazard mapping, and mitigation initiatives in the update of the safety and land use elements, as applicable. Target growth for low hazard areas.
	Capital Improvement Plan (5-year plan)	2022	Include applicable mitigation initiatives in CIP budgetary allotments. Plan major infrastructure improvements in areas suitable for safe growth and avoid capital expenditures in hazard areas.
	Disaster Debris Management Plan		Use hazard mapping to determine potentially large areas with debris after natural disasters.
	Floodplain SOP		Incorporate flood risk assessment and hazard mapping in future code revisions. Protect critical infrastructure from flooding.
	Stormwater Management Program – Structural Control Guideline		Incorporate flood risk assessment and hazard mapping in future guideline revisions.
	Hitchcock Emergency Response Plan		Use risk assessments, hazard mapping, and mitigation initiatives to develop plan updates.
Jamaica Beach (C)	Comprehensive Plan	April 2017	Incorporate all risk assessments, hazard mapping, and mitigation initiatives in the update of the safety and land use elements, as applicable. Target growth for low hazard areas.
	Stormwater Management Ordinance	December 1993	Incorporate flood risk assessment and hazard mapping in future revisions.
	Shoreline Management Ordinance	December 1993	Incorporate flood and erosion risk assessments and hazard mapping in future revisions. Seek to acquire high hazard areas for public open space.
	Emergency Management Ordinance	March 1994	Use risk assessments, hazard mapping, and mitigation initiatives in future revisions.
Kemah (C)	Strategic Plan, 2009-2013		Incorporate all risk assessments, hazard mapping, and mitigation initiatives in the update of the safety and land use elements, as applicable. Target growth for low hazard areas.
	Capital Projects 2022		Include applicable mitigation initiatives in annual CIP budgetary allotments. Plan major infrastructure improvements in areas suitable for safe growth and avoid capital expenditures in hazard areas.



Jurisdiction	Plan or Program	Last Update (if known)	How will this HMP be incorporated in the plan?
	Floodplain Management Plan		Incorporate flood risk assessment and hazard mapping in future plan revisions. Seek to acquire high hazard areas for public open space.
	Stormwater Management Program	June 2019	Incorporate flood risk assessment and hazard mapping in future program revisions.
	Emergency Management Plan		Use risk assessments, hazard mapping, and mitigation initiatives in future plan revisions.
La Marque (C)	Capital Improvement Plan	2022	Include applicable mitigation initiatives in annual CIP budgetary allotments. Plan major infrastructure improvements in areas suitable for safe growth and avoid capital expenditures in hazard areas.
	Disaster Debris Management Plan		Use hazard mapping to determine potentially large areas with debris after natural disasters.
	Floodplain Management Plan		Incorporate flood risk assessment and hazard mapping in future plan revisions. Seek to acquire high hazard areas for public open space.
	Stormwater Management Program		Incorporate flood risk assessment and hazard mapping in future program revisions.
	Parks Master Plan	In progress	Incorporate all risk assessments and hazard mapping, as applicable in the development of the plan.
	Imagine La Marque – Renaissance District Revitalization Plan	2017	Incorporate risk assessments and hazard mapping in future revisions.
League City (C)	Comprehensive Plan 2035	June 2013	Incorporate all risk assessments, hazard mapping, and mitigation initiatives in the update of the safety and land use elements, as applicable. Target growth for low hazard areas.
	Capital Improvement Plan (2022-2026)	September 2021	Include applicable mitigation initiatives in annual CIP budgetary allotments. Plan major infrastructure improvements in areas suitable for safe growth and avoid capital expenditures in hazard areas.
	Disaster Debris Management Plan		Use hazard mapping to determine potentially large areas with debris after natural disasters.
	Parks, Trails, and Open Space Master Plan	November 2017	Incorporate flood and wildfire risk assessment and hazard mapping in future revisions.
	Master Mobility Plan	2018	In future updates, use hazard mapping to determine potential evacuation routes before and after natural disaster events. Use transportation planning to guide growth to safer areas.
	Revitalizing Historic League City – Downtown Redevelopment	2016	Incorporate risk assessments and hazard mapping in future revisions.
	Emergency Management Plan		Use risk assessments, hazard mapping, and mitigation initiatives in future plan revisions.
Santa Fe (C)	Capital Improvement Plan (2021-2022)		Include applicable mitigation initiatives in annual CIP budgetary allotments. Plan major infrastructure improvements in areas suitable for safe growth and avoid capital expenditures in hazard areas.
	Disaster Debris Management Plan		Use hazard mapping to determine potentially large areas with debris after natural disasters.



Jurisdiction	Plan or Program	Last Update (if known)	How will this HMP be incorporated in the plan?
	Floodplain Management Plan		Incorporate flood risk assessment and hazard mapping in future plan revisions. Seek to acquire high hazard areas for public open space.
	Stormwater Management Program		Incorporate flood risk assessment and hazard mapping in future plan revisions.
Tiki Island (V)	Emergency Management Plan		Use risk assessments, hazard mapping, and mitigation initiatives in future plan revisions.

7.3 CONTINUED PUBLIC INVOLVEMENT

Galveston County and participating jurisdictions are committed to the continued involvement of the public in the hazard mitigation process. This HMP update will continue to be posted on-line: <http://www.gcoem.org>

In addition, public outreach, and dissemination of the HMP will include:

- Links to the plan on municipal websites of each jurisdiction with capability.
- Continued utilization of existing social media outlets (Facebook, Twitter) to inform the public of natural hazard events, such as floods and severe storms. Educate the public via the jurisdictional websites on how these applications can be used in an emergency situation.
- Development of annual articles or workshops on flood hazards to educate the public and keep them aware of the dangers of flooding

The Steering Committee representatives and the Galveston County HMP Coordinator will be responsible for receiving, tracking, and filing public comments regarding this HMP. The public will have an opportunity to comment on the plan via the hazard mitigation website at any time. The HMP Coordinator will maintain this website, posting new information and maintaining an active link to collect public comments.

The public can also provide input at the annual review meeting for the HMP and during the next five-year plan update. The Galveston County HMP Coordinator is responsible for coordinating the plan evaluation portion of the meeting, soliciting feedback, collecting, and reviewing the comments, and ensuring their incorporation in the five-year plan update as appropriate. Additional meetings might also be held as deemed necessary by the planning group. The purpose of these meeting would be to provide the public an opportunity to express concerns, opinions, and ideas about the mitigation plan.

The Steering Committee representatives shall be responsible to assure that:

- Public comment and input on the plan, and hazard mitigation in general, are recorded and addressed, as appropriate.
- Copies of the latest approved plan (or draft in the case that the five-year update effort is underway) are available for review, along with instructions to facilitate public input and comment on the HMP.
- Appropriate links to the Galveston County Hazard Mitigation Plan webpage are included on municipal websites.
- Public notices are made as appropriate to inform the public of the availability of the plan, particularly during HMP update cycles.

The Galveston County HMP Coordinator shall be responsible to assure that:



Public and stakeholder comment and input on the plan, and hazard mitigation in general, are recorded and addressed, as appropriate.

- Copies of the latest approved plan are available for review at appropriate county facilities along with instructions to facilitate public input and comment on the plan.
- Public notices, including media releases, are made as appropriate to inform the public of the availability of the plan, particularly during plan update cycles



SECTION 8. PLANNING PARTNERSHIP

This section provides a description of the Galveston County’s HMP update planning partnership, their responsibilities throughout the planning process, and the jurisdictional annexes developed as a result of their plan update efforts.

8.1 PLAN MAINTENANCE PROCEDURES

The Federal Emergency Management Agency (FEMA) encourages multi-jurisdictional planning for hazard mitigation. All participating jurisdictions must meet the requirements of Chapter 44 of the Code of Federal Regulations (44 CFR):

“Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan” [Section 201.6a(4)]

Members of the Planning Partnership have the expertise to develop the plan and have their jurisdiction’s authority to implement the mitigation strategy developed during the planning process.

The Planning Partnership is responsible for developing and reviewing draft sections of the plan, updating their respective annex, creating the mitigation strategy for their jurisdiction, and adopting the final plan.

For the Galveston County HMP update, a Planning Partnership was formed to leverage resources and to meet requirements for the federal Disaster Mitigation Action of 2000 (DMA) for as many eligible governments as possible. Members of the Planning Partnership consisted of representatives from each jurisdiction. The DMA defines a local government as follows:

Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

Each participating planning partner has prepared a jurisdictional annex to this plan. These annexes, as well as information on the process by which they were created, are contained in this volume.

8.2 INITIAL SOLICITATION AND LETTERS OF INTENT

Galveston County solicited the participation of all municipalities in the County at the commencement of this project. Galveston County and 11 municipalities in the County participated in the update process and have met the minimum requirements of participation as established by the County and Steering Committee.

8.3 PLANNING PARTNER EXPECTATIONS

The Planning Partners agreed to the following planning partner expectations, which were outlined in the letter sent by Galveston County on September 20, 2021 and confirmed at the kick-off meeting held on September 29, 2021 (see Appendix C [Meeting Documentation] for details):

- Provide representation at regular planning group meetings and workshops.
- Be responsible for providing data and information as requested.



- Review and comment on data and information compiled by the contract consultant relevant to their jurisdiction.
- Be responsible for completing plan documents specific to your municipality, using provided templates with guidance and assistance by the contract consultant.
- Assist with the identification of stakeholders within your community that should be informed and potentially involved with the planning process.
- Facilitate public outreach efforts with residents and local stakeholders within your community using materials provided by the contract consultant.
- Assist with the identification of strengths, weaknesses, opportunities, and obstacles to implementing natural hazard mitigation within your community.
- Assist with the identification of past, ongoing and appropriate future mitigation strategies, and activities within your municipality.
- Review and comment on plan documents, specifically the draft and final plans prior to submission to TDEM and FEMA.

As described in Section 7 (Plan Maintenance), the planning partnership is intended to remain active beyond the regulatory update to support plan maintenance. Regarding the composition of the Steering and Planning Committees, it is recognized that individual commitments change over time, and it will be the responsibility of each jurisdiction and its representatives to inform the HMP Coordinator of any changes in representation.

8.4 JURISDICTIONAL ANNEX PREPARATION PROCESS

New to the 2022 HMP, jurisdictional annexes were used to provide a unique, stand-alone guide to mitigation planning for each participating jurisdiction. The Galveston County HMP Update is organized so that there is an annex for Galveston County and for every participating jurisdiction. Section 9 (Jurisdictional Annexes) includes an annex for every jurisdiction in Galveston County.

8.4.1 Data Collection

Each jurisdiction was paired with a contract consultant mitigation planner to work with the mitigation team to update their annexes. Each jurisdiction was asked to participate in a municipal kick-off meeting, held on September 29, 2021 to review participant expectations and the updated information needed to support the annex update. It was made clear that the annexes are sections of the plan that can be enhanced if more information is available to further customize any and all aspects of mitigation planning.

8.4.2 Hazard Ranking Exercise

The presentation of the risk assessment and hazard ranking for each jurisdiction was conducted December 21, 2021. At this meeting, the consultant presented the overall risk assessment for the hazards of concern and distributed jurisdiction-specific handouts with risk assessment results relevant to each plan participant. In addition, each planning partner was asked to review the ranked hazards specific for its jurisdiction. Refer to Section 4.4 (Hazard Ranking) for the methodology of the hazard ranking process. The calculated ranking was presented to each jurisdiction and they were asked to review the ranking and revise based on history of events, probability of occurrence, and the potential impact on people, property, and the economy. In addition, each jurisdiction was asked to rank their adaptive capacity for each hazard. Refer to Appendix B (Participation Matrix) for the input submitted by each municipality. The objectives of this exercise were to familiarize the partnership with how to use the risk assessment as a tool to support other planning and hazard mitigation processes and to help prioritize types of mitigation actions that should be considered. Hazards that were ranked



as “high” for each jurisdiction as a result of this exercise were considered to be priorities for identifying appropriate mitigation actions, although jurisdictions also identified actions to mitigate “medium” or “low” ranked hazards as appropriate.

8.4.3 Strengths Weaknesses Obstacles and Opportunities (SWOO) Exercise

After the draft risk assessment results were presented and hazard ranking exercise at the second Steering Committee Meeting on November 18, 2021, attendees participated in a facilitated SWOO session to identify strengths, weakness or challenges, obstacles, and opportunities in hazard mitigation for the County’s hazards of concern. All SWOO results were compiled and provided as a resource to plan participants at the Mitigation Strategy Workshop in December 2021. Refer to Appendix B (Participation Matrix) which provides the information captured by meeting participants during the SWOO session.

8.4.4 Mitigation Strategy Workshop

A mitigation strategy workshop was conducted by the contracted planning consultant on December 2, 2021, for all participating jurisdictions to support the development of the updated mitigation strategy. To assist with the identification of implementable and action-oriented mitigation actions, the participating jurisdictions were provided with tools to help identify mitigation strategies: public survey responses, potential mitigation actions for each jurisdiction, and FEMA *Mitigation Ideas*. The purpose of this workshop was to guide the planning partnership in completing this portion of the planning process and discuss how projects that are well developed and documented are more quickly identifiable for selection when grants become available.

At the workshop, the Planning Partnership focused on developing problem statements based on the impacts of hazards in the County and their communities. The results of the updated risk assessment, challenges and opportunities identified during the capability assessment update and SWOO sessions, and information gathered from the public survey were used to develop mitigation strategies. As a result, a mitigation workbook was compiled with potential mitigation actions for the County and participating jurisdictions. This workbook helped form a bridge between the hazard risk assessment, which quantifies impacts to each community, with the development of achievable mitigation strategies. Mitigation development worksheets were filled out by each municipality to identify additional problem statements and draft action worksheets were developed.

8.4.5 Municipal Support Conference Calls

In addition to the municipal kick-off meeting, municipal support conference calls were held throughout the planning process. During these calls, the consultant worked one-on-one with the planning partners to complete their jurisdictional annexes. Each section of the annex was discussed to ensure accuracy and completeness. This included, but not limited to, the following:

- Reviewing the calculated hazard ranking for the jurisdiction and provide input to adjust the ranking as necessary.
- Updating information regarding the jurisdiction’s capabilities and past integration of hazard mitigation concepts.
- Identify mitigation initiatives that have reasonable potential to be accomplished within the lifespan of the County HMP (five years), including both FEMA-eligible projects and those projects using funds from non-FEMA sources.

8.4.6 Jurisdictional Annexes



While the jurisdictional annex format is designed to document and assure local compliance with the DMA 2000 regulations, its greater purpose and function includes:

- Providing a locally-relevant synthesis of the overall mitigation plan that can be readily presented, distributed, and maintained.
- Facilitating local understanding of the community's risk to natural hazards.
- Facilitating local understanding of the community's capabilities to manage natural hazard risk, including opportunities to improve those capabilities.
- Facilitating local understanding of the efforts the community has taken, and plans to take, to reduce their natural hazard risk.
- Facilitating the implementation of mitigation strategies, including the development of grant applications.
- Providing a framework by which the community can continue to capture relevant data and information for future plan updates.

It is recognized that each jurisdiction's annex is a "living" document and will continue to be improved as resources permit. As such, its design is intended to promote and accommodate continued efforts to maintain the annex to be current and to improve the effectiveness of the annex as the key tool, reference, and guiding document by which the jurisdiction will implement hazard mitigation locally.

The following provides a description of the various elements of the jurisdictional annex.

Section 9.X.1: Hazard Mitigation Planning Team: Identifies the hazard mitigation planning team who provided input during the planning process. Further detail is provided in Section 2 (Planning Process) and Appendix B (Participation Matrix).

Section 9.X.2: Jurisdictional Profile: Provides an overview and profile of the jurisdiction, including an identification of areas of known and anticipated future development and the vulnerability of those areas to the hazards of concern.

Section 9.X.3: Jurisdictional Capability Assessment and Integration: This subsection provides an inventory and evaluation of the jurisdiction's tools, mechanisms, and resources available to support hazard mitigation and natural hazard risk reduction. Within the municipal annexes, tables provide an inventory of the municipality's planning and regulatory, administrative, and technical, and fiscal, capabilities, respectively. Further, another table identifies the municipality's level of participation in state and federal programs designed to promote and incentivize local risk reduction efforts. Further information regarding Federal, State, and local capabilities may be found in the Capability Assessment portion of Section 5.

Section 9.X.4: National Flood Insurance Program (NFIP) Compliance: A tabular summary of the specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Section 9.X.5: Growth/Development Trends: Identifies of areas of known and anticipated future development and the vulnerability of those areas to the hazards of concern.

Section 9.X.6: Jurisdictional Risk Assessment:

- **Hazard Extent and Location:** Each annex includes a map (or series of maps) illustrating identified hazard zones and critical facilities. Further, these maps show areas of known or anticipated future development, as available and provided by the jurisdiction.



- **Hazard Event History:** Identifies hazard events that have caused significant impacts within the jurisdiction, including a summary characterization of those impacts as identified by the jurisdiction. The documentation of events and losses is critical to supporting the identification and justification of appropriate mitigation actions, including providing critical data for benefit-cost analysis. It is recognized that this “inventory” of events and losses is a work-in-progress and may continue to be improved as resources permit. As such, the lack of data or information for a specific event does not necessarily mean that the jurisdiction did not suffer significant losses during that event.
- **Hazard Ranking and Vulnerabilities:** This subsection provides information regarding each plan participant’s vulnerability to the identified hazards. Full data and information on the hazards of concern, the methodology used to develop the vulnerability assessments, and the results of those assessments that serve as the basis of these local risk rankings may be found in Section 4 (Risk Assessment).

Section 9.X.7: Mitigation Strategy and Prioritization: This section discusses and provides the status of past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

- **Past Mitigation Initiative Status:** Where applicable, a review of progress on the jurisdiction’s prior mitigation strategy is presented, identifying the disposition of each prior action, project, or initiative in the jurisdiction’s updated mitigation strategy. Other completed or on-going mitigation activities that were not specifically part of a prior local mitigation strategy may be included in this sub-section as well.
- **Additional Mitigation Efforts:** Other completed or on-going mitigation activities that were not specifically part of a prior local mitigation strategy may be included in this subsection as well.
- **Proposed Hazard Mitigation Initiatives for the Plan Update:** Table 9.X-16 presents the jurisdiction’s updated mitigation strategy. As indicated, applicable mitigation actions, projects and initiatives are further documented on an Action Worksheet which provides details on the project identification, evaluation, prioritization, and implementation process. Table 9.X-17 provides a summary of the local mitigation strategy prioritization process discussed in Section 6 (Mitigation Strategy).

8.4.7 Annex Review

Workshops and additional meetings (via email and/or teleconference) to complete the jurisdictional annexes were held with the Steering Committee and Planning Partnership throughout the planning process. In preparation for the draft plan public review, each jurisdiction was asked to have their ‘mitigation team’ review their annex to ensure it was complete and accurate for posting to the Galveston County Office of Emergency Management’s mitigation website. To demonstrate broad and comprehensive review and input, each jurisdiction collected signatures from these representatives. Refer to Appendix B (Participation Matrix) to review the annex signature pages.

In summary, all participating communities and the County completed the planning partner expectations and annex-preparation process. Details regarding these meetings are described further in Section 2 (Planning Process) and Section 6 (Mitigation Strategy). Completed jurisdictional annexes are presented in Section 9 (Jurisdictional Annexes).

8.5 COVERAGE UNDER THE PLAN

The County and 11 jurisdictions met the participation requirements specified by the Steering Committee. Any non-participating local jurisdiction within the Galveston County planning area can “dock” to this plan in the future following the linkage procedures defined in Appendix G (Linkage Procedures).



Table 8-1 lists the status of each participating jurisdiction and their ultimate status in this plan update. Refer to Appendix B (Participation Matrix) and Appendix C (Meeting Documentation) for details on participation and meeting attendance.

Table 8-1. Jurisdictional Status

Municipality	Attended Workshops and/or Meetings and Project Calls	Provided Update on Past Projects	Submitted Mitigation Actions for Current Plan	Seeking Approval for Adoption (meets all previous requirements)
Galveston County	X	X	X	X
Bayou Vista (C)	X	X	X	X
Clear Lake Shores (C)	X	X	X	X
Dickinson (C)	X	X	X	X
Friendswood (C)	X	X	X	X
Hitchcock (C)	X	X	X	X
Jamaica Beach (C)	X	X	X	X
Kemah (C)	X	X	X	X
La Marque (C)	X	X	X	X
League City (C)	X	X	X	X
Santa Fe (C)	X	X	X	X
Tiki Island (V)	X	X	X	X

N/A = Not applicable.



References

- Association of State Dam Safety Officials. 2021. *Dams 101*. Accessed November 26, 2021. <https://www.damsafety.org/dams101#Dams%20Are%20a%20Vital%20Part%20of%20the%20National%20Infrastructure>.
- Bureau of Economic Geology, University of Texas. 2012. *Shoreline Change Map -2012*. Accessed October 1, 2021. <https://coastal.beg.utexas.edu/shorelinechange2012/>.
- CDC. 2017. *About Extreme Heat*. June 19. Accessed November 29, 2021. https://www.cdc.gov/disasters/extremeheat/heat_guide.html.
- . 2021. *Culture and Language*. December 9. Accessed December 31, 2021. <https://www.cdc.gov/healthliteracy/culture.html>.
- . 2021. *Different COVID-19 Vaccines*. September 1. Accessed September 24, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines.html>.
- . 2020. *Disability and Health Overview*. September 16. Accessed December 31, 2021. <https://www.cdc.gov/ncbddd/disabilityandhealth/disability.html>.
- . n.d. *Monitoring for Influenza Viruses*. Accessed September 24, 2021. <https://www.cdc.gov/flu/pandemic-resources/monitoring/index.html>.
- . n.d. *Pandemic Influenza*. Accessed September 24, 2021. <https://www.cdc.gov/flu/pandemic-resources/index.htm>.
- . 2021. *Symptoms of COVID-19*. February 22. Accessed September 24, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>.
- Center for Climate and Energy Solutions. n.d. *Tornadoes and Climate Change*. Accessed November 25, 2021. <https://www.c2es.org/content/tornadoes-and-climate-change/>.
- Dickinson Bayou Watershed Partnership. n.d. "An Overview of the Dickinson Bayou Watershed Bacteria Implementation Plan: Strategies for Success."
- EPA. 2001. "Chemical Accidents from Electric Power Outages." September. Accessed December 21, 2021. <https://www.epa.gov/sites/default/files/2013-11/documents/power.pdf>.
- . 2021. *Heat Island Effect*. August 10. Accessed October 6, 2021. <https://www.epa.gov/heatislands>.
- . 2016. "What Climate Change Means for Texas." *United States Environmental Protection Agency*. August. Accessed September 23, 2021. <https://www.epa.gov/sites/default/files/2016-09/documents/climate-change-tx.pdf>.
- FEMA. 2021. *Declared Disasters*. Accessed September 24, 2021. https://www.fema.gov/disaster/declarations?field_dv2_state_territory_tribal_value=TX&field_year_value=All&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All.
- . 2004. *Federal Guidelines for Dam Safety*. Accessed 2021. <http://www.fema.gov/media-library-data/20130726-1516-20490-7951/fema-333.pdf>.



- . 2020. *Flood Zones*. July 8. Accessed October 1, 2021. <https://www.fema.gov/glossary/flood-zones>.
- . 2017. *Hazard Overview: Floods*. March. Accessed October 4, 2021. https://www.fema.gov/sites/default/files/2020-07/fema_p1086_flood_2017.pdf.
- . 2021. *Taking Shelter from the Storm*. March 3. Accessed November 15, 2021. https://www.fema.gov/sites/default/files/documents/fema_taking-shelter-from-the-storm_p-320.pdf.
- Galveston County . 2017. "Galveston County Multi-Jurisdictional HMP." Hazard Mitigation Plan.
- Galveston County Health District. 2021. *COVID-19 Dashboard*. December 3. Accessed December 3, 2021. <https://www.gchd.org/public-health-services/covid-19/covid-19-dashboard>.
- GCHD. 2022. *COVID-19 Dashboard*. Accessed 2022. <https://www.gchd.org/public-health-services/covid-19/covid-19-dashboard>.
- Harris-Galveston Subsidence District. 2018. "2018 Annual Groundwater Report."
- Huff, Charlotte. 2021. "Growing Power Outages Pose Grave Threat To People Who Need Medical Equipment To Live." *Shots. Health News From NPR*, May 15.
- Kleiner, Diana J. 2021. *Texas State Historical Association Handbook of Texas - Galveston County*. April 7. Accessed October 17, 2021. <https://www.tshaonline.org/handbook/entries/galveston-county>.
- Madhav, Nita, Ben Oppenheim, Mark Gallivan, Prime Mulembakani, Edwin Rubin, and Nathan Wolfe. 2017. "Chapter 17 Pandemics: Risks, Impacts, and Mitigation." *Disease Control Priorities: Improving Health and Reducing Poverty*. 3rd edition. November 27. Accessed September 24, 2021. <https://www.ncbi.nlm.nih.gov/books/NBK525302/>.
- NASA/JPL-Caltech. 2021. *What is an Urban Heat Island?* October 19. Accessed November 30, 2021. <https://climatekids.nasa.gov/heat-islands/>.
- National Committee on Levee Safety. 2010. "Creating a National Levee Safety Program." April. Accessed September 21, 2021. http://www2.apwa.net/Documents/DraftFinal_NLSP%20brochure_20Apr.pdf.
- National Geographic Society. 2021. *Wind*. Accessed November 25, 2021. <https://www.nationalgeographic.org/encyclopedia/wind/>.
- National Lightning Safety Institute. 2021. *Lightning Fatalities, Injuries, and Damage Reports*. Accessed November 24, 2021. http://lightningsafety.com/nlsi_lls/fatalities_us.html.
- National Science Foundation. 2016. *Extreme downpours could increase 400 percent across parts of U.S.* December 5. Accessed November 25, 2021. https://www.nsf.gov/news/news_summ.jsp?cntn_id=190537.
- National Tsunami Warning Center. 2021. *Tsunami Frequently Asked Questions*. November 19. Accessed November 22, 2021. <https://www.tsunami.gov/?page=tsunamiFAQ>.
- National Wildfire Coordinating Group. n.d. *Lightning Activity Level (LAL)*. Accessed November 24, 2021. <https://www.nwcg.gov/term/glossary/lightning-activity-level-lal>.
- NHC NOAA. 2010. *NHC Issuance Criteria Changes for Tropical Cyclone Watches/Warnings*. Accessed November 15, 2021.



- https://www.nhc.noaa.gov/watchwarn_changes.shtml#:~:text=Hurricane%20Watch%3A%20An%20announcement%20that,within%20the%20specified%20coastal%20area.&text=Hurricane%20Warning%3A%20An%20announcement%20that,within%20the%20specified%20coastal%20area.
- NOAA. 2017. *6 tools our meteorologists use to forecast the weather*. August 17. Accessed November 25, 2021. <https://www.noaa.gov/stories/6-tools-our-meteorologists-use-to-forecast-weather>.
- NOAA NCEI. n.d. *Regional Snowfall Index (RSI)*. Accessed November 25, 2021. <https://www.ncdc.noaa.gov/snow-and-ice/rsi/>.
- NOAA NIDIS. n.d. *Keetch-Byram Drought Index*. Accessed November 25, 2021. <https://www.drought.gov/data-maps-tools/keetch-byram-drought-index>.
- NOAA NSSL. n.d. *Severe Weather 101 - Winter Weather*. Accessed November 25, 2021. <https://www.nssl.noaa.gov/education/svrwx101/winter/types/>.
- NOAA NWS. 2009. *National Weather Service Glossary*. June 25. Accessed November 22, 2021. <https://w1.weather.gov/glossary/>.
- NOAA. n.d. *Severe Weather 101 - Thunderstorms*. Accessed November 24, 2021. <https://www.nssl.noaa.gov/education/svrwx101/thunderstorms/>.
- . n.d. *Severe Weather 101- Tornadoes*. Accessed November 23, 2021. <https://www.nssl.noaa.gov/education/svrwx101/tornadoes/>.
- . 2011. *Tornadoes 101*. April 17. Accessed November 25, 2021. <https://www.noaa.gov/stories/tornadoes-101>.
- . n.d. *Tropical Cyclone Introduction*. Accessed November 15, 2021. <https://www.weather.gov/jetstream/tc>.
- NRC. n.d. "Probable Maximum Tsunami Hazards." Final Safety Analysis Report.
- NRCD. 2010. *2007 National Resources Inventory Soil Erosion on Cropland*. April. Accessed October 4, 2021. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012269.pdf.
- NSIDC. 2020. *All About Snow*. January 10. Accessed November 25, 2021. <https://nsidc.org/cryosphere/snow>.
- . 2010. *Snow and Climate*. January 10. Accessed November 25, 2021. <https://nsidc.org/cryosphere/snow/climate.html>.
- NWS. 2021. *Advanced Hydrologic Prediction Service*. December 1. Accessed December 1, 2021. <https://water.weather.gov/ahps2/index.php?wfo=hgx>.
- . n.d. *Beaufort Wind Scale*. Accessed November 25, 2021. <https://www.weather.gov/mfl/beaufort>.
- . 2020. *Climate*. Accessed January 24, 2022. <https://www.weather.gov/wrh/climate?wfo=hgx>.
- . n.d. *During a Heat Wave*. Accessed November 29, 2021. <https://www.weather.gov/safety/heat-during>.
- . n.d. *Explanation of EF-Scale Ratings*. Accessed November 25, 2021. https://www.weather.gov/hun/efscale_explanation.
- . 2021. *Houston/Galveston, TX Climate*. November 30. Accessed November 30, 2021. <https://www.weather.gov/wrh/Climate?wfo=hgx>.



- . n.d. *How Dangerous is Lightning?* Accessed November 24, 2021. <https://www.weather.gov/safety/lightning-odds>.
- . n.d. *Lightning Activity Level (LAL)*. Accessed November 24, 2021. <https://graphical.weather.gov/definitions/defineLAL.html>.
- NWS NOAA. n.d. *Saffir-Simpson Hurricane Scale*. Accessed November 15, 2021. <https://www.weather.gov/mfl/saffirsimpson>.
- NWS. n.d. *Severe Weather Definitions*. Accessed November 25, 2021. <https://www.weather.gov/bgm/severedefinitions>.
- . n.d. *Stay Safe in the Extreme Cold*. Accessed November 29, 2021. <https://www.weather.gov/dlh/extremecold>.
- . n.d. *Thunderstorm Definition*. Accessed November 25, 2021. <https://www.weather.gov/phi/ThunderstormDefinition>.
- . n.d. *Tornado Definition*. Accessed November 28, 2021. <https://www.weather.gov/phi/TornadoDefinition>.
- . n.d. *Watch/Warning/Advisory Definitions*. Accessed November 25, 2021. <https://www.weather.gov/lwx/WarningsDefined>.
- . 2018. *What Ice Storm Accumulations Mean and How to Stay Safe*. February 19. Accessed November 25, 2021. <https://weather.com/news/news/ice-storm-damage-impacts-20121123>.
- . n.d. *What is the heat index?* Accessed November 29, 2021. <https://www.weather.gov/ama/heatindex>.
- . n.d. *Wind Chill Chart*. Accessed November 30, 2021. <https://www.weather.gov/safety/cold-wind-chill-chart>.
- . n.d. *Wind Chill Warning vs Watch*. Accessed November 30, 2021. <https://www.weather.gov/safety/cold-wind-chill-warning>.
- . n.d. *Winter Weather Safety*. Accessed November 2021, 2021. <https://www.weather.gov/dmx/wintersafety>.
- Ritter, J. 2018. *Ministry of Agriculture, Food and Rural Affairs. Soil Erosion – Causes and Effects*. December. Accessed October 1, 2021. <http://www.omafra.gov.on.ca/english/engineer/facts/12-053.htm>.
- Shang, Yunfeng, Haiwei Li, and Ren Zhang. 2021. "Effects of Pandemic Outbreak on Economies: Evidence From Business History Context." *Frontiers in Public Health*. March 12. Accessed September 24, 2021. <https://www.frontiersin.org/articles/10.3389/fpubh.2021.632043/full>.
- Shirzaei, M., and R. Bürgmann. 2018. "Global climate change and local land subsidence exacerbate inundation risk to the San Francisco Bay Area." *NASA, Science Advances, Volume 4, Issue 3*, March 7.
- Soil Science Society of America. n.d. *Erosion*. Accessed October 1, 2021. <https://www.soils4teachers.org/erosion/>.
- SPC. 2021. *Frequently Asked Questions (FAQ)*. June 17. Accessed November 25, 2021. <https://www.spc.noaa.gov/faq/#2.1>.

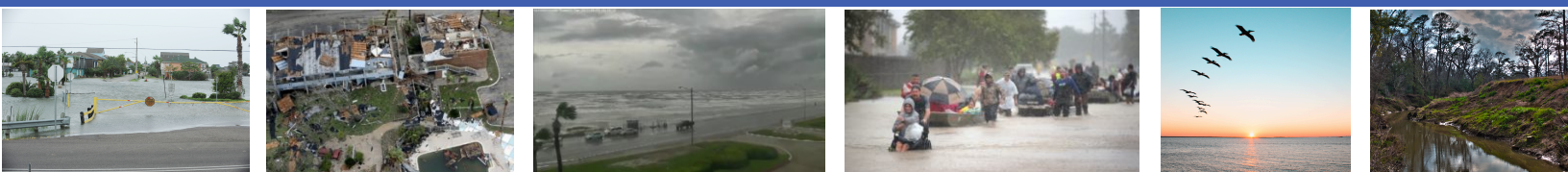


- State of Texas Hazard Mitigation Plan. 2018. "State of Texas Hazard Mitigation Plan 2018." *Texas Department of Public Safety Emergency Management*. October 17. Accessed September 21, 2021. <http://tdem.wpengine.com/wp-content/uploads/2019/08/txHazMitPlan.pdf>.
- Sun, Xi, Jie Li, and Annan Zhou. 2017. "Assessment of the impact of climate change on expansive soil movements and site classification." *Australian Geomechanics Journal*, Vol.52(3) 39-50.
- Texas A&M AgriLife Extension. n.d. *Highland Bayou Watershed Protection Plan*. Accessed November 29, 2021. <https://agrilife.org/highlandbayou/>.
- Texas A&M Forest Service. 2021. *Texas Wildfire Risk Explorer*. December 6. Accessed December 6, 2021. <https://wrap.texaswildfirerisk.com/Map/Public/#map-themes>.
2018. *Texas Demographic Center Population Projections*. Accessed August 20, 2021. <https://demographics.texas.gov/data/tpepp/Projections/Report.aspx?id=f7845eb8775c4107aaa975a52f7fb359>.
- Texas Department of State Health Services. 2021. *COVID-19*. September 24. Accessed September 24, 2021. <https://tabexternal.dshs.texas.gov/t/THD/views/COVIDCountyTrendsOverTime/COVIDTrends?:isGuestRedirectFromVizportal=y&embed=y>.
- . n.d. *West Nile Virus in Texas*. Accessed September 24, 2021. <https://dshs.texas.gov/idcu/disease/arboviral/westnile/>.
- Texas Division of Emergency Management. 2013. "State of Texas Hazard Mitigation Plan Update 2013." Hazard Mitigation Plan.
- Texas General Land Office. 2015. "Coastal Erosion Planning & Response Act, A Report to the 84th Texas Legislature."
- Texas Weather Connection. 2021. *Keetch-Byram Drought Index (KBDI)*. November 24. Accessed November 25, 2021. <https://twc.tamu.edu/kbdi>.
- U. S. Census. 2021. *Poverty Thresholds*. Accessed December 31, 2021. <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>.
- U.S. Army Corps of Engineers. n.d. *National Inventory of Dams*. Accessed November 26, 2021. <https://nid.sec.usace.army.mil/ords/f?p=105:1:.....>.
- U.S. Drought Monitor. n.d. *Drought Classification*. Accessed September 24, 2021. <https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx>.
- UCAR. 2017. *NORTH AMERICAN STORM CLUSTERS COULD PRODUCE 80 PERCENT MORE RAIN*. November 20. Accessed November 24, 2021. <https://news.ucar.edu/130085/north-american-storm-clusters-could-produce-80-percent-more-rain>.
- UNESCO. 2007. *Tsunami Glossary*. Accessed December 5, 2021. https://www.gitews.org/tsunami-kit/en/E5/further_resources/Tsunami%20Glossary.pdf.
- University of Nevada, Reno Extension College of Agriculture, Biotechnology & Natural Resources. n.d. *Living with Drought*. Accessed September 24, 2021. <https://extension.unr.edu/program.aspx?ID=115>.



- USDA. 2000. *Erosion and Sedimentation on Construction Sites*. March. Accessed October 1, 2021. <http://www.aiswcd.org/wp-content/uploads/2013/04/u011.pdf>.
- . 2019. *National Agricultural Statistic Service*. June 24. Accessed December 31, 2021. https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Census_by_State/Texas/.
- . 2001. *Rangeland Soil Quality—Water Erosion*. May. Accessed October 04, 2021. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051599.pdf.
- . 2021. *Soil Survey*. December 7. Accessed December 7, 2021. <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- USFS - Wildland Fire Assessment System. n.d. *Keetch-Byram Drought Index*. Accessed September 24, 2021. <http://www.wfas.net/index.php/keetch-byram-index-moisture--drought-49>.
- USGCRP. 2018. *U.S. Global Change Research Program Fourth National Climate Assessment*. Accessed September 24, 2021. <https://nca2018.globalchange.gov/>.
- USGS. 2019. *Domestic (Private) Supply Wells*. March 1. Accessed January 14, 2022. <https://www.usgs.gov/mission-areas/water-resources/science/domestic-private-supply-wells>.
- . 2021. *Groundwater and Land Subsidence*. December 6. Accessed December 6, 2021. https://txpub.usgs.gov/houston_subsidence/map.html.
- . n.d. *Houston Area Groundwater Level and Subsidence Monitoring*. Accessed December 6, 2021. https://www.usgs.gov/centers/ot-water/science/houston-area-groundwater-level-and-subsidence-monitoring?qt-science_center_objects=0#qt-science_center_objects.
- USGS. 2009. *Regional Assessment of Tsunami Potential in the Gulf of Mexico*. USGS.
- . n.d. *Subsidence Overview*. Accessed December 6, 2021. <https://hgsubsidence.org/science-research/what-is-subsidence/>.
- . n.d. *Texas Gulf Coast Groundwater and Land Subsidence*. Accessed December 6, 2021. https://txpub.usgs.gov/houston_subsidence/.
- World Health Organization . n.d. *Coronavirus disease (COVID-19)*. Accessed September 24, 2021. https://www.who.int/health-topics/coronavirus#tab=tab_1.

Galveston County **2022 Multi-Jurisdictional Hazard Mitigation Plan**



Appendices

May 2022



TETRA TECH





APPENDIX A. ADOPTION RESOLUTIONS

Galveston County adoption resolution will be included in this appendix upon receipt of the Federal Emergency Management Agency (FEMA) Approval Pending Adoption (APA) status. This appendix also includes an example resolution to be submitted by Galveston County authorizing adoption of the Galveston County Hazard Mitigation Plan Update.



RESOLUTION NO. XXXX-XX

A RESOLUTION OF THE Governing Body OF THE Jurisdiction Name

AUTHORIZING THE ADOPTION OF THE

2022 GALVESTON COUNTY, TX HAZARD MITIGATION PLAN UPDATE

WHEREAS, all jurisdictions within Galveston County, Texas have exposure to natural hazards that increase the risk to life, property, environment, and the County and local economy; and

WHEREAS; pro-active mitigation of known hazards before a disaster event can reduce or eliminate long-term risk to life and property; and

WHEREAS, The Disaster Mitigation Act of 2000 (Public Law 106-390) established new requirements for pre and post disaster hazard mitigation programs; and

WHEREAS; a coalition of Galveston County municipalities with like planning objectives has been formed to pool resources and create consistent mitigation strategies within Galveston; and

WHEREAS, the coalition has completed a planning process that engages the public, assesses the risk and vulnerability to the impacts of natural hazards, develops a mitigation strategy consistent with a set of uniform goals and objectives, and creates a plan for implementing, evaluating and revising this strategy;

NOW, THEREFORE, BE IT RESOLVED that the [jurisdiction name]:

- 1) Adopts in its entirety, the 2022 Galveston County, TX Hazard Mitigation Plan Update (the "Plan") as the jurisdiction's Natural Hazard Mitigation Plan and resolves to execute the actions identified in the Plan that pertain to this jurisdiction.
- 2) Will use the adopted and approved portions of the Plan to guide pre- and post-disaster mitigation of the hazards identified.
- 3) Will coordinate the strategies identified in the Plan with other planning programs and mechanisms under its jurisdictional authority.
- 4) Will continue its support of the Mitigation Planning Committee as described within the Plan.
- 5) Will help to promote and support the mitigation successes of all participants in this Plan.
- 6) Will incorporate mitigation planning as an integral component of government and partner operations.
- 7) Will provide an update of the Plan in conjunction with the County no less than every five years.

PASSED AND ADOPTED on this Xst, Xnd, Xrd, Xth day of MONTH, YEAR, by the following vote:

AYES:

NOES:



ABSENT:

ABSTAIN:

Mayor, Town/Village of _____

ATTEST: _____
Clerk, Town/Village of _____



APPENDIX B. PARTICIPATION MATRIX

The matrix in Appendix B is intended to give a broad overview of FEMA, the State of Texas, county, municipal and stakeholder personnel that participated in the Galveston County HMP update planning process. Meeting attendees and input provided are also included. All participants were encouraged to attend the kick-off meeting and mitigation workshop. During the planning process the consultant contacted each participant to offer support, explain the process, and facilitate the submittal and review of critical documents.

The participating jurisdictions agreed to abide by the Planning Partner Expectations and Planning Committee Guidelines which established a Steering Committee. The Steering Committee served as the core of the working group. Participation is defined as having input to the hazard analysis (providing critical facility, hazard event, vulnerability data), and as having participated in the mitigation workshop or alternate annex meetings as described in the HMP for the purpose of creating a mitigation strategy to be included in each municipalities annex in Section 9. A list of participating jurisdictions and representatives is found in Table B-1.

A number of stakeholders were invited to participate in the planning process. Stakeholders were invited to meetings, asked to complete a stakeholder survey, requested to provide input on their involvement in Galveston County, and review and comment on the draft plan. However, due to the limitations on participation posed by the pandemic starting in 2020 and the strains on time and resources for many local governments and other community organizations, participation of stakeholders at the municipal level was limited. In accordance with FEMA guiding principles for inclusive participation at various levels, the planning team will place a high priority on an expanded effort on stakeholder participation with local planning committees in future plan updates. A list of stakeholders and their participation is found in Table B-2.

A Strengths, Weakness, Obstacles and Opportunities exercise (SWOO) was completed by the planning partnership. Participants were asked to fill out the SWOO for each of the hazards of concern for the 2022 HMP update. The results were compiled and presented to the planning partnership at the risk assessment presentation. The results were also used by the participants to help identify capabilities and potential mitigation actions. The results from this activity are found in Table B-3.

In preparation for the draft plan public review, each jurisdiction was asked to have their 'mitigation team' review their annex to ensure it was complete and accurate for posting to the Galveston County Office of Emergency Management website.



Table B-1. Participation Matrix

Jurisdiction	Name	Title / Position	Attended Pre-Kick Off Meeting	Attended SC #1 (9/16/21)	Attended PP #1 (9/28/21)	Attended SC #2 (11/18/21)	Attended Risk Assessment (12/21/21)	Attended MAW (12/2/21)	Attended Draft Plan Presentation (1/25/22)	Feedback Provided?	Steering Committee Member	Designated Project Point of Contact
Galveston County	James Gentile	Director of Contract Services, County Contract Services			X	X				X	X	
Galveston County	Julie Diaz	Director, Parks and Cultural Services								X	X	
Galveston County	Laura Norman	Deputy Emergency Management Coordinator	X	X	X	X		X	X	X	X	X
Galveston County	Lee Crowder	Road Administrator, County Roads and Bridges		X	X	X				X	X	
Galveston County	Martha Lee	Assistant Director, Parks and Cultural Services		X		X	X			X	X	
Galveston County	Michael Shannon	County Engineer, Engineering & Right of Way		X			X	X		X	X	
Galveston County	Randy Valcin	Director of Public Health Surveillance, Galveston County Health District								X	X	
Galveston County	William Riordan	Facilities Director, County Facilities		X						X	X	
Galveston County	Scott Tafuri	Emergency Management Coordinator					X		X	X		
Galveston County	Joey Brower	Homeland Security Planner					X			X		
Galveston County	Alyssa Young	Finance/Administration Coordinator							X	X		
Bayou Vista (C)	Jimmie Gillane	Emergency Management Coordinator								X		X
Bayou Vista (C)	John Bocquet	Police Sargent			X					X		
Bayou Vista (C)	Russel Buhler	Building Inspector								X		
Clear Lake Shores (C)	Brent Spiers	City Admin/EMC			X				X	X		X
Clear Lake Shores (C)	Kevin Harrell	Building Official			X					X		
Dickinson (C)	Greg Trantham	Co-Emergency Mgt Coordinator			X				X	X		X
Dickinson (C)	Derek Hunt	Co-Emergency Mgt Coordinator					X		X	X		
Dickinson (C)	Selmer Ray Burgess, CBO, CFM	Building Official								X		
Friendswood (C)	Steven Simmons	Deputy Fire Marshal			X			X	X	X		X
Friendswood (C)	Niki Bender						X			X		



Jurisdiction	Name	Title / Position	Attended Pre-Kick Off Meeting	Attended SC #1 (9/16/21)	Attended PP #1 (9/28/21)	Attended SC #2 (11/18/21)	Attended Risk Assessment (12/21/21)	Attended MAW (12/2/21)	Attended Draft Plan Presentation (1/25/22)	Feedback Provided?	Steering Committee Member	Designated Project Point of Contact
Friendswood (C)	Brian Rouane	Building Official								X		
Hitchcock (C)	Arnie Cross	Director of Community Development								X		
Hitchcock (C)	Wilmon Smith	Police Chief			X					X		X
Hitchcock (C)	Jeff Evans	Police Captain			X					X		
Hitchcock (C)	Ruth Ann Sorrell	City Secretary								X		
Hitchcock (C)	Leroy Thomas	Public Works								X		
Jamaica Beach (C)	Brad Heiman	Police Chief								X		X
Jamaica Beach (C)	Ana Mondragon	Director of Operations					X	X	X	X		
Kemah (C)	Walter Gant	Emergency Management Coordinator								X		X
La Marque (C)	Kyle Hunter	Emergency Management			X			X		X		X
League City (C)	Ryan Edghill	Emergency Management			X		X	X	X	X		X
League City (C)	Kristin Gauthier	Emergency Management					X		X	X		
League City (C)	Kris Carpenter	Planning Manager								X		
Santa Fe (C)	Bobby Shores	Police Captain						X	X	X		X
Santa Fe (C)	Butch Pean	Detective			X					X		
Tiki Island (V)	Graham George	Emergency Management Coordinator								X		X
Tiki Island (V)	Steven Broussard	Emergency Management Coordinator			X					X		



Table B-2. Stakeholder Participation Matrix

Organization/Title	Stakeholder Type	Notified of Planning Process	Invited to Meetings	Attended Meetings	Invited to Take Survey	Completed Survey	Notified of Posting of Draft Plan
Clear Creek Independent School District	Academic	X	X	X	X		X
Dickinson Independent School District	Academic	X	X	X	X	X	X
Friendswood Independent School District	Academic	X	X		X		X
Galveston College	Academic	X	X		X		X
Galveston Independent School District	Academic	X	X		X		X
High Island Independent School District	Academic	X	X		X		X
Hitchcock Independent School District	Academic	X	X		X		X
Santa Fe Independent School District	Academic	X	X		X		X
Texas A&M University at Galveston	Academic	X	X	X	X		X
Texas City Independent School District	Academic	X	X	X	X		X
University of Texas Medical Branch	Academic	X	X		X		X
Port of Galveston	Business/Commerce	X	X		X		X
Port of Texas City	Business/Commerce	X	X	X			X
Galveston County Emergency Communications District	Emergency Services	X	X		X		X
Galveston County Emergency Communications District #2	Emergency Services	X	X	X	X	X	X
Port of Texas City Security Council	Emergency Services	X	X		X		X
San Leon Volunteer Fire Department	Emergency Services	X	X		X		X
Santa Fe Fire and Rescue	Emergency Services	X	X		X	X	X
NWS	Federal Government	X	X	X	X	X	X
NOAA	Federal Government	X	X		X		X
TX DOT	Highway/DPW	X	X		X		X
Galveston County Health District	Hospital/Health Care	X	X	X	X	X	X



Organization/Title	Stakeholder Type	Notified of Planning Process	Invited to Meetings	Attended Meetings	Invited to Take Survey	Completed Survey	Notified of Posting of Draft Plan
Gulf Coast Center	Hospital/Health Care	X	X	X	X	X	X
Brazoria County	Neighbor	X	X		X		X
Chambers County	Neighbor	X	X		X		X
Harris County OEM	Neighbor	X	X		X		X
Bolivar Peninsula Special Utility District	Utilities	X	X	X	X	X	X
Gulf Coast Water Authority	Utilities	X	X		X		X
Galveston County Water Control and Improvement District #1	Utilities	X	X	X	X	X	X
Galveston County Water Control and Improvement District #19	Utilities	X	X		X		X

Table B-3. Strengths, Weaknesses, Opportunities, and Obstacles Exercise

Hazard	Strengths	Weaknesses	Obstacles	Opportunities
Erosion (Coastal and Inland)	- Long History of grant programs and awards to identify off shore sand sources. - The inland portion of the County is not susceptible to coastal erosion. Beach replenishment programs are routinely undertaken by coastal communities. - R&B performs maintenance on lateral drainage ditches, rip rap erosion control shoreline, all weather roads. - Based on my experience, there is a spirit of cooperation and partnership between units of government. - Bulkhead Ordinance in force.	- Construct an engineer beach and dune - Any community along the Gulf or Bay is vulnerable. - R&B continues to build or maintain roads in areas regularly inundated by tide water. - Based on my limited experience, evacuation tracking and tracing. Though my city does not have an issue with this, others do and I hear about it frequently. - No routine visible inspections of all bulkheads are actually performed. Most are complaint based or noticed while an	- Funding, permitting, financing. - Private property owners need access to private property. - Lack of interest by some partners, an attitude of malaise. There are many residents and partners who benchmark all storm events (what we seem to focus on) to those past. They say, "It's not like Ike" or "we rode it out last time" or "I left and nothing happened , I won't do that again." Persistent messaging, concise information, not overloading	- Protect the evacuation route of Bolivar Peninsula - The time is now to sharpen your ax, not when you need to use it. Time hinders and time prepares. Need to utilize our preparation and planning process, now in the 'off-season' in prep for what may be coming.



Hazard	Strengths	Weaknesses	Obstacles	Opportunities
Dam/Levee Failure	- Excellent maintained hurricane and seawall system - R&B performs excellent maintenance of Federal sponsored levee projects, i.e. TC LM Hurricane Protection Levee, Galveston Seawall.	inspection of something else is being performed. - Age of some equipment, needs update. - Most of the County, none. Texas City is the most vulnerable. - Limited level of protection of the levee or seawall - I wonder about inspections of facilities and possible encroachments.	folks too early is a concern of mine. - Funding - Financial, cost to improve the current project. - Public officials not interested in taxing the public for infrastructure improvements.	- Provide better response to events. - Education , communication of levee capabilities, warning systems etc. - Opportunities to educate public and private on the importance of this and the affect it has on other communities not immediately protected - that consideration should weigh heavily in the decision process.
Drought	- The County averages high rainfall rates and high humidity during the year. - R&B has the opportunity to provide increase maintenance on lateral ditches and storm-water system. - We message a lot based on NWS and other official sources. - Water Conservation rules.	- Start a program for the desalinization of seawater, store more surface water - The region is susceptible to drought. - Soil disturbance during construction	- Funding, permitting, regulatory etc. - Construction maintenance is needed for proper functioning drainage system. - Convincing people that green grass or clean dust-free car vs drinking water should not be considered a choice.	- Reduce dependency on surface water, and demand on Brazos River.? - To conserve or reserve storm water in drainage ponds or reservoirs. - Education, when needed.
Expansive Soils	- Engineer to build in known conditions - Modern construction techniques help to limit foundation damage due to soil movement.	Many older structures are prone to foundation damage. Extreme rainfall followed by dry spells can cause issues.	Adoption of more stringent codes causes higher building costs.	Explain what this is and how it could impact me or my city.
Extreme Temperature	- Available shelters - Residents are well adapted to the regions heat and have ample places to go to cool off, such as the beach. - Messaging and early communication.	- Can't provide shelters for 100% of population - Winter weather can wreak havoc on the state's power grid causing cascade failures within infrastructure systems. Buildings are poorly insulated for cold weather within the region. - Lack of public buy in as it being a real issue (extreme weather winter storm Uri changed perceptions earlier this year)	- Financial - Winterization of infrastructure can be expensive. - Energy consumption is increased in either event. Something outside the purview of most cities, as they are not providers.	- Emergency generators at public facilities - Public support for better winterization is at an all-time high due to the 2021 freeze. - Education of public, providing possible solutions to survival if power is lost, importance of preparation.



Hazard	Strengths	Weaknesses	Obstacles	Opportunities
Expansive Soils	• Engineer to build in known conditions • Modern construction techniques help to limit foundation damage due to soil movement.	• Many older structures are prone to foundation damage. Extreme rainfall followed by dry spells can cause issues.	• Adoption of more stringent codes causes higher building costs.	• Explain what this is and how it could impact me or my city.
Flood	• Developing a master drainage plan. • Communities within the county are well equipped to respond to floods. • Early messaging, accurate forecasting, public and private partners that understand • CFR program and building codes	• Low lying coastal elevations, subsidence, and conflicts • The region is prone to flooding. Many new buyers seem to ignore floodplains and don't purchase insurance. • You cannot change elevation of coastal communities.	• Funding, environmental, geographical • Flood control is very expensive and often requires the purchase of residential homes. • My city is in the direct line of storm water run-off from Houston and others located upstream on clear creek watershed. Their concern is getting water quickly to the drain and flowing into the receiving waters. We have the same issue but are heavily influenced by not only our own water but that comes from others and impacts our ability to drain.	• Proactive engineering strategies • Public interest in flood control is high following Harvey and federal funding is available through various mitigation grants. • Improved seawall/bulkhead construction techniques. Having upstream designers consider impacts on those downstream, with increased flows, velocity and delivery.
Hail	• N/A	• N/A	• N/A	• Keep sending the message
Hurricane/Tropical Storm	• Strong EOC, planning, staff, experienced response • Most jurisdictions within the County have planned and prepared for hurricane response with experience through various storms. • Early forecasting, good predictions, early season preparation for citizens to prepare • Constant community contact and updates through a community call out system.	• Communication with public • There has been turnover within several jurisdictions which will cause a learning curve for staff. • Apathy on part of some in population, inability to make messages meaningful to them, resistance by some in public to take things seriously. • Citizens who won't heed the warnings or advice.	• Geography, education • Financing and support for EM programs during slow periods. • Comparisons to other storms and a prevailing attitude of "I'm staying, I stayed for Rita/Harvey/Ike/etc. And I lived." Too bad there is no one who could speak from Bolivar when it was wiped clean and many lives lost.	• Social media, news media, volunteer programs • Harvey, the Winter Storm, and other events have occurred recently which cause support for various preparedness initiatives. • Education, Preparation, Execution for all county and state partners. Continued partnership meetings and updates, this is our consistent event that we plan for annually. Continued public messaging and alerts that are of substantive importance to the public.



Hazard	Strengths	Weaknesses	Obstacles	Opportunities
Land Subsidence	• GHSD to permit water wells, monitor water levels and control discharges • The regional subsidence district tracks ground water usage and issues permits only as necessary. • Permit the departments ground water wells. • Establishing a district and working to advocate subsidence issues.	• Increased need for water • Disruptions in surface water can cause increased pumping on water wells. • Most people are unaware of the existence of the district and issues it champions.	• Regulatory, geographical, environmental, financial • Usage of water wells can be difficult to enforce or monitor. • Environmental, financial • It is a multi-faceted problem and relies on many specialized disciplines to identify root causes and formulate solutions. Water pumping from commercial, public and private water wells, coastal erosion, geologic formations, commercial extraction activities, weather can play a role, and help find an answer. Liability is a concern and they are	• Restrict or limit use of ground water • To better understand the program, and identify feasible solutions.
Lightning	• Building codes and engineering to ground strikes. • New technology allows for rapid messaging by the NWS. • Lightning tracking through NWS and good forecasting based on storm behavior.	• Structures built before newer codes	• Regulatory, financial	• N/A
Pandemic	• Recently provided a response, UTMB • Local jurisdictions are very aware of pandemic protocols due to COVID-19. • A county health department and emergency management team that took control and did a FANTASTIC job offering COVID shots that were timely, easy to get and convenient. Figuring that out 'on-the-fly' was a huge task. Many hours devoted and many lives saved. I was not a proponent of the vaccine, but when I decided to get my two	• Communication • The Health District does not communicate well with local jurisdictions.	• Environmental, financial • Political will for pandemic control measures can fade quickly. • Changes above the local and state level. Mixed messages from federal government. Changes in approach and vulnerable populations. Vaccine availability, vaccine efficacy, and drug company numbers. An unrealistic accounting system of active, deaths, recovered, etc. People want information but sometimes too much is too	• Assist UTMB • Better streamline updates and communications from the County to jurisdictions. • If it should come to pass again, dust off the plan, change the name and run again. I thought it was a good process/program.



Hazard	Strengths	Weaknesses	Obstacles	Opportunities
	shots I got them at the Walter Hall drive-through. No complaints were heard from those working and putting the time and effort. I'm sure there was challenges and grumbling but the strength of promoting a unified and professional image went a long way with everyone who witnessed. Community outreach and communication including prohibiting gatherings and entry to city owned facilities without proper PPE procedures.		much and it fuels a lot of fear and anxiety.	
Severe Winter Weather	- With the February 2021 winter storm, locals have a better idea of what to expect. - Provide response to icing road conditions, including traffic control and sanding bridges. - We had adequate warning that the storm and cold front were approaching based on temperatures experienced behind the front. NWS did a fine job. - Community outreach and communication.	- The power grid and critical infrastructure is still susceptible to extreme cold. - Low experience for operators in icing conditions. - Not prepared for something that we've not seen. - Citizens who don't need advice	- Winterizing all facilities and infrastructure can be costly. - Rare opportunities to respond and contribute to these conditions. - Energy delivery, that is outside our purview and control. ERCOT issues, outside our control. Aging Electrical Infrastructure - outside our control. Building methods don't adequately cover cold events.	- Open mitigation funding for potential projects. - Improve planning, exercise winter weather procedures, test equipment - Improve building methods and codes to include insulation against extreme cold. Exposed water lines, sprinklers and the like do fine in extreme hot weather - not the same during a cold event.
Tornado	- Many of the planning and preparedness measures for tornado's are the same for other types of incidents. The region tends to have weak and short lived tornadoes when compared to others. - Already built to windstorm requirements in most cases. NWS is doing great job. - Community outreach and communication.	- Many in the region associate warning sirens with chemical emergencies. - Older structures may be lacking adequate structural support and materials to withstand impacts and high winds.	Already build out to Hurricane force winds. Tornadoes are less likely (in most people's minds) and don't get the same attention, preparation or warning.	Educate persons specifically to the dangers of tornados and when they can be expected and how quickly the develop.
Tsunami	Many of the digital warning systems could also be used for Tsunamis	The region does not prepare for or communicate tsunami dangers to the public.	Tsunamis are seen as low risk or unlikely on the Gulf Coast. Siren systems for	N/A



Hazard	Strengths	Weaknesses	Obstacles	Opportunities
			beach and bay communities would be expensive. • Convincing people it could happen here.	
Utility Failure	• Communities maintain backup generators for critical facilities and many have standby contracts to obtain additional equipment. • Using generators on residential homes, large building and municipal/public safety buildings. Quick reporting. Responsive utilities with information available to public via internet or app.	• Large grid failures can make it difficult to obtain additional equipment. • Most people can't afford a generator set-up or two-three days without power. Consumers have some unrealistic expectations.	• Spare generators are expensive to maintain. • Education.	• Open mitigation grant opportunities. • Educating public on processes and efforts to restore.
Wildfire	• County wide, mutual aid agreements allow for responses to larger fires. The region has a low risk of wildfire due to typically high humidity levels, high annual rainfall, and urbanization.	• Local fire departments do not have a lot of experience in responding to large urban-wildland interface fires.	• N/A	• N/A
Wind Storms	• The region has a lot of experience in planning for and responding to windstorms. • NWS does a great forecasting job. We are used to the potential hurricane and the winds it may bring. • Community outreach and communication. Building code adherence.	• N/A	• Sometimes with extended anticipation, interest wanes and people discount the importance of the message.	• Education of public. I think it is an on-going issue and one we cannot simply discount.



APPENDIX C. MEETING DOCUMENTATION

Appendix C includes meeting agendas, sign-in sheets and minutes (where applicable and available) for meetings convened during the development of the Galveston County Hazard Mitigation Plan 2022 Update.



Virtual Meeting

Join by Computer: <https://bit.ly/3zeJyR1>

Or

Dial-in Number (toll): 832-856-3579 | Conference ID: 984 648 808#

1. **Welcome and Introductions**
2. **In-Kind Services Tracking**
3. **Benefits of Hazard Mitigation and Overview**
 - Purpose and expected outcomes of the Hazard Mitigation Plan
 - 2022 enhancements
4. **Project Organization**
 - Key Agencies
 - Municipal Participants
 - Stakeholders
5. **Steering Committee Roles and Responsibilities**
6. **Public and Stakeholder Outreach**
 - Strategy – press releases, social media posts, capture of miscellaneous outreach, HMP website
 - Tracking
7. **Data Collection Status**
8. **Hazards of Concern Identification**
9. **Critical Facilities and Lifelines**
10. **Goals and Objectives**
11. **Schedule**
 - Overview and Milestones
 - Meeting Schedule
12. **Questions / Wrap-Up**



Purpose of Meeting: Steering Committee Meeting #1 Location of Meeting: Microsoft Teams Date/Time of Meeting: September 16, 2021 – 1:00 pm to 2:00 pm		
Attendees: ☒ Laura Norman, County OEM ☒ Michael Shannon, County Engineer ☒ Lee Crowder, County Roads and Bridges ☒ Martha Lee, County Parks ☒ Will Riordan, County Facilities ☐ James Gentile, County Contract Services ☐ Julie Diaz, County Parks & Cultural Services ☐ Randy Valcin, County Health ☒ Heather Apgar, Tetra Tech ☒ Kate Long, Tetra Tech		
Agenda Summary: Introduce Steering Committee to the HMP update process, discuss mitigation planning, project organization, roles and responsibilities, data collection, hazards of concern, and schedule of plan.		
Item No.	Description	Action By:
1.	Welcome and Introductions Tetra Tech started the meeting by introducing themselves and asking everyone to document their attendance in the meeting chat and introduce themselves.	N/A
2.	In-Kind Tracking - With this being a federally-funded project, the County is responsible to match their share of the grant. In order to do, we are asking each of you to track your time spent working on the HMP. - We will provide several tools to use to help you keep track of your time. This includes attending meetings, completing surveys, filling out worksheets, etc.	Steering Committee to keep track of time; Tt will provide tools to do so
3.	Benefits of Hazard Mitigation and Overview - Hazard mitigation is part of the emergency management cycle – it's any sustained action(s) taken to reduce or eliminate long-term risk to life and property from hazards. - This is the required 5-year update to the 2017 HMP; participating and adopting the HMP allows you to remain eligible for FEMA pre- and post-disaster mitigation funding. 2022 Update enhancements – annex approach and will work with the County and participating municipalities to create/update their chapter of the plan.	N/A
4.	CRS Integration Several municipalities participate in the CRS program; therefore, to help those municipalities, the HMP update will follow both FEMA requirements and the CRS Coordinator's Manual.	N/A
5.	Project Organization and Overview - Steering Committee – responsible for providing guidance and leadership throughout the planning process; oversee the planning process and act as points of contact for the municipalities and stakeholders. - Planning Partnership – made up of the Steering Committee and participating municipalities - Stakeholders - play an important role in the planning process; help us learn about more specific topics and provide input from their points of view	Tt to send the list of stakeholders to the Steering Committee for their review and comment
6.	Public and Stakeholder Outreach Public outreach is a key element in the HMP process and one of the requirements of the planning process.	Tt will send social media text and graphics to the



	Tetra Tech will be sending social media text and graphics to the Steering Committee to post on their websites and social media accounts.	Steering Committee
7.	Project Scope - Risk Assessment - Capabilities - Mitigation Strategy - Other Sections of HMP - Submit to TDEM for review/comment - Submit to FEMA for review/comment/approval - Plan adoption - Implement the plan	N/A
8.	Hazards of Concern Identification - The list of hazards from the last plan was presented to the Steering Committee and then the list of suggested hazards for the 2022 update. Tetra Tech will develop a survey to collect input from the Committee to finalize the list of hazards of concern. 2022 proposed hazards: - Wildfire (Urban and Rural) - Dam/Levee Failure - Severe Winter Weather - Coastal and Inland Erosion - Expansive Soils - Lightning - Land Subsidence - Tsunami - Pandemic - Utility Failure - Flood (Coastal and Inland) - Drought - Hurricane/Tropical Storm - Extreme Temperature (Heat and Cold) - Tornado - Windstorm - Hailstorm	Tt to send hazard of concern survey; Steering Committee to complete by 10/1/21
9.	Critical Facilities and Lifelines Tetra Tech asked the Steering Committee what types of facilities should we include as critical facilities. Once the critical facility list is put together, the Committee will be asked to review and add facilities as needed.	Steering Committee to review critical facility lists after Tt sends out.
10.	Goals and Objectives The Steering Committee will need to review the goals and objectives from the 2017 HMP and update as needed. Tetra Tech will send out a survey to collect input and finalize the goals and objectives for the 2022 update.	Tt to send goals and objectives survey; Steering Committee to complete survey by 10/1/21
8.	Schedule - Organize resources now through late-September 2021 - Risk assessment October-November 2021 - Mitigation strategy – December 2021 - Maintenance strategy – December 2021 - Public draft (14 days public review period) early January 2022 - TDEM – mid-January 2022 - FEMA – mid-February 2022 - Adoption – late-March 2022	N/A
9.	Questions/Wrap Up	N/A



Galveston County, Texas Hazard Mitigation Plan – 2022 Update

Steering Committee Kick-Off Meeting | September 16, 2021

complex world | CLEAR SOLUTIONS™

2

Agenda



- Welcome and Introductions
- In-Kind Services Tracking
- Benefits of Hazard Mitigation
- Hazard Mitigation Planning Overview
- Project Organization
- Steering Committee Responsibilities
- Public and Stakeholder Outreach
- Update Hazards of Concern and Risk Assessment
- Critical Facilities and Lifelines
- Goals and Objectives
- Schedule
- Questions/Next Steps/Wrap Up



3

3

Introductions



- Tell us...
 - What's your name?
 - Where you are from?
 - What is your mitigation experience?
 - What do you want to focus on during this process or what is your area of expertise?
 - What are your resilience concerns for Galveston County?



4

In-Kind Tracking

[illegible]

5

Hazard Mitigation – What is it?

Mitigation is a sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event

-or-

Any action taken to reduce future disaster losses

“provides the blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and local ability...” (CFR).



6

Hazard Mitigation Works!

- According to the January 2019 National Institute of Building Sciences Natural Hazard Mitigation Saves: 2018 Interim Report, federal mitigation grants save \$6 for every \$1 spent!

National Benefit-Cost Ratio Per Peril *BCR numbers in this study have been rounded		Federally Funded
Overall Hazard Benefit-Cost Ratio		6:1
 Riverine Flood		7:1
 Hurricane Surge		Too few grants
 Wind		5:1
 Earthquake		3:1
 Wildland-Urban Interface Fire		3:1

More Mitigation Measures,
More Savings



One dollar invested in mitigation =
six dollars U.S. saves in future costs

7

Why Update?

- The mitigation plan update will:
 - Help the County prepare for and mitigate the effects of disasters
 - Continue to allow the County and participating partners to be eligible for pre- and post-disaster mitigation funding
 - Support CRS participation/rating of municipalities

Hazard	Losses (1950 – May 2021)
Coastal Flood	\$700,000
Drought	\$1 million (property) \$109.6 million (crop)
Excessive Temperature	-
Flash Flood	\$10+ billion (property) \$10,000 (crop)
Hail	\$3.023 million
High Wind	\$20,000
Hurricane/Tropical Storm	\$1.258 billion
Lightning	\$3.529 million
Thunderstorm	\$53.133 million (property) \$8,500 (crop)
Tornado/Funnel Cloud	\$36.212 million
Wildfire	\$0
Winter Storm (Cold/Wind Chill)	\$12 million
TOTAL	\$11,367,617,000 (property) \$109,618,500 (crop)

Source: NOAA-NCEI 2021

What's at Risk?

- FEMA Disaster Declarations

Year of Declaration Date	Declaration Title	Disaster Number
1973	SEVERE STORMS & FLOODING	398
1979	SEVERE STORMS & FLOODING	605
	STORMS & FLASH FLOODS	595
1983	HURRICANE ALICIA	609
1994	SEVERE THUNDERSTORMS AND FLOODING	1041
1998	HURRICANE GEORGES - TEXAS	1245
	TROPICAL STORM CHARLEY	1239
	TX-FLOODING 10/18/98	1257
1999	EXTREME FIRE HAZARDS	3142
2001	TX-TROPICAL STORM ALLISON-06-06-2001	1379
2002	TROPICAL STORM FAY	1434
2003	HURRICANE CLAUDETTE	1479
2005	HURRICANE KATRINA EVACUATION	3216
	HURRICANE RITA	1606
		3261
2006	EXTREME WILDFIRE THREAT	1694
2007	HURRICANE DEAN	3277
2008	HURRICANE GUSTAV	3290
	HURRICANE IKE	1791
		3294
	WILDFIRES	3284
2015	SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND	4245
2017	HURRICANE HARVEY	4332
2020	COVID-19	3458
	COVID-19 PANDEMIC	4485
	HEALTH AND HUMAN SERVICES	3540
	TROPICAL STORMS MARCO AND LAURA	3540



12 Hurricane



5 Flood



3 Fire



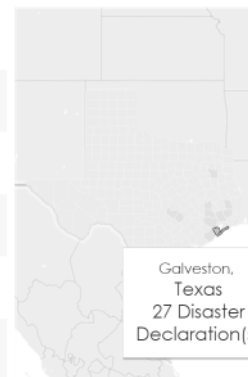
3 Severe Storm(s)



2 Biological



2 Coastal Storm



Galveston,
Texas
27 Disaster
Declaration(s)

CRS Integration

- HMPs qualify for CRS points as "Floodplain Management Plans" through Activity 510
- To achieve a Class 4, specific outreach requirements in Activity 510 must be met
- Tetra Tech will structure and document meetings to meet prerequisites for CRS Class 4 and achieve as many points as possible through Activity 510. We will also work with the communities to help them throughout the process.
- Communities still need to meet the other Class 4 prerequisites (e.g., watershed management plan, Activity 610) and present the documentation of participation during individual verifications to meet Class 4.
- All meetings must be open to the public
- All meetings must be publicized and documented on the County's website

CRS Communities:

- Dickinson – Class 8
- Friendswood – Class 7
- Jamaica Beach – Class 8
- Kemah – Class 8
- League City – Class 5
- Tiki Island – Class 7

Meeting Name	CRS Step
Steering Committee Kick-Off	-
Planning Partnership Kick-Off	-
Public Kick-Off	Step 2 – held in floodprone areas within 2 months of partnership kick-off
Risk Assessment Presentation and SWOO	Step 4 – Assess the Hazard Step 5 – Assess the problem
Goals and Objectives Meeting	Step 6 – Set Goals
Mitigation Strategy Workshop	Step 7 – Review possible activities
Plan Review Meeting	Step 8 – Draft an action plan

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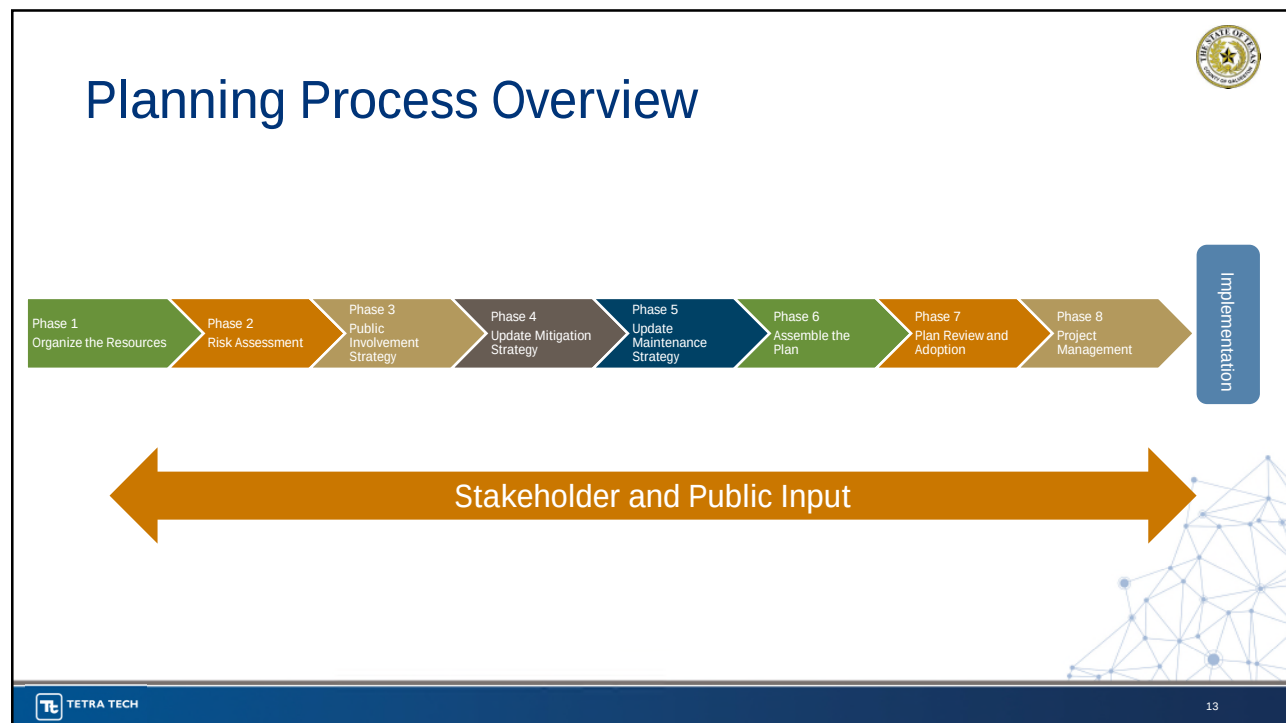
Project Organization



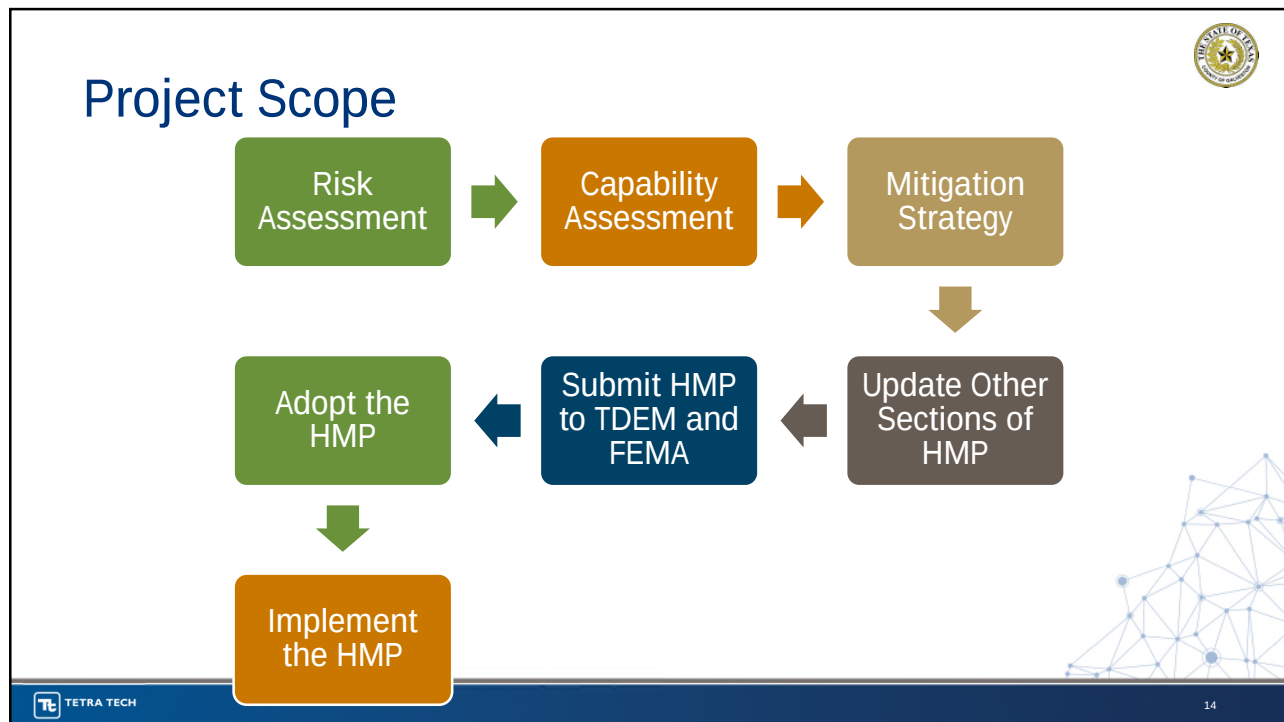
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14



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2016 Hazards of Concern

- Flood (Coastal and Inland)
- Drought
- Hurricane/Tropical Storm
- Extreme Heat
- Tornado
- Windstorm
- Hailstorm
- Wildfire (Urban and Rural)
- Dam/Levee Failure
- Severe Winter Weather
- Coastal Erosion and Retreat
- Expansive Soils
- Lightning
- Land Subsidence
- Tsunami



Potential 2022 Hazards of Concern

- Flood (Coastal and Inland)
- Drought
- Hurricane/Tropical Storm
- Extreme **Temperature (Heat and Cold)**
- Tornado
- Windstorm
- Hailstorm
- Wildfire (Urban and Rural)
- Dam/Levee Failure
- Severe Winter Weather
- Coastal Erosion and Retreat
- Expansive Soils
- Lightning
- Land Subsidence
- Tsunami
- **Pandemic**
- **Utility Failure**
- **Inland Erosion ?**



EXERCISE – Identifying Hazards of Concern

- Looking at the hazards included in the 2017 plan...
 - Have additional hazards impacted the County since 2017?
 - Have hazard been mitigated and no longer cause damage?
 - Should hazards be regrouped to align with the 2019 State HMP?
 - Should additional hazards be included?
- How have hazards affected the county? Where are your problem areas?
- Quick survey!
 - We will send around a quick online survey to get your input on the hazards of concern for the 2022 HMP – Stay tuned!

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Community Lifelines

- Review 2017 critical facility inventory to ensure complete
- Crosswalk and identify lifelines

Lifelines provide indispensable service that enables the continuous operation of *critical business* and *government functions*, and is critical to *human health and safety*, or *economic security*

Critical Facilities are those facilities considered critical to the health and welfare of the population and that are especially important following a hazard. As defined for this HMP, critical facilities include essential facilities, transportation systems, lifeline utility systems, high-potential loss facilities, and hazardous material facilities.

Essential facilities are a subset of critical facilities that include those facilities that are important to ensure a full recovery following the occurrence of a hazard event. For the County risk assessment, this category was defined to include police, fire, EMS, schools/colleges, shelters, senior facilities, and medical facilities.



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Community Lifelines

- To be reviewed:
 - Critical infrastructure
 - Bus Stops
 - Bus Routes
 - EMS sites
 - Fire departments
 - Police departments
 - Rail lines
 - Roadways
 - Healthcare Facilities
 - Long Term Care Facilities
 - Lakes/streams
 - Trails
 - Green Acres
 - Open Space
 - Parcels
 - Parks
 - Preserved Farms
 - Recreation and Open Space Inventory (ROSI)
 - Schools

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Community Lifelines

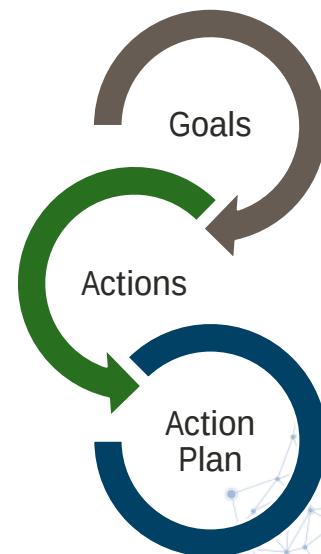
- What additional facilities and lifelines should we add? Types to consider:
 - Utility locations – substations, pump stations, treatment plants
 - Critical food establishments – food pantries, grocery stores, senior nutrition
 - COVID-19 locations – testing and vaccination sites
 - Others?



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Mitigation Strategy

- Goals
 - What outcomes do you want to achieve?
- Actions
 - What specific actions will be taken to reduce risk from hazards?
- Action Plan
 - How will the actions be prioritized and implemented?



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Goals and Objectives Review and Update

Goal 1: Minimize loss of life, injury, damage to property, the economy, and natural systems

Objective 1.1:	Protect the life, health and safety of residents
Objective 1.2:	Protect existing/new critical facilities and infrastructure
Objective 1.3:	Provide protection for future/existing developments
Objective 1.4:	Provide backup power to critical facilities/infrastructure
Objective 1.5:	Minimize impacts from all hazards

Goal 3: Maintain public education and awareness activities

Objective 3.1:	Expand Public Outreach Campaigns for all hazards
Objective 3.2:	Promote disaster preparedness planning for families

Goal 2: Maintain and enhance emergency management/mitigation capabilities

Objective 2.1:	Update/develop plans, studies, and mapping for all hazards
Objective 2.2:	Incorporate/improve hazard mitigation strategies into ordinances, plans and policies
Objective 2.3:	Conduct/develop drills/training for all hazards
Objective 2.4:	Implement and maintain the Galveston County Multi-Jurisdictional Hazard Mitigation Plan
Objective 2.5:	Participate in programs that promote hazard mitigation strategies
Objective 2.6:	Build, obtain, and maintain critical facilities and equipment

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Public and Stakeholder Outreach

- Social Media Posts
- Press Release
- HMP website – will work with the County to set this up
- Planning Partnership meetings open to the public
- Stakeholder Survey
- Public Survey
- Neighboring County Outreach
 - Notified of planning process
 - Survey



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Next Steps / Upcoming Schedule

- Take online survey to update goals – *to be distributed via email*
- Confirm access to OneDrive – *access to be provided in separate email*
- Planning Partnership Kick-Off (Steering Committee and Municipalities) – September 29th
- Steering Committee Meeting to discuss goals/objectives– mid-October
- Risk Assessment Meeting – October/November (tentatively)
- Mitigation Strategy Workshop – December (tentatively)

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Questions?



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Galveston County Project Contacts

Laura Norman, Deputy Emergency Management Coordinator
(856) 307-7100 | dmcnulty@co.gloucester.nj.us

Tetra Tech Project Contacts

Heather Apgar, CFM, Project Manager
(973) 630-8046 | heather.apgar@tetratech.com

Kate Long, Lead Planner
(607) 216-6901 | kate.long@tetratech.com

Thank
You!

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Virtual Meeting

Join by Computer: <https://bit.ly/3hyYX8I>

Or

Dial-in Number (toll): 832-856-3579 | Conference ID: 159 723 362#

1. **Welcome and Introductions**
2. **In-Kind Services Tracking**
3. **Benefits of Hazard Mitigation and Overview**
 - Purpose and expected outcomes of the Hazard Mitigation Plan
 - 2022 enhancements
4. **Project Organization**
 - Key Agencies
 - Municipal Participants
 - Stakeholders
5. **Public and Stakeholder Outreach**
 - Strategy – press releases, social media posts, capture of miscellaneous outreach, HMP website
 - Tracking
6. **Planning Partnership – Responsibilities and Expectations**
7. **Updating Annexes**
 - Mitigation Team
 - Capability Assessment
 - Community Lifelines
 - Hazards of Concern
 - Risk Assessment
8. **Mitigation Strategy**
9. **Schedule**
 - Overview and Milestones
10. **Questions / Wrap-Up**



Purpose of Meeting: Planning Partnership Meeting #1 Location of Meeting: Galveston County Office of Emergency Management/Microsoft Teams Date/Time of Meeting: September 29, 2021 – 2:00 pm to 3:00 pm		
Attendees: ☒ Galveston County ☒ Bayou Vista (C) ☒ Clear Lake Shores (C) ☒ Dickinson (C) ☐ Friendswood (C) ☒ Hitchcock (C) ☐ Jamaica Beach (C) ☐ Kemah (C) ☒ La Marque (C) ☒ League City (C) ☒ Santa Fe (C) ☒ Tiki Island (V) ☒ Tetra Tech SEE SIGN-IN SHEET FOR NAMES		
Agenda Summary: Introduce Planning Partnership to the HMP update process, discuss mitigation planning, project organization, roles and responsibilities, data collection, hazards of concern, HMP update process and municipal worksheets, and schedule of plan.		
Item No.	Description	Action By:
1.	Welcome and Introductions Tetra Tech started the meeting by introducing themselves and asking everyone to document their in-person attendance on the provided sign-in sheets.	N/A
2.	In-Kind Tracking - With this being a federally-funded project, the County is responsible to match their share of the grant. In order to do, we are asking each of you to track your time spent working on the HMP. - We will provide several tools to use to help you keep track of your time. This includes attending meetings, completing surveys, filling out worksheets, etc.	All to keep track of time spent on HMP: https://www.surveymonkey.com/r/Galveston_InKind
3.	Benefits of Hazard Mitigation and Overview - Hazard mitigation is part of the emergency management cycle – it's any sustained action(s) taken to reduce or eliminate long-term risk to life and property from hazards. - This is the required 5-year update to the 2017 HMP; participating and adopting the HMP allows you to remain eligible for FEMA pre- and post-disaster mitigation funding. 2022 Update enhancements – annex approach and will work with the County and participating municipalities to create/update their chapter of the plan.	N/A
4.	CRS Integration Several municipalities participate in the CRS program; therefore, to help those municipalities, the HMP update will follow both FEMA requirements and the CRS Coordinator's Manual.	N/A
5.	Project Organization and Overview Steering Committee – responsible for providing guidance and leadership throughout the planning process; oversee the planning process and act as points of contact for the municipalities and stakeholders.	N/A



	- Planning Partnership – made up of the Steering Committee and participating municipalities - Stakeholders - play an important role in the planning process; help us learn about more specific topics and provide input from their points of view	
6.	Project Scope - Risk Assessment - Capabilities - Mitigation Strategy - Other Sections of HMP - Submit to TDEM for review/comment - Submit to FEMA for review/comment/approval - Plan adoption - Implement the plan	N/A
7.	Hazards of Concern Identification - The list of hazards from the last plan was presented to the Steering Committee and then the list of suggested hazards for the 2022 update. Tetra Tech will develop a survey to collect input to finalize the list of hazards of concern. 2022 proposed hazards: - Flood (Coastal and Inland) - Drought - Hurricane/Tropical Storm - Extreme Temperature (Heat and Cold) - Tornado - Windstorm - Hailstorm - Wildfire (Urban and Rural) - Dam/Levee Failure - Severe Winter Weather - Coastal and Inland Erosion - Expansive Soils - Lightning - Land Subsidence - Tsunami - Pandemic - Utility Failure	All to complete hazard of concern survey by 10/8/21: https://forms.gle/uHTfkHW1KtGDJ17K8
8.	Municipal Annexes and Worksheets - To meet FEMA requirements, all participating municipalities will need to review how hazard mitigation is incorporated into municipal planning mechanisms and capabilities; how their community has been impacted by hazard events since the last update; and review the completion of mitigation actions included in the last HMP: - Worksheet A – Hazard Event History - Worksheet B – Capability Assessment - Worksheet C – NFIP Floodplain Administration - Worksheet D – Mitigation Action Review - Worksheet E – Building Permit Information	Participating Municipalities to complete Worksheets A-E by 10/8/21
9.	Critical Facilities and Lifelines Tetra Tech asked the Steering Committee what types of facilities should we include as critical facilities. Once the critical facility list is put together, the Planning Partnership will be asked to review and add facilities as needed.	All to review critical facility lists after Tt sends out.
10.	Goals and Objectives The Steering Committee will need to review the goals and objectives from the 2017 HMP and update as needed. Tetra Tech	All to complete goals and objectives survey by 10/8/21: https://forms.gle/yJwyhm2hM4HTCVER9



	will send out a survey to collect input and finalize the goals and objectives for the 2022 update.	
11.	Public and Stakeholder Outreach - Public outreach is a key element in the HMP process and one of the requirements of the planning process. - Tetra Tech will be sending social media text and graphics to the Steering Committee to post on their websites and social media accounts.	It will send social media text and graphics to the Steering Committee
12.	Schedule - Organize resources now through late-September 2021 - Risk assessment October-November 2021 - Mitigation strategy – December 2021 - Maintenance strategy – December 2021 - Public draft (14 days public review period) early January 2022 - TDEM – mid-January 2022 - FEMA – mid-February 2022 - Adoption – late-March 2022	N/A
13.	Questions/Wrap Up/Next Steps - Municipal Worksheets due to Tetra Tech or County OEM by October 8th - Risk Assessment Meeting: October/November 2021 (date TBD) - Mitigation Strategy Workshop: December 2021 (date TBD)	N/A



GALVESTON COUNTY HAZARD MITIGATION PLAN - 2022 UPDATE
TOPIC: Planning Partnership Kick-Off Meeting
DATE: September 29, 2021
* Galveston County may take pictures during the meeting and include in the public plan.



Name	Jurisdiction/Agency & Title	Email	Phone Number	Photo Release (Y/N)
Brent Spiller	City of Clear Lake Shores	bspiller@clearlakeshores.tx.gov	281 595 1585	Y
Sheila Cunningham	Belvoir Peninsula SUD	sheila@bpsud.com		Y
Wilmon Smith	City of Hitchcock	wsmith@hitchcockpd.com	409 789 5994	Y
Craig Strevan	Texas City ISD	estrevan@TCISD.org	409-916-6034	Y
Vernon Cammus	TAMU-G	Cammus@tamug.edu	409-740-4460	Y
Amberla Grover	Gulf Coast Center	ambergrover@gulfcoastcenter.org	409 502 1446	Y
James Whitehead	Port of Texas City Seaview Council	jwhitehead@ptsc.org	409-392-8275	Y
Ryan Edgell	League City DEW	ryan.edgell@leaguecity.gov	979 450 5857	Y
White ROSSER	Galveston OB's	cec.rosser@ob.org	281 534 4112	Y
Steven Simmons	Friendswood FMO	ssimmons@Friendswood.org	281-986-3335	Y
Dan Reilly	NWS	dan.reilly@nws.gov	832-224-9380	Y
Thurston	GCCHD	TTIP@GCCHD.org	409-938-2275	Y
Jim Gentile	GC/C	James.Gentile@co.galveston.tx.us		
Doug Saunders	GCESD 2	dougsaunders@gcesd2.org	409-781-1245	Y



GALVESTON COUNTY HAZARD MITIGATION PLAN - 2022 UPDATE
TOPIC: Planning Partnership Kick-Off Meeting
DATE: September 29, 2021
* Galveston County may take pictures during the meeting and include in the public plan.



Name	Jurisdiction/Agency & Title	Email	Phone Number	Photo Release (Y/N)
Kevin Hurrell	City of Cleburne Shores	K.Hurrell@cleburneshores-tx.gov	281-254-1294	Y
Jgm Baquet	Bayer Vita	jbacquet@bayerusa.com	830 237-3601	Y
Allen Post	TAMU	post@tamus.edu	409 342 5701	Y
Jeff Evans	Mitchell PD	JEVANS@MITCHELLPD.COM	832-833-0404	Y
Maile Vera	TCISD	mvera@tcisd.org	409-795-7814	Y
Robert Cobb	IDISD	rcobb@idisonline.org	281 229 6102	Y
Ivan Langford	GC WCIOA	ilangford@wcioa.com	409 739 0898	Y
Butch Teer	Santa Fe PD	teer@sfpd.com	409 925 2000	Y
Greg Trautman	City of Dickinson	gtrautman@cityof Dickinson.com	281 332 4554	N
Amber Walker	Director of EMS	awalker@galveston-tx.gov	409 938-2345	Y
Sandra Torres	CCISD	satorres@ccisd.net	281-284-0052	Y
Clifford Howard	BRMAD	clifford@brmad.com	409-689-3515	Y
Steven Braussard	Tiki Island	sbraussard@tiki-island.com	409 935 1427	
Jenn Thickett	GCHD	jthickett@gchd.org	409-938-2249	Y



GALVESTON COUNTY HAZARD MITIGATION PLAN - 2022 UPDATE
TOPIC: Planning Department - 17.1.2022

DATE: September 29, 2021

** Galveston County may take pictures during the meeting and include in the public plan.*

[illegible]



Galveston County, Texas Hazard Mitigation Plan – 2022 Update

Planning Partnership Kick-Off Meeting | September 29, 2021

complex world | CLEAR SOLUTIONS™

1

Agenda



- In-Kind Services Tracking
- Benefits of Hazard Mitigation
- Hazard Mitigation Planning Overview
- Project Organization
- Planning Partnership Responsibilities
- Public and Stakeholder Outreach
- Completing Worksheets
- Critical Facilities and Lifelines
- Goals and Objectives
- Schedule
- Questions/Next Steps/Wrap Up



2

2

In-Kind Tracking

[illegible]

3

Hazard Mitigation – What is it?

Mitigation is a sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event

-or-

Any action taken to reduce future disaster losses

“provides the blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and local ability...” (CFR).



4

Hazard Mitigation Works!

- According to the January 2019 National Institute of Building Sciences Natural Hazard Mitigation Saves: 2018 Interim Report, federal mitigation grants save \$6 for every \$1 spent!

National Benefit-Cost Ratio Per Peril *BCR numbers in this study have been rounded		Federally Funded
Overall Hazard Benefit-Cost Ratio		6:1
 Riverine Flood		7:1
 Hurricane Surge		Too few grants
 Wind		5:1
 Earthquake		3:1
 Wildland-Urban Interface Fire		3:1

More Mitigation Measures, More Savings



One dollar invested in mitigation =
six dollars U.S. saves in future costs

Why Update?

- The mitigation plan update will:
 - Help the County prepare for and mitigate the effects of disasters
 - Continue to allow the County and participating partners to be eligible for pre- and post-disaster mitigation funding
 - Support CRS participation/rating of municipalities

Hazard	Losses (1950 – May 2021)
Coastal Flood	\$700,000
Drought	\$1 million (property) \$109.6 million (crop)
Excessive Temperature	-
Flash Flood	\$10+ billion (property) \$10,000 (crop)
Hail	\$3.023 million
High Wind	\$20,000
Hurricane/Tropical Storm	\$1.258 billion
Lightning	\$3.529 million
Thunderstorm	\$53.133 million (property) \$8,500 (crop)
Tornado/Funnel Cloud	\$36.212 million
Wildfire	\$0
Winter Storm (Cold/Wind Chill)	\$12 million
TOTAL	\$11,367,617,000 (property) \$109,618,500 (crop)

Source: NOAA-NCEI 2021

What's at Risk?

• FEMA Disaster Declarations

Year of Declaration Date	Declaration Title	Disaster Number
1973	SEVERE STORMS & FLOODING	398
1979	SEVERE STORMS & FLOODING	603
	STORMS & FLASH FLOODS	595
1983	HURRICANE ALICIA	609
1994	SEVERE THUNDERSTORMS AND FLOODING	1041
1998	HURRICANE GEORGES - TEXAS	1245
	TROPICAL STORM CHARLEY	1239
	TX-FLOODING 10/18/98	1257
1999	EXTREME FIRE HAZARDS	3142
2001	TX-TROPICAL STORM ALLISON-06-06-2001	1379
2002	TROPICAL STORM FAY	1434
2003	HURRICANE CLAUDETTE	1479
2005	HURRICANE KATRINA EVACUATION	3216
	HURRICANE RITA	1606
		3261
2006	EXTREME WILDFIRE THREAT	1624
2007	HURRICANE DEAN	3277
2008	HURRICANE GUSTAV	3290
	HURRICANE IKE	1791
		3294
	WILDFIRES	3284
2015	SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND	4245
2017	HURRICANE HARVEY	4332
2020	COVID-19	3458
	COVID-19 PANDEMIC	4485
	ARTIFICIAL HAZARD	3666
	TROPICAL STORMS MARCO AND LAURA	3540



12 Hurricane



5 Flood



3 Fire



3 Severe Storm(s)



2 Biological



2 Coastal Storm



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CRS Integration

- HMPs qualify for CRS points as "Floodplain Management Plans" through Activity 510
- To achieve a Class 4, specific outreach requirements in Activity 510 must be met
- Tetra Tech will structure and document meetings to meet prerequisites for CRS Class 4 and achieve as many points as possible through Activity 510. We will also work with the communities to help them throughout the process.
- All planning partnership meetings must be open to the public
- All meetings must be publicized and documented on the County's website

CRS Communities:

- Dickinson – Class 8
- Friendswood – Class 7
- Jamaica Beach – Class 8
- Kemah – Class 8
- League City – Class 5
- Tiki Island – Class 7

Meeting Name	CRS Step
Steering Committee Kick-Off	-
Planning Partnership Kick-Off	-
Public Kick-Off	Step 2 – held in floodprone areas within 2 months of partnership kick-off
Risk Assessment Presentation and SWOO	Step 4 – Asses the Hazard Step 5 – Assess the problem
Goals and Objectives Meeting	Step 6 – Set Goals
Mitigation Strategy Workshop	Step 7 – Review possible activities
Plan Review Meeting	Step 8 – Draft an action plan

8



9



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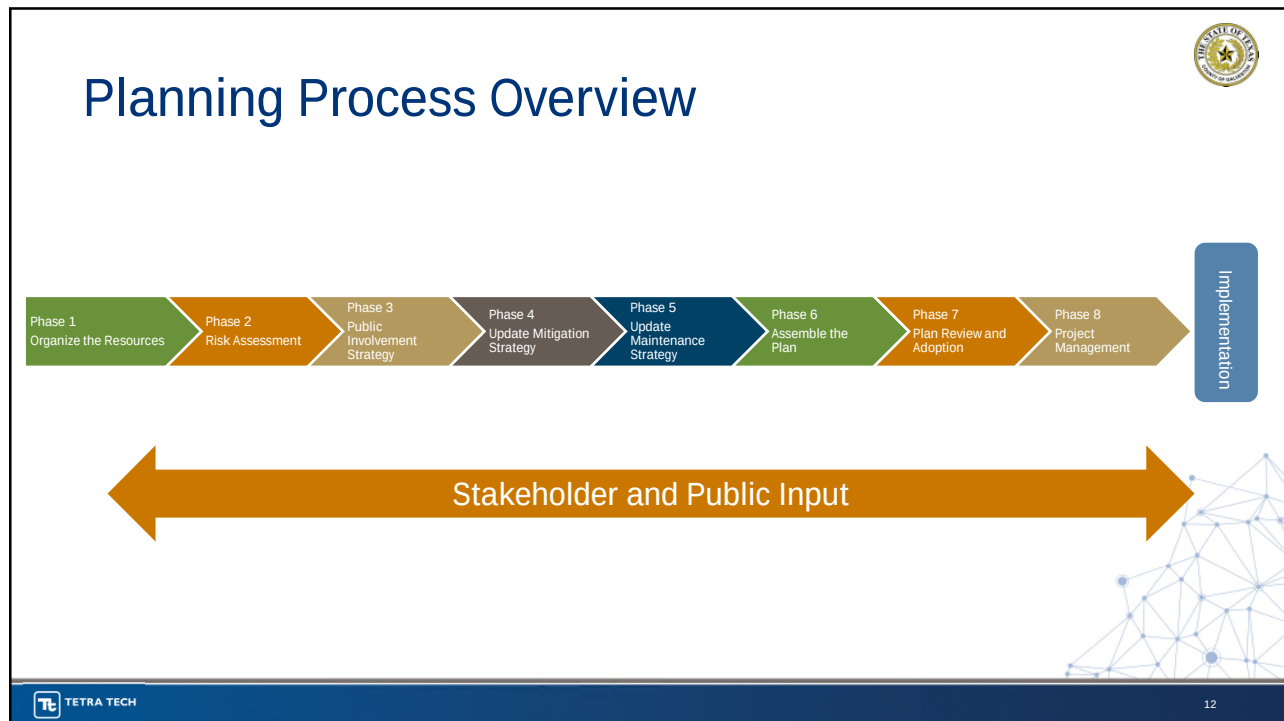


Participation Tracker

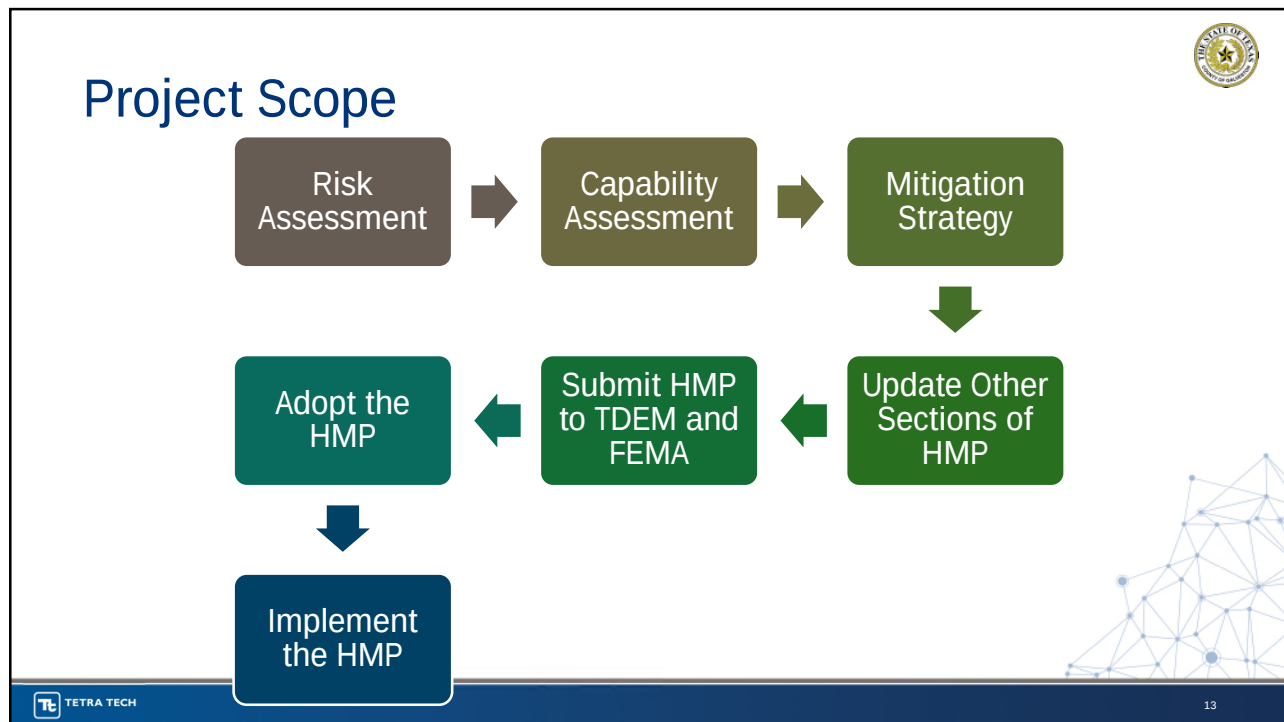
Jurisdiction Name	Requirements Met (Y/N)					
	Planning Process	Hazard Identification and Risk Assessment	Mitigation Strategy	Plan Review, Evaluation, and Implementation	Plan Adoption	State Requirements
Galveston County						
Bayou Vista (C)						
Clear Lake Shores (C)						
Dickinson (C)						
Friendswood (C)						
Hitchcock (C)						
Jamaica Beach (C)						
Kemah (C)						
La Marque (C)						
League City (C)						
Santa Fe (C)						
Tiki Island (V)						


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13



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2016 Hazards of Concern

- Flood (Coastal and Inland)
- Drought
- Hurricane/Tropical Storm
- Extreme Heat
- Tornado
- Windstorm
- Hailstorm
- Wildfire (Urban and Rural)
- Dam/Levee Failure
- Severe Winter Weather
- Coastal Erosion and Retreat
- Expansive Soils
- Lightning
- Land Subsidence
- Tsunami

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Potential 2022 Hazards of Concern

- Flood (Coastal and Inland)
- Drought
- Hurricane/Tropical Storm
- Extreme **Temperature (Heat and Cold)**
- Tornado
- Windstorm
- Hailstorm
- Wildfire (Urban and Rural)
- Dam/Levee Failure
- Severe Winter Weather
- Coastal Erosion and Retreat
- Expansive Soils
- Lightning
- Land Subsidence
- Tsunami
- **Pandemic**
- **Utility Failure**
- **Inland Erosion ?**

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Worksheet A – Hazard Event History



Hazard Mitigation Plan 2022 Update
 Galveston County, TX
 Worksheet A – Hazard Event History



Please work with your municipal planning team and complete this worksheet. Please send electronic Word version to Kate Long (Tetra Tech) by Friday, October 8th. Email: kate.long@tetratech.com

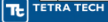
Municipality: _____

Name and Title of Individual Completing Worksheet: _____

Galveston County has frequently experienced natural hazard events. Please complete the table below to summarize specific loss and damages experienced during hazard events since the last hazard mitigation plan update (2015). Information already populated in the table below is based on County-wide events that resulted in significant damages and losses.

Please update the table to provide a summary of local impacts to the listed events AND note other local hazard events that resulted in damages, closures, or other impacts.

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 519 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million. Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme	


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Hazard Mitigation Plan 2022 Update
 Galveston County, TX
 Worksheet A – Hazard Event History



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			to widespread power outages. Loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gully winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	

Please identify other hazard events that have caused damage/losses in your community. Refer to FEMA project worksheets (PWs), overtime records, police/fire reports, repair costs (invoices), etc.

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses


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Update the Capability Assessment

- Capabilities
 - Planning and Regulatory Capability
 - Administrative and Technical Capability
 - Financial Capability
 - Education and Outreach

Please work with your municipal planning team and complete this worksheet. Please send electronic Word version to Kate Long (Tetra Tech) by Friday, October 11th. Email: kate.long@tetratech.com

Completing Worksheet:

Planning and Regulatory Capability

Planning and Regulatory Capability

Code, Ordinance, or Regulation	Authorizing Resolution (Yes/No)	Required by State? (Yes/No)	Code Citation and Code Book (include name of plan date if state)	Authority (local, county, state, federal)	Individual or Department/Agency Responsible
Building Code	Yes	Yes	Chapter 3 – Building and Construction 1/28/21	State and Local	Building Inspector
How does this reduce risk?					
Zoning/Local Use Code	No	No	-	-	-
How does this reduce risk?					
Consider the following: • Prior to issuing changes or development permitting, have your jurisdiction review the hazard mitigation plan and other documents to ensure consistency with the plan.					

Consider the following:

- Prior to making changes, or development permitting, have your jurisdiction review the hazard mitigation plan and other hazard analyses to ensure compliance and consistency (and vice versa)



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Please work with your municipal planning team and complete this worksheet. Please send electronic Word version to Kate Long (Tetra Tech) by Friday, October 8th. Email: kate.long@tetratech.com

NFIP Floodplain Administrator Name/Title:

NFIP Topic		Comments
Flood Vulnerability Summary		
Describe areas prone to flooding in your jurisdiction.		
Do you maintain a list of properties that have been damaged by flooding?		
Do you maintain a list of property owners interested in flood mitigation?		
How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?		
Are any RiskMAP projects currently underway in your jurisdiction?		
If so, state what projects are underway.		
How do you make Substantial Damage determinations?		
How many were declared for recent flood events in your jurisdiction?		
How many properties have been mitigated (elevation or acquisition) in your jurisdiction?		
If there are mitigation projects, how were the projects funded?		
Do your flood hazard maps adequately address the flood risk within your jurisdiction?		
If so, state what requires are underway.		

NRIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	The intersection of Main Street and Maple Road routinely flood during heavy rain events. The leads to road closures and impacts emergency response time and access. The City does not maintain a list of flood-damaged properties.
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	At this time, there has been no interest in participating flood mitigation.
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No.
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	The leading inspector conducts substantial damage determinations after a flood event. During the last flood event, two determinations were made.
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	To date, no properties have been mitigated in the City.
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes.



Worksheet E – Building Permits



Hazard Mitigation Plan 2022 Update
 Galveston County, TX
 Worksheet E – Building Permits

Please work with your municipal planning team and complete this worksheet. Please send electronic Word version to Kate Long (Tetra Tech)
 Email: kate.long@tetratech.com

Municipality: _____

Name and Title of Individual Completing Worksheet: _____

Who can assist with completing these tables: The Building Department, Planning Department, and NFIP Floodplain Administrator

Type of Development	2014		2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the previous HMP* (total/within regulatory floodplain)														
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family														
Multi-Family														
Other (commercial, mixed-use, etc.)														
Total Permits Issued														

SFHA = Special Flood Hazard Area (1% annual chance flood event)
 * Only location-specific hazard zones or vulnerabilities identified.

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Update the Mitigation Strategy

- Review the goals and objectives – we will send out a survey link to provide input
- Determine status of mitigation actions
- Identify new mitigation actions/projects
 - Focus on specific, implementable and achievable actions!
 - Look at your list of critical facilities and lifelines – what do they need to be operational during a disaster?
- Conduct Mitigation Strategy Workshop

Goal #	2022 HMP Goal Statement
1	Minimize loss of life, injury, damage to property, the economy, and natural systems
2	Maintain and enhance emergency management/mitigation capabilities
3	Maintain public education and awareness activities

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Worksheet D – Action Review



Galveston County Mitigation Plan Update
Worksheet D – Mitigation Action Review
Galveston County



Please work with your municipal planning team and complete this worksheet. Please send electronic Word version to Kate Long (Tetra Tech) by Friday, October 8th Email: kate.long@tetratech.com

Municipality: _____
 Name and Title of Individual Completing Worksheet: _____

Who should provide you information about past mitigation actions: We suggest that your Engineer and Public Works Superintendent take the first pass at updating this table after which you coordinate with other officials/responsible parties as noted (e.g., Code Official, Planner, OEM Coordinator) to determine the status of each action. This project status update is a RMA requirement. It will also help in identifying ongoing actions for our current plan.

Use the following table to indicate progress and status.

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)? Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
GC 2006-12	Develop GIS System to record locations of vulnerable populations and structures	Office of Emergency Management	Ongoing - something the County is implementing and maintaining	No		
GC 2011-3	Implement tree and vegetation trimming/removal program	Road and Bridge	Ongoing - the Department performs routine maintenance of trees and vegetation	No		
GC 2011-6	Develop and provide public information and awareness for hazards	GCOEM and applicable county departments, and state and federal agencies		No		
GC 2011-10	Harden critical utility facilities by purchasing equipment and installing emergency backup power (generator) at Public Works, MUD water plant and MUD wastewater treatment facility	Bayview MUD Board of Directors	No progress - due to lack of funding, not all critical facilities have backup generators	Yes	Several critical facilities do not have backup power and need power to operate during a disaster	Bayview MUD and County



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Community Lifelines

- Review 2017 critical facility inventory to ensure complete
- Crosswalk and identify lifelines

Lifelines provide indispensable service that enables the continuous operation of **critical business** and **government functions**, and is critical to **human health and safety**, or **economic security**

Critical Facilities are those facilities considered critical to the health and welfare of the population and that are especially important following a hazard. As defined for this HMP, critical facilities include essential facilities, transportation systems, lifeline utility systems, high-potential loss facilities, and hazardous material facilities.

Essential facilities are a subset of critical facilities that include those facilities that are important to ensure a full recovery following the occurrence of a hazard event. For the County risk assessment, this category was defined to include police, fire, EMS, schools/colleges, shelters, senior facilities, and medical facilities.



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Update Other Sections of Plan

- County Profile
 - Taking the previous profile from the last plan and updating it accordingly
- Planning Process
 - Documentation of the update process
- Plan Maintenance
 - Incorporation into other plans as well as identifying way to incorporate other plans into the updated HMP
 - Identify a game plan for annually reviewing and updating the HMP



TETRA TECH 25

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Submit HMP for Review

- Review Draft with Planning Team
- 14-day Public Comment Period
- Conduct Public Meeting to Review the Draft
- Submit for Texas Division of Emergency Management (TDEM) Review
 - 30 days
- Submit for Federal Emergency Management Agency (FEMA) Review
 - 45 days
- “Approvable Pending Adoption” Status



TETRA TECH 26

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Adopt the HMP

- Galveston County and at least one participating municipality need to adopt the HMP
- Once FEMA approves the plan, adoption can begin
- Adoption deadline – TBD

Implement the HMP

- Regular Planning Team meetings
- Stakeholder meetings
- Implement mitigation actions and projects
 - Integrate actions where appropriate

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Public and Stakeholder Outreach

- Social Media Posts
- Press Release
- HMP website – will work with the County to set this up
- Planning Partnership meetings open to the public
- Stakeholder Survey
- Public Survey
- Neighboring County Outreach
 - Notified of planning process
 - Survey



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Next Steps / Upcoming Schedule

- Take online survey to update goals – *to be distributed via email*
- Planning Partnership Kick-Off (Steering Committee and Municipalities) – Today!
- Complete Municipal Worksheets
 - Due back to the County and/or Tetra Tech by **October 8, 2021**
- Steering Committee Meeting to discuss goals/objectives– mid-October
- Risk Assessment Meeting –November (tentatively)
- Mitigation Strategy Workshop – December (tentatively)

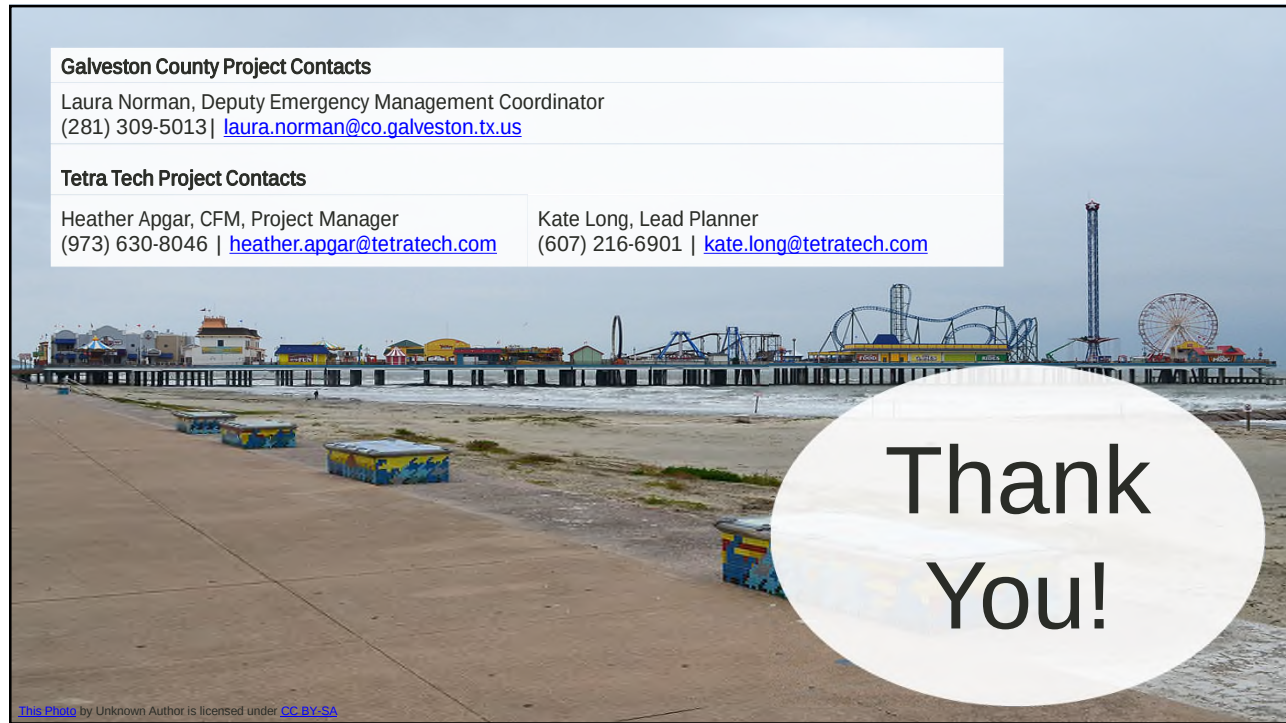


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Questions?



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Galveston County Project Contacts

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Tetra Tech Project Contacts

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Kate Long, Lead Planner
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Thank You!

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**Galveston County, Texas – 2022 Hazard Mitigation Plan Update
Steering Committee Meeting #2 | November 18, 2021 | 2:00 pm CST**

Virtual Meeting

Join by Computer: <https://bit.ly/3x10LK>

Or

Dial-in Number (toll): 832-856-3579 | Conference ID: 285 583 569#

- 1. Welcome and Introductions**
- 2. Project Schedule and Status Review**
 - Municipal Participation Status Update
 - Data Collection Status Update
 - Stakeholder and Public Outreach Strategy
- 3. Hazards of Concern Review**
- 4. Critical Facilities and Lifelines**
- 5. Confirmation of Goals and Objectives**
- 6. Strengths, Weaknesses, Obstacles, and Opportunities (SWOO) Assessment**
 - Purpose and Examples
 - Discussion
 - Complete SWOO survey - <https://forms.gle/Ei6s8Srij2Trv8WQ46> (due December 1st)
- 7. Next Steps**
 - As hazard profiles are complete, we will post on OneDrive for your review and input
 - Continued public outreach
 - Complete surveys (due December 3rd)
 - Problem Areas – <https://arcg.is/0Sfeb8>
 - New Development – <https://arcg.is/by0G8>
 - Critical Facilities - <https://arcg.is/brDzv>
 - Mitigation Workshop – December 2nd @ 2:00 pm
 - Risk assessment meeting – December 9th @ 2:00 pm



Purpose of Meeting: Steering Committee Meeting #2 Location of Meeting: Microsoft Teams Date/Time of Meeting: November 18, 2021 – 2:00 pm to 3:00 pm		
Attendees: ☒ Laura Norman, County OEM ☐ Michael Shannon, County Engineer ☒ Lee Crowder, County Roads and Bridges ☒ Martha Lee, County Parks ☐ Will Riordan, County Facilities ☒ James Gentile, County Contract Services ☐ Julie Diaz, County Parks & Cultural Services ☐ Randy Valcin, County Health ☒ Tyler Tipton, PHEP Manager, GCHD ☒ Heather Apgar, Tetra Tech ☒ Megan Brotherton, Tetra Tech		
Agenda Summary: Review project schedule and status, hazards of concern, critical facilities and lifelines, goals and objectives, SWOO exercise and next steps.		
Item No.	Description	Action By:
1.	Welcome	N/A
2.	Project Schedule and Status Review - Municipal Participation Status Update - Worksheets have been received from everyone, except Bayou Vista is missing one worksheet - Annexes are being developed based on the worksheets received - Surveys on new development and problem areas will be sent to planning partners this week - December 3rd – Mitigation strategy workshop will focus on identifying mitigation action for the County and the planning partners - December 9th – Risk assessment presentation - Data Collection Status Update - Data is being collected - The list of Critical Facilities needs to be reviewed and updated - Stakeholder and Public Outreach Strategy - Public outreach materials have been developed by Tetra Tech for use by the planning partners - List of suggested stakeholders was previously sent to the Steering Committee - January 2022 – Draft plan will be available for planning partner review - Hazard Profile sections will be posted on OneDrive as they are completed for review and input - February 2022 – Final draft will be submitted to TDEM and FEMA	Tt to send out list of Critical Facilities for planning partner and Steering Committee input and updates. Tt to send public outreach materials for County approval. Tt to send approved outreach materials to the Steering Committee. Steering Committee to document outreach efforts and send to Tt. Steering Committee to review and revise stakeholder list.



3.	Hazards of Concern Review - Added Pandemic and Utility Failure to the previous list - No other additions	N/A
4.	Critical Facilities and Lifelines - List of critical facilities was developed from County GIS data - FEMA-defined lifelines enable the continuous operation of critical government and business functions that are essential to human health and safety and/or economic security.	Tt to send list of critical facilities. Steering Committee to remove facilities if not needed for risk assessment. Update lifeline categories as needed.
5.	Confirmation of Goals and Objectives - Three goals were confirmed at the last meeting. - New Goal #4 was added to address vulnerabilities from high-hazard dams. - Objectives were updated to align with the State HMP and other recent county plans in Texas. - Objectives include language to reflect FEMA lifelines.	N/A
6.	Strengths, Weaknesses, Obstacles, and Opportunities (SWOO) Assessment - Purpose and Examples - Helps with the identification of mitigation actions - Discussion - Complete SWOO survey - https://forms.gle/Ei6s8Srij2Trv8WQ46 (due December 1st)	Tt to send out link. Planning partners to complete the SWOO exercise.
7.	Next Steps - As hazard profiles are complete, we will post on OneDrive for your review and input - Continued public outreach - Complete surveys (due December 3rd) - Problem Areas – https://arcg.is/0Sfeb8 - New Development – https://arcg.is/by0G8 - Critical Facilities - https://arcg.is/brDzv - Mitigation Workshop – December 2nd @ 2:00 pm - Risk assessment meeting – December 9th @ 2:00 pm	Planning partners to submit completed surveys by 12/3.



Galveston County, Texas Hazard Mitigation Plan – 2022 Update

Steering Committee Meeting #2 | November 18, 2021

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Agenda

- Welcome and Introductions
- Project Schedule and Status Review
- Hazards of Concern
- Mission Statement, Goals and Objectives
- Strengths, Weaknesses, Obstacles, and Opportunities
- Next Steps



3



Project Schedule

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4

4

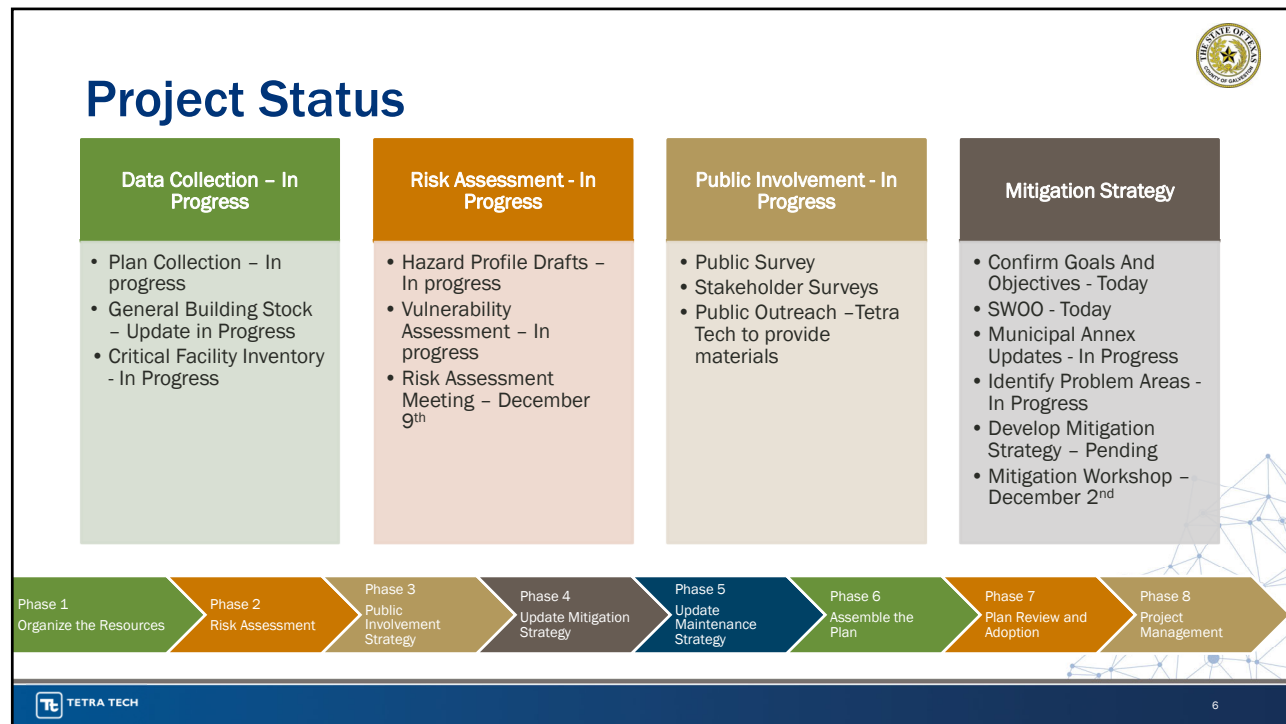
Schedule



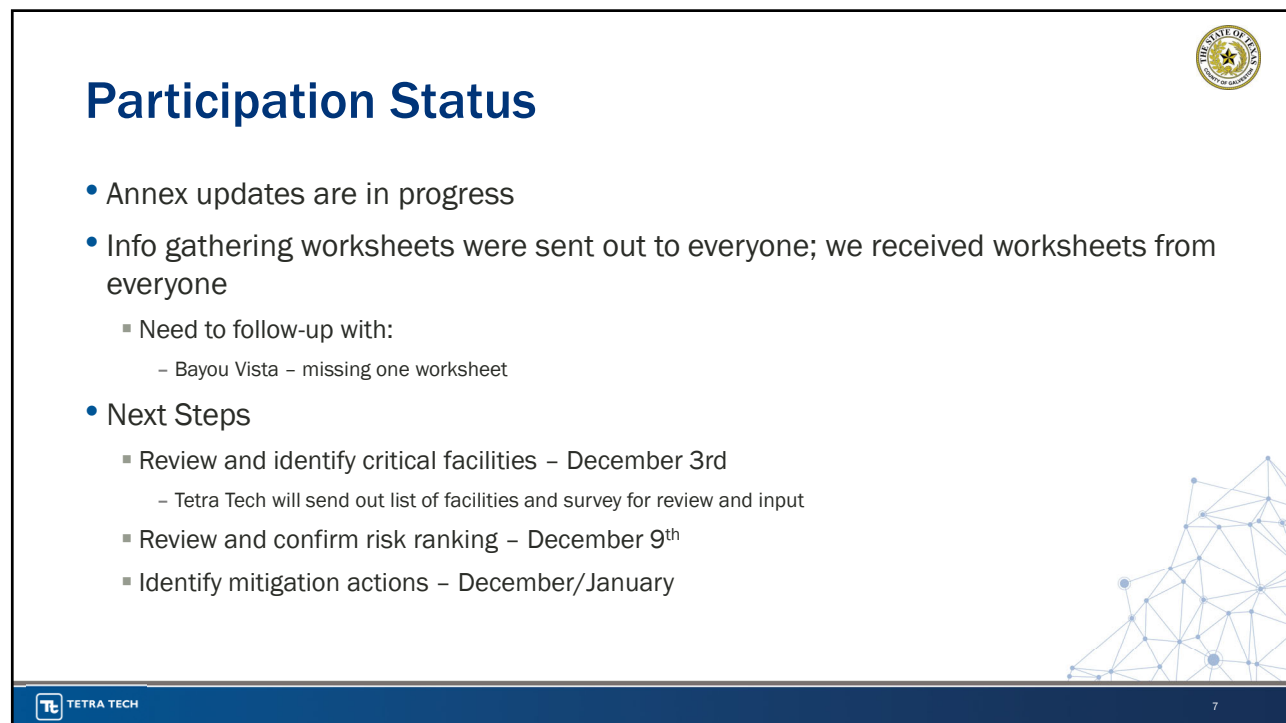
- Overview and Milestones
 - Planning Process
 - Currently working on reviewing plans, studies, and codes/ordinances
 - Steering Committee Meeting #2 – TODAY!
 - Risk Assessment and Hazard Ranking Meeting – December 9th
- Update Risk Assessment
 - Hazard profiles and vulnerability assessment are underway
- Public Involvement Strategy – ongoing throughout the planning process
 - Need your help to get the word out about the HMP – post on your website and social media. Tetra Tech will send out graphics to use.
- Mitigation Strategy
 - Mitigation Strategy Workshop with FEMA and TDEM – December 2nd
- Draft Plan to Steering Committee by January 2022
- Final draft plan to TDEM and FEMA by February 2022



5



6



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Public and Stakeholder Outreach

- Press Release and Social Media
 - Tetra Tech to provide sample press release and social media posts for your use
- Survey (public and stakeholder)
 - County is reviewing surveys before we distribute
 - Next step – distribute and advertise survey links and brochure
 - Stakeholders begin to complete survey
 - Municipalities to post an HMP project link and flyer on their website; press release sent to newspapers
- Outreach – present key info on the HMP process at local meetings
 - Tetra Tech can provide some talking points if needed

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Hazards of Concern

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2022 Hazards of Concern

- Flood (Coastal and Inland)
- Drought
- Hurricane/Tropical Storm
- Extreme Temperature (Heat and Cold)
- Tornado
- Windstorm
- Hailstorm
- Wildfire (Urban and Rural)
- Dam/Levee Failure
- Severe Winter Weather
- Coastal Erosion and Retreat
- Expansive Soils
- Lightning
- Land Subsidence
- Tsunami
- Pandemic
- Utility Failure

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Critical Facilities and Lifelines

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Critical Facilities and Community Lifelines



- To be reviewed:
 - Airport
 - Bank
 - Bridge
 - Bus Facility
 - Childcare Facility
 - Communication Facility
 - County Building
 - Dam
 - DMV
 - Drainage Ditch
 - Electric Power Facility
 - Electric Substation
 - EMS
 - Energy Facility
 - EOC
 - Farmers Market
 - Ferry
 - Fire Station
 - Food Bank
 - Gas Station
 - Grocery Store
 - HazMat Superfund
 - HazMat TRI
 - Heliport
 - Homeless Shelter
 - Hospital
 - Major Employer
 - Military
 - Municipal Building
 - Nursing Home
 - Police Station
 - Polling Site
 - Port Facility
 - Post Office
 - Post-Secondary Education
 - Potable Water Pump Station
 - Potable Water Tank
 - Potable Water Treatment Plant
 - Potable Water Well
 - Primary Education
 - Prison
 - Public Health
 - Department
 - Public Works Building
 - Radio Tower
 - Secondary Education
 - Train Station
 - Transportation
 - Wastewater Lift Station
 - Wastewater Pump Station
 - Wastewater Tank
 - Wastewater Treatment Plant
 - Wastewater Wet Well



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Critical Facilities and Lifelines



- What are lifelines?
 - A lifeline enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security.
 - Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.
 - When disrupted, decisive intervention (e.g., rapid re-establishment or employment of contingency response solutions) is required to stabilize the incident.
- Tetra Tech conducted a preliminary review of the critical facilities and assigned the lifeline categories to each
- We will be distributing a list of facilities for your review and input. We will also be using an online survey to collect new facilities to be included.
 - All input is due **December 3rd**



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Critical Facilities and Lifelines



INSTRUCTIONS: Filter this list using the 'Municipality' column to identify the critical facilities/lifelines geographically located in your community.
 -->Please use this excel file to update information about the facility name, critical facility type, ownership, or backup power for each facility as needed.
 -->If a change is made, mark the 'Change?' column and specify what change was made. Please make your changes in **RED**.
 -->If there is a critical facility/lifeline listed in your community that DOES NOT EXIST, mark the 'Change?' column with 'REMOVE'.
 -->For critical facilities/lifelines MISSING from your municipality, please use the following survey link to add each facility/lifeline that is missing: <https://oreg.in/GSRXnp>
 --> Please note that the 'Cross-Reference ID' in column J is indicated on the survey 123 map for information.

Change?	Municipality	Facility Name	Address
	CITY OF GALVESTON	PORT OF GALVESTON, TX	<Null>
	CITY OF TEXAS CITY	PORT OF TEXAS CITY, TX	<Null>
	CITY OF TEXAS CITY	<Null>	E SIDE ST HWY 3 BETWN INTX 197
	CITY OF TEXAS CITY	<Null>	10TH ST. SOUTH
	CITY OF TEXAS CITY	<Null>	E SIDE ST HWY 3 BETWN INTX 197
	CITY OF GALVESTON	The Moody National Bank	2302 Post Office
	CITY OF GALVESTON	Galveston Downtown Branch	100 West Houston Street
	CITY OF DICKINSON	Dickinson Termini	1 S Main Street
	CITY OF TEXAS CITY	Mainland Bank	2851 Palmer Highway
	CITY OF HITCHCOCK	First Texas Bank - Hitchcock Branch	3232 Palmer Highway
	CITY OF GALVESTON	Hometown Bank, National Association	1801 45th Street
	CITY OF FRIENDSWOOD	Friendswood Branch	1111 Polaris Parkway
	UNINCORP	Lamarque Branch	1900 Fifth Avenue North
	CITY OF SANTA FE	Santa Fe Branch	3232 Palmer Highway
	CITY OF LEAGUE CITY	League City Branch	1900 Fifth Avenue North
	CITY OF TEXAS CITY	Texas First Bank	3232 Palmer Highway
	CITY OF FRIENDSWOOD	Friendswood Branch	2177 Main Street
	CITY OF LEAGUE CITY	South Shore Banking Center	2302 Post Office
	CITY OF GALVESTON	West Branch Banking Center	2302 Post Office
	CITY OF TEXAS CITY	Texas City Banking Center	2302 Post Office
	CITY OF FRIENDSWOOD	Friendswood Banking Center	2302 Post Office
	CITY OF GALVESTON	Stewart Road Branch	100 West Houston Street
	CITY OF GALVESTON	Galveston Banking Center - Rf 626	507 North Gray Street
	CITY OF TEXAS CITY	Texas City Palmer Branch	1900 Fifth Avenue North
	CITY OF DICKINSON	Dickinson Fm 517 West	1 S Main Street
	CITY OF SANTA FE	Santa Fe Branch	1 S Main Street

Galveston Critical Facilities and Lifelines

Please use this app to identify additional critical facilities or lifelines that were not provided in your excel list of facilities. To assist you in identifying the location, the facility name includes an identifying number to cross-reference the excel list. One survey response is needed for each new facility identified.

Your Name*

Your Agency/Dept/Municipality*

Name of Facility or Lifeline*

Type of Facility*

Please select the type that best fits the facility and add any comments if needed.

-Please Select-



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Finalize Goals and Objectives

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Goals and Objectives Review and Update

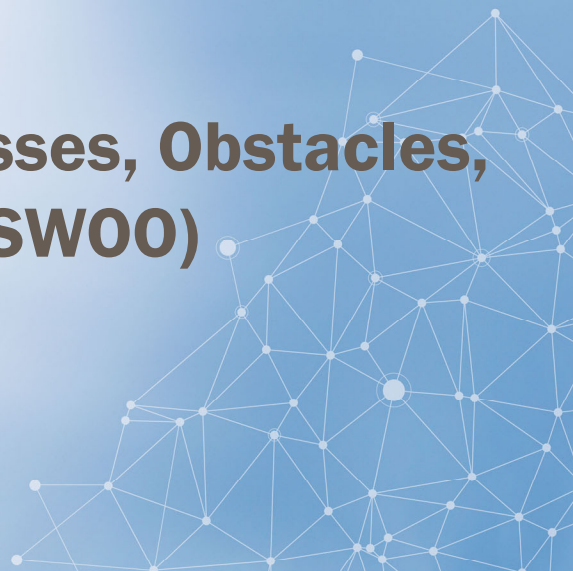
Goal 1: Minimize loss of life, injury, damage to property, the economy, and natural systems from natural and human-caused hazard events		Goal 2: Maintain and enhance emergency management/mitigation capabilities	
Objective 1.1:	Protect the life, health and safety of residents	Objective 2.1:	Update/develop plans, studies, and mapping for all hazards of concern for the County
Objective 1.2:	Protect existing/new critical facilities and community lifelines	Objective 2.2:	Incorporate/improve hazard mitigation strategies into ordinances, plans and policies
Objective 1.3:	Enforce regulatory measures to ensure that current and new development will not put people in harm's way or increase threats to existing properties.	Objective 2.3:	Conduct/develop drills/training for all hazards of concern for the County
Objective 1.4:	Provide backup power to critical facilities and community lifelines	Objective 2.4:	Implement and maintain the Galveston County Multi-Jurisdictional Hazard Mitigation Plan
Objective 1.5:	Minimize impacts from all hazards	Objective 2.5:	Participate in programs that promote hazard mitigation strategies
Objective 1.6:	Build, enhance, and support partnerships to continuously become less vulnerable to hazards	Objective 2.6:	Build, obtain, and maintain critical facilities, community lifelines, and equipment
Goal 3: Enhance and Maintain public education and awareness activities		Goal 4: Address long-term vulnerabilities from high hazard dams *NEW*	
Objective 3.1:	Expand Public Outreach Campaigns for all hazards	Objective 4.1:	Ensure dam infrastructure is routinely inspected and maintained.
Objective 3.2:	Promote and encourage disaster preparedness planning of appropriate hazard mitigation measures for families	Objective 4.2:	Ensure Emergency Action Plans are developed and updated.
		Objective 4.3:	Support the identification and access to funding to repair, replace, or decommission dams.



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Strengths, Weaknesses, Obstacles, and Opportunities (SWOO)



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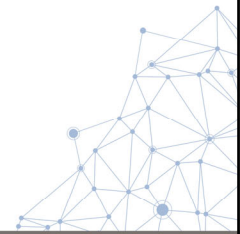
17

Strengths, Weaknesses, Obstacles, and Opportunities



The purpose of the SWOO is to identify mitigation strategies and capabilities that will meet the goals and objectives of the plan update. It is also used to develop potential mitigation actions for the participating jurisdictions.

- **Strengths** – what we do well
- **Weaknesses** – what could we do better
- **Obstacles** – things that stand in the way, and either prevents you from doing something or something that need to be overcome
- **Opportunities** – used to develop mitigation strategies



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SWOO Exercise



Thinking about the 2017 hazards of concern and any new hazards for this update...what are some strengths, weaknesses, obstacles and opportunities the Planning Area has for each? Complete the online form (<https://forms.gle/Ei6s8Srj2Trv8WQ46>)

Here are some examples to help brainstorm:

Hazard: Flood	
S	Minimal exposure to flood risk
W	Silt and debris buildup in streams can lead to localized flooding
Ob	Funding for culvert and catch basin maintenance
Opps	Installing stream gages

Hazard: Severe Storms	
S	Tree trimming programs are in place
W	Aging infrastructure; lack of underground utilities
Ob	Cost to retrofit existing utility infrastructure
Opps	Underground utilities; enhance public outreach program

Hazard: Severe Winter Storm	
S	Not a frequent occurrence
W	Not a frequent occurrence and may not have the resources to respond
Ob	Funding; limited staff for prolonged events
Opps	Shared services

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2022 SWOO Discussion/Example



Hazard	
Strengths	Weaknesses
What do the Planning Area do well in terms of: ➤ Plans and Regulations ➤ Codes, Ordinances, Planning Studies, Comprehensive Plans, Adaptation and Resiliency Plans ➤ Structure and Infrastructure Projects ➤ Natural Systems Protection ➤ Education and Awareness Programs? ➤ Preparedness ➤ Others?	What can the Planning Area do better or what are identified gaps in terms of: ➤ Plans and Regulations ➤ Codes, Ordinances, Planning Studies, Comprehensive Plans, Adaptation and Resiliency Plans ➤ Structure and Infrastructure Projects ➤ Natural Systems Protection ➤ Education and Awareness Programs? ➤ Preparedness ➤ Others?

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2022 SWOO Discussion/Example



Hazard	
Obstacles	Opportunities
What is preventing the Planning Area to implement: ➤ Plans and Regulations ➤ Codes, Ordinances, Planning Studies, Comprehensive Plans, Adaptation and Resiliency Plans ➤ Structure and Infrastructure Projects ➤ Natural Systems Protection ➤ Education and Awareness Programs? ➤ Preparedness ➤ Others?	What can the Planning Area implement terms of: ➤ Plans and Regulations ➤ Codes, Ordinances, Planning Studies, Comprehensive Plans, Adaptation and Resiliency Plans ➤ Structure and Infrastructure Projects ➤ Natural Systems Protection ➤ Education and Awareness Programs? ➤ Preparedness ➤ Others?

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Next Steps

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Next Steps

- Review Hazard Profiles
- Review Risk Assessment Results
- Identify Problems and Problem Areas
- Develop Mitigation Strategy
- Review Draft Plan
- Submit Draft Plan for TDEM/FEMA Review
- Adopt FEMA - Approved Plan
- Implement Projects and Maintain the Plan → Increase Resilience!



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Questions?




TETRA TECH

24

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Galveston County Project Contacts

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Tetra Tech Project Contacts

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Thank You!

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1. **Opening Remarks**
2. **In-Kind Tracking**
 - Use the Word tracker or online tracker to document time spent working on the HMP
https://www.surveymonkey.com/r/Galveston_inKind
3. **Project Overview and Status**
 - Where we are in the process, participation status, public outreach, survey discussions
4. **Mitigation Strategy**
 - Focus on the hazards of highest concern to your community
 - At least one mitigation per each hazard of concern
 - Filling out Action Worksheets
5. **Updating Your Mitigation Strategy**
 - Review goals and objectives
6. **Next Steps**
7. **Questions**



Purpose of Meeting: Mitigation Action Workshop Location of Meeting: 1353 FM-646 Suite 201, Dickinson, TX or Microsoft Teams Date/Time of Meeting: December 2, 2021 – 2:00 pm to 3:00 pm		
Attendees: ☒ Laura Norman, County OEM ☒ Galveston County ☒ Galveston County Engineering Department ☐ Bayou Vista ☐ Clear Lake Shores ☐ Dickinson ☒ Friendswood ☐ Hitchcock ☒ Jamaica Beach ☐ Kemah ☒ La Marque ☒ League City ☒ Santa Fe ☐ Tiki Island ☒ Heather Apgar, Tetra Tech ☒ Megan Brotherton, Tetra Tech		
Agenda Summary: Review project schedule and status, hazards of concern, critical facilities and lifelines, goals and objectives, SWOO exercise and next steps.		
Item No.	Description	Action By:
1.	Welcome	N/A
2.	In-Kind Tracking - Keep track of your time spent working on the HMP. This will help the County meet their local match requirement for the grant used to update the plan. - Use the Word tracker or online tracker https://www.surveymonkey.com/r/Galveston_inKind	Jurisdictions continue to track time
3.	Project Overview and Status - What is mitigation? - Mitigation describes actions taken to help reduce or eliminate the long-term risks/damages cause by hazards - Developing an HMP is one of several steps to take to mitigate hazards - Mitigation helps us: - Plan for the future - Recovery quickly after disasters - Identify mitigations - Access FEMA funds - Why are we updating the plan? - The HMP needs to be updated every 5 years to: - Prepare for and mitigate the effects of hazards - Allow the County and municipalities to be eligible for pre disaster funding - Supports CRS participation – helps your municipality's CRS rating - Why are you spending time on this? - In order to stay eligible for funding, you need to participate in and adopt the County's HMP	N/A



	○ For every \$1 spent on hazard mitigation, the U.S. saves \$6 on future disaster costs ○ Many jurisdictions have been leveraging FEMA funding for years including elevations, flood control measures, and updating the HMP • Schedule ○ All annex worksheets need to be returned to Tt by December 29th. We will get them send out to you as part of the meeting follow-up. Tt will be available to help you identify projects and complete the worksheets. ○ Draft plan review with the Steering Committee and Planning Partners will be in January – public review January and plan submitted to TDEM/FEMA by the end of January • Annex Progress ○ The SWOO, critical facilities, problem areas, and new development surveys are due by 12/3. ○ After our 12/21 meeting, you will need to confirm your hazard ranking. ○ Next is identify mitigation actions to include in the 2022 plan ○ Annexes will need to be finalized by January 4th (before public review period)	
4.	Mitigation Strategy • Focus on the hazards of highest concern to your community • At least TWO mitigation actions per each hazard of concern ○ Dam and Levee Failure ○ Drought ○ Earthquake ○ Erosion ○ Expansive Soils ○ Extreme Temperatures ○ Flood ○ Hail ○ Hurricane and Tropical Storm ○ Land Subsidence ○ Lightning ○ Pandemic ○ Severe Winter Storm ○ Thunderstorm Wind ○ Tornadoes ○ Wildfire • One action may cover all hazards and will count toward one of the two actions for each hazard. • Reduce risk by: ○ Manipulating the hazard – flood control projects, levees ○ Reducing or eliminating exposure – property acquisitions ○ Reducing vulnerability – floodproof structures, elevations, install hurricane shutters ○ Increasing capability – develop plans, codes/ordinances to help address hazards (prevent building in floodplain, increase code requirements for wind) • Risk reduction measures can be turned into mitigation actions • Requirements for the Mitigation Strategy ○ TDEM and FEMA want creative/big projects that would work well under the BRIC grant program ▪ Flood control measures, multi-jurisdictional projects	Jurisdictions to begin developing mitigation actions



	○ 2017 actions – remove general ones and make them more specific; remove maintenance (this should be an ongoing capability) ○ Minimum of TWO projects per hazard of concern • Mitigation actions to consider: ○ Local debris management plan ○ Repetitive loss/severe repetitive loss properties– mitigate through elevations or acquisitions. ○ Public education and outreach programs ○ Generators at critical facilities ○ Actions to address high hazard dams • Connect to the Mitigation Strategy ○ The risk assessment, capability assessment, hazards of concern, and problem areas will be used to identify the best projects and actions for your community. ○ Make a clear connection between vulnerability and proposed mitigation actions. ○ The results of the capability assessment may alert you to plans and ordinances that need to be updated. Include an action to update the plan and incorporate the HMP. Or update an ordinance to include higher freeboard for properties in the floodplain. ○ Provide a factual basis for the proposed projects and activities in your plan. Tie the actions to vulnerability reduction. • Focus on: ○ Connecting the risk assessment to the mitigation strategy ○ Actions that you can achieve in the next five years – whether you have the funding now or will need grant funding ○ Diverse actions – identify a variety of actions that cover all hazards and action types (structural, natural systems protection, etc.)	
5.	Updating Your Mitigation Strategy • Review goals and objectives - think about how the projects you identify will meet the goals and objectives of the HMP • Start with your problems ○ Turn challenges into mitigation actions ○ Look at your historic impacts – are certain areas always damaged by storm events? ○ Do you have repetitive loss or severe repetitive loss properties? Areas that are always flooding? ○ Do you have stormwater flooding issues? What can be done to reduce or eliminate? ○ Do you have critical facilities that need backup power? Are they located in hazard areas? ○ Have you submitted FEMA grant applications for projects that were not funded? • Use the actions from the last plan that you did not complete as actions for this plan. If needed, modify those to be more specific or address different aspects of the original problem. • Cover at least one of the FEMA mitigation types with each action ○ Plans and regulations ○ Structure and infrastructure ○ Natural systems protection ○ Education and awareness programs	It to send proposed action table and instructions Jurisdictions to begin developing mitigation actions



	Complete the proposed action table for each action you will be including in the plan, focusing on highlighted areas	
6.	Next Steps - Actions and annexes – identify actions and return worksheets to Tt by 12/29 - Risk assessment and hazard ranking – TBD at the 12/21 meeting - Review draft annex by 1/4 (before public review)	
7.	Questions None	



Galveston County, Texas Hazard Mitigation Plan – 2022 Update

Mitigation Strategy Workshop | December 2, 2021

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Agenda

- Introduction
- In-Kind Tracking
- Project Overview and Status – where we are in the process
- Development of:
 - Mitigation Strategy/Actions/Projects
 - Action Worksheets using the Mitigation Action Development Worksheets
- Next Steps
- Questions



2

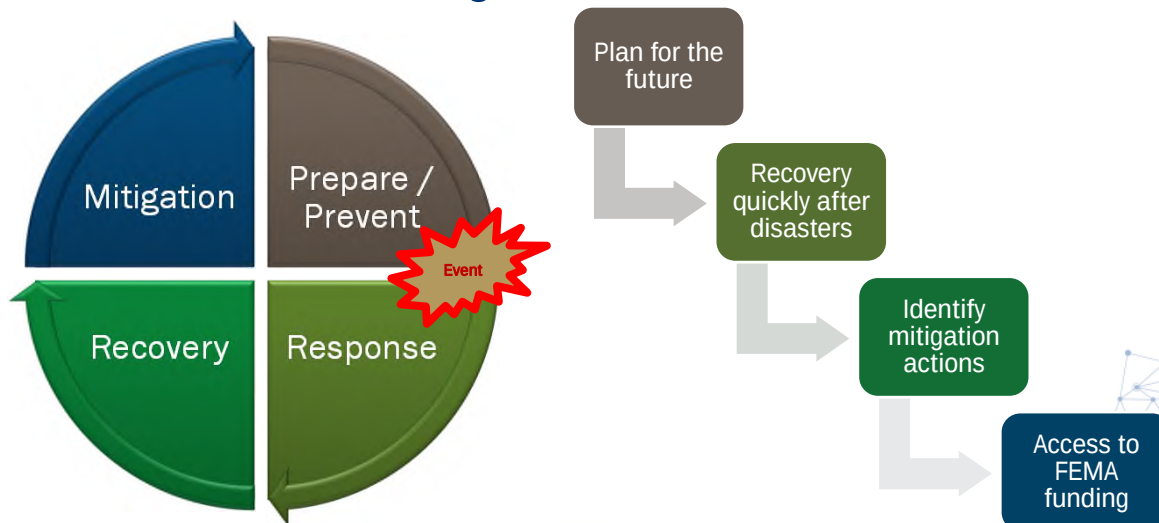
In-Kind Tracking Reminder

- Document your time working on the HMP (e.g., attend meetings, complete worksheets and surveys, emails, etc.)
- Use the Word tracker or online tracker
https://www.surveymonkey.com/r/Galveston_inKind

[illegible]

3

What is Hazard Mitigation?



4



Why Update?

- Every five years, FEMA requires a County's HMP to be updated.
- The mitigation plan update will:
 - Help the County prepare for and mitigate the effects of disasters
 - Continue to allow the County and participating communities to be eligible for pre- and post-disaster mitigation funding
 - Support CRS participation/rating of municipalities

5



Why are you spending time on this? Because mitigation works!

- For every \$1 spent on hazard mitigation, the U.S. saves \$6 in future disaster costs!
- The County has been leveraging FEMA funding for years – receiving money to prepare and update this plan, install generators at critical facilities, etc.

More Mitigation Measures, More Savings



One dollar invested in mitigation =
six dollars U.S. saves in future costs



6



Project Schedule Review

- | | |
|--------------------------|---|
| ✓ September 2021 | Kick-Off Meetings |
| ✓ September-October 2021 | Data Collection |
| ☐ October-December 2021 | Update Hazard Profiles – in progress |
| ✓ December 2, 2021 | Mitigation Strategy Workshop – TODAY! |
| ☐ December 21, 2021 | Risk Assessment Presentation |
| ☐ December 2021 | Develop Mitigation Actions – due to Tetra Tech by 12/29 |
| ☐ Now – January 2022 | Plan Development |
| ☐ December - January | Review Draft Plan |
| ☐ January 4, 2022 | Draft Plan Review Meeting |
| ☐ January 5-19, 2022 | Public Review Period |
| ☐ Late-January 2022 | Submit plan to TDEM and FEMA |

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Annex Progress

- Looking ahead...
 - Complete the surveys sent out on 11/22
 - SWOO – due TODAY!
 - Critical Facilities – due 12/3
 - Problem Areas – due 12/3
 - New Development – due 12/3
 - Confirm hazard ranking
 - Status updates on previous mitigation actions
 - Identify new mitigation actions for the 2022 update
 - Complete action worksheets
 - Finalize annexes by January 2022
- Orange municipalities – missing a worksheet
- Green municipalities – annex in good shape; need to identify mitigation actions

Status (12/2/2021)	
Galveston County	Annex in progress
Bayou Vista (C)	Annex in progress; missing Worksheet A (event history)
Clear Lake Shores (C)	Annex in progress
Dickinson (C)	Annex in progress
Friendswood (C)	Annex in progress
Hitchcock (C)	Annex in progress
Jamaica Beach (C)	Annex in progress
Kemah (C)	Annex in progress
La Marque (C)	Annex in progress
League City (C)	Annex in progress
Santa Fe (C)	Annex in progress
Tiki Island (V)	Annex in progress

8



Mitigation Strategy

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9



2022 Hazards of Concern

- Coastal Erosion and Retreat
- Dam/Levee Failure
- Drought
- Expansive Soils
- Extreme Temperature (Heat and Cold)
- Flood (Coastal and Inland)
- Hailstorm
- Hurricane/Tropical Storm
- Land Subsidence
- Lightning
- Pandemic
- Severe Winter Weather
- Tornado
- Tsunami
- Utility Failure
- Wildfire (Urban and Rural)
- Windstorm



10

10



Risk Reduction

- How do you reduce risk for a hazard?
 - **Manipulate the Hazard**
 - Structural flood control
 - **Reduce/Eliminate Exposure**
 - Acquire floodprone properties
 - **Reduce Vulnerability**
 - Retrofit (floodproofing)
 - **Increase Capability**
 - \$, preparation, technical assistance, planning enforcement

11



Using Your Mitigation Strategy to Reduce Risk

- What is a **Mitigation Strategy**?
 - A group of projects or actions to reduce the impacts of the hazards of concern on your community
 - Plans and Regulations
 - Structure and Infrastructure Studies and Projects
 - Natural Systems Protection Studies and Projects
 - Education and Awareness Programs
- Terms to describe the Mitigation Strategy include:
 - **Mitigation Action Plan** or **Action Plan**
 - **Mitigation Projects** or **Initiatives** or **Actions**

Your Mitigation Strategy table is included in your annex. We will use action worksheets to collect details on the actions you will include in the 2022 Update.

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Requirements for the Mitigation Strategy Update



- TDEM and FEMA would like to see more creative/big projects that would work well under the BRIC grant program
- 2017 projects
 - If a project is not finished and still a priority, include in 2022 HMP
 - Remove general projects or make more specific
 - Remove routine maintenance
 - Remove ongoing capabilities
- Minimum of 2 mitigation actions for EACH hazard of concern
 - One action can cover multiple hazards and jurisdictions. For example, education program on mitigation techniques you can implement – applies to all hazards and all jurisdictions.

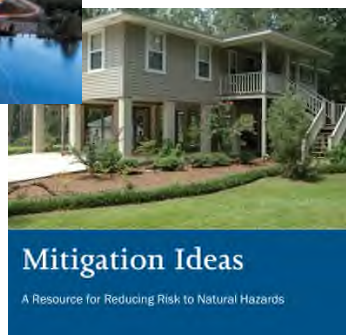
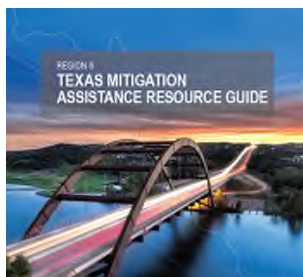


FEMA



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Other Mitigation Actions to Consider

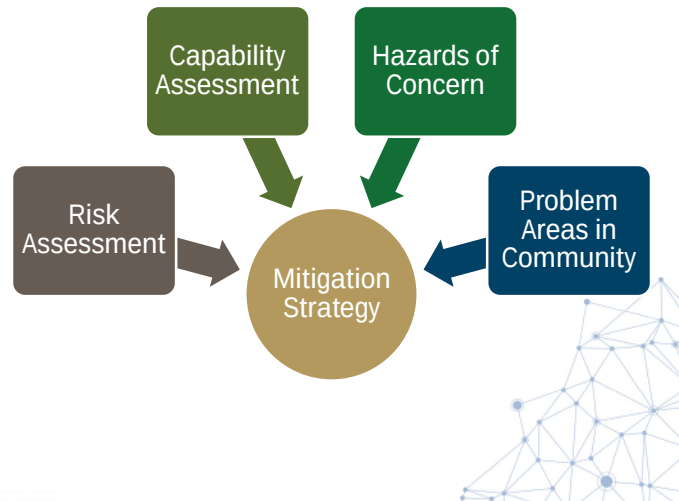


- Local Disaster Debris Management Plans
- Actions to address high hazard or significant hazard dams
- Public education and outreach programs
- Generators at critical facilities
- Floodproofing critical facilities
- Addressing repetitive and severe repetitive loss properties

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Connecting to the Mitigation Strategy

- Need a clear connection between vulnerability and proposed mitigation actions.
- Capability assessment provides insight into challenges and opportunities for the mitigation strategy.
- Provides the factual basis for activities proposed in the mitigation strategy.



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Where do you need to focus?

- Stronger connection between the risk assessment and mitigation strategy
- More specific, achievable actions
 - Specific projects, in specific locations, in a specific timeframe
- Diverse actions
 - You need at least 2 actions per hazard of concern. Think about actions that can cover multiple hazards.
 - Include a variety in the types of actions

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Update the Mitigation Strategy

Action Types

Initiative Table – actions and projects

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Update the Mitigation Strategy

- Review the Goals and Objectives of the HMP
- Start with problems
 - Turn challenges/obstacles/gaps into mitigation actions
 - Examine historic impacts
 - Review the risk and capability assessment results
 - RL/SRL properties
 - Stormwater/urban flooding areas
 - Critical facilities and lifelines located in a hazard area (if feasible)
 - Additional areas of vulnerability
 - Previous FEMA HMA submitted projects – awarded/unawarded
- Identify new Mitigation Actions/Projects/Strategies
- REMEMBER – 2 actions for every hazard of concern!
- Modify 'carry-over' projects from the 2017 HMP
 - **More specific** or to **address different aspects of the original problem**



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Mitigation Action Types



Plans and regulations include government authorities, policies, or codes that encourage risk reduction, such as building codes and state planning regulations. This may also include planning studies.



Structure and infrastructure projects involve modifying existing structures and infrastructure or constructing new structures to reduce the impact of hazards.



Natural systems protection projects minimize losses while also preserving or restoring the function of natural systems.



Education and awareness programs include long-term, sustained programs to inform and educate citizens and stakeholders about hazards and mitigation options. This category could also include training.

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Range of Mitigation Actions

- Primary types of mitigation actions to reduce long-term vulnerabilities include:

Local Plans and Regulations

- Zoning codes
- Ordinances
- Open space plan
- Debris management plan

Structural Projects

- Elevation
- Drainage improvements
- Property acquisitions
- Stormwater improvements

Natural Systems Protection

- Stream and wetland restoration
- Erosion control
- Water quality improvement
- Environmental corridors

Education and Outreach

- Public awareness
- Education programs
- Real estate disclosure
- Map information
- Environmental education

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Proposed Action Table

- Each municipality will need to complete the **Proposed Hazard Mitigation Initiatives** table in your annex
- Each column needs to be filled in. Tetra Tech will assist you with completing each cell.
- Action Worksheets will need to be completed for all projects.

Initiative Number	Mitigation Initiative Name	Description of the Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met
2021-Your Town-001	Repetitive Loss Property Outreach	Problem: There are 100 repetitive loss properties located in the Borough. According to NFIP claims records, these properties have experienced extensive flood damage through the years. Without proper mitigation, the structures will continue to experience flood damages. Solution: Conduct outreach to the property owners to inform them of their repetitive loss designation and provide mitigation options to protect the structures. If the property owners choose elevation or acquisition, the Borough will develop a grant application to fund acquisitions or elevations of the properties.	Existing	Flood, Severe Storm, Hurricanes/Tropical Storms	All

Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Cost	Timeline	Priority	Mitigation Category	CRS Category
Municipal Floodplain Administrator, Property Owner	Borough Budget for outreach; FEMA FMA or HMGP for mitigation measures	Increase resilience of structure and Borough; decrease flood damages	<\$10,000 for outreach; mitigation costs vary depending on project	One year for outreach; 5 years for mitigation measures	High	EAP, SIP	PP, PI



How do you fill in the Action Worksheets?

- The entire worksheet needs to be filled in; however, Tetra Tech will assist with this. We ask that each municipality fill in (at least) the highlighted cells.
- We need one worksheet for each action.
- Focus on providing highly detailed:
 - Description of the Problem
 - Description of the Solution



Next Steps

- Actions and Annexes
 - Tetra Tech will reach out to help you with identify mitigation actions
 - We will be sending out a worksheet to help capture additional problem areas. Complete the online survey to identify areas as well.
- Review your hazard ranking and adjust as needed (to be discussed at our 12/21 meeting)
- Review your draft annex prior to posting for public review.



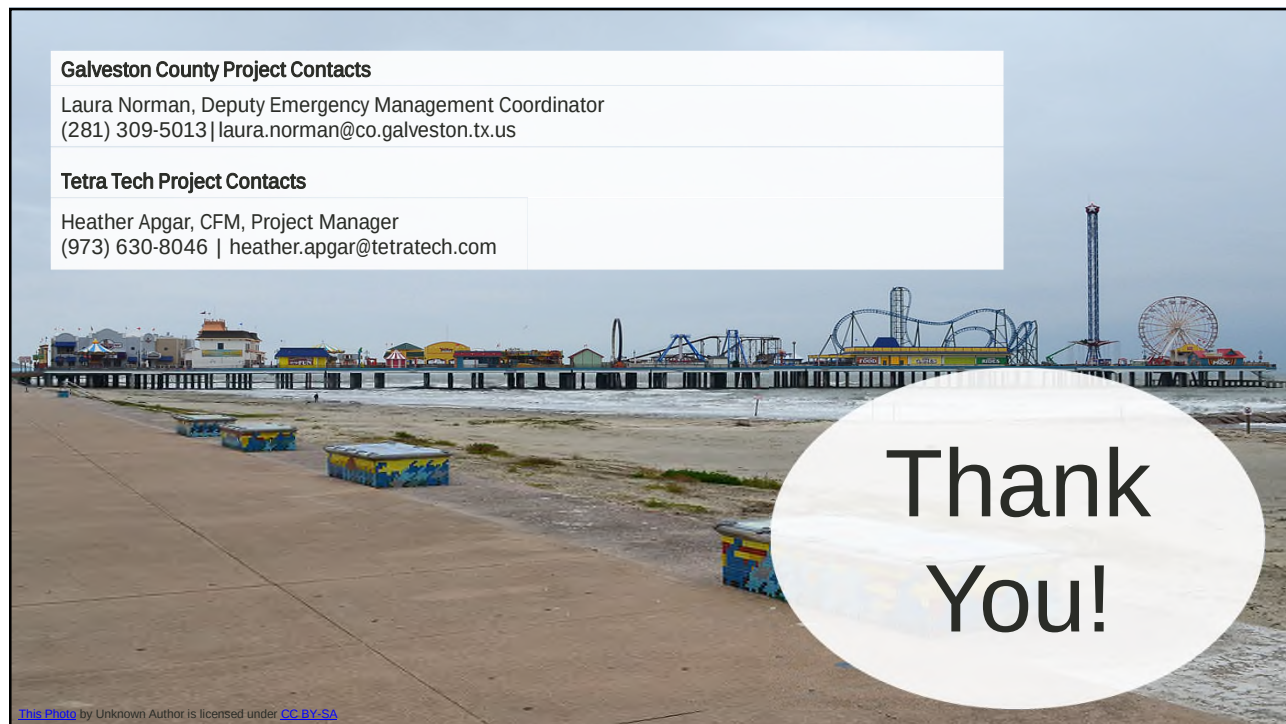
23



Questions?



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Galveston County Project Contacts

Laura Norman, Deputy Emergency Management Coordinator
(281) 309-5013 | laura.norman@co.galveston.tx.us

Tetra Tech Project Contacts

Heather Apgar, CFM, Project Manager
(973) 630-8046 | heather.apgar@tetrattech.com

Thank You!

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1. **Opening Remarks**
2. **In-Kind Tracking**
 - Use the Word tracker or online tracker to document time spent working on the HMP
https://www.surveymonkey.com/r/Galveston_inKind
3. **Project Status –**
 - Where we are in the process, participation status, public outreach, survey discussions
4. **Risk Assessment Overview –**
 - Hazards of concern risk ranking
 - Results of each risk assessment for each hazard
 - How will this information be used in the HMP
5. **Using the Risk Assessment in Developing Mitigation Actions**
6. **Next Steps**
7. **Questions**



Purpose of Meeting: Risk Assessment Presentation		
Location of Meeting: 1353 FM-646 Suite 201, Dickinson, TX or Microsoft Teams		
Date/Time of Meeting: December 21, 2021 – 2:00 pm to 3:00 pm		
Attendees: ☒ Galveston County OEM ☐ Bayou Vista ☐ Clear Lake Shores ☐ Dickinson ☐ Friendswood ☐ Hitchcock ☐ Jamaica Beach ☐ Kemah ☐ La Marque ☐ League City ☐ Santa Fe ☐ Tiki Island ☒ Heather Apgar, Tetra Tech ☒ Megan Brotherton, Tetra Tech		
Agenda Summary: Review project schedule and status, present risk ranking, and go over how to review and provide input		
Item No.	Description	Action By:
1.	Welcome	N/A
2.	In-Kind Tracking - Keep track of your time spent working on the HMP. This will help the County meet their local match requirement for the grant used to update the plan. - Use the Word tracker or online tracker https://www.surveymonkey.com/r/Galveston_inKind	Jurisdictions continue to track time
3.	Project Schedule: - Hazard Profiles are underway - Mitigation Action Worksheets are due December 29 - Two actions are required for each hazard - Draft plan to TDEM by the last week in January	N/A
4.	Public Outreach and Engagement - Public and Stakeholder outreach surveys will be distributed today - Post outreach materials to social media and jurisdictional websites - Send Tt copies of the posts to include in the plan	Tt and Jurisdictions
5.	Risk Assessment Overview Risk is defined as: - A function of hazard, exposure, and vulnerability. We are also looking at capabilities and climate change. Combining all of these things gives us the risk of each hazard of concern. The risk assessment: - Gives us a better understanding of the risks the Planning Area faces - Initial results are based on best available data at the time of the plan update - Some hazards we did a qualitative assessment (e.g., disease outbreak, extreme heat). The hazards that do not have defined mapping or extents were the ones where the qualitative assessment was done. - Other hazards we performed a quantitative assessment where we were able to use	N/A



	mapping to determine the number of people and structures exposed, along with estimated structural damages. This was done for hurricane/wind and flood.	
6.	Ranking the Hazards of Concern This shows the overall ranking for the County for each hazard, with the highest ranked on top and the lowest on bottom. Rankings were done for the County and for each municipality. Some of the rankings different from 2017: • We used best available data and looked at population, economy, property (buildings), capabilities to respond to or address the hazard, climate change projections, and probability of occurrence. • We also used different thresholds for the impacts listed above. • We incorporated your capabilities to respond/address the hazard and the potential for climate change impacts This shows the different levels assigned to each hazard and what was used to calculate the risk factor ranking. Overall output for each hazard of concern: • Coastal and Inland Erosion - Low • Dam/Levee Failure - Low • Drought - Medium • Expansive Soils - High • Extreme Temperatures (Heat and Cold) - Medium • Flood (Coastal and Inland) - Medium • Hailstorm - Low • Hurricane/Tropical Storm - High • Land Subsidence - Low • Lighting - Low • Pandemic - Low • Severe Winter Storm - Low • Tornado - Medium • Tsunami - Low • Utility Failure - Medium • Wildfire (Urban and Rural) - Low • Windstorm - Medium	N/A
7.	Questions and Comments • Dam & Levee Failure: Galveston Seawall is categorized as a levee and upgrades are currently under construction. Provide updated info to Tt. • Sinkholes can be categorized under expansive soils. • Erosion map? The entire coastline is subject to erosion. Tt to get clarification from GIS. • Events that occurred in non-participating jurisdictions can be included. • Expansive Soils may need to be adjusted to a lower ranking. • Flood should be changed to high.	Tt and Jurisdictions
8.	Next Steps • Mitigation Action Worksheets due by Wednesday, December 29 • Risk Assessment finalization due by Wednesday, December 29 • Draft Plan Review, January 4, 2022 • Public Review Period, January 5-19, 2022	



Galveston County, Texas
Hazard Mitigation Plan – 2022 Update
Risk Assessment Presentation | December 21, 2021

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Agenda

- Welcome
- In-Kind Tracking
- Project Overview and Status – where we are in the process
- Risk Assessment Overview
- Review Calculated Hazard Ranking
- Next Steps



TETRA TECH

2

2

In-Kind Tracking Reminder

- Document your time working on the HMP (e.g., attend meetings, complete worksheets and surveys, emails, etc.)
- Use the Word tracker or online tracker
https://www.surveymonkey.com/r/Galveston_inKind

[illegible]

3

Project Schedule Review

- | | |
|--------------------------|--|
| ✓ September 2021 | Kick-Off Meetings |
| ✓ September-October 2021 | Data Collection |
| ☐ October-December 2021 | Update Hazard Profiles – in progress |
| ✓ December 2, 2021 | Mitigation Strategy Workshop |
| ☐ December 21, 2021 | Risk Assessment Presentation – TODAY! |
| ☐ December 29, 2021 | Mitigation Action Worksheets due to Tetra Tech – two actions per hazard! |
| ☐ December 29, 2021 | Hazard Ranking Review due to Tetra Tech |
| ☐ Now – January 2022 | Plan Development |
| ☐ January 2022 | Review Draft Plan |
| ☐ January 4, 2022 | Draft Plan Review Meeting |
| ☐ January 10-24, 2022 | Public Review Period |
| ☐ January 28, 2022 | Submit plan to TDEM and FEMA |

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Annex Progress



- Looking ahead...
 - Confirm hazard ranking
 - Status updates on previous mitigation actions
 - Identify new mitigation actions for the 2022 update
 - Complete action worksheets
 - Finalize annexes by January 7, 2022
- Orange municipalities – missing a worksheet
- Green municipalities – annex in good shape; need to identify mitigation actions

Status (12/2/2021)	
Galveston County	Annex in progress
Bayou Vista (C)	Annex in progress; missing Worksheet A (event history)
Clear Lake Shores (C)	Annex in progress
Dickinson (C)	Annex in progress
Friendswood (C)	Annex in progress
Hitchcock (C)	Annex in progress
Jamaica Beach (C)	Annex in progress
Kemah (C)	Annex in progress
La Marque (C)	Annex in progress
League City (C)	Annex in progress
Santa Fe (C)	Annex in progress
Tiki Island (V)	Annex in progress

5

Public and Stakeholder Outreach



- Surveys are ready to distribute!
- We will send out different tools to use to help with public outreach – please share!
 - Social media – Facebook, Twitter
 - Let Tetra Tech know when you post so we can grab screen shots to include in the plan

Galveston County Hazard Mitigation Plan - Citizen Survey

Introduction

Galveston County Residents,

A planning committee, along with the support of county, regional and state agencies and stakeholders, has recently been formed to address natural disasters that may occur in the County and develop strategies to mitigate against losses. In order to identify and plan for future natural disasters, we need assistance from the citizens of Galveston County.

This questionnaire is designed to help us gauge the level of knowledge local citizens already have about natural disaster issues. Our questionnaire also asks for information you may have about areas vulnerable to any type of natural disaster. The information you provide will help us coordinate activities to reduce the risk of injury or property damage in the future.

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Risk Assessment Overview

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What is Risk?

Risk is defined as a function of :

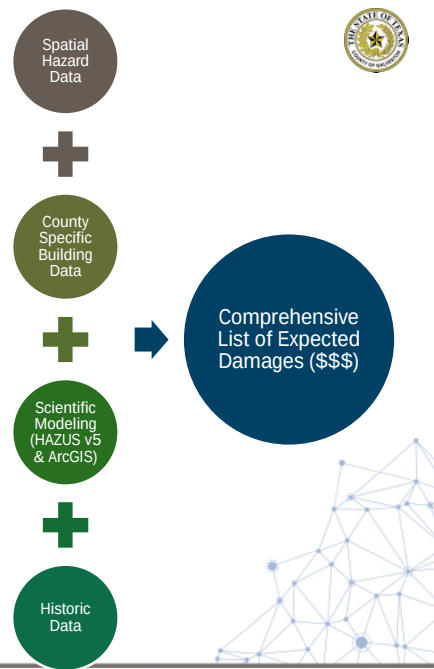
- ✓ **Hazard**
 - *Source of potential danger or adverse condition*
- ✓ **Exposure**
 - *Manmade or natural features that are exposed to the hazard*
- ✓ **Vulnerability**
 - *Damage susceptibility of the exposed features*



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Purpose of the Risk Assessment

- To get a better understanding of the risks you face
- Initial results based on available data
- Quantitative data (population/structures exposed, structural damages within hazard zones) used when available
- Qualitative community input (such as unmapped flood areas) integrated to adjust results
- Local community input to adjust relative rankings



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Ranking the Hazards of Concern

How are the rankings calculated? What is the preliminary ranking?

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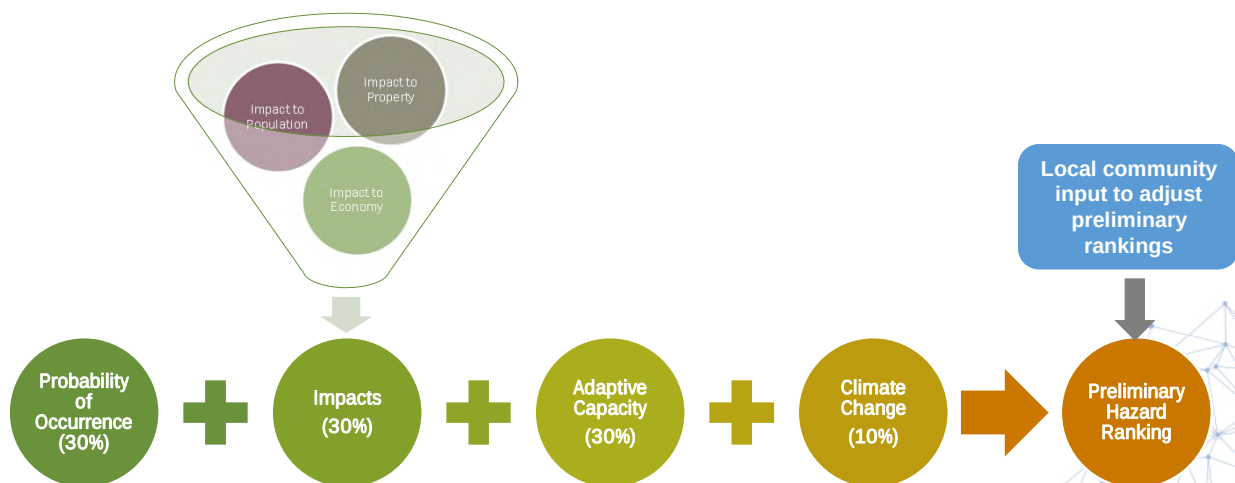
2022 Hazards of Concern

- Coastal Erosion and Retreat
- Dam/Levee Failure
- Drought
- Expansive Soils
- Extreme Temperature (Heat and Cold)
- Flood (Coastal and Inland)
- Hailstorm
- Hurricane/Tropical Storm
- Land Subsidence
- Lightning
- Pandemic
- Severe Winter Weather
- Tornado
- Tsunami
- Utility Failure
- Wildfire (Urban and Rural)
- Windstorm

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Preliminary Hazard Ranking Formula



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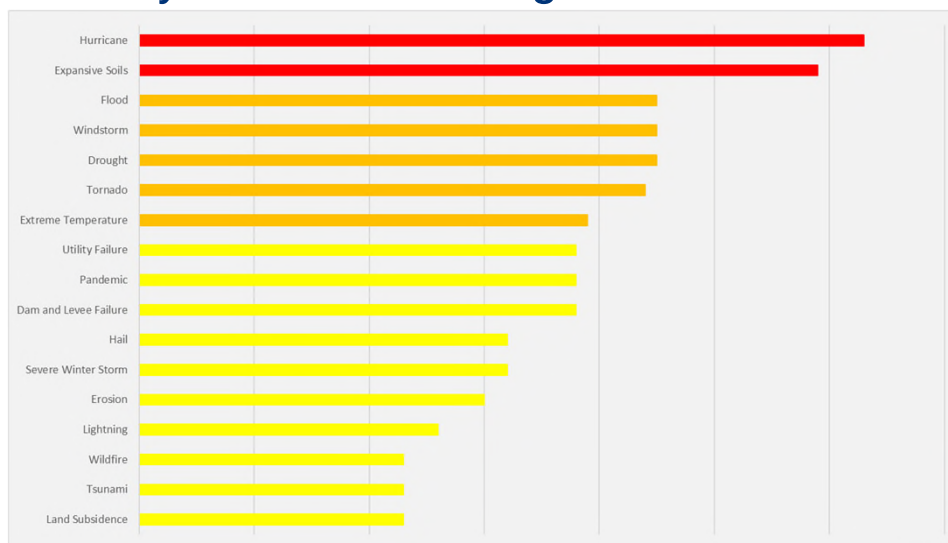
Ranking the Hazards of Concern

What information plays a role in determining the risk rankings?

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Preliminary Hazard Ranking



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Preliminary Hazard Ranking

Hazard of Concern	2017 Countywide Ranking	2022 Countywide Preliminary Ranking
Dam and Levee Failure	Low	Low
Drought	Low	Medium
Erosion	Low	Low
Expansive Soils	Low	High
Extreme Temperature	Low	Medium
Flood	Low	Medium
Hail	Low	Low
Hurricane and Tropical Storm	Medium	High
Land Subsidence	Low	Low
Lightning	Low	Low
Pandemic	Not profiled	Low
Severe Winter Storm	Low	Low
Tornado	Low	Medium
Tsunami	Low	Low
Utility Failure	Not profiled	Low
Wildfire	Low	Low
Windstorm	High	Medium

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Municipal Preliminary Rankings

	Clear Lake Shores (C)	Dickinson (C)	Friendswood (C)	Hitchcock (C)	Jamaica Beach (C)	Kemah (C)	La Marque (C)	League City (C)	Santa Fe (C)	Bayou Vista (V)	Tiki Island (V)
Erosion	Low	Low	Low	High	Low	Medium	Low	Medium	High	Low	High
Dam and Levee Failure	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Drought	Low	Low	Low	Low	Low	Low	Low	Low	Low	Medium	Medium
Expansive Soils	Low	High	High	High	Low	Low	High	High	Low	High	Low
Extreme Temperature	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Flood	High	High	Low	High	High	High	Low	Low	Low	High	High
Hail	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Hurricane	High	High	Medium	High	High	High	High	High	Medium	High	High
Land Subsidence	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Lightning	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Pandemic	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Severe Winter Storm	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Tornado	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Tsunami	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Utility Failure	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Wildfire	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Windstorm	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium

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Why are the rankings different from the last plan?



- We used a different methodology for the 2022 HMP
 - Population
 - Property
 - Economy
 - Capabilities to respond to/address the hazard
 - Climate change projections
 - Probability of occurrence
- We used different thresholds for the impacts listed above
- We incorporated your capabilities to respond/address the hazard and the potential for climate change impacts

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Hazard Ranking Input – 2022 HMP



Impact on Population – Function of population exposed

- ✓ Low – 14% or less population exposed
- ✓ Medium – 15%-29% population exposed
- ✓ High – 30%+ population exposed

Impact on property – Function of structures exposed

- ✓ Low – 14% or less structures exposed
- ✓ Medium – 15%-29% structures exposed
- ✓ High – 30%+ structures exposed

Impact on economy – Function of damages to building stock

- ✓ Low – 9% or less loss estimate of total replacement cost
- ✓ Medium – 10%-19% loss estimate of total replacement cost
- ✓ High – 19%+ loss estimate of total replacement cost

Capability – Function of level of planning, policies, enforcement

- ✓ Low – outdated policies; limited to no deployable resources; limited capabilities to respond; long recovery
- ✓ Medium – minimum requirements; mitigation strategies identified but not implemented; moderate county capabilities
- ✓ High – exceed requirements; mitigation/protective measures in place; county/jurisdiction has ability to recover quickly because resources are readily available, and capabilities are high

Climate Change – Function of climate predictions

- ✓ Low - No local data is available; modeling projects are uncertain on whether there is increased future risk; confidence level is low (inconclusive evidence)
- ✓ Medium - Studies and modeling projections indicate a potential for exacerbated conditions due to climate change
- ✓ High - Studies and modeling projections indicate exacerbated conditions/increased future risk due to climate change

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Coastal and Inland Erosion



- Previous events include erosion along beaches as a result of coastal storms
 - Any significant events in the last 5 years?
- Looked at both coastal and inland erosion impacts
 - Coastal – 100-ft shoreline buffer
 - Inland – K factor >0.49 (susceptibility to erosion)

Probability - Occasional

Population - Low

Property - Low

Economy -
Medium

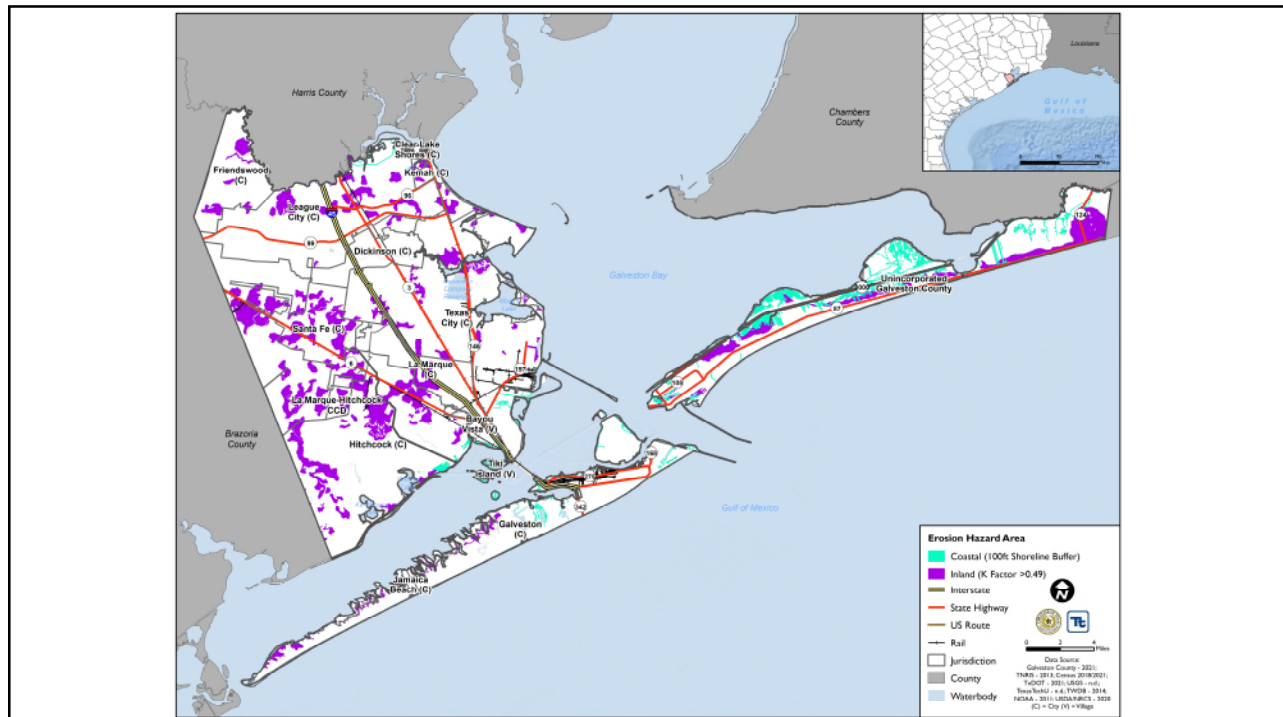
Capacity – Medium

Climate Change – High

Ranking -
Low



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Dam and Levee Failure



Probability - Rare	Population - Medium
Property - Medium	Economy - Low
Capacity – Medium	Climate Change – Medium
Ranking - Low	

- One dam and six levee systems
 - Galveston County Water Industrial Reservoir Dam – high hazard
 - Galveston County Industrial Water Reservoir Levee System
 - Old Fort San Jacinto Levee System
 - Pelican Island Levee 4
 - Pelican Island Levee System
 - Shoal Point Levee System
 - Texas City Hurricane Flood Protection
- No reported failures or incidents in the County
 - Are they any in the last five years we should include?


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Drought



- Previous Events
 - Between 1996 and 2021, 9 reported drought events in Galveston County; however, this may not represent all drought events that impacted the area.
 - The County was included in 7 USDA Declarations for drought events between 2012 and 2021.
- Exposure
 - Entire Planning Area is vulnerable
 - Increased vulnerability to populations at higher risk (65+ / <5 years old)
- Potential impacts:
 - Increased wildfire/brush fire risk
 - Impacts to agriculture/farms
 - Drinking water supply (groundwater and surface water)

Probability - Occasional	Population - Medium
Property - Medium	Economy - Medium
Capacity – Medium	Climate Change – High
Ranking - Medium	


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Expansive Soils

Probability - Rare	Population - High
Property - High	Economy - High
Capacity – Medium	Climate Change – Medium
Ranking - High	

- Little to no information on expansive soil incidents in the County.
 - Expansive soils cause structures to move unevenly and crack and cause roads and sidewalks to buckle.
- Impacts
 - People and structures located in areas with >6% extensibility (shrink-swell potential of soils) – high is anything over 6%




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Extreme Temperature

- Previous Events
 - Looked at both hot and cold events
 - Between 2000 and 2021, the County had 67 days with temperatures over 90°F and two days with temperatures below 32°F
- Exposure
 - Entire Planning Area is vulnerable
 - Increased vulnerability to populations at higher risk (65+ / <5 years old)

Probability - Frequent	Population - Medium
Property - Low	Economy - Low
Capacity – Medium	Climate Change – High
Ranking - Medium	




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Flood

Probability -
Frequent

Population -
Medium

Property -
Low

Economy -
High

Capacity -
Medium

Climate
Change -
High

Ranking -
Medium

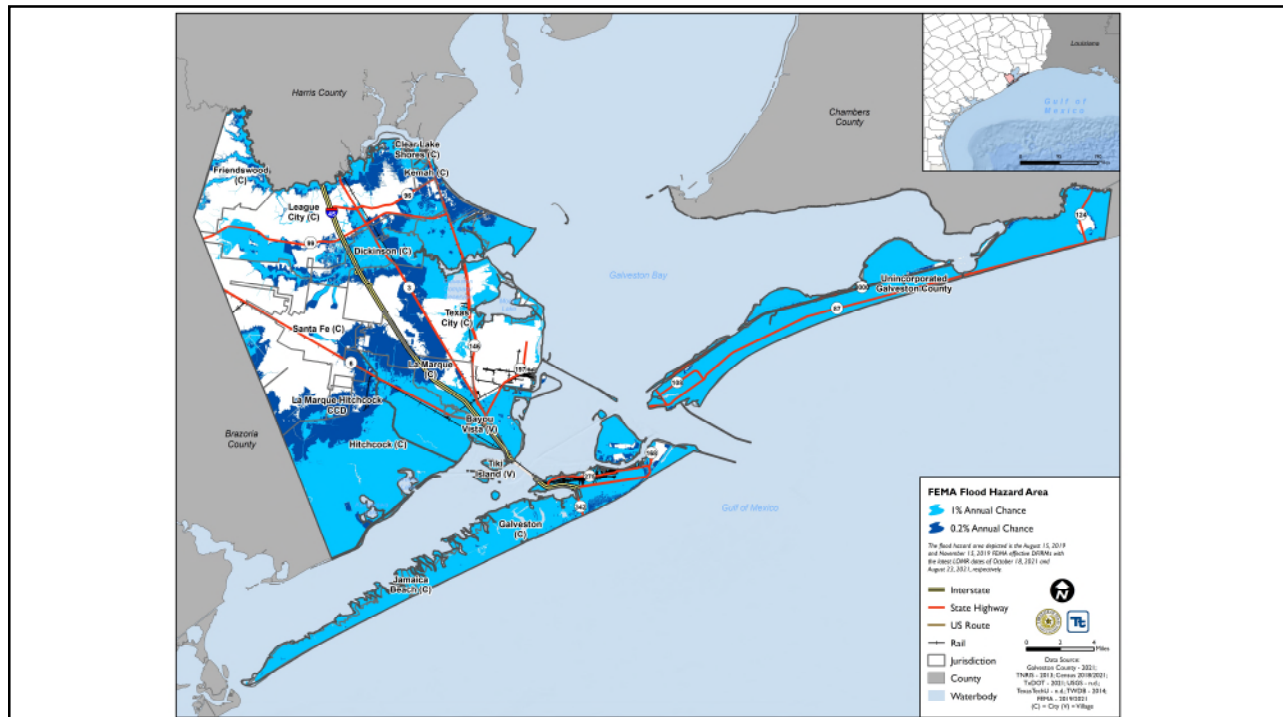
• Previous Events

- Looked at riverine, coastal, flash, and stormwater flooding
- 10 FEMA disaster declarations since 1973 specific to flooding; 113 reported flood events since 1996

• Exposure

- People and property located in the 1% annual chance flood area

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Hail



- Previous Events
 - 120 hail events since 1957 causing over \$3 million in property damage (as reported to NOAA).
 - Largest hail diameter – 4.5 inches in Hitchcock on April 2, 2013
- Exposure
 - Entire population and building stock vulnerable

Probability -
Occasional

Population -
Low

Property -
Low

Economy -
Low

Capacity –
Medium

Climate
Change –
Medium

Ranking -
Low

Hurricane and Tropical Storm



Probability -
Occasional

Population -
High

Property -
High

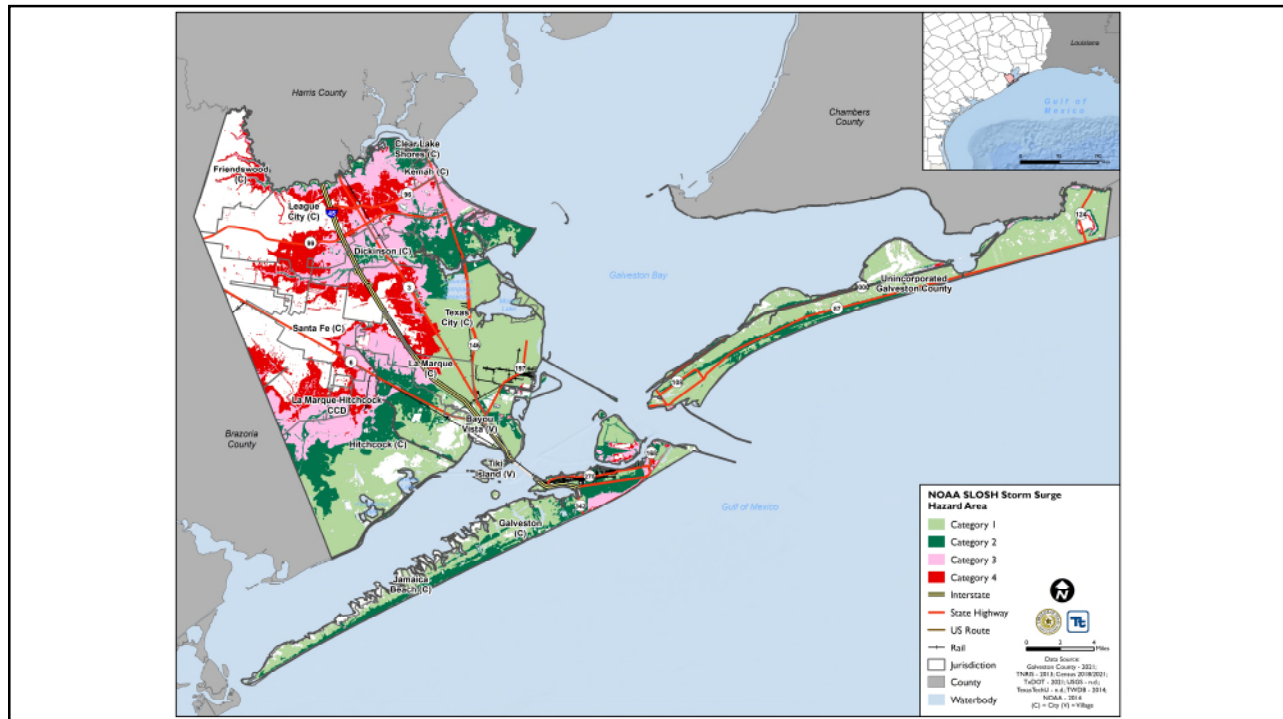
Economy -
High

Capacity –
Medium

Climate
Change –
High

Ranking -
High

- Previous Events
 - 4 events since 2017; 16 FEMA disaster declarations related to hurricanes and tropical storms
 - Most recent event to hit the County – Hurricanes Laura and Nicholas
- Exposure
 - Population and property exposed to storm surge
 - Used Category 4 storm surge to develop ranking



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Land Subsidence

- Previous Events
 - No record of subsidence incidents since 2017; however, it is a continuous hazard, and its effects are often combined with other events
 - Rates of decreased over time, but the effects are still a risk
- Exposure
 - Limited exposure to population and buildings

Probability -
Rare

Population -
Low

Property -
Low

Economy -
Low

Capacity -
Medium

Climate
Change -
Medium

Ranking -
Low

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Lightning

Probability - Occasional	Population - Low
Property - Low	Economy - Low
Capacity – Medium	Climate Change – Medium
Ranking - Low	

- Previous Events
 - Three recorded lightning strike since 2017; over \$900,000 in property damage
- Exposure
 - All people and property exposed and vulnerable; however, damage from lightning strikes are considered minimal

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Pandemic

- Previous Events
 - Looked at COVID-19, Flu, and West Nile Virus
- Exposure
 - Entire County is exposed and vulnerable; however, not occurring multiple times a year with significant impacts
 - Severe events can lead to staffing and bed shortages in hospitals

Probability - Occasional	Population - Medium
Property - Low	Economy - Low
Capacity – Medium	Climate Change – Medium
Ranking - Low	

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Severe Winter Storm

Probability - Rare	Population - Medium
Property - Low	Economy - Low
Capacity – Medium	Climate Change – Medium

**Ranking -
Low**

- Previous Events
 - Snow event in December 2017
 - Most recent event occurred February 2021 – below-freezing temperatures, power outages
- Exposure
 - All people and property in the Planning Area are vulnerable
 - Populations of 65+ and <5 may be more at risk

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Tornado

- Previous Events
 - 15 reported tornadoes/funnel clouds since 2017; over \$780,000 in property damage
- Exposure
 - All people and property in the Planning Area exposed and vulnerable

Probability - Occasional	Population - Medium
Property - Medium	Economy - Medium
Capacity – Medium	Climate Change – Medium

**Ranking -
Medium**

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Tsunami



Probability -
Rare

Population -
Low

Property -
Low

Economy -
Low

Capacity –
Medium

Climate
Change –
Medium

Ranking -
Low

- Previous Events
 - No recorded tsunamis in Galveston County or Texas
- Exposure
 - Looked at population and buildings located in the tsunami hazard area – evacuation areas plus high tide (322 ft from mapped shoreline)
 - Only 0.4% of population exposed and 0.8% of buildings exposed




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Utility Failure



- Previous Events
 - Looked at power outages and events that downed power lines and utility poles
- Exposure
 - Entire County is exposed and vulnerable; however, overall impacts or low to medium

Probability -
Frequent

Population -
Medium

Property -
Low

Economy -
Medium

Capacity –
Medium

Climate
Change –
Medium

Ranking -
Medium




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Windstorm

• Previous Events

- Wind-related events associated with thunderstorms
- Since 2017, 22 wind-related events (associated with thunderstorms); \$63,000 in property damage and \$6,500 in crop damage

• Exposure

- Looked at population and property exposed to a 500-year event (Category 4 wind gusts – 130-156 mph)

Probability -
Occasional

Population -
Medium

Property -
Medium

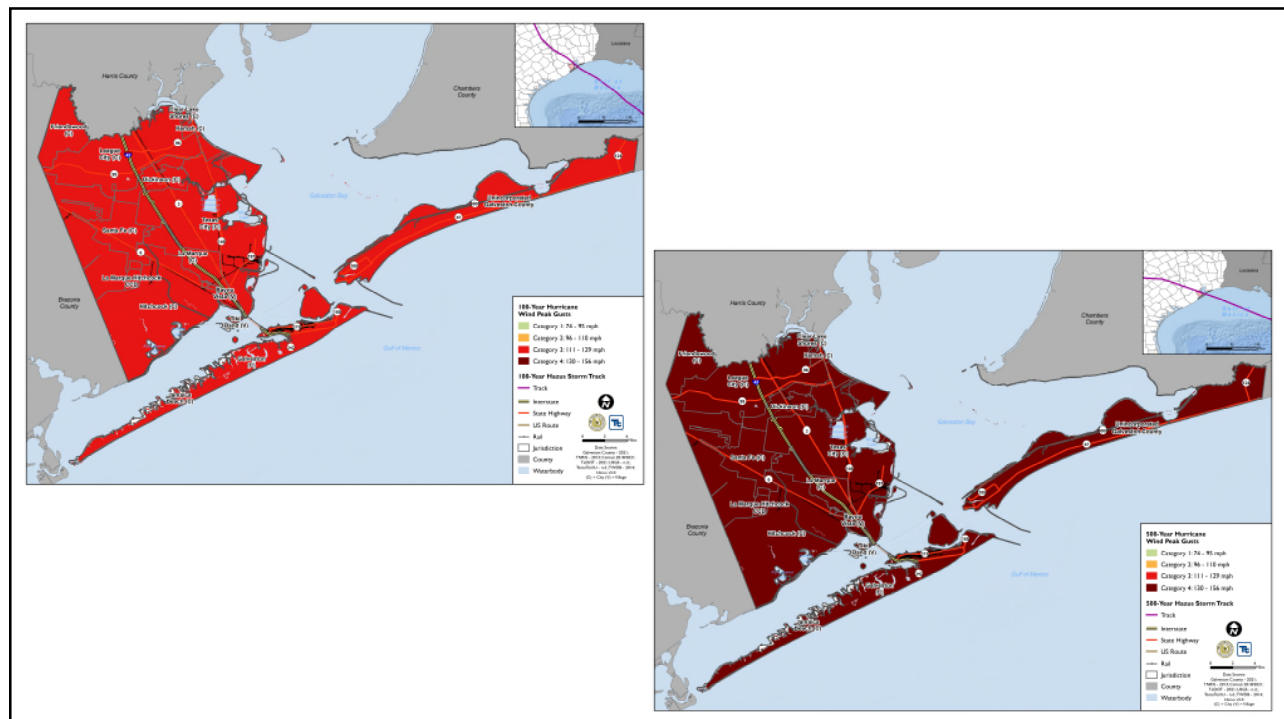
Economy -
Medium

Capacity –
Medium

Climate
Change –
High

Ranking -
Medium

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Next Steps



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Next Steps

- Mitigation Actions – worksheets due Wednesday, December 29th
 - If you need help completing, please reach out to Tetra Tech
- Finalize risk assessment – due to Tetra Tech by Wednesday, December 29th
- Finalize annexes by January 7, 2022
- Submit Draft Plan for TDEM/FEMA Review
- Adopt FEMA - Approved Plan
- Implement Projects and Maintain the Plan → Increase Resilience!



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Questions?

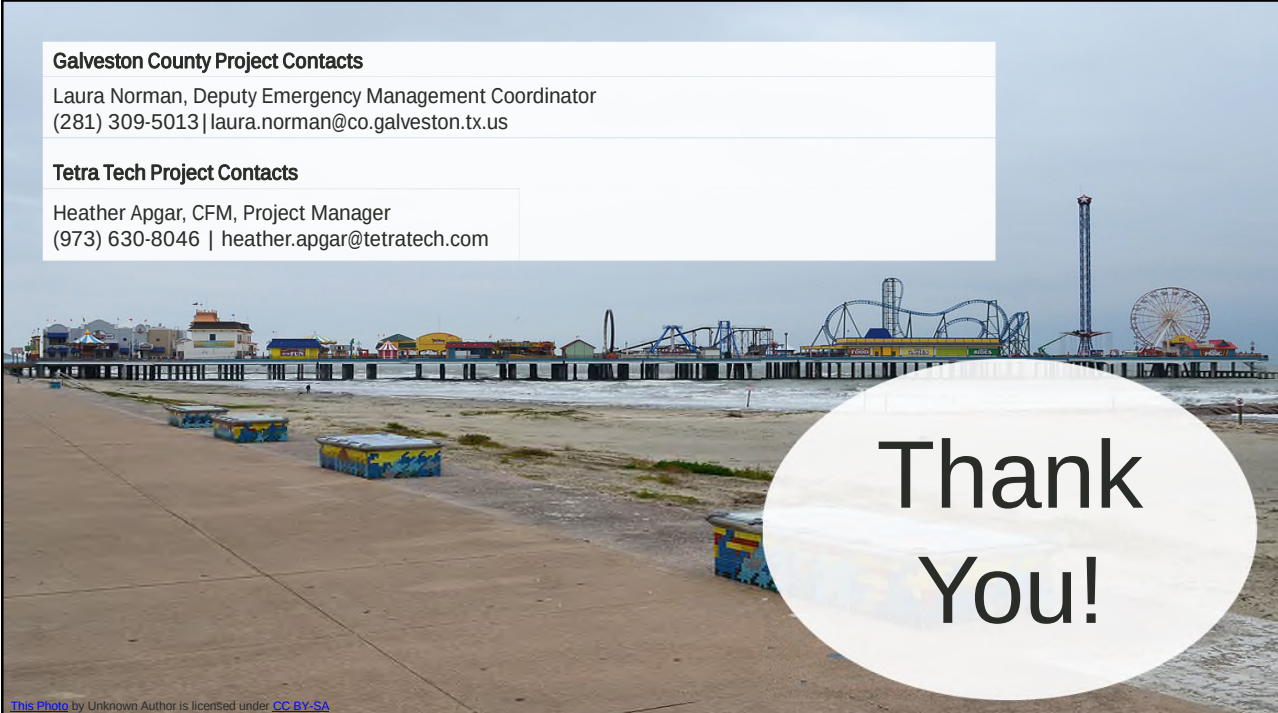


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Thank You!

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1. **Opening Remarks**
2. **In-Kind Tracking**
 - Use the Word tracker or online tracker to document time spent working on the HMP
https://www.surveymonkey.com/r/Galveston_inKind
3. **Project Status –**
 - Where we are in the process, participation status, public outreach, survey discussions
4. **Draft Plan Overview –**
 - What's new
 - Review each section
 - Plan Maintenance
 - Finalizing the Plan
5. **Section Contents of HMP**
6. **Next Steps**
7. **Questions**



Galveston County, Texas Hazard Mitigation Plan – 2022 Update

Draft Plan Presentation | January 25, 2022

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1

Agenda

- In-Kind Tracking
- Draft Plan Review
 - What's New
 - Section-by-section content overview
 - Review guidelines
 - Finalizing the plan
- Next Steps
- Questions



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2

2

- Please use this form to document your time spent working on the HMP. This includes attending meeting, conference calls, working on your municipal annex, reviewing sections of the plan, etc.

[illegible]

- Critical facilities – updated inventory and included community lifelines
- Hazards of concern – incorporated new hazards, concise hazard profiles, included recent events
- Climate change impacts and adaptive capacity to reduce vulnerability used in hazard ranking
- Jurisdictional annexes – each municipality and the County have their own ‘chapter’
 - Enhanced capability assessment including integration
 - Mitigation actions for every hazard of concern

[illegible]



Section Contents

• Section 4 – Risk Assessment

- Methodology and Tools –
 - Describes the various procedures and tools used to complete the risk assessment.
 - Steps to do so included identifying and profiling each hazard of concern; determine exposure to each hazard; and assess the vulnerability of exposed population/buildings/economy.
- Identification of Hazards of Concern
 - Process to go through all potential hazards and identify the hazards that have the potential to impact Galveston County
- Hazard Profiles
 - Created individual sections for each hazard of concern.
 - Each section includes:
 - Hazard Profile – description, location, extent, worst-case scenario, previous occurrences, climate change projections, and probability of future events
 - Vulnerability Assessment – impact on life/health/safety, impact on building stock and critical facilities, impact on economy, impact on the environment, future changes that may impact vulnerability, and changes in vulnerability since the last plan
- Hazard Ranking
 - Provides a preliminary ranking (high, medium, low) of each hazard to show the County and municipalities hazards of greatest risk



Section Contents

• Section 5 – Capability Assessment

- Capability Assessment
 - Available plans, programs, & resources
 - Administrative and technical capabilities
 - Fiscal capabilities

• Section 6 - Mitigation Strategies

- Past accomplishments
- Goals and Objectives
- Mitigation strategy development and update
 - Action identification
 - Evaluation and prioritization
 - Benefit/cost review

2022 Goals

1. Minimize loss of life, injury, damage to property, the economy, and natural systems from natural and human-caused hazard events
2. Maintain and enhance emergency management/mitigation capabilities
3. Enhance and Maintain public education and awareness activities
4. Address Long-Term Vulnerabilities from High Hazard Dams

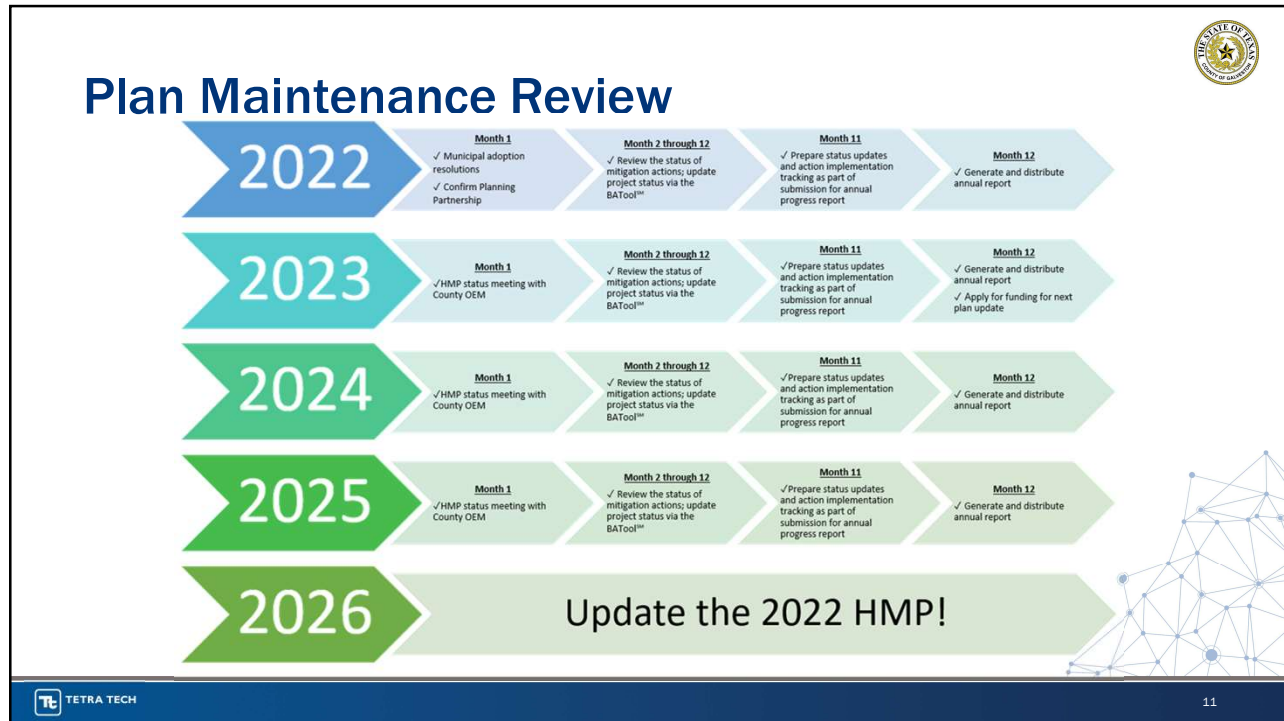
Section Contents

- **Section 7 – Plan Maintenance**
 - HMP Coordinator
 - Ongoing Planning Partnership – meet annually to discuss HMP
 - Monitoring
 - Continuous evaluation and progress reports
 - FEMA action worksheets and BAToolSM
 - Updating
 - Integrating the HMP with existing and future programs
 - Continued public involvement

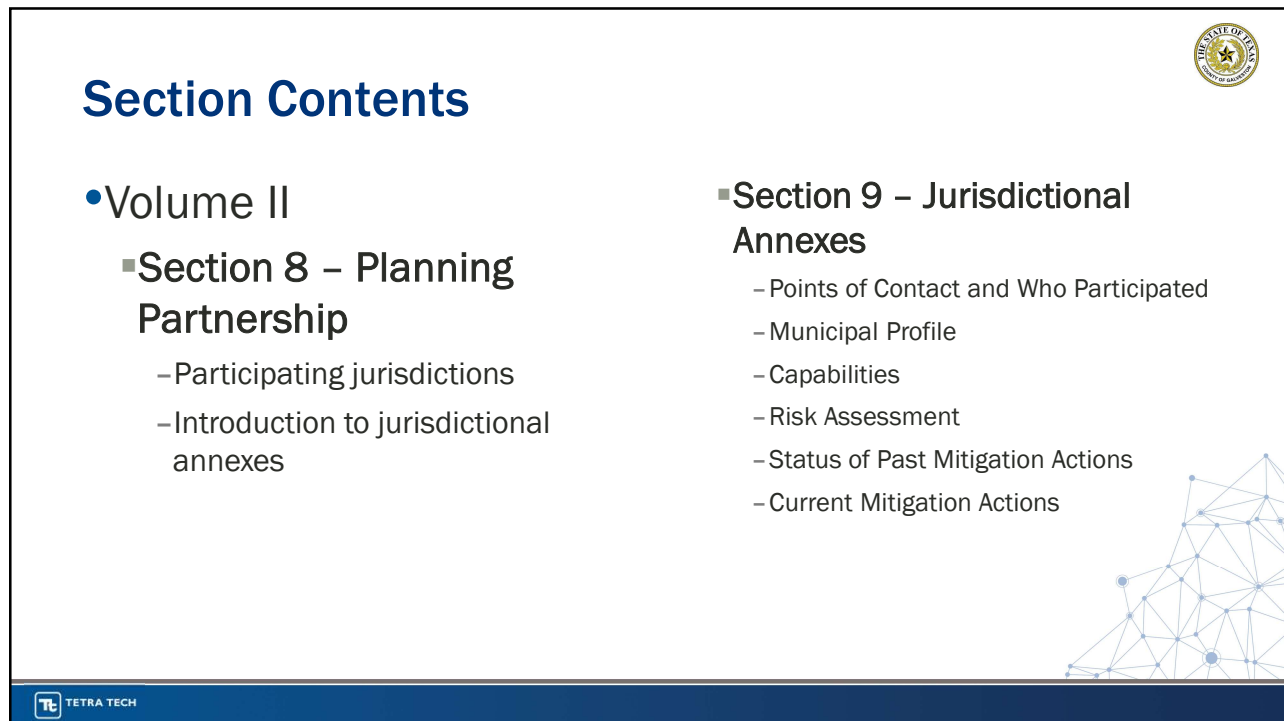


BAToolSM

- Online progress reporting for individual mitigation actions – pre-populated by Tetra Tech



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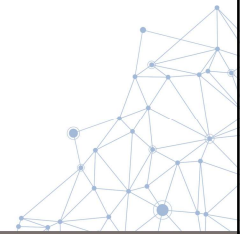


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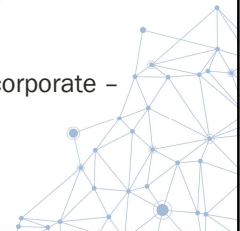
Section Contents - Appendices

- **Appendices**
 - Appendix A Plan Adoption
 - Appendix B Participation Documentation
 - Appendix C Meeting Documentation
 - Appendix D Public and Stakeholder Outreach Documentation
 - Appendix E Mitigation Strategy Supplementary Data
 - Appendix F Plan Maintenance Tools
 - Appendix G Linkage Procedures
 - Appendix H Critical Facilities



Review the Draft Plan

- The entire plan will be posted on the Galveston County website for a 14-day review period (starting Monday, January 31st)
 - You can review sections of the plan during the public review, and we will incorporate any applicable revisions into the final deliverable to the State and FEMA
- TDEM will begin their review concurrently with the public review period. This will help with their review/approval process and submittal to FEMA.
- Public feedback to be incorporated as appropriate prior to submittal to TDEM/FEMA for their review.
 - If needed, we will hold a brief meeting to discuss public comments and how to incorporate – date TBD





Next Steps

- Draft Posted for Public Review and Comment – 14 Days
- Submit to TDEM – January 31st
- Submit to FEMA – once TDEM reviews and approves the HMP
- Estimated 45-day FEMA review period
- BAToolSM Webinar to Review Plan Maintenance
- Plan Adoption by County and Participating Municipalities
- Leverage the plan to create mitigation principles in Galveston County!

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Questions?



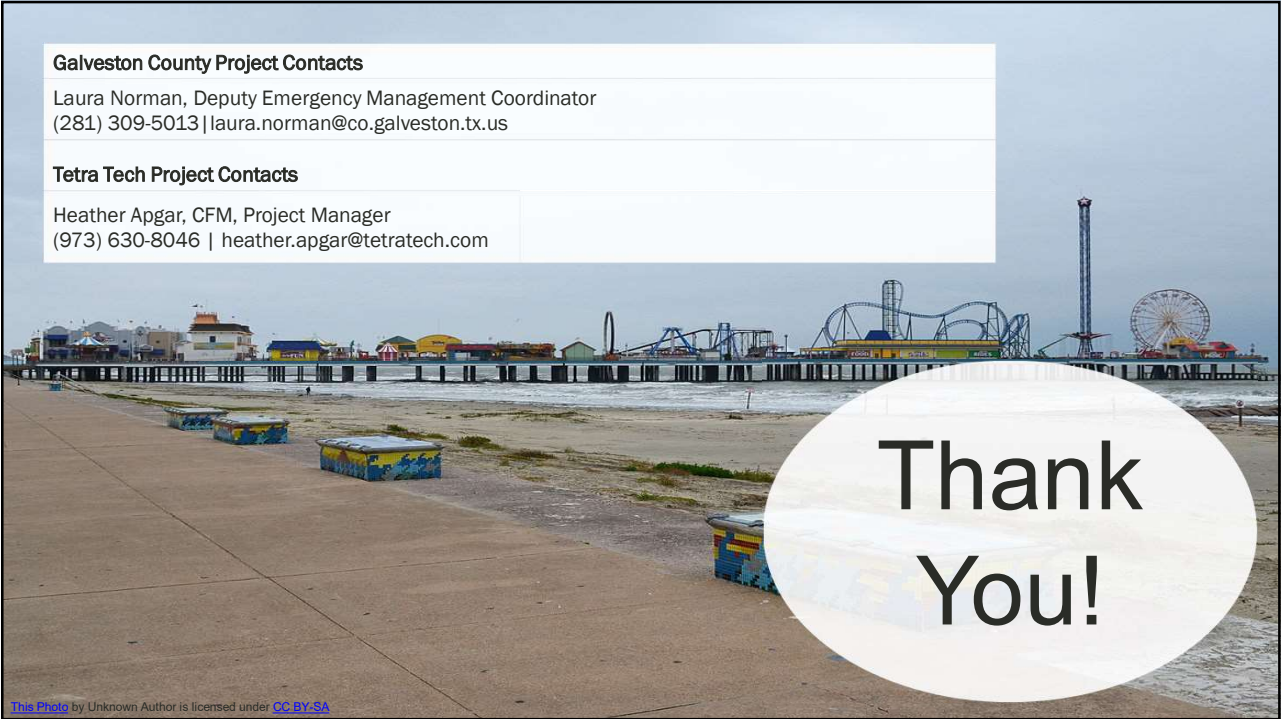
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Tetra Tech Project Contacts

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Thank
You!

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APPENDIX D. PUBLIC AND STAKEHOLDER OUTREACH

This appendix provides documentation of public and stakeholder outreach. Stakeholder involvement in this planning process was broad and productive as discussed and further documented in Section 3 (Planning Process). Public and stakeholder input has been incorporated throughout this HMP as appropriate, as identified in Section 3 and the References section.

D.1 Website and Social Media Posts

The following provides screenshots of websites, news articles, and social media posts.

Figure D-1. County Postings About HMP

The screenshot shows the official website of Galveston County, Texas. The header includes the county seal, the name 'THE COUNTY OF GALVESTON, TX', and the tagline 'Proudly Serving Our Community Since 1838'. A search bar is located on the right. The main navigation menu includes 'OUR COUNTY', 'COUNTY OFFICES', 'RESIDENTS', 'BUSINESS', and 'HOW DO I...'. The 'OUR COUNTY' section is expanded, showing a list of elected officials: Constables, County Clerk, County Courts at Law, County Judge, Commissioners, District Attorney, District Clerk, Judicial District Courts, Justice of the Peace Courts, Probate Court, Tax Assessor - Collector, and Treasurer. The main content area displays the 'Calendar Meeting List' for the 'Hazard Mitigation Plan'. The meeting is scheduled for 01/25/2022 from 2:00 PM to 4:00 PM. The introduction is 'Presentation'. There is a link to 'Add to my Calendar'. The agenda includes '1. Opening Remarks' and '2. In-Kind Tracking'. A bullet point under 'In-Kind Tracking' states: 'Use the Word tracker or online tracker to document time spent working on the HMP https://www.surveymonkey.com/r/Galveston_inKind'.



APPENDIX D: PUBLIC AND STAKEHOLDER OUTREACH

The image displays two side-by-side screenshots of the Galveston County website. Both pages feature the county's logo and navigation menu at the top. The left screenshot shows the 'Calendar Meeting List' page, which includes a sidebar with links to various county departments and a main content area with a 'Mitigation Strategy Workshop' announcement. The right screenshot shows the 'Public Invitation Galveston County' page, which details a public meeting for the 'Galveston County Hazard Mitigation Plan Update' on September 29, 2021.

Figure D-2. Municipal Postings About HMP

The image displays two screenshots of municipal websites. The left screenshot shows the League City website with a post titled 'Provide Your Feedback: Take the Galveston County Hazard Mitigation Survey'. The right screenshot shows the City of League City Government website with a post titled 'Galveston County Hazard Mitigation Plan 2022 Update'. Both posts encourage residents to provide feedback on the county's hazard mitigation plan.

D.2 Stakeholder Surveys

This section contains information and results gathered from the Galveston County Stakeholder Survey. Unlike steering committee or planning partnership members, stakeholders may not be involved in all stages of the planning process, but they may have information or input to provide. In order to gather that information, the surveys were sent to the following stakeholders that provide various services to the County (emergency

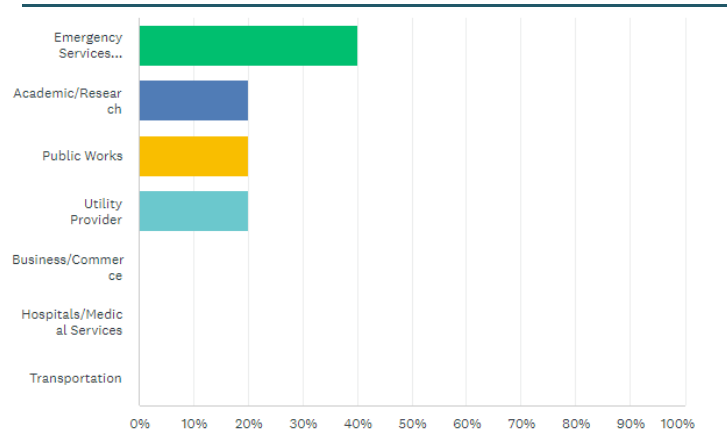


services, academic/research, public works, utility providers, business/commerce, hospitals/medical services, and transportation). Results of the surveys are provided below, with personal information redacted.

D.1.1 Stakeholder Survey

The stakeholder survey was designed to help identify general needs for hazard mitigation and resiliency within Galveston County from its perspective, as well as to identify specific projects that may be included in the mitigation plan. It was distributed to identified stakeholders, including the various county and municipal departments and agencies in the county. As of January 28, 2022, 8 stakeholders completed the survey, 40% of which in the emergency services category, 20% in academic/research, 20% in public work, and 20% in utilities.

Figure D-3. Stakeholder Category



Hazard and Damage Identification

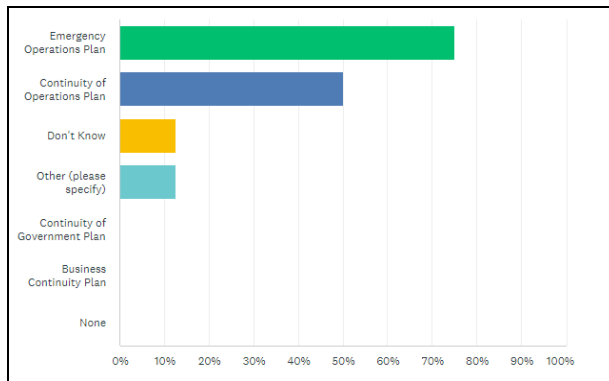
Half of respondents said the buildings/facilities/structures they have worked in and/or are responsible for have been impacted by a hazard; 25% said no and 25% were unsure. Those that experienced damage stated that the structures had wind and flood damage from hurricanes, with some reporting complete destruction of buildings. When asked what areas are most vulnerable to hazards in the County, answers included storm surge flooding, hazardous material releases, flooding from heavy rainfall, structures not built to withstand hurricane impacts, exposed water lines, and road/underpass flooding. Over 60% of respondents believe the facilities and infrastructure for their organization are equipped to handle a disaster and/or are resilient to damages; 25% said no; and 12/5% says maybe.

Community Preparedness

A majority of respondents (75%) stated that their organization has an emergency operations plan. Half of the respondents stated they are covered by a Continuity of Operations Plan, a Continuity of Government Plan. One respondent indicated that they have risk and vulnerability assessments and one was unsure of what plans are available in their organization.



Figure D-4. Plans of Stakeholders



Project Identification

Respondents identified the following projects or programs that could reduce their organization's vulnerability to damages, including operation of service:

- Reduce vulnerability to water systems
- Storage and emergency operations building to place equipment and materials prior to a hurricane or other event to allow for access during the event
- Relocating water lines to reduce risk of line being severed during a storm
- Improvements to drainage systems

The following were identified as recently implemented projects that reduced vulnerabilities to hazard events:

- Elevated operations center in Dickinson
- Elevated 1 million gallon storage tank to provide drinking water during power outages or damages

Respondents were also asked to detail how their organization has been involved in response to the ongoing COVID-19 pandemic. Respondents detailed the following:

- Weather briefings to support outdoor testing and vaccination operations
- Testing, vaccinations, contact tracing, and data collection
- Providing potable water throughout the pandemic
- Testing center for fire, police, EMS, and municipal employees
- Emotional support and resources

The following services and infrastructure needs were identified by respondents as needing to be built or improved upon within their communities in order to mitigate damages experienced by the pandemic:

- Crew living quarters
- Air filtration systems
- Water and wastewater operations

D.1.2 Neighboring County Survey

The neighbor survey was sent to the surrounding counties of Galveston County due to their proximity to and because effects of hazard events that impact Galveston County would be similar to that of their neighbors. As of January 28, 2022, one county completed the survey. The respondent stated Galveston County is involved in



their county's comprehensive emergency operations planning. Together, they are part of UASI, HGAC, MACC and various hurricane and evacuation plans. During emergency operations and disaster response, the counties communicate through conference calls, MACC, and mutual aid requests. They are also part of an evacuation hub plan.

D.3 Galveston County Public Survey Results

This section contains information and results gathered from the Galveston County Public Survey. The main objective of this survey was to gather information from citizens regarding their level of knowledge regarding hazard vulnerability and knowledge of hazard mitigation information for their local communities. 144 respondents completed this survey over a period of two months during the planning process. The survey was available on Galveston County OEM website (<https://gcoem.org/>) and several municipalities posted a link to the survey through their social media accounts. Survey responses are provided at the end of the appendix.

D.3.1 Public Survey Results

Demographically, survey respondents were from six of the participating municipalities within Galveston County, with 34% having lived in the county for 20 years or more, and the vast majority (96.5%) in their own home. The most common (38.9%) age of respondents was over the age of 60. Residents were asked the ways in which they receive their information concerning a natural disaster. The majority (71.3%) of respondents rely on the internet to receive information concerning natural disasters. Over half (59.1%) receive information through TV news and slightly under half (46.1%) receive information through municipal websites.

Survey respondents were asked how concerned they were about 21 different hazards, on a scale of not concerned to extremely concerned. Respondents were most concerned (reporting "concerned", "very concerned", or "extremely concerned") about hurricanes/tropical storms, flooding, and severe storms.

About 57% of respondents' properties are not located in the floodplain, with 36.5% within a floodplain and 6% are unsure. A majority of those have flood insurance (85%), 13% do not have flood insurance, and 1.7% are unsure if they have flood insurance. Residents were then asked what types of projects they believe local, county, state, or federal government agencies could be doing in order to reduce the damage and disruption of disasters in Galveston County including:

- Improve and strengthen infrastructure, such as elevating roadways and improving drainage systems (82.6%)
- Work on improving the damage resistance of utilities (electricity, communications, water/wastewater facilities etc.) (75.9%)
- Buy out flood prone properties and maintain as open-space (47.1%)
- Install or improve protective structures, such as bulkheads, floodwalls or levees to protect against flooding (41.3%)
- Strengthen codes, ordinances and plans to require higher hazard risk management standards and/or provide greater control over development in high hazard areas (40.3%)
- Assist vulnerable property owners with securing funding to mitigate their properties (30.7%)
- Replace inadequate or vulnerable bridges and causeways (28.8%)
- Inform property owners of ways they can mitigate damage to their properties (25.0%)
- Provide better information about hazard risks and high-hazard areas (25.0%)
- Improve and strengthen critical facilities such as police, schools, hospitals (22.1%)
- Enhance dune restoration and beach nourishment projects/programs (18.2%)



APPENDIX E. MITIGATION STRATEGY SUPPLEMENT

This appendix summarizes additional activities and resources provided to plan participants to support the update of the mitigation strategy.

E.1 Mitigation Strategy Workshop Resources

On December 2, 2021 a Mitigation Strategy Workshop was held for all plan participants. The workshop was conducted as a hybrid meeting due to current coronavirus pandemic. The workshop was led by the contract consultant and supplemented by emails and phone calls between jurisdictions and the contract consultant, for all participating jurisdictions to support the development of mitigation strategies. Resources available at the workshop and follow up discussions included the following to assist with the identification of mitigation alternatives and the development of the mitigation strategy workshops found in Section 9 (Jurisdictional Annexes).

1. FEMA Local Mitigation Handbook
2. Strengths, Weaknesses, Obstacles and Opportunities exercise results
3. Public survey results
4. Galveston County Potential Mitigation Actions
5. FEMA Mitigation action types (Table E-1)
6. FEMA Mitigation Ideas
7. FEMA Region 6 Funding Sources for Texas

E.1.1 Types of Mitigation Actions

A mitigation action is a specific action, project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan's mission and goals. The actions to reduce vulnerability to threats and hazards form the core of the plan and are a key outcome of the planning process.

The primary types of mitigation actions to reduce long-term vulnerability are:

- Local Plans and Regulations (LPR)
- Structure and Infrastructure Projects (SIP)
- Natural Systems Protection (NSP)
- Education and Awareness Programs (EAP)

Table E-1. FEMA Mitigation Action Types

Mitigation Type	Description	Examples
Local Plans and Regulations	These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.	• Comprehensive plans • Land use ordinances • Subdivision regulations • Development review • Building codes and enforcement • NFIP Community Rating System • Capital improvement programs • Open space preservation • Stormwater management regulations and master plans
Structure and Infrastructure Projects	These actions involve modifying existing structures and infrastructure to protect them from	• Acquisitions and elevations of structures in flood prone areas



APPENDIX E: MITIGATION STRATEGY SUPPLEMENT

Mitigation Type	Description	Examples
	a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance program.	• Utility undergrounding • Structural retrofits • Floodwalls and retaining walls • Detention and retention structures • Culverts • Safe rooms
Natural Systems Protection	These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	• Sediment and erosion control • Stream corridor restoration • Forest management • Conservation easements • Wetland restoration and preservation
Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady or Firewise Communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	• Radio or television spots • Websites with maps and information • Real estate disclosure • Presentations to school groups or neighborhood organizations • Mailings to residents in hazard-prone areas • StormReady • Firewise Communities

Galveston County HMP Suggested Mitigation Actions 2022

The **General Mitigation Actions tab** contains ideas for actions to address each hazard.

The **Jurisdictional tabs** identify actions to address capability gaps that were identified in each jurisdiction's capability assessment worksheets.

Actions can be reworded to more accurately fit jurisdictional needs.

Risk can be reduced through mitigation by manipulating the hazard, reducing exposure to the hazard, reducing the vulnerability and/or increasing capability. And, where mitigation is not yet possible, the risk can be reduced through preparation, response and/or recovery.

These lists are not meant to be exhaustive, but to inspire thought.

Not every potential action needs to be included in your plan.

General Mitigation Action	Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence	Lightning	Pandemic	Severe Winter Storm	Thunderstor m Wind	Tornadoes	Tsunami	Utility Failure	Wildfire
Where appropriate, support retrofitting, purchase or relocation of structures located in hazard areas, prioritizing those that have experienced repetitive losses and/or are located in high- or medium-risk hazard areas. Purchase generators for critical facilities and infrastructure that lack adequate backup power.	X	X		X		X	X	X	X	X		X	X	X	X	X	X
Replace earthen dams and levees with hardened structures		X			X	X	X	X		X		X	X	X	X	X	X
Consider open space land uses in identified hazard areas	X	X		X		X			X						X		X
Ground water recharge through stormwater management			X			X											
Develop a public education program on drought resilience			X														
Utilize drought-resistant landscapes on community-owned facilities			X														
Construct regional stormwater control facilities						X											
Educate the public on land instability hazards and appropriate risk reduction alternatives.	X			X					X								
Develop a regular tree maintenance program to remove growth from utility lines.								X				X					X
Harden infrastructure by locating utilities underground.							X	X		X		X	X	X		X	X
Establish evacuation sanctuaries within areas of potential tsunami inundation zones.															X		
Develop and communicate evacuation routes.		X				X		X							X		X
Clear fuels such as dry brush and diseased trees on public land.																	X
Create and maintain defensible space around structures and infrastructure.																	X
Develop public awareness campaigns on illness prevention.											X						
Stock sufficient amounts of PPE and other supplies or materials needed for staff to function during a pandemic outbreak.											X						
Retrofit public buildings to meet social distancing and contactless service guidelines.											X						

Capability Gap Addressed	Potential Actions - Galveston County
Planning and Regulatory Gaps	Develop and adopt a Zoning/Land Use Code
Planning and Regulatory Gaps	Develop and adopt a Subdivision Ordinance
Planning and Regulatory Gaps	Develop and adopt a Site Plan Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Plan
Planning and Regulatory Gaps	Develop and adopt a Capital Improvement Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Business/ Downtown Development Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Other	Develop an inventory of buildable land
Development and Permitting Gaps	Organize a Planning Board
Administrative and Technical Gaps	Organize a Zoning Board of Adjustments
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Hire staff with expertise or training in benefit/cost analysis
Administrative and Technical Gaps	Hire a Resilience Officer
Community Classification Gaps	Determine feasibility of joining or improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of the Building Code Effectiveness Grading Schedule (BCEGS)
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of properties that have been damaged by flooding
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Develop flood hazard maps to adequately address the flood risk
NFIP Gaps	Develop resources to determine possible future flooding conditions from climate change.
NFIP Gaps	Assist/train floodplain management staff to support the floodplain management program.
NFIP Gaps	Overcome the barriers to running an effective NFIP program.
NFIP Gaps	Address outstanding NFIP compliance violations.
NFIP Gaps	Amend the flood damage prevention ordinance.
NFIP Gaps	Develop local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements. For instance, the planning board or zoning board could consider efforts to reduce flood risk when reviewing variances such as height restrictions.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
Other	•Enforce the flood damage prevention ordinance. •Participate in floodplain identification and mapping updates. •Provide public assistance/information on floodplain requirements and impacts.

Capability Gap Addressed	Potential Actions - Bayou Vista
Planning and Regulatory Gaps	Develop and adopt a Zoning/Land Use Code
Planning and Regulatory Gaps	Develop and adopt a Subdivision Ordinance
Planning and Regulatory Gaps	Develop and adopt a Site Plan Ordinance
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt an Environmental Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Emergency Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Plan
Planning and Regulatory Gaps	Develop and adopt a Capital Improvement Plan
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt an Agriculture Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Business/ Downtown Development Plan
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Emergency Management Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery Plan
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Other	Develop a database to track building permits in hazard areas
Development and Permitting Gaps	Organize a Planning Board
Administrative and Technical Gaps	Organize a Zoning Board of Adjustments
Administrative and Technical Gaps	Develop a Planning Department
Administrative and Technical Gaps	Develop a Mitigation Planning Committee
Administrative and Technical Gaps	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Organize an Economic Development Commission/Committee
Administrative and Technical Gaps	Develop a Public Works/Highway Department
Administrative and Technical Gaps	Develop maintenance programs to reduce risk
Administrative and Technical Gaps	Hire planners or engineers with knowledge of land development and land management practices
Administrative and Technical Gaps	Hire engineers or professionals trained in building or infrastructure construction practices
Administrative and Technical Gaps	Hire planners or engineers with an understanding of natural hazards
Administrative and Technical Gaps	Hire personnel skilled or trained in GIS and/or HAZUS – Multi-Hazards (MH) applications
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Administrative and Technical Gaps	Hire an Emergency Manager
Administrative and Technical Gaps	Hire grant writer(s)
Administrative and Technical Gaps	Hire a Resilience Officer
Education and Outreach Gaps	Develop citizen boards or commissions that address issues related to hazard mitigation
Education and Outreach Gaps	Develop natural disaster/safety programs for outreach in schools
	Determine feasibility of joining or improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of the Building Code Effectiveness Grading Schedule (BCEGS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Hire a certified floodplain manager.
NFIP Gaps	Develop resources to determine possible future flooding conditions from climate change.
NFIP Gaps	Assist/train floodplain management staff to support the floodplain management program.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
	•Enforce the flood damage prevention ordinance. •Participate in floodplain identification and mapping updates. •Provide public assistance/information on floodplain requirements and impacts.
NFIP Gaps	

Capability Gap Addressed	Potential Actions - Clear Lake Shores
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt an Environmental Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Plan
Planning and Regulatory Gaps	Develop and adopt a Capital Improvement Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt an Agriculture Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
Other	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Administrative and Technical Gaps	Develop a Planning Department
Administrative and Technical Gaps	Develop a Mitigation Planning Committee
Administrative and Technical Gaps	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Develop mutual aid agreements
	Write and implement a Human Resources Manual
Administrative and Technical Gaps	Hire planners or engineers with knowledge of land development and land management practices
Administrative and Technical Gaps	Hire engineers or professionals trained in building or infrastructure construction practices
Administrative and Technical Gaps	Hire planners or engineers with an understanding of natural hazards
Administrative and Technical Gaps	Hire staff with expertise or training in benefit/cost analysis
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Administrative and Technical Gaps	Hire grant writer(s)
Administrative and Technical Gaps	Hire a Resilience Officer
Education and Outreach Gaps	Develop citizen boards or commissions that address issues related to hazard mitigation
Education and Outreach Gaps	Develop natural disaster/safety programs for outreach in schools
Community Classification Gaps	Continue working to join the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of the Building Code Effectiveness Grading Schedule (BCEGS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Develop resources to determine possible future flooding conditions from climate change.
NFIP Gaps	Overcome the barriers to running an effective NFIP program.
NFIP Gaps	Address outstanding NFIP compliance violations.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
	•Enforce the flood damage prevention ordinance. •Participate in floodplain identification and mapping updates. •Provide public assistance/information on floodplain requirements and impacts.
NFIP Gaps	

Capability Gap Addressed	Potential Actions - Dickinson
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Disaster Debris Management Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Business/ Downtown Development Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery Plan
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Other	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Write and implement a Human Resources Manual
Administrative and Technical Gaps	Hire personnel skilled or trained in GIS and/or HAZUS – Multi-Hazards (MH) applications
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Administrative and Technical Gaps	Hire grant writer(s)
Administrative and Technical Gaps	Hire a Resilience Officer
	Hire personnel skilled or trained in website development
Education and Outreach Gaps	Add hazard mitigation information to website
Education and Outreach Gaps	Begin using social media for hazard mitigation education and outreach
Community Classification Gaps	Determine feasibility of the Building Code Effectiveness Grading Schedule (BCEGS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of properties that have been damaged by flooding
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
	•Enforce the flood damage prevention ordinance. •Participate in floodplain identification and mapping updates. •Provide public assistance/information on floodplain requirements and impacts.
NFIP Gaps	

Friendswood

Capability Gap Addressed

Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps
Planning and Regulatory Gaps

Other

Development and Permitting Gaps
Administrative and Technical Gaps
Administrative and Technical Gaps
Administrative and Technical Gaps
Administrative and Technical Gaps
Administrative and Technical Gaps
Administrative and Technical Gaps
Education and Outreach Gaps
Education and Outreach Gaps

Community Classification Gaps
Community Classification Gaps
NFIP Gaps

NFIP Gaps

Potential Actions - Friendswood

Develop and adopt a Wellhead Protection Ordinance
Develop and adopt a Climate Change Ordinance
Develop and adopt an Open Space Plan
Develop and adopt an Urban Water Management Plan
Develop and adopt a Habitat Conservation Plan
Develop and adopt a Habitat Conservation Plan
Develop and adopt an Economic Development Plan
Develop and adopt a Shoreline Management Plan
Develop and adopt a Community Wildfire Protection Plan
Develop and adopt a Community Forest Management Plan
Develop and adopt an Agriculture Plan
Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Develop and adopt a Tourism Plan
Develop and adopt a Strategic Recovery Planning Report
Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Develop an inventory of buildable land
Organize an Environmental Board/Commission
Organize an Open Space Board/Committee
Write and implement a Human Resources Manual
Hire scientist familiar with natural hazards
Hire surveyor(s)
Hire a Resilience Officer
Develop citizen boards or commissions that address issues related to hazard mitigation
Develop natural disaster/safety programs for outreach in schools

Determine feasibility of improving the current classification of the Community Rating System (CRS)
Determine feasibility of becoming a Firewise community
Address outstanding NFIP compliance violations.
Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:

- Enforce the flood damage prevention ordinance.
- Participate in floodplain identification and mapping updates.
- Provide public assistance/information on floodplain requirements and impacts.

Capability Gap Addressed	Potential Actions - Hitchcock
Planning and Regulatory Gaps	Develop and adopt a Site Plan Ordinance
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt an Environmental Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt an Agriculture Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Business/ Downtown Development Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery Plan
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
Other	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Development and Permitting Gaps	Develop an inventory of buildable land
Administrative and Technical Gaps	Develop a Mitigation Planning Committee
	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Write and implement a Human Resources Manual
Administrative and Technical Gaps	Hire planners or engineers with knowledge of land development and land management practices
Administrative and Technical Gaps	Hire engineers or professionals trained in building or infrastructure construction practices
Administrative and Technical Gaps	Hire planners or engineers with an understanding of natural hazards
Administrative and Technical Gaps	Hire staff with expertise or training in benefit/cost analysis
Administrative and Technical Gaps	Hire professionals trained in conducting damage assessments
Administrative and Technical Gaps	Hire personnel skilled or trained in GIS and/or HAZUS – Multi-Hazards (MH) applications
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Administrative and Technical Gaps	Hire an Emergency Manager
Administrative and Technical Gaps	Hire grant writer(s)
Administrative and Technical Gaps	Hire a Resilience Officer
Education and Outreach Gaps	Hire personnel skilled or trained in website development
Education and Outreach Gaps	Add hazard mitigation information to website
Education and Outreach Gaps	Begin using social media for hazard mitigation education and outreach
Education and Outreach Gaps	Develop citizen boards or commissions that address issues related to hazard mitigation
Education and Outreach Gaps	Develop warning systems for hazard events
Education and Outreach Gaps	Develop natural disaster/safety programs for outreach in schools
Community Classification Gaps	Determine feasibility of joining or improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of the Building Code Effectiveness Grading Schedule (BCEGS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Develop flood hazard maps to adequately address the flood risk during heavy rain events.
NFIP Gaps	Hire a certified floodplain manager.
NFIP Gaps	Develop resources to determine possible future flooding conditions from climate change.
NFIP Gaps	Increase floodplain management staff to support the floodplain management program.
NFIP Gaps	Overcome the barriers to running an effective NFIP program.
NFIP Gaps	Address outstanding NFIP compliance violations.
NFIP Gaps	Amend the flood damage prevention ordinance last dated April 21, 2008.
NFIP Gaps	Develop local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements. For instance, the planning board or zoning board could consider efforts to reduce flood risk when reviewing variances such as height restrictions.
	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
	•Enforce the flood damage prevention ordinance.
	•Participate in floodplain identification and mapping updates.
	•Provide public assistance/information on floodplain requirements and impacts.

Capability Gap Addressed	Potential Actions - Jamaica Beach
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Capital Improvement Plan
Planning and Regulatory Gaps	Develop and adopt a Disaster Debris Management Plan
Planning and Regulatory Gaps	Develop and adopt a Floodplain Management or Watershed Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt an Agriculture Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Business/ Downtown Development Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery Plan
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Other	Develop a Planning Department
Administrative and Technical Gaps	Develop a Mitigation Planning Committee
Administrative and Technical Gaps	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
	Organize an Economic Development Commission/Committee
Administrative and Technical Gaps	Develop an Emergency Management/Public Safety Department
Administrative and Technical Gaps	Develop Warning Systems / Services
Administrative and Technical Gaps	Hire staff with expertise or training in benefit/cost analysis
Administrative and Technical Gaps	Hire personnel skilled or trained in GIS and/or HAZUS – Multi-Hazards (MH) applications
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Administrative and Technical Gaps	Hire grant writer(s)
Administrative and Technical Gaps	Hire a Resilience Officer
Education and Outreach Gaps	Hire personnel skilled or trained in website development
Education and Outreach Gaps	Develop warning systems for hazard events
Education and Outreach Gaps	Develop natural disaster/safety programs for outreach in schools
Community Classification Gaps	Determine feasibility of improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of the Building Code Effectiveness Grading Schedule (BCEGS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Develop resources to determine possible future flooding conditions from climate change.
	Assist/train floodplain management staff to support the floodplain management program. Re-certify
NFIP Gaps	Director of Operations as a floodplain manager.
	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
	•Enforce the flood damage prevention ordinance. •Participate in floodplain identification and mapping updates. •Provide public assistance/information on floodplain requirements and impacts.
NFIP Gaps	

Capability Gap Addressed	Potential Actions - Kemah
Planning and Regulatory Gaps	Develop and adopt a Subdivision Ordinance
Planning and Regulatory Gaps	Develop and adopt a Site Plan Ordinance
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt an Environmental Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Capital Improvement Plan
Planning and Regulatory Gaps	Develop and adopt a Disaster Debris Management Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt an Agriculture Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Business/ Downtown Development Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery Plan
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
Other	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Administrative and Technical Gaps	Organize a Planning Board
	Organize a Zoning Board of Adjustments
Administrative and Technical Gaps	Develop a Planning Department
Administrative and Technical Gaps	Develop a Mitigation Planning Committee
Administrative and Technical Gaps	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Education and Outreach Gaps	Develop natural disaster/safety programs for outreach in schools
Community Classification Gaps	Determine feasibility of improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Develop resources to determine possible future flooding conditions from climate change.
NFIP Gaps	Train floodplain management staff (CFM) to support the floodplain management program.
	Develop local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements. For instance, the planning board or zoning board could consider efforts to reduce flood risk when reviewing variances such as height restrictions.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
	•Enforce the flood damage prevention ordinance. •Participate in floodplain identification and mapping updates. •Provide public assistance/information on floodplain requirements and impacts.
NFIP Gaps	

Capability Gap Addressed	Potential Actions - La Marque
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Plan
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Emergency Management Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery Plan
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
Other	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Development and Permitting Gaps	Develop a database to track building permits in hazard areas
Administrative and Technical Gaps	Develop a Mitigation Planning Committee
Administrative and Technical Gaps	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Develop maintenance programs to reduce risk
Administrative and Technical Gaps	Hire planners or engineers with knowledge of land development and land management practices
Administrative and Technical Gaps	Hire engineers or professionals trained in building or infrastructure construction practices
Administrative and Technical Gaps	Hire staff with expertise or training in benefit/cost analysis
Administrative and Technical Gaps	Hire personnel skilled or trained in GIS and/or HAZUS – Multi-Hazards (MH) applications
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Administrative and Technical Gaps	Hire an Emergency Manager
Administrative and Technical Gaps	Hire grant writer(s)
Administrative and Technical Gaps	Hire a Resilience Officer
Education and Outreach Gaps	Begin using social media for hazard mitigation education and outreach
Education and Outreach Gaps	Develop citizen boards or commissions that address issues related to hazard mitigation
Education and Outreach Gaps	Develop natural disaster/safety programs for outreach in schools
Community Classification Gaps	Determine feasibility of joining or improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of the Building Code Effectiveness Grading Schedule (BCEGS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of properties that have been damaged by flooding
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Support efforts for staff to become a certified floodplain manager.
NFIP Gaps	Obtain funding to assist/train floodplain management staff to support the floodplain management program.
NFIP Gaps	Determine funding options to overcome the staffing cost barriers to running an effective NFIP program.
NFIP Gaps	Address outstanding NFIP compliance violations.
NFIP Gaps	Amend the flood damage prevention ordinance of 2014.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
NFIP Gaps	•Enforce the flood damage prevention ordinance. •Participate in floodplain identification and mapping updates. •Provide public assistance/information on floodplain requirements and impacts.

Capability Gap Addressed	Potential Actions - League City
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt an Environmental Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Floodplain Management or Watershed Plan
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt an Agriculture Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
Planning and Regulatory Gaps	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Other	Develop a database to track building permits in hazard areas
Development and Permitting Gaps	Develop an inventory of buildable land
Development and Permitting Gaps	Develop a Mitigation Planning Committee
Administrative and Technical Gaps	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Education and Outreach Gaps	Develop citizen boards or commissions that address issues related to hazard mitigation
Education and Outreach Gaps	Develop natural disaster/safety programs for outreach in schools
Community Classification Gaps	Determine feasibility of improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Develop flood hazard maps to adequately address the flood risk
NFIP Gaps	Assist/train floodplain management staff to support the floodplain management program.
NFIP Gaps	Overcome the barriers to running an effective NFIP program.
NFIP Gaps	Develop local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements. For instance, the planning board or zoning board could consider efforts to reduce flood risk when reviewing variances such as height restrictions.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
NFIP Gaps	•Enforce the flood damage prevention ordinance. •Participate in floodplain identification and mapping updates. •Provide public assistance/information on floodplain requirements and impacts.

Capability Gap Addressed	Potential Actions - Santa Fe
Planning and Regulatory Gaps	Develop and adopt a Zoning/Land Use Code
Planning and Regulatory Gaps	Develop and adopt a Subdivision Ordinance
Planning and Regulatory Gaps	Develop and adopt a Site Plan Ordinance
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt an Environmental Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Flood Damage Prevention Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Emergency Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Plan
Planning and Regulatory Gaps	Develop and adopt a Capital Improvement Plan
Planning and Regulatory Gaps	Develop and adopt a Disaster Debris Management Plan
Planning and Regulatory Gaps	Develop and adopt a Floodplain Management or Watershed Plan
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt an Agriculture Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Business/ Downtown Development Plan
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Emergency Management Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery Plan
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
Other	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Development and Permitting Gaps	Develop a database to track building permits in hazard areas
Development and Permitting Gaps	Develop an inventory of buildable land
Administrative and Technical Gaps	Organize a Planning Board
Administrative and Technical Gaps	Organize a Zoning Board of Adjustments
Administrative and Technical Gaps	Develop a Planning Department
Administrative and Technical Gaps	Develop a Mitigation Planning Committee
Administrative and Technical Gaps	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Organize an Economic Development Commission/Committee
Administrative and Technical Gaps	Develop a Public Works/Highway Department
Administrative and Technical Gaps	Develop a Construction/Building/Code Enforcement Department
Administrative and Technical Gaps	Develop an Emergency Management/Public Safety Department
Administrative and Technical Gaps	Develop Warning Systems / Services
Administrative and Technical Gaps	Develop maintenance programs to reduce risk
Administrative and Technical Gaps	Develop mutual aid agreements
Administrative and Technical Gaps	Write and implement a Human Resources Manual
Administrative and Technical Gaps	Hire planners or engineers with knowledge of land development and land management practices
Administrative and Technical Gaps	Hire engineers or professionals trained in building or infrastructure construction practices
Administrative and Technical Gaps	Hire planners or engineers with an understanding of natural hazards
Administrative and Technical Gaps	Hire staff with expertise or training in benefit/cost analysis
Administrative and Technical Gaps	Hire professionals trained in conducting damage assessments
Administrative and Technical Gaps	Hire personnel skilled or trained in GIS and/or HAZUS – Multi-Hazards (MH) applications
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Administrative and Technical Gaps	Hire an Emergency Manager
Administrative and Technical Gaps	Hire grant writer(s)
Administrative and Technical Gaps	Hire a Resilience Officer
Education and Outreach Gaps	Hire personnel skilled or trained in website development
Education and Outreach Gaps	Add hazard mitigation information to website
Education and Outreach Gaps	Begin using social media for hazard mitigation education and outreach
Education and Outreach Gaps	Develop citizen boards or commissions that address issues related to hazard mitigation
Education and Outreach Gaps	Develop warning systems for hazard events
Education and Outreach Gaps	Develop natural disaster/safety programs for outreach in schools
Community Classification Gaps	Determine feasibility of joining or improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of the Building Code Effectiveness Grading Schedule (BCEGS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of properties that have been damaged by flooding
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Hire a certified floodplain manager.
NFIP Gaps	Assist/train floodplain management staff to support the floodplain management program.
NFIP Gaps	Overcome the barriers to running an effective NFIP program by increasing public awareness of the program.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
NFIP Gaps	•Enforce the flood damage prevention ordinance.
NFIP Gaps	•Participate in floodplain identification and mapping updates.
NFIP Gaps	•Provide public assistance/information on floodplain requirements and impacts.

Capability Gap Addressed	Potential Actions - Tiki Island
Planning and Regulatory Gaps	Develop and adopt a Zoning/Land Use Code
Planning and Regulatory Gaps	Develop and adopt a Site Plan Ordinance
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery/ Reconstruction Ordinance
Planning and Regulatory Gaps	Develop and adopt a Growth Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Flood Damage Prevention Ordinance
Planning and Regulatory Gaps	Develop and adopt a Wellhead Protection Ordinance
Planning and Regulatory Gaps	Develop and adopt a Emergency Management Ordinance
Planning and Regulatory Gaps	Develop and adopt a Climate Change Ordinance
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Plan
Planning and Regulatory Gaps	Develop and adopt a Capital Improvement Plan
Planning and Regulatory Gaps	Develop and adopt a Disaster Debris Management Plan
Planning and Regulatory Gaps	Develop and adopt a Floodplain Management or Watershed Plan
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Plan
Planning and Regulatory Gaps	Develop and adopt an Open Space Plan
Planning and Regulatory Gaps	Develop and adopt an Urban Water Management Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt a Habitat Conservation Plan
Planning and Regulatory Gaps	Develop and adopt an Economic Development Plan
Planning and Regulatory Gaps	Develop and adopt a Shoreline Management Plan
Planning and Regulatory Gaps	Develop and adopt a Community Wildfire Protection Plan
Planning and Regulatory Gaps	Develop and adopt a Community Forest Management Plan
Planning and Regulatory Gaps	Develop and adopt a Transportation Plan
Planning and Regulatory Gaps	Develop and adopt an Agriculture Plan
Planning and Regulatory Gaps	Develop and adopt a Climate Action/ Resiliency/Sustainability Plan
Planning and Regulatory Gaps	Develop and adopt a Tourism Plan
Planning and Regulatory Gaps	Develop and adopt a Business/ Downtown Development Plan
Planning and Regulatory Gaps	Develop and adopt a Comprehensive Emergency Management Plan
Planning and Regulatory Gaps	Develop and adopt a Continuity of Operations Plan
Planning and Regulatory Gaps	Develop and adopt a Strategic Recovery Planning Report
Planning and Regulatory Gaps	Develop and adopt a Threat & Hazard Identification & Risk Assessment (THIRA)
Planning and Regulatory Gaps	Develop and adopt a Post-Disaster Recovery Plan
Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
Other	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Administrative and Technical Gaps	Develop a Mitigation Planning Committee
Administrative and Technical Gaps	Organize an Environmental Board/Commission
Administrative and Technical Gaps	Organize an Open Space Board/Committee
Administrative and Technical Gaps	Organize an Economic Development Commission/Committee
Administrative and Technical Gaps	Develop a Public Works/Highway Department
Administrative and Technical Gaps	Write and implement a Human Resources Manual
Administrative and Technical Gaps	Hire planners or engineers with knowledge of land development and land management practices
Administrative and Technical Gaps	Hire engineers or professionals trained in building or infrastructure construction practices
Administrative and Technical Gaps	Hire planners or engineers with an understanding of natural hazards
Administrative and Technical Gaps	Hire staff with expertise or training in benefit/cost analysis
Administrative and Technical Gaps	Hire professionals trained in conducting damage assessments
Administrative and Technical Gaps	Hire personnel skilled or trained in GIS and/or HAZUS – Multi-Hazards (MH) applications
Administrative and Technical Gaps	Hire scientist familiar with natural hazards
Administrative and Technical Gaps	Hire surveyor(s)
Administrative and Technical Gaps	Hire grant writer(s)
Administrative and Technical Gaps	Hire a Resilience Officer
Education and Outreach Gaps	Hire personnel skilled or trained in website development
Education and Outreach Gaps	Begin using social media for hazard mitigation education and outreach
Education and Outreach Gaps	Develop citizen boards or commissions that address issues related to hazard mitigation
Community Classification Gaps	Determine feasibility of improving the current classification of the Community Rating System (CRS)
Community Classification Gaps	Determine feasibility of becoming a StormReady community
Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Assist/train floodplain management staff to support the floodplain management program.
NFIP Gaps	Overcome the staffing barriers to running an effective NFIP program.
NFIP Gaps	Amend the flood damage prevention ordinance.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
	•Enforce the flood damage prevention ordinance.
	•Participate in floodplain identification and mapping updates.
	•Provide public assistance/information on floodplain requirements and impacts.

Capability Gap Addressed	All Potential Actions
Planning and Regulatory Gaps	Develop and adopt a Zoning/Land Use Code
Planning and Regulatory Gaps	Develop and adopt a Subdivision Ordinance
Planning and Regulatory Gaps	Develop and adopt a Site Plan Ordinance
Planning and Regulatory Gaps	Develop and adopt a Stormwater Management Ordinance
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Planning and Regulatory Gaps	Develop and adopt a Public Health Plan
Planning and Regulatory Gaps	Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community.
Other	Develop a database to track building permits in hazard areas
Development and Permitting Gaps	Develop an inventory of buildable land
Development and Permitting Gaps	Organize a Planning Board
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Community Classification Gaps	Determine feasibility of becoming a Firewise community
NFIP Gaps	Maintain a list of properties that have been damaged by flooding
NFIP Gaps	Maintain a list of property owners interested in flood mitigation (elevation or acquisition).
NFIP Gaps	Develop RiskMAP projects
NFIP Gaps	Develop flood hazard maps to adequately address the flood risk
NFIP Gaps	Hire a certified floodplain manager.
NFIP Gaps	Develop resources to determine possible future flooding conditions from climate change.
NFIP Gaps	Assist/train floodplain management staff to support the floodplain management program.
NFIP Gaps	Overcome the barriers to running an effective NFIP program.
NFIP Gaps	Address outstanding NFIP compliance violations.
NFIP Gaps	Amend the flood damage prevention ordinance.
NFIP Gaps	Develop local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements. For instance, the planning board or zoning board could consider efforts to reduce flood risk when reviewing variances such as height restrictions.
NFIP Gaps	Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:
NFIP Gaps	•Enforce the flood damage prevention ordinance.
NFIP Gaps	•Participate in floodplain identification and mapping updates.
NFIP Gaps	•Provide public assistance/information on floodplain requirements and impacts.

REGION 6

TEXAS MITIGATION ASSISTANCE RESOURCE GUIDE



NOVEMBER 2020



FEMA

About the Texas Mitigation Assistance Resource Guide

PURPOSE OF THE GUIDE

According to the National Institute of Building Sciences 2019 Natural Hazard Mitigation Saves report, every federal grant dollar invested in mitigation results in \$6 saved, on average, during disaster recovery. However, finding those initial dollars to invest, and determining the best way to spend them, can pose a challenge for communities across the nation. Many resources exist, but they can be difficult to access and may not fit the needs of the community.

This guide aims to fill that gap by providing an initial list of federal and state resources, including grants, technical assistance, loans, and other means of support. It will help state, local and tribal officials determine a possible source(s) of funding and technical assistance for their potential mitigation projects. For more information on available federal grants, visit [grants.gov](https://www.grants.gov).

DEVELOPMENT OF THE GUIDE

The federal assistance resources were compiled by a FEMA contract provider. The information was verified from each agency/organization's website. The state-specific resources are referenced in the State Hazard Mitigation Plan.

GUIDE ORGANIZATION

This guide provides information about federal and state resources that are currently available in Texas. The guide is organized alphabetically by agency/department.

HOW TO USE THIS GUIDE

Each resource includes information such as the name of the program, resource type, hazards addressed, and type of mitigation, as well as practical details on cost-sharing and eligibility requirements. The guide also provides state-specific information on where to find the next steps for applying and additional details.

The icons at the top of each page display key information:

RESOURCE TYPE



Grants

Resources that provide financial support, often with a cost-share requirement



Loans

Resources that provide initial financial support, often for low or no interest



Technical Assistance

Resources that provide guidance and key information for success

MITIGATION TYPE



Education and Outreach

Sustained programs to educate residents and community leaders about risks, vulnerabilities, and mitigation opportunities



Natural Systems Protection

Actions that minimize damage and losses through preservation or restoration of natural systems



Planning and Regulations

Policies or codes that influence the way land is developed and buildings are constructed



Structure and Infrastructure

Actions modifying existing structures/infrastructure to remove them from a vulnerable area, or construction of new structures to protect existing development

FEDERAL, STATE, AND PRIVATE / NOT-FOR-PROFIT RESOURCES

Some of the resources are funded by the federal government, some by the state, and others are a combination. A small sample of not-for-profit resources, at the national level, are included in this guide. The “Next Steps” section for each resource provides information about how to access the resource.

QUESTIONS?

Communities are generally encouraged to contact their State Hazard Mitigation Officer for hazard mitigation assistance. They may also contact their FEMA regional office or find contact information for each program through the websites included in this guide.

FEMA Region 6 Office: <https://www.fema.gov/about/organization/region-6>



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Conservation Reserve Program (CRP)	
Grant	
Department or Organization	Farm Service Agency (FSA), United States Department of Agriculture (USDA)
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	Erosion, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Generally, to be eligible for CRP enrollment, a farmer must have owned or operated the land for at least 12 months prior to the previous CRP sign-up period. The land must be either be: cropland (including field margins) that was planted to an agricultural commodity for 4 of the previous 6 crop years, and which is physically and legally capable of being planted in a normal manner to an agricultural commodity; or certain marginal pastureland that is suitable for use as a riparian buffer or for similar water quality purposes.
Funding Available	Variable annually
Cost Sharing	The rental payment does not require a cost share.
Restrictions	See eligible applicants
Website	fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index
Next Steps for Texas Communities	This is a federal program, administered by local offices. Find your local USDA representative's contact information here: farmers.gov/service-center-locator . Additional USDA conservation programs can be found at nrcs.usda.gov/wps/portal/nrcs/main/national/programs/ .

About the Resource

The Conservation Reserve Program (CRP) is a voluntary program for agricultural landowners to receive rental payments when they convert marginal farmlands to vegetated cover. Participants enroll in CRP contracts for 10 to 15 years. This reduces soil erosion, supports farmers, reduces sedimentation and pollution in water sources, and establishes wildlife habitat. The wetland enhancement, shoreline protection, and riparian buffer practices enhance resilience by reducing downstream flooding during storm events.

One effort of the CRP is the Floodplain Wetlands Initiative, which restores the functions and values of wetland ecosystems that had been devoted to agricultural use. Wetland restoration reverses the degradation of the wetland areas on what is often marginal soil. For farmers and landowners facing crop damage from flooding, restoring wetlands to receive floodwaters can also increase flood storage capacity – while significantly reducing farming risks.



Conservation Stewardship Program (CSP)	
Grant, Technical Assistance	
Department or Organization	Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA)
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All

Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Applicants may include individuals, legal entities, joint operations, or tribes that meet the stewardship threshold for at least two priority resource concerns when they apply. They must also agree to meet or exceed the stewardship threshold for at least one additional priority resource concern by the end of the contract. Producers must have effective control of the land for the term of the proposed contract.
Funding Available	Payment rates vary by state
Cost Sharing	Farmers receive a payment for conservation practices.
Restrictions	Unknown
Website	nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp
Next Steps for Texas Communities	This is a federal program, administered by local offices. Find your local USDA representative's contact information here: farmers.gov/service-center-locator . Additional USDA programs can be found at nrcs.usda.gov/wps/portal/nrcs/main/national/programs/ .

About the Resource

The Conservation Stewardship Program (CSP) helps agricultural producers maintain and improve their existing conservation systems and adopt additional conservation activities to address priority resource concerns. CSP pays participants for conservation performance—the higher the performance, the higher the payment. Many conservation practices (riparian forest buffers, cover crops, etc.) reduce runoff and erosion, reducing flooding downstream.

CSP provides two possible types of payments through 5-year contracts: annual payments for installing new conservation activities and maintaining existing practices, and supplemental payments for adopting a resource-conserving crop rotation.



Emergency Watershed Protection Program (EWPP)	
Grant, Technical Assistance	
Department or Organization	Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA)
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	<i>EWP - Recovery:</i> Applicants may include individuals, legal entities, joint operations, or tribes that meet the stewardship threshold for at least two priority resource concerns when they apply. They must also agree to meet or exceed the stewardship threshold for at least one additional priority resource concern by the end of the contract. Producers must have effective control of the land for the term of the proposed contract. <i>EWP - Floodplain Easements:</i> Landowners can apply directly for assistance at the local NRCS office when project funding for floodplain easements become available.
Funding Available	Variable depending on the scope of the project

Cost Sharing	NRCS can pay up to 75% of the cost for eligible emergency recovery projects. Local sponsors must acquire the remaining 25% in cash or in-kind services. Contact NRCS for more information for funding of floodplain easement projects.
Restrictions	The EWP Program cannot be used: • To address problems that existed prior to the disaster. • To improve the level of protection above the existing level at the time of the disaster. • For projects' operation and maintenance. • To repair private or public transportation facilities or utilities. • To install non-essential restoration work that will not reduce or eliminate adverse impacts from the natural disaster. • To restore projects installed by another federal agency.
Website	nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewp
Next Steps for Texas Communities	This is a federal program, administered by local offices. Find your local USDA representative's contact information here: farmers.gov/service-center-locator . Additional USDA programs can be found at nrcs.usda.gov/wps/portal/nrcs/main/national/programs/ .

About the Resource

Congress established the Emergency Watershed Protection (EWP) program to respond to emergencies created by natural disasters. The EWP program offers technical and financial assistance to help local communities mitigate imminent hazards to life and property caused by floods, fires, windstorms, and other natural occurrences that impair a watershed. The Natural Resources Conservation Service (NRCS) administers the EWP program, which consists of two options: EWP – Recovery, and EWP – Floodplain Easement (FPE).

NRCS offers financial and technical assistance for various activities under EWP – Recovery, including:

- Removing debris from stream channels, road culverts, and bridges.
- Reshaping and protecting eroded streambanks.
- Correcting damaged or destroyed drainage facilities.
- Establishing vegetative cover on critically eroding lands.
- Repairing levees and structures.
- Repairing conservation practices.

In addition to recovery projects, NRCS may purchase EWP floodplain easements instead of trying to recover damaged floodplain lands if it proves to be more cost-effective than recovery.



Environmental Quality Incentives Program (EQIP)	
Grant, Technical Assistance	
Department or Organization	Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA)
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Agricultural producers, owners of non-industrial private forestland, and tribes are eligible to apply for EQIP. Eligible land includes cropland,

	rangeland, pastureland, non-industrial private forestland, and other farm or ranch lands. Socially disadvantaged, beginning and limited resource farmers, tribes, and veterans are eligible for an increased payment rate and may receive an advance payment of up to 50% to purchase the materials and services needed to implement the conservation practices included in their EQIP contract.
Funding Available	Varies by state
Cost Sharing	75% federal, 90% in certain cases (socially disadvantaged, veterans, beginning farmers, etc.)
Restrictions	Applicants must: • Control or own eligible land. • Comply with adjusted gross income limitation (AGI) provisions. • Comply with the highly erodible land and wetland conservation requirements. • Develop an NRCS EQIP plan of operations. Additional restrictions and program requirements may apply.
Website	nrcs.usda.gov/wps/portal/nrcs/detail/sc/programs/financial/eqip/?cid=nrcseprd1384284
Next Steps for Texas Communities	This is a federal program, administered by local offices. Find your local USDA representative's contact information here: farmers.gov/service-center-locator . Additional USDA programs can be found at nrcs.usda.gov/wps/portal/nrcs/main/national/programs/ .

About the Resource

The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural producers to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion, and sedimentation, or improved or created wildlife habitat.

While not designed to be an emergency response or hazard mitigation program, EQIP can play a vital role in helping producers prevent the worst impacts of and recover from natural disasters like floods, hurricanes, wildfires, and drought. Through EQIP, NRCS provides financial assistance to repair and prevent the excessive soil erosion caused or affected by natural disasters. These practices include activities like stream bank restoration, grassed waterways, and buffers. NRCS-funded conservation practices protect the land from erosion, support disaster recovery, and repair, and can help mitigate loss from future natural disasters.



Forest Legacy Program (FLP)	
Other- Purchase	
Department or Organization	Forest Service, United States Department of Agriculture (USDA)
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	A proposed project is eligible if it meets federal requirements as well as minimum eligibility: • It is within, or partially within, a designated forest legacy area.

	• It has a minimum of 75% forestland or a documented plan that includes sufficient landowner capacity to reforest to at least 75% forestland. • It can be managed in ways consistent with the purpose for which it was acquired by FLP. • The landowner is willing to sell or donate the interest in perpetuity. • The landowner acknowledges that the conservation easement will be held by a government entity if federal funds are used for the acquisition.
Funding Available	States can submit up to three projects which cannot exceed \$10 million, or \$7 million for individual projects.
Cost Sharing	At least 25% of the total project cost
Restrictions	Project selection is based on national priorities
Website	fs.fed.us/managing-land/private-land/forest-legacy/program
Next Steps for Texas Communities	This is a federal program, administered by local offices. Find your local USDA representative's contact information here: farmers.gov/service-center-locator . Additional USDA programs can be found at nrcs.usda.gov/wps/portal/nrcs/main/national/programs/ .

About the Resource

The purpose of the Forest Legacy Program is to identify and conserve environmentally important forest areas that are threatened by conversion to non-forest uses. Providing economic incentives to landowners to keep their land as forests encourage sustainable forest management and supports strong markets for forest products. Forest protection can be a valuable tool for natural resource conservation and can reduce flooding and hazard risk downstream within a watershed.

Landowners may participate in the Forest Legacy Program by either selling their property outright or by retaining ownership and selling only a portion of the property's development rights; both are held by state agencies or another unit of government. The use of a conservation easement, a legal agreement between a landowner and a non-profit land trust or governmental agency allows the land to remain in private ownership while ensuring that its environmental values are retained.



Forest Stewardship Program	
Technical Assistance	
Department or Organization	Forest Service, United States Department of Agriculture (USDA)
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Non-industrial private forest landowners
Funding Available	N/A
Cost Sharing	N/A
Restrictions	Participants must agree to manage their property following an approved Forest Stewardship Management Plan
Website	fs.fed.us/managing-land/private-land/forest-stewardship
Next Steps for Texas Communities	This is a federal program, administered by local offices. Find your local USDA representative's contact information here: farmers.gov/service-center-locator . Additional USDA programs can be found at nrcs.usda.gov/wps/portal/nrcs/main/national/programs/ .

About the Resource

The Forest Stewardship Program encourages long-term stewardship of important state and private forest landscapes by helping landowners more actively manage their forest and related resources. Protected forests can reduce flooding and hazard risk downstream within a watershed, and well-managed forests can reduce wildfire risk. The program provides assistance to owners of forest land and other lands where good stewardship, including agroforestry applications, will enhance and sustain the long-term productivity of multiple forest resources, and produce healthy, resilient forest landscapes. Special attention is given to landowners in landscape areas identified by State Forest Action Plans and those new to, or in the early stages of, managing their land in a way that embodies multi-resource stewardship principles. The program provides landowners with the professional planning and technical assistance they need to keep their land in a productive and healthy condition. Assistance offered through the Forest Stewardship Program also provides landowners with enhanced access to other USDA conservation programs, forest certification programs, and forest product and ecosystem service markets.



Housing Preservation Grants

Grant	
Department or Organization	Rural Development, United States Department of Agriculture (USDA)
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	State, tribal, and local governments, and nonprofit organizations. Eligible areas include rural towns with 20,000 or fewer people and federally recognized tribal lands.
Funding Available	\$15.3 million in 2020
Cost Sharing	Up to 100% federal
Restrictions	Applicants must have the necessary background and experience, with a proven ability to perform the repair and rehabilitation of low-income housing.
Website	rd.usda.gov/programs-services/housing-preservation-grants
Next Steps for Texas Communities	Contact your local USDA representative to get started on applying for the grant. Their information can be found at: rd.usda.gov/contact-us/state-offices

About the Resource

The Housing Preservation Grant (HPG) program provides grants to sponsoring organizations for the repair or rehabilitation of low- and very low-income housing. The grants are competitive and are made available in areas where there is a concentration of need. Those assisted must own very-low- or low-income housing, either as homeowners, landlords, or members of a cooperative. Very low income is defined as below 50% of the area median income (AMI); low income is between 50 and 80% of AMI.

Applicants provide grants or low-interest loans to repair or rehabilitate housing for low- and very-low-income homeowners. Rental property owners may also receive assistance if they agree to make units available to low- and very-low-income families.

Eligible expenses include:

- Repairing or replacing electrical wiring, foundations, roofs, insulation, heating systems, and water/waste disposal systems.
- Accessibility features.

- Labor and materials.
- Administrative expenses.

Eligible homeowners can apply for funding to repair damages caused by natural hazards or to harden their structures against future hazard events.



Source Water Protection Program (SWPP)	
Technical Assistance	
Department or Organization	Farm Service Agency (FSA), United States Department of Agriculture (USDA)
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Open; producers in participating states are encouraged to take part in SWPP by using suggested conservation practices and becoming a member of the local team responsible for developing the SWPP
Funding Available	N/A. This a technical assistance program.
Cost Sharing	N/A. This a technical assistance program.
Restrictions	Must be in a participating state. Contact your local FSA office for more information.
Website	fsa.usda.gov/programs-and-services/conservation-programs/source-water-protection/index
Next Steps for Texas Communities	This is a federal program, administered by local offices. Find your local USDA representative's contact information here: farmers.gov/service-center-locator . Additional USDA programs can be found at nrcs.usda.gov/wps/portal/nrcs/main/national/programs/ .
About the Resource	

The Source Water Protection Program (SWPP) is a joint project of the U.S. Department of Agriculture (USDA) Farm Service Agency (FSA) and the National Rural Water Association (NRWA), a non-profit water and wastewater utility membership organization. The SWPP is designed to help prevent pollution of surface and groundwater used as the primary source of drinking water by rural residents. Water quality projects often meet flood mitigation goals and vice versa. SWPP funds can be used for flood mitigation when the projects also improve water quality.



USDA Disaster Assistance Programs	
Grant	
Department or Organization	Farm Service Agency (FSA), United States Department of Agriculture (USDA)
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Eligible applicants vary depending on the specific sub-program

Funding Available	Amount of funding available varies based on sub-program
Cost Sharing	Cost-sharing requirements vary depending on the sub-program.
Restrictions	Restrictions vary based on sub-program
Website	fsa.usda.gov/programs-and-services/disaster-assistance-program/index
Next Steps for Texas Communities	This is a federal program, administered by local offices. Find your local USDA representative's contact information here: farmers.gov/service-center-locator

About the Resource

The Farm Service Agency provides several disaster assistance programs. These include the Emergency Conservation Program, Emergency Forest Restoration Program, Emergency Loan Program, and Tree Assistance Program, as well as a mix of other programs aimed at specific agricultural sectors. While focused on recovery, many of these programs provide funding for conservation practices that enhance resilience.



Water and Environmental Programs	
Grant, Technical Assistance	
Department or Organization	Rural Development, United States Department of Agriculture (USDA)
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	Details vary by program, but most programs are open to state, local, and federally recognized tribes
Funding Available	Amount of funding available varies based on sub-program
Cost Sharing	Cost-sharing requirements vary depending on the sub-program.
Restrictions	Restrictions vary based on sub-program
Website	rd.usda.gov/programs-services/all-programs/water-environmental-programs
Next Steps for Texas Communities	Your local USDA representative can help you apply for this program. Find their contact information here: farmers.gov/service-center-locator . Additional USDA programs can be found at nrcs.usda.gov/wps/portal/nrcs/main/national/programs/ .

About the Resource

The USDA's Rural Development Water and Environmental Programs (WEP) provide technical assistance, loans, grants, and loan guarantees for drinking water, sanitary sewer, solid waste, and storm drainage facilities in rural areas and cities and towns of 10,000 or less. WEP also makes grants to non-profit organizations to provide technical assistance and training to help rural communities with their water, wastewater, and solid waste problems. Water quality projects often meet flood mitigation goals and vice versa.

WEP includes Emergency Community Water Assistance Grants, Grants for Rural and Native Alaskan Villages, Water & Waste Disposal Loans & Grants, and more.



Wetland Mitigation Banking Program	
Other - Credit	
Department or Organization	Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA)
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Operational Coordination
Eligible Applicants	• City or township governments. • Public and State-controlled institutions of higher education. • Nonprofits that do not have a 501(c)(3) status with the IRS, other than institutions of higher education. • Federally recognized tribal governments. • State governments. • Special district governments. • County governments. • Private institutions of higher education. • For-profit organizations other than small businesses.
Funding Available	\$5 million (2020 round)
Cost Sharing	Banking programs that are strictly In-Lieu Fee are not eligible for the NRCS Wetland Mitigation Banking Program.
Restrictions	There are no specific restrictions for this program
Website	nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/farmbill/?cid=nrcseprd362686
Next Steps for Texas Communities	Applications for this federal program can be submitted at Grants.gov during the open application period.

About the Resource

The Wetlands Mitigation Banking Program helps establish wetland mitigation banks to help producers meet their wetland conservation compliance responsibilities. Producers must comply to maintain eligibility for many USDA programs administered by the FSA and NRCS and to maintain eligibility for the federal crop insurance premium subsidy administered by the Risk Management Agency.

This program assists with establishing the banks, not with securing the wetlands.



Climate Adaptation Knowledge Exchange	
Technical Assistance	
Department or Organization	Climate Adaptation Knowledge Exchange
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Threats and Hazard Identification
Eligible Applicants	N/A – this is a technical assistance resource. Anyone can access the materials, which are targeted to local governments and organizations.
Funding Available	N/A

Cost Sharing	N/A
Restrictions	Available to all
Website	cakex.org
Next Steps for Texas Communities	This not for profit resource is an international online forum to share information. Access the website to learn more.

About the Resource

The Climate Adaptation Knowledge Exchange is the world's largest and most used source of climate adaptation case studies and resources. The materials can be filtered by scale (community to national/international); sector addressed (conservation, land use planning, infrastructure, etc.); hazards (flood, erosion, sea level rise, etc.); region; and more. Refer to the materials or upload your own to share lessons, ideas, and opportunities with others in the field.



Coastal and Marine Habitat Restoration Grants

Grant

Department or Organization	National Oceanic and Atmospheric Administration, Department of Commerce
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure, Education and Outreach
Hazard Addressed	Erosion, Sea Level Rise, Storm Surge, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Institutions of higher education, non-profits, commercial (for profit) organizations, U.S. territories, and state, local, and tribal governments.
Funding Available	\$4 million in Community-based Restoration Program funding available for coastal and marine habitat restoration in 2020.
Cost Sharing	None is required, but applicants are encouraged to demonstrate a 1:1 non-federal match for the NOAA funds requested to conduct the proposed project.
Restrictions	The FY2020 funding opportunity required a pre-proposal application and an invitation-only proposal application. Land acquisition and marine debris removal are ineligible.
Website	fisheries.noaa.gov/grant/coastal-and-marine-habitat-restoration-grants
Next Steps for Texas Communities	Application information for this federal program is available on the website. Application periods will include explanatory webinars.

About the Resource

The National Oceanic and Atmospheric Administration (NOAA) Community-Based Restoration Program recognizes that habitat protection and restoration are essential elements of a strategy for sustainable commercial and recreational fisheries. Investing in habitat restoration projects leads to real, lasting differences for communities, businesses, and the environment. The program grants support restoration projects that use a habitat-based approach to rebuild productive and sustainable fisheries, contribute to the recovery and conservation of protected resources, and promote healthy ecosystems and resilient communities.

Restoration includes activities that return degraded or altered marine, estuarine, coastal, and freshwater, migratory fish habitats to functioning conditions, and techniques that return NOAA trust species to their historic habitats. These projects support economic recovery. They can also prevent future hazards and hazard losses by protecting natural resources in critical areas of the coastal floodplain.



Coastal Resilience Grants	
Grant	
Department or Organization	National Oceanic and Atmospheric Administration, Department of Commerce
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	Erosion, Sea Level Rise, Storm Surge, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Institutions of higher education, nonprofit, and for-profit organizations, U.S. territories and states, tribes, and local governments including counties, municipalities, and cities
Funding Available	In 2018, NOAA granted roughly \$9 million
Cost Sharing	Federal funds awarded under this program must be matched with non-federal funds at a 2:1 ratio. For a project requesting \$500,000 in federal funding, for example, the award recipient would need to provide \$250,000 in non-federal matching contributions, for a total project budget of \$750,000.
Restrictions	Past funding opportunities have included a pre-proposal application and an invitation-only proposal application.
Website	fisheries.noaa.gov/grant/noaa-coastal-resilience-grants
Next Steps for Texas Communities	Application information for this federal program is available on the website. Application periods will include explanatory webinars.

About the Resource

The NOAA Coastal Resilience Grants program, jointly administered by NOAA's National Ocean Service and NOAA Fisheries, implements projects that build resilient U.S. coastal communities and ecosystems.

Resilience is the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events such as extreme weather or long-term changing environmental conditions. This program is intended to build resilience through projects that conserve and restore sustainable ecosystem processes and functions and reduce the vulnerability of coastal communities and infrastructure from the impacts of extreme weather events, climate hazards, and changing ocean conditions.



Disaster Loan Assistance	
Loan	
Department or Organization	Small Business Administration, Department of Commerce
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Businesses, private non-profit organizations, homeowners, and renters
Funding Available	Businesses may borrow up to \$2 million. Homeowners may borrow up to \$200,000 to repair/replace a disaster-damaged private residence or \$40,000 for a homeowner or renter to repair/replace damaged personal property.

Cost Sharing	Loan
Restrictions	Varies by applicant type
Website	disasterloan.sba.gov/ela/Information/Index
Next Steps for Texas Communities	Decisions are made based on individual disaster declarations. Refer to the SBA website for more information.

About the Resource

The Small Business Administration (SBA) provides low-interest disaster loans to businesses of all sizes, private non-profit organizations, homeowners, and renters. SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.



EDA Disaster Recovery Grant	
Department or Organization	Economic Development Administration, Department of Commerce
Type of Mitigation Action	Structure and Infrastructure, Education and Outreach
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Varies by disaster
Funding Available	Varies by disaster \$587 million was available in FY 2019.
Cost Sharing	Up to 80% federal
Restrictions	Varies by disaster
Website	eda.gov/programs/disaster-recovery
Next Steps for Texas Communities	This federal program is administered through the state. More information can be found on the Texas EDC website at texasedc.org

About the Resource

The Economic Development Administration (EDA) has a long history of successfully supporting disaster recovery and resiliency efforts. EDA's role in disaster recovery is to facilitate the timely and effective delivery of federal economic development assistance to support long-term community economic recovery planning and project implementation, redevelopment, and resiliency. EDA coordinates regional disaster recovery efforts in partnership with its extensive network of Economic Development Districts (EDDs), University Centers, institutions of higher education, and other partners in designated impact areas.



EDA Disaster Supplemental Funding Grant	
Department or Organization	Economic Development Administration, Department of Commerce
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Varies by disaster
Funding Available	Varies by disaster
Cost Sharing	Varies by disaster
Restrictions	Varies by disaster

Website	eda.gov/disaster-recovery/supplemental
Next Steps for Texas Communities	This federal program is administered through the state. More information can be found on the Texas EDC website at texasedc.org

About the Resource

Congress often appropriates supplemental funds for economic recovery after significant disasters. Between Fiscal Years 2018 and 2019, EDA received \$1.2 billion in supplemental disaster appropriations (\$600 million each year) from Congress to help regions recover from the economic harm and distress resulting from natural disasters in 2017-2019. With the support of these funds, American regions and communities hard hit by major disasters are rebuilding stronger, more resilient economies.



Continuing Authorities Program	
Technical Assistance	
Department or Organization	U.S. Army Corps of Engineers (USACE), Department of Defense
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	Erosion, Flood, Sea Level Rise, Storm Surge
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	State, regional, and local governments, tribes, and other non-federal public agencies
Funding Available	Varies by sub-program
Cost Sharing	Varies by sub-program, but many programs follow the following guidelines: Feasibility Study: 100%/0% for initial \$100,000; 50%/50% remaining cost Implementation: 75% federal
Restrictions	Varies by sub-program (streambank and shoreline protection, hurricane and storm damage reduction projects, and flood damage reduction projects)
Website	nae.usace.army.mil/Missions/Public-Services/Continuing-Authorities-Program
Next Steps for Texas Communities	There are 4 USACE districts that cover Texas, the Dallas District, the Fort Worth District, the Galveston District, and the Albuquerque District. Find your district here: swf.usace.army.mil/Locations
About the Resource	

The Continuing Authorities Program (CAP) allows the USACE to plan, design, and implement certain types of water resources projects without additional project-specific congressional authorization. Under CAP, the USACE can plan and implement projects of limited size, cost, scope, and complexity. Projects include streambank and shoreline protection, hurricane and storm damage reduction projects, and flood damage reduction projects.

All projects in this program include a feasibility phase and an implementation phase.



Ecosystem Restoration	
Technical Assistance	
Department or Organization	U.S. Army Corps of Engineers (USACE), Department of Defense
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	Erosion, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Communities and local governments
Funding Available	Variable by project type
Cost Sharing	Variable with project type, but generally: Feasibility: 100%/0% for initial \$100,000; 50%/50% remaining cost (\$100,000 limit does not apply for dredging projects) Implementation: 75% federal for project modifications; 65% federal for dredging and aquatic ecosystem restoration projects
Restrictions	\$10 million federal project limit
Website	nae.usace.army.mil/Missions/Public-Services/Ecosystem-Restoration-Authorities
Next Steps for Texas Communities	There are 4 USACE districts that cover Texas, the Dallas District, the Fort Worth District, the Galveston District, and the Albuquerque District. Find your district here: swf.usace.army.mil/Locations
About the Resource	

Ecosystem Restoration is one of the primary missions of the USACE. The purpose of the USACE ecosystem restoration activities is to restore significant ecosystem function, structure, and dynamic processes that have been degraded. Ecosystem restoration efforts involve examining the problems contributing to the system degradation and developing alternative means to solve these problems. The intent of restoration is to partially or fully re-establish the attributes of a natural, functioning, self-regulating system. Restoration opportunities associated with wetlands, riparian, and other floodplain and aquatic systems are likely to be most appropriate for USACE involvement.

The three ecosystem restoration authorities within the program are Project Modifications for Improvements to the Environment, Beneficial Use of Dredged Materials, and Aquatic Ecosystem Restoration.



Emergency Operations	
Technical Assistance	
Department or Organization	U.S. Army Corps of Engineers (USACE), Department of Defense
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Operational Coordination
Eligible Applicants	State and local governments
Funding Available	N/A
Cost Sharing	N/A
Restrictions	Disaster response and recovery program

Website	swg.usace.army.mil/Business-With-Us/Emergency-Management-Office
Next Steps for Texas Communities	There are 4 USACE districts that cover Texas, the Dallas District, the Fort Worth District, the Galveston District, and the Albuquerque District. Find your district here: swf.usace.army.mil/Locations

About the Resource

Emergency preparedness and response are primarily state and local responsibilities. However, when the nature of the disaster exceeds the capabilities of state and local interests, the USACE may provide help to save human life, prevent immediate human suffering, or mitigate property damage.

The USACE participates in the National Response Framework as the primary agency for planning, preparedness, and response under Emergency Support Function (ESF) #3, Public Works and Engineering. The purpose of ESF #3 is to provide lifesaving or life-protecting assistance to augment efforts of the affected state(s) and local response efforts following a major or catastrophic disaster.

The USACE's Rehabilitation and Inspection Program provides the inspection of flood control projects, the rehabilitation of damaged flood control projects, and the rehabilitation of federally authorized and constructed hurricane or shore protection projects.



Floodplain Management Services (FPMS) Program	
Technical Assistance	
Department or Organization	U.S. Army Corps of Engineers (USACE), Department of Defense
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	Erosion, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	State, regional, and local governments, tribes, and other non-federal public agencies
Funding Available	N/A
Cost Sharing	None. State and local governments can receive technical assistance free of charge.
Restrictions	This program provides studies only. Design and construction are not included.
Website	nae.usace.army.mil/Missions/Public-Services/Flood-Plain-Management-Services
Next Steps for Texas Communities	There are 4 USACE districts that cover Texas, the Dallas District, the Fort Worth District, the Galveston District, and the Albuquerque District. Find your district here: swf.usace.army.mil/Locations

About the Resource

The USACE provides the full range of technical services and planning guidance needed to support effective floodplain management. General technical assistance efforts under this program include determining site-specific data on obstructions to flood flows, flood formation, and timing; flood depths, stages, or floodwater velocities; the extent, duration, and frequency of flooding; information on natural and cultural floodplain resources; and flood loss potentials before and after the use of floodplain management measures. The types of studies conducted under the FPMS program include floodplain delineation/hazard, dam failure analyses, hurricane evacuation, flood warning, floodway, flood damage reduction, stormwater management, flood-proofing, and inventories of flood-prone structures.



Inspection of Completed Works Program	
Technical Assistance	
Department or Organization	U.S. Army Corps of Engineers (USACE), Department of Defense
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Communities with critical infrastructure completed by the USACE
Funding Available	Not applicable. This is a technical assistance program.
Cost Sharing	N/A
Restrictions	Only for previously completed projects
Website	mvp.usace.army.mil/Missions/Civil-Works/Programs-Project-Management/District-Programs/Inspection-of-Completed-Works
Next Steps for Texas Communities	There are 4 USACE districts that cover Texas, the Dallas District, the Fort Worth District, the Galveston District, and the Albuquerque District. Find your district here: swf.usace.army.mil/Locations

About the Resource

The USACE's Inspection of Completed Works Program is designed to ensure that non-federal owners of federally built critical infrastructure, such as a flood damage reduction project, perform essential maintenance in accordance with the operation and maintenance manuals. Annual compliance inspections identify maintenance deficiencies, operational problems, and corrective actions. When necessary, the USACE provides technical assistance before, during, and after each flood emergency. Through these compliance inspections, the USACE ensures that the project will operate and function as designed.



Silver Jackets	
Technical Assistance	
Department or Organization	U.S. Army Corps of Engineers (USACE), Department of Defense
Type of Mitigation Action	Structure and Infrastructure, Education and Outreach
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Operational Coordination
Eligible Applicants	N/A. The Silver Jackets offer technical assistance to communities.
Funding Available	N/A. The Silver Jackets offer technical assistance to communities.
Cost Sharing	N/A
Restrictions	There are no restrictions.
Website	silverjackets.nfrmp.us
Next Steps for Texas Communities	Learn more about the Texas Silver Jackets at silverjackets.nfrmp.us/State-Teams/Texas

About the Resource

Silver Jackets teams across the United States bring together multiple state, federal, and sometimes tribal and local agencies, to learn from one another about reducing the risk of floods and other natural disasters. The collaboration, shared knowledge, and relationships enhance response and recovery efforts when hazard events do occur. Each state Silver Jackets team is unique. Common state agency

participants include those with mission areas of hazard mitigation, emergency management, floodplain management, natural resources management or conservation, etc. Federal participation typically includes the USACE, FEMA, and often others such as the National Weather Service and the U.S. Geological Survey.



Small Flood Control	
Technical Assistance	
Department or Organization	U.S. Army Corps of Engineers (USACE), Department of Defense
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	State and local governments
Funding Available	N/A. This a technical assistance program.
Cost Sharing	Feasibility Study: 100%/0% for initial \$100,000; 50%/50% remaining cost Design and implementation: 65% federal/35% non-federal. At least 5% must be in cash; the rest may be in kind.
Restrictions	Projects must pass a cost/benefit analysis
Website	mvp.usace.army.mil/Missions/Civil-Works/Programs-Project-Management/District-Programs/Small-Flood-Control-Projects
Next Steps for Texas Communities	There are 4 USACE districts that cover Texas, the Dallas District, the Fort Worth District, the Galveston District, and the Albuquerque District. Find your district here: swf.usace.army.mil/Locations
About the Resource	

Under the Small Flood Control Program, the USACE works with communities to plan, design, and construct certain small flood control projects that have not already been specifically authorized by Congress. Both structural (levees, channels, or dams, for instance) and nonstructural (floodproofing or evacuation, for example) solutions are considered. Studies are required to evaluate potential projects. Each project selected must be economically justified; that is, the benefits resulting from a project must exceed the cost incurred to construct the project. It also must be environmentally acceptable and complete within itself. In addition, each separate project is limited to a total federal cost of not more than \$10 million, including studies, design, and implementation.



Brownfields Program Grant Funding	
Grant, Technical Assistance	
Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Communities
Funding Available	Amount available varies based on the funding program.
Cost Sharing	Cost-sharing varies depending on the funding program.
Restrictions	Grant programs are available for assessment, cleanup, environmental job training, and more. Restrictions vary based on the specific grant program.
Website	epa.gov/brownfields/types-brownfields-grant-funding
Next Steps for Texas Communities	Grant applications for these federal programs vary based on the sub-grant. Detailed information is available on the website.

About the Resource

The EPA's Brownfields Program provides direct funding for brownfields assessment, cleanup, revolving loans, and environmental job training, and it provides technical information on brownfields financing matters. Separate grant programs are available for assessment, cleanup, environmental job training, and more. While not envisioned as a mitigation program, brownfield cleanup can prevent toxic materials from spreading during a hazard event.



Clean Water State Revolving Loan Fund	
Loan	
Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure
Hazard Addressed	Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Funding is provided to states, and states distribute it to local communities. Tribal and territorial funding is also available.
Funding Available	Varies by state
Cost Sharing	Loan
Restrictions	Varies by state
Website	epa.gov/cwsrf
Next Steps for Texas Communities	This federal program is administered by the state. More information can be found at twdb.texas.gov/financial/programs/CWSRF/index.asp

About the Resource

The EPA's Clean Water State Revolving Fund (CWSRF) program is a federal-state partnership that provides communities a permanent, independent source of low-cost financing for a wide range of water quality infrastructure projects. CWSRF can fund a wide variety of water quality protection efforts. The

program's flexibility and broad range of project eligibilities enable states to target CWSRF funds to their specific water quality priorities. Water quality projects often meet flood mitigation goals and vice versa.

States are responsible for the operation of their CWSRF program. Under the CWSRF, states may provide various types of assistance, including loans, refinancing, purchasing, or guaranteeing local debt and purchasing bond insurance. States may also set specific loan terms, including interest rates from 0% to market rate and repayment periods of up to 30 years. States have the flexibility to target financial resources to their specific community and environmental needs.



Drinking Water State Revolving Fund	
Loan	
Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure
Hazard Addressed	Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Funding is provided to states, and states distribute it to local communities. Tribal and territorial funding is also available.
Funding Available	Varies by state
Cost Sharing	Loan
Restrictions	Varies by state
Website	epa.gov/drinkingwatersrf
Next Steps for Texas Communities	This federal program is administered by the state. More information can be found at twdb.texas.gov/financial/programs/DWSRF/index.asp
About the Resource	

Under the Drinking Water State Revolving Fund (DWSRF), the EPA provides grants to all 50 states plus Puerto Rico to capitalize state DWSRF loan programs. The states contribute an additional 20% to match the federal grants. The program also provides direct grant funding for the District of Columbia, U.S. Virgin Islands, American Samoa, Guam, and the Commonwealth of Northern Marianas. Water quality projects often meet flood mitigation goals and vice versa.

The 51 DWSRF programs function like infrastructure banks by providing low-interest loans to eligible recipients for drinking water infrastructure projects. As money is paid back into the state's revolving loan fund, the state makes new loans to other recipients. These recycled repayments of loan principal and interest earnings allow the state's DWSRF to "revolve" over time.

States are responsible for operating their DWSRF programs. Under the DWSRF, states may provide various types of assistance, including:

- Loans.
- Refinancing.
- Purchasing.
- Guaranteeing local debt.
- Purchasing bond insurance.

States may also set specific loan terms, including interest rates from 0% to the market rate, and repayment periods of up to 30 years.



Environmental Finance Centers	
Technical Assistance	
Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	States, tribes, local governments, and the private sector
Funding Available	N/A
Cost Sharing	N/A
Restrictions	N/A Technical assistance
Website	epa.gov/waterfinancecenter/efcn
Next Steps for Texas Communities	The Region VI Water Finance Center is housed at the University of New Mexico: southwestefc.unm.edu
About the Resource	

The EPA's Environmental Finance Centers (EFCs) deliver targeted technical assistance to, and partner with states, tribes, local governments, and the private sector in providing innovative solutions to manage the costs of environmental financing and program management. Potential environmental projects may include hazard mitigation projects.



Environmental Justice Grants and Technical Assistance	
Grant	
Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	Incorporated non-profit organizations— including, but not limited to, environmental justice networks, faith-based organizations and those affiliated with religious institutions; federally recognized tribal governments—including Alaska Native Villages and tribal organizations
Funding Available	\$1.5 million in 2019
Cost Sharing	None. The grant is 100% federal.
Restrictions	1-year projects
Website	epa.gov/environmentaljustice/environmental-justice-grants-funding-and-technical-assistance
Next Steps for Texas Communities	Grant opportunities for this federal program are posted on grants.gov . Refer to EPA's website for more information about application periods and requirements.
About the Resource	

The EPA's Environmental Justice Small Grants (EJSG) program awards grants that support community-driven projects designed to engage, educate, and empower communities to better understand local

environmental and public health issues and develop strategies for addressing those issues, building consensus in the community, and setting community priorities. The grants can be used for education and outreach about hazard mitigation efforts.



Greening America's Communities	
Technical Assistance	
Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Cities and towns
Funding Available	Technical assistance provided in kind
Cost Sharing	Unknown
Restrictions	Technical assistance
Website	epa.gov/smartgrowth/greening-americas-communities
Next Steps for Texas Communities	Grant opportunities for this federal resource are posted on grants.gov . Refer to EPA's website for more information about application periods and requirements.

About the Resource

Greening America's Communities (formerly known as Greening America's Capitals) is an EPA program that helps cities and towns develop an implementable vision of environmentally friendly neighborhoods that incorporates innovative green infrastructure, hazard mitigation, and other sustainable/resilient design strategies. EPA provides design assistance to help support sustainable communities that protect the environment, economy, and public health and to inspire local and state leaders to expand this work elsewhere.



Nonpoint Source Water Quality (Section 319) Grants	
Grant	
Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	Erosion, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Funding is provided to states, and states distribute to local communities. Tribal 319 funding is also available.
Funding Available	Varies by state; total funds in 2019: \$165.4 million
Cost Sharing	Each state receives different funding per year
Restrictions	Varies by state
Website	epa.gov/nps
Next Steps for Texas Communities	This federal program is administered through the state. More information can be found at tceq.texas.gov/waterquality/nonpoint-source/grants .

About the Resource

Clean Water Act Section 319(h) funds are provided only to designated state and tribal agencies to implement their approved nonpoint source management programs. State and tribal nonpoint source programs include a variety of components, including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and regulatory programs. Water quality projects often meet flood mitigation goals and vice versa.

Each year, EPA awards Section 319(h) funds to states in accordance with a state-by-state allocation formula that EPA developed in consultation with the states. Tribal funding is also available under Clean Water Act Section 319(h).



Smart Growth Support Grant, Technical Assistance

Department or Organization	Office of Sustainable Communities, Environmental Protection Agency
Type of Mitigation Action	Local Planning and Regulations, Education and Outreach
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Planning
Eligible Applicants	Eligible applicants vary depending on the specific sub-program
Funding Available	Amount of funding available varies based on sub-program
Cost Sharing	Cost-sharing requirements vary depending on the sub-program
Restrictions	Restrictions vary based on sub-program
Website	epa.gov/smartgrowth/about-smart-growth
Next Steps for Texas Communities	Grant opportunities are posted on grants.gov . Refer to EPA's website for more information about application periods and requirements.

About the Resource

The Environmental Protection Agency's (EPA) Office of Community Revitalization works on smart growth issues by:

- Conducting research.
- Producing reports and other publications.
- Providing examples of outstanding smart growth communities and projects.
- Working with tribes, states, regions, and communities through grants and technical assistance.

Smart growth can incorporate elements of green infrastructure and/or land preservation and can create more resilient communities.



Water Infrastructure and Resiliency Finance Center Technical Assistance

Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	Erosion, Flood, Sea Level Rise, Storm Surge
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience

Eligible Applicants	Communities
Funding Available	N/A. This a technical assistance program.
Cost Sharing	N/A. This a technical assistance program.
Restrictions	Technical Assistance
Website	epa.gov/waterfinancecenter
Next Steps for Texas Communities	N/A - no application necessary

About the Resource

The Water Finance Center provides financing information to help local decision-makers make informed decisions about drinking water, wastewater, and stormwater infrastructure, to protect human health and the environment. Water quality projects often meet flood mitigation goals and vice versa.



Wetlands Protection Program Development Grants Grant	
Department or Organization	Environmental Protection Agency
Type of Mitigation Action	Local Planning and Regulations, Education and Outreach
Hazard Addressed	Erosion, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Funding is provided through each EPA region
Funding Available	Variable by EPA region
Cost Sharing	75% federal
Restrictions	Variable by EPA region
Website	epa.gov/wetlands/wetland-program-development-grants-and-epa-wetlands-grant-coordinators
Next Steps for Texas Communities	Application information is available at epa.gov/wetlands/region-6-wetland-program-development-grant-request-applications

About the Resource

Wetlands Protection Development Grants (WPDGs) provide eligible applicants an opportunity to conduct projects to strengthen wetland protection programs. Eligible projects promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. Wetland protection is an important type of natural resource protection hazard mitigation project.



Georgetown Adaptation Resources Technical Assistance	
Department or Organization	Georgetown Climate Center
Type of Mitigation Action	Local Planning and Regulations, Education and Outreach
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Threats and Hazard Identification
Eligible Applicants	Technical assistance is available to all
Funding Available	N/A

Cost Sharing	N/A
Restrictions	None
Website	georgetownclimate.org/adaptation/featured.html
Next Steps for Texas Communities	More resources are available at the website

About the Resource

The Georgetown Climate Center provides resources to policymakers and others helping communities adapt to climate change.



Building Resilient Infrastructure and Communities (BRIC)	
Grant	
Department or Organization	Federal Emergency Management Agency, Department of Homeland Security
Type of Mitigation Action	Structure and Infrastructure, Natural Systems Protection, Local Planning and Regulations
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	States and territories that have had a major disaster declaration under the Stafford Act in the 7 years prior to the annual application period start date are eligible to apply to FEMA for federal assistance under BRIC as applicants. Local governments and tribes are eligible to apply to states and territories as subapplicants.
Funding Available	On an annual basis, FEMA will assess the amount of funding set aside for BRIC and determine what portion of that amount will be available during the following application period for the BRIC program. FEMA will announce its determination in the annual Notice of Funding Opportunity for the BRIC program.
Cost Sharing	Unknown at this time. Cost sharing requirements will be provided with the annual Notice of Funding Opportunity.
Restrictions	More information on ineligible activities can be found in the HMA Guidance, located here: fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf
Website	fema.gov/grants/mitigation/building-resilient-infrastructure-communities
Next Steps for Texas Communities	The first NOFO will be available in fall 2020. States, territories, and federally recognized tribes are potential applicants. Local governments, tribal governments, state agencies, and tribal agencies are potential sub-applicants. The State Hazard Mitigation Officer can provide more information.
About the Resource	

BRIC supports states, local communities, tribes, and territories in pre-disaster mitigation projects to reduce long-term risk from natural hazards. The BRIC program's guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the Pre-Disaster Mitigation (PDM) program and is a result of amendments made to Section 203 of the Robert T. Stafford Disaster

Relief and Emergency Assistance Act (Stafford Act) by Section 1234 of the Disaster Recovery Reform Act of 2018 (DRRA). The Notice of Funding Opportunity for the first funding round is anticipated in fall 2020.



Emergency Management Performance Grants	
Grant	
Department or Organization	Federal Emergency Management Agency, Department of Homeland Security
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	States or territories. May make available to subgrantee communities.
Funding Available	\$350 million (FY19)
Cost Sharing	The recipient's contribution can be cash (hard match) or third-party in-kind (soft match). Eligible EMPG program applicants agree to make available non-federal funds to carry out an EMPG award in an amount not less than 50% of the total project cost.
Restrictions	Grant funds may not be used for: • Prohibited equipment. • Weapons systems and ammunition. • Costs to support the hiring of sworn public safety officers for the purposes of fulfilling traditional public safety duties or to supplant traditional public safety positions and responsibilities. • Activities and projects unrelated to the completion and implementation of the EMPG Program.
Website	fema.gov/grants/preparedness/emergency-management-performance
Next Steps for Texas Communities	Reach out to your State Hazard Mitigation Officer for more information.

About the Resource

The purpose of the Emergency Management Performance Grant (EMPG) Program is to provide federal funds to states to assist state, local, territorial, and tribal governments in preparing for all hazards. Title VI of the Stafford Act authorizes the Federal Emergency Management Agency (FEMA) to make grants for providing a system of emergency preparedness for the protection of life and property in the United States from hazards. It vests responsibility for emergency preparedness jointly in the federal government, states, and their political subdivisions. The federal government, through the EMPG Program, provides the necessary direction, coordination, guidance, and assistance to support a comprehensive all-hazards emergency preparedness system. The EMPG Program will provide federal funds to assist state, local, tribal, and territorial emergency management agencies to obtain the resources required to support the National Preparedness Goal's associated mission areas and core capabilities.





Flood Mitigation Assistance Program	
Grant	
Department or Organization	Federal Emergency Management Agency, Department of Homeland Security
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure
Hazard Addressed	Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Applicants must be states, U.S. territories, or federally recognized tribes. Local governments may apply as sub-applicants under their states or territories.
Funding Available	\$210 million (FY19)
Cost Sharing	Federal funding is available for up to 75% of the eligible activity costs.
Restrictions	Applying communities must be members of the National Federal Insurance Program.
Website	fema.gov/grants/mitigation/floods
Next Steps for Texas Communities	This federal program is administered through the state. Tribes can apply directly. More information can be found at twdb.texas.gov/flood/grant/fma.asp
About the Resource	

The goal of FEMA's Flood Mitigation Assistance (FMA) Program is to reduce or eliminate claims under the National Flood Insurance Program (NFIP). FMA provides funding to states, territories, federally recognized tribes, and local communities for projects and planning that reduce or eliminate the long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually.



Hazard Mitigation Grant Program	
Grant	
Department or Organization	Federal Emergency Management Agency, Department of Homeland Security
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	In general, individuals, businesses, and private nonprofits via local governments, can apply for HMGP funding. Individuals must be sponsored through an appropriate subapplicant such as a local government, state agency, tribe or tribal agency, or private nonprofit. Applications are submitted to the state, eligible tribe, or territory, which receives HMGP funds from FEMA.
Funding Available	The available funding is determined based upon the disaster declaration.
Cost Sharing	Matching requirements are up to 75% for a federal match and a minimum of 25% for a non-federal match. Note that funding from other

	federal sources cannot be used for the 25% share with one exception: funding provided to states, tribes, or territories under the Community Development Block Grant (CDBG) program from the Department of Housing and Urban Development (HUD) can be used to meet the non-federal share requirement.
Restrictions	To be considered for funding under HMGP, a project must: • Conform with the approved state and local mitigation plan • Benefit the disaster area • Conform with environmental regulations • Solve a problem and be technically feasible • Meet all applicable state and local codes and standards • Demonstrate cost-effectiveness • Consider a range of alternatives
Website	fema.gov/grants/mitigation/hazard-mitigation
Next Steps for Texas Communities	This federal program is administered through the state. Tribes can apply directly. More information can be found at tdem.texas.gov/hazard-mitigation

About the Resource

The purpose of the Hazard Mitigation Grant Program (HMGP) is to help communities implement hazard mitigation measures following a Presidential Major Disaster Declaration in the areas of the state, tribe, or territory requested by the Governor or Tribal Executive. The key purpose of this grant program is to enact mitigation measures that reduce the risk of loss of life and property from future disasters. The primary guidance document for this program is the Hazard Mitigation Assistance Guidance. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.



National Dam Safety Program Grant, Technical Assistance	
Department or Organization	Federal Emergency Management Agency, Department of Homeland Security
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Non-federal dams that (i) are in a state or territory with a state or territorial dam safety program; (ii) are classified as having "high hazard potential" by the dam safety agency in the dam's state or territory ; (iii) have an emergency action plan approved by the state or territory's dam safety agency; and (iv) the state or territory in which the dam is located determines either of these criteria – the dam fails to meet minimum dam safety standards public. An "eligible high hazard potential dam" does not include: (i) a licensed hydroelectric dam; or (ii) a dam built under the federal authority of the Secretary of Agriculture.
Funding Available	\$10 million
Cost Sharing	Non-federal cost share requirement of not less than 35%, which may be partially or fully in-kind.
Restrictions	Dams on tribal lands are not eligible to receive HHPD grant funding. The Indian Dam Safety Act of 1994 establishes a Dam Safety Maintenance and Repair Program within the Bureau of Indian Affairs.
Website	fema.gov/emergency-managers/risk-management/dam-safety

Next Steps for Texas Communities	Grant funds go to states. Technical assistance is available to everyone.
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About the Resource

For 30 years, the federal government has used the National Dam Safety Program (NDSP) to protect Americans from dam failure. The NDSP is a partnership of states, federal agencies, and other stakeholders that encourages and promotes the establishment and maintenance of effective federal and state dam safety programs to reduce the risks to human life, property, and the environment from dam-related hazards.



Public Assistance 404 and 406 Programs	
Grant	
Department or Organization	Federal Emergency Management Agency, Department of Homeland Security
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Eligible applicants include states, federally recognized tribal governments (including Alaska Native villages and organizations, as long as they are not privately owned), U.S. territories, local governments, and certain organizations.
Funding Available	Mitigation funding limits are determined based on a benefit-cost analysis or as a share of the damaged facility's repair cost.
Cost Sharing	The federal share of assistance is not less than 75% of the eligible cost.
Restrictions	Mitigation funding is generally only available for eligible disaster-damaged facilities. Projects must directly reduce the potential of similar damage to the facility and must be cost-effective, technically feasible, and compliant with environmental and historic preservation laws, regulations, and Executive Orders.
Website	fema.gov/assistance/public
Next Steps for Texas Communities	Contact your State Hazard Mitigation Officer for more information.
About the Resource	

The FEMA Public Assistance (PA) program provides grants to state, local, tribal, and territorial governments, and certain types of private non-profit (PNP) organizations, so that communities can quickly respond to and recover from major disasters or emergencies declared by the President.

Through the program, FEMA provides supplemental federal disaster grant assistance for debris removal; life-saving emergency protective measures; and the repair, replacement, or restoration of disaster-damaged publicly owned facilities, and the facilities of certain PNP organizations. The PA program also encourages protection of these damaged facilities from future events by providing assistance for cost-effective hazard mitigation measures during the recovery process.



Community Development Block Grant - Disaster Recovery Grant	
Department or Organization	Department of Housing and Urban Development
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	State and local governments act as grantees. Those who receive funding include state agencies, non-profit organizations, economic development agencies, citizens, and businesses.
Funding Available	Varies depending on the disaster
Cost Sharing	Varies depending on the cost type More information on costs can be found here: hudexchange.info/resources/documents/CDBG-DR-Cost-Types-Summary.pdf
Restrictions	Each activity must be CDBG-eligible, address a disaster-related impact in a Presidentially declared county, and meet a national objective. Eligible grantees are states, units of general local government, tribes, and insular areas.
Website	hudexchange.info/programs/cdbg-dr/ hudexchange.info/programs/cdbg-dr/cdbg-dr-grantee-contact-information/#all-disasters
Next Steps for Texas Communities	More information can be found at: texasagriculture.gov/GrantsServices/RuralEconomicDevelopment/RuralCommunityDevelopmentBlockGrant(CDBG).aspx

About the Resource

The Department of Housing and Urban Development (HUD) provides flexible grants to help cities, counties, and states recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations. In response to Presidentially declared disasters, Congress may appropriate additional funding for the CDBG Program as Disaster Recovery grants, to rebuild the affected areas and provide crucial seed money to start the recovery process. Since this Disaster Recovery assistance may fund a broad range of recovery activities, HUD can help communities and neighborhoods that otherwise might not recover due to limited resources.

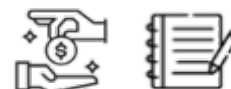


Community Development Block Grant - Mitigation Grant	
Department or Organization	Department of Housing and Urban Development
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	See CDBG-DR
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	States
Funding Available	Variable by year and opportunity
Cost Sharing	Variable by year and opportunity

Restrictions	Restrictions may vary, depending on the specific opportunity.
Website	hudexchange.info/programs/cdbq-mit
Next Steps for Texas Communities	This federal resource is administered through the state. More information can be found at: texasagriculture.gov/GrantsServices/RuralEconomicDevelopment/RuralCommunityDevelopmentBlockGrant(CDBG).aspx

About the Resource

The Community Development Block Grant- Mitigation Program is designed to provide assistance to areas affected by recent disasters through funding high-impact activities aimed at reducing future losses from natural hazards.



Section 108 Loan Guarantee Program	
Loan	
Department or Organization	Department of Housing and Urban Development
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	States, metropolitan, cities, and urban counties (i.e., CDBG entitlement recipients), non-entitlement communities that are assisted in the submission of applications by states that administer the CDBG program, non-entitlement communities eligible to receive CDBG funds under the HUD-administered small cities CDBG program. The public entity may be the borrower, or it may designate a public agency as the borrower. Activities eligible under Section 108 include: • Acquisition of real property. • Rehabilitation of publicly owned real property. • Housing rehabilitation eligible under CDBG. • Construction, reconstruction, or installation of public facilities (including street, sidewalk, and other site improvements). • Related relocation, clearance, and site improvements. • Loan to for-profit businesses for economic development purposes. • Payment of interest on the guaranteed loan and issuance costs of public offerings. • Debt service reserves. • Finance fees. • Public works and site improvements. • In limited circumstances, affordable housing construction.
Funding Available	Current availability of funding can be found here: hudexchange.info/resource/5197/current-availability-of-section-108-financing-cdbq-entitlement-and-State-grantees/
Cost Sharing	N/A
Restrictions	All projects must benefit low-moderate income persons, aid in the elimination of slums and blight, or meet the urgent needs of the community.
Website	hudexchange.info/programs/section-108

Next Steps for Texas Communities	More information can be found at: texasagriculture.gov/GrantsServices/RuralEconomicDevelopment/TexasAgriculturalFinanceAuthority/AgriculturalLoanGuaranteeProgram.aspx
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About the Resource

The Section 108 Loan Guarantee Program (Section 108 of the Housing and Community Development Act of 1974) provides communities with financing for economic development, housing rehabilitation, public facilities, and other physical development projects, including improvements to increase their resilience against natural disasters. The flexibility of the program makes it one of the most important public investment tools that HUD offers to state and local governments. Section 108 offers state and local governments the ability to transform a small portion of their CDBG funds into federally guaranteed loans large enough to pursue physical and economic revitalization projects capable of revitalizing entire neighborhoods.



Disaster Recovery Grants	
Grant	
Department or Organization	National Park Service, Department of Interior
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Dependent on Congressional authorization specific to disaster; must be affected by specific disaster
Funding Available	Varies depending on the disaster
Cost Sharing	N/A
Restrictions	Must be affected by specific disaster
Website	nps.gov/preservation-grants/disaster-recovery/index.html
Next Steps for Texas Communities	Funds are made available for specific disasters. Refer to the NPS website for more information.

About the Resource

Congress responds to some major disasters by appropriating Emergency Supplemental funding from the Historic Preservation Fund (ESHPF) for recovery, allowing state and tribal Historic Preservation Offices to work on various recovery projects, including compliance activities, survey and inventory of historic resources in areas impacted by the disaster, recovery, and repair of historic properties damaged during the disaster, and other activities related to disaster recovery, as approved by the National Park Service (NPS). All funded repair work must substantially mitigate the threat and include steps to mitigate future damages.



Housing Improvement Program	
Grant	
Department or Organization	Bureau of Indian Affairs, Department of Interior
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	No

National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Member of a federally recognized tribe or an Alaska Native; live in an approved tribal service area; have an income that does not exceed 150% of the U.S. Department of Health and Human Services (DHHS) Poverty Guidelines; have present housing that is substandard, as defined by the regulations; have no other resource for housing assistance; and have not acquired the present housing through a federally sponsored housing program that includes such housing assistance.
Funding Available	Interim Improvements: Provides up to \$7,500 in housing repairs for conditions that threaten the health and/or safety of the occupants. Repairs and Renovation: Provides up to \$60,000 in repairs and renovation to improve the condition of a homeowner's dwelling to meet applicable building code standards. Replacement Housing: Provides a modest replacement home if a homeowner's dwelling cannot be brought to applicable building code standards. New Housing: Provides a modest new home. People who do not own a home may be eligible if they own or lease land suitable for housing and the lease is for not less than 25 years when assistance is received.
Cost Sharing	No cost-share required
Restrictions	Consult the eligibility guidelines found here: bia.gov/bia/ois/dhs/housing-improvement-program
Website	bia.gov/bia/ois/dhs/housing-improvement-program
Next Steps for Texas Communities	Contact your local BIA representative. Their information can be found at: bia.gov/sites/bia.gov/files/assets/bia/ois/Region%20Contact%20list%20rev%205.1.20.docx

About the Resource

The Housing Improvement Program (HIP) is a home repair, renovation, replacement and new housing grant program administered by the Bureau of Indian Affairs (BIA) and by federally recognized tribes. It is aimed at American Indians and Alaska Native (AI/AN) individuals and families who have no immediate resources for standard housing. Repairs can include those required as part of recovery or to reinforce the structure.



National Coastal Wetlands Conservation Grants	
Grant	
Department or Organization	Fish and Wildlife Service, Department of Interior
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	Flood, Sea Level Rise, Storm Surge
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	State agencies, coastal states only
Funding Available	\$20 million in 2019
Cost Sharing	Open to applicants who have established a fund that is used for acquiring coastal wetlands, other natural areas, or open space, at a 75% grant share of total project costs, up to the maximum award of \$1,000,000. Open to others at a 50% cost
Restrictions	Must meet cost-share
Website	fws.gov/coastal/CoastalGrants/index.html

Next Steps for Texas Communities	Contact the Southeast Region of the US Fish and Wildlife Service: fws.gov/southeast/about/
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About the Resource

The National Coastal Wetlands Conservation Grants (NCWCG) program annually provides grants of up to \$1 million to coastal and Great Lakes states and territories to protect, restore, and enhance coastal wetland ecosystems and associated uplands. The grants are funded through the Sport Fish Restoration and Boating Trust Fund, which is supported by excise taxes on fishing equipment and motorboat fuel. Wetland conservation is an important type of natural resource protection hazard mitigation project.



North American Wetland Conservation Fund Grant	
Department or Organization	Fish and Wildlife Service, Department of Interior
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	A list of eligible and ineligible activities can be found in Eligibility Criteria & Processes: fws.gov/migratorybirds/pdf/grants/EligibilityCriteria.pdf
Funding Available	\$23.9 million in 2019
Cost Sharing	1:1 matching.
Restrictions	According to the NAWCA website, projects must provide long-term conservation for wetlands-associated migratory birds and other wetlands-associated wildlife. Coastal Wetlands Planning, Protection and Restoration Act-derived funds eligible for NAWCA projects may be used only in U.S. coastal wetlands ecosystems.
Website	fws.gov/birds/grants/north-american-wetland-conservation-act.php
Next Steps for Texas Communities	Contact the Southeast Region of the US Fish and Wildlife Service: fws.gov/southeast/about/

About the Resource

The North American Wetland Conservation Fund Program provides matching grants to wetlands conservation projects in the United States, Canada, and Mexico. It includes a Standard Program and a Small Grants Program. Wetland conservation is an important type of natural resource protection hazard mitigation project.



Tribal Resilience Program Grant	
Department or Organization	Bureau of Indian Affairs, Department of Interior
Type of Mitigation Action	Local Planning and Regulations, Education and Outreach
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Federally recognized tribes

Funding Available	\$8,731,454 awarded in FY2019
Cost Sharing	Not required
Restrictions	Proposals should be for projects that can be completed within 2 years. Because funding is limited, awards shall not exceed \$150,000 for any one proposal for Categories 1-2, 4, and 7 (training, planning, ocean and coastal management, relocation); \$15,000 for any one proposal in Categories 3 and 5 (travel); and \$65,000 for any one proposal in Category 6 (capacity-building support for scoping efforts).
Website	bia.gov/bia/ots/Tribal-resilience-program
Next Steps for Texas Communities	This is a federal program. Apply to the BIA during open Request for Proposal windows.

About the Resource

The BIA's Tribal Resilience Program (TRP) provides grants to tribes to build capacity and resilience for tribally designed resilience training, adaptation planning, vulnerability assessments, supplemental monitoring, capacity building, and youth engagement.



WaterSMART Programs	
Grant, Technical Assistance	
Department or Organization	Bureau of Reclamation, Department of Interior
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	Drought, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	States, tribes, and local entities in western states
Funding Available	Between \$1,000 and \$20,000,000
Cost Sharing	Not required
Restrictions	Western states: Washington, Oregon, Idaho, Montana, North Dakota, South Dakota, Nebraska, Wyoming, California, Nevada, Utah, Colorado, Kansas, Oklahoma, Texas, New Mexico, and Arizona
Website	usbr.gov/watersmart
Next Steps for Texas Communities	Information can be found on the USBR website, and applications may be submitted during open application periods through grants.gov .

About the Resource

Through WaterSMART, the Bureau of Reclamation will continue to work with states, tribes, and local entities as they plan for and implement actions to increase their water supply through investments to modernize existing infrastructure and attention to local water conflicts. WaterSMART is an umbrella for a variety of programs, including water and energy efficiency grants, drought planning grants, and watershed management planning grants.



Firewise	
Technical Assistance	
Department or Organization	National Fire Prevention Association
Type of Mitigation Action	Education and Outreach
Hazard Addressed	Wildfire
Specific to Recovery	No
National Mitigation Framework Core Capability	Public Information and Warning
Eligible Applicants	Communities
Funding Available	N/A
Cost Sharing	N/A
Restrictions	None
Website	nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA
Next Steps for Texas Communities	More resources from this non-profit organization are available at the website

About the Resource

Firewise USA is a voluntary program that provides a framework to help neighbors get organized, find direction and take action to increase the ignition resistance of their homes and community.



Five Star and Urban Waters Restoration Grant Program	
Grant	
Department or Organization	National Fish and Wildlife Foundation
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	Local governments or organizations
Funding Available	Awards range from \$20,000 to \$50,000 with an average size of \$30,000 and 40-50 grants awarded per year
Cost Sharing	Matching required
Restrictions	All projects must have: - On-the-ground activities such as wetland, river, or coastal habitat restoration and/or targeted green infrastructure creation and monitoring. - Community partners united to achieve ecological and educational outcomes. - Integrated education, outreach, and training on the restoration project through broad community engagement activities or participation and integration with K-12 environmental curriculum. - Measurable ecological, educational, and community benefits.
Website	nfwf.org/fivestar/Pages/home.aspx
Next Steps for Texas Communities	More information on this not for profit resource is available at the website

About the Resource

The Five Star and Urban Waters Restoration Program seeks to develop nationwide-community stewardship of local natural resources, preserving these resources for future generations and enhancing habitat for local wildlife. Projects seek to address water quality issues in priority watersheds, such as erosion due to unstable streambanks, pollution from stormwater runoff, and degraded shorelines caused by development.



National Coastal Resilience Fund Grant

Department or Organization	National Fish and Wildlife Foundation
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	Storm Surge
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Eligible applicants include non-profit 501(c) organizations, state and territorial government agencies, local governments, municipal governments, tribal governments, educational institutions, or commercial (for-profit) organizations. Tribal governments include both federally recognized tribes and tribes that are not federally recognized.
Funding Available	\$30 million (2019)
Cost Sharing	Matching required
Restrictions	Financial Assistance
Website	nfwf.org/programs/national-coastal-resilience-fund
Next Steps for Texas Communities	More information on this not for profit resource is available at the website

About the Resource

The National Coastal Resilience Fund restores, increases, and strengthens natural infrastructure to protect coastal communities while also enhancing habitats for fish and wildlife. Established in 2018, the National Coastal Resilience Fund invests in conservation projects that restore or expand natural features such as coastal marshes and wetlands, dune and beach systems, oyster and coral reefs, forests, coastal rivers and floodplains, and barrier islands that minimize the impacts of storms and other naturally occurring events on nearby communities. The National Coastal Resilience Fund restores, increases, and strengthens natural infrastructure to protect coastal communities while also enhancing habitats for fish and wildlife. Established in 2018, the National Coastal Resilience Fund invests in conservation projects that restore or expand natural features such as coastal marshes and wetlands, dune and beach systems, oyster and coral reefs, forests, coastal rivers and floodplains, and barrier islands that minimize the impacts of storms and other naturally occurring events on nearby communities. The National Coastal Resilience Fund is supported by NOAA, Shell Oil Company, and TransRe.



Resilient Communities Program

Grant

Department or Organization	National Fish and Wildlife Foundation
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	Local governments or organizations
Funding Available	\$12 million, plus additional local funding to \$24 million
Cost Sharing	Matching required
Restrictions	Grants will be offered once a year to support priority projects in select states and communities
Website	nfwf.org/resilientcommunities/Pages/home.aspx
Next Steps for Texas Communities	More information on this not for profit resource is available at the website

About the Resource

The program focuses on water quality and quantity declines, forest health concerns, and sea-level rise. The program will emphasize community inclusion and assistance to traditionally underserved populations in vulnerable areas.



Forest Management Technical Assistance

Department or Organization	Forest Service, Texas A&M
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-term Vulnerability Reduction
Eligible Applicants	Texas A&M Forest Service provides technical assistance to landowners and communities throughout the state.
Funding Available	N/A
Cost Sharing	N/A
Restrictions	None identified
Website	https://tfsweb.tamu.edu/LandownerAssistance/
Next Steps for Texas Communities	More information on this state resource is available on the website.

About the Resource

The Forest Service provides technical assistance to landowners and communities to better manage their forests, protect water resources, and prevent the worst impacts of wildfire.



Water Resources Outreach and Training Program

Technical Assistance

Department or Organization	Texas Water Resources Institute, Texas A&M
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	The Water Resources Outreach and Training Program is targeted at interested citizens, students, and water professionals.
Funding Available	N/A
Cost Sharing	N/A
Restrictions	None identified
Website	twri.tamu.edu/
Next Steps for Texas Communities	More information on this state resource is available on the website.

About the Resource

The Water Resources Outreach and Training Program provides workshops and technical resources for citizens, students, and water professionals. One popular course is the Texas Watershed Planning Program, which trains attendees in sustainable, proactive approaches to managing water quality throughout the state. Water quality projects can often mitigate against flooding.



Wetland Restoration Program

Technical Assistance

Department or Organization	AgriLife Extension, Texas A&M
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	The Wetlands Restoration Program focuses on public lands. Education classes are also provided for adults and children.
Funding Available	N/A – Restoration services are provided directly.
Cost Sharing	N/A
Restrictions	None identified
Website	tcwp.tamu.edu/wetland-restoration/
Next Steps for Texas Communities	More information on this state resource is available on the website and in the weekly newsletter

About the Resource

The Wetlands Restoration Program is focused on providing resources to the Houston-Galveston region by helping to restore wetlands to their natural state and by providing hands-on education to students and adults through volunteer experiences. Restoring these wetlands can support flood risk reduction.



Texas Coastal Management Program	
Grant	
Department or Organization	Coast, Texas General Land Office
Type of Mitigation Action	Natural Systems Protection, Local Planning and Regulations
Hazard Addressed	Coastal
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Cities, counties, state agencies, public universities, regional governments, and nonprofit organizations
Funding Available	The amount available depends on the project type.
Cost Sharing	Construction and administrative projects require a 40% applicant match. Projects of special merit do not require a match.
Restrictions	Projects must be in the coastal zone. The program requires a competitive pre-application and then a full application by invitation only.
Website	glo.texas.gov/coast/grant-projects/funding/index.html
Next Steps for Texas Communities	More information on this state resource is available on the website.
About the Resource	

The Texas Coastal Management Program grants are designed to address environmental concerns in the coastal zone. Project types include public access enhancement, data collection, coastal hazard and resiliency planning, coastal resource improvement or enhancement, and projects of special merit. Projects must implement a previously approved local, regional, state, or federal plan.



Water Quality and Flood Control Programs	
Grant, Technical Assistance	
Department or Organization	Texas State Soil and Water Conservation Board
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure
Hazard Addressed	Flood, Drought
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Varies by program. Reach out to your local Soil and Water Conservation District for more information.
Funding Available	Varies by program
Cost Sharing	Varies by program
Restrictions	Varies by program
Website	tsswcb.texas.gov/index.php/programs
Next Steps for Texas Communities	More information on this state resource is available on the website or through your local Soil and Water Conservation District.
About the Resource	

The Texas State Soil and Water Conservation Board maintains water-related programs, including the Flood Control Program, which funds dam construction and maintenance; Water Quality Management Planning Program, which funds site-specific water quality planning; Texas Nonpoint Source Management

Program to protect water pollution from nonpoint sources; and the Water Supply Enhancement Program, which assists with water management given drought.



Agricultural Water Conservation Grants Program	
Grant	
Department or Organization	Texas Water Development Board
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure, Local Planning and Regulations, Education and Outreach
Hazard Addressed	Drought, Erosion, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience (may vary based on annual solicitation criteria)
Eligible Applicants	State agencies and political subdivisions
Funding Available	Varies; current program funding authorization is \$1,200,000 per fiscal year
Cost Sharing	Varies; local match is always encouraged and sometimes required
Restrictions	Funding is only available for agricultural water conservation projects and programs, as defined by statute. Funding may also be restricted to projects within regional water planning areas that have identified Irrigation Conservation as a goal in their regional water plans.
Website	twdb.texas.gov/financial/programs/AWCG/index.asp
Next Steps for Texas Communities	Applications for this state resource can be found on the grant website.

About the Resource

The grant program offers funding to state agencies and local communities to support agricultural irrigation conservation and water conservation. Types of fundable projects include technical assistance, demonstrations and technology transfer, equipment cost share, and research and education.



Agricultural Water Conservation Loan Program	
Loan	
Department or Organization	Texas Water Development Board
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure, Local Planning and Regulations, Education and Outreach
Hazard Addressed	Drought, Erosion, Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience (may vary)
Eligible Applicants	Political subdivisions
Funding Available	Varies; contact TWDB staff to determine funding availability
Cost Sharing	N/A
Restrictions	Funding is only available for agricultural water conservation projects and programs, as defined by statute.
Website	twdb.texas.gov/financial/programs/AWCL/index.asp
Next Steps for Texas Communities	Applications for this state resource can be found on the grant website

About the Resource

The loan program allows for conservation projects or programs, including those that fund political subdivisions or individual persons.



Flood Infrastructure Fund

Grant, Loan

Department or Organization	Texas Water Development Board
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure, Education and Outreach
Hazard Addressed	Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Community Resilience
Eligible Applicants	Cities, counties, and any district or authority created under Article III, Section 52 or Article XVI, Section 59 of the Texas Constitution
Funding Available	Varies
Cost Sharing	Structure of financial assistance can be found in the Flood Intended Use Plan.
Restrictions	See program website for specific requirements
Website	http://www.twdb.texas.gov/financial/programs/FIF/index.asp
Next Steps for Texas Communities	Applications for this state resource can be found on the website.

About the Resource

The Flood Infrastructure Fund provides grants and loans to cities, counties, and other governmental districts and authorities for a wide range of flood mitigation projects. The projects include structural, nonstructural, and nature-based projects. Funding is available for planning/engineering and construction/rehabilitation phases, as well as education and outreach, stream guages, and warning systems.



Regional Water Plans/Planning Group Grants

Grant

Department or Organization	Texas Water Development Board
Type of Mitigation Action	Local Planning and Regulations, Education and Outreach
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Planning
Eligible Applicants	Regional Water Planning Groups. These groups include individuals representing at least 12 interest groups.
Funding Available	Varies
Cost Sharing	N/A
Restrictions	Funds may not be used for activities which the Board determines sufficient data exist, activities related to the preparation of applications for permits or other approvals, administration costs, or cost/benefit analysis.

Website	twdb.texas.gov/financial/programs/RWPG/index.asp
Next Steps for Texas Communities	Applications for this state resource can be found on the grant website

About the Resource

The Planning Group Grants allows for communities in a regional group to develop a water plan, including determining water needs, supplies available during drought conditions, sites for reservoir construction, regulatory/legislative recommendations for improving water management, and other elements. The plan will contain specific water management strategies, including conservation, identified needs with no feasible solutions, and alternative strategies. The plans address concerns around drought and may also relate to other hazards, such as floods.



State Participation Program	
Other	
Department or Organization	Texas Water Development Board
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	Flood
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Political subdivisions of the state and non-profit water supply corporations
Funding Available	Funding is dependent on legislative appropriations. No maximum funding limit.
Cost Sharing	N/A
Restrictions	Program funding dependent upon legislative appropriations or available funds. Water supply projects must be consistent with the current state water plan. Reservoir funding must be segmented or phased; permitting is required prior to a construction commitment. Limited to funding of excess capacity portion; up to 80% of total water project costs and 50% for wastewater costs. Entities receiving assistance greater than \$500,000 must adopt a water conservation and drought contingency plan. U.S. Iron and Steel requirements. No maximum funding limit.
Website	twdb.texas.gov/financial/programs
Next Steps for Texas Communities	Twice-a-year funding cycle (February 1/August 1); includes a prioritization process. For specific questions on the program, please contact Financial_Assistance@twdb.texas.gov .

About the Resource

The State Participation Program assists local communities by allowing the state to take on a temporary ownership interest in a regional water, wastewater, or flood control project.



State Water Implementation Fund for Texas (SWIFT)

Loan

Department or Organization	Texas Water Development Board
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	Drought
Specific to Recovery	No
National Mitigation Framework Core Capability	Planning
Eligible Applicants	Political subdivisions and nonprofit water supply corporations with a project included in the state water plan
Funding Available	No maximum funding limit
Cost Sharing	N/A
Restrictions	Projects must be recommended water management strategies included in the state water plan. Communities must complete an Infrastructure Financing Survey and meet other requirements.
Website	twdb.texas.gov/financial/programs/SWIFT/index.asp
Next Steps for Texas Communities	Applications for this state resource can be found on the website

About the Resource

This program helps communities develop cost-effective water supplies with low-interest loans. Eligible projects include conservation and reuse, desalinating groundwater and seawater, building new pipelines, developing reservoirs and well fields, and purchasing water rights, as well as numerous other strategies. Projects may incorporate hazard mitigation elements, especially around flood and drought.



Texas Water Development Fund (DFund)

Loan

Department or Organization	Texas Water Development Board
Type of Mitigation Action	Natural Systems Protection, Structure and Infrastructure
Hazard Addressed	Flood, Drought
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Political subdivisions and nonprofit water supply corporations
Funding Available	No maximum funding limit
Cost Sharing	N/A
Restrictions	Water supply projects must be consistent with the current state water plan, and entities receiving assistance greater than \$500,000 must adopt a water conservation and drought contingency plan. There may be other requirements specific to different project types.
Website	twdb.texas.gov/financial/programs/TWDF/index.asp
Next Steps for Texas Communities	Applications for this state resource can be found on the website

About the Resource

The loan program offers assistance for water supply, wastewater, and flood control. Flood control may include both structural and nonstructural protection solutions and improvement, including modifying stream channels and flood warning systems.



Emergency Relief Program Grant

Department or Organization	Federal Highway Administration, Department of Transportation
Type of Mitigation Action	Structure and Infrastructure
Hazard Addressed	All
Specific to Recovery	Yes
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	States may request ER funds, which can be used for either "emergency repairs" or "permanent repairs."
Funding Available	\$100 million is authorized annually under 23 U.S.C. 125. Congress has periodically provided additional funds for the ER program through supplemental appropriations. MAP-21 eliminated the cap of \$100 million per state event.
Cost Sharing	For Interstate highways, the federal share is 90%. For all other highways, the federal share is 80%. The federal share for permanent ER repairs may amount to 90% if the combined eligible ER expenses incurred by the state in a federal fiscal year exceeds the annual apportionment of the state under 23 U.S.C. section 104 for the fiscal year in which the disasters or failures occurred.
Restrictions	Must be in affected disaster areas
Website	fhwa.dot.gov/programadmin/erelief.cfm
Next Steps for Texas Communities	States apply to FHWA. Contact the Texas Department of Transportation for more information.

About the Resource

The Federal Highway Administration's (FHWA) Emergency Relief (ER) Program provides grants for the repair or reconstruction of federal-aid highways and roads on federal lands that have suffered serious damage as a result of either natural disasters or catastrophic failures from an external cause. The program supplements the commitment of resources by states, their political subdivisions, or other federal agencies to help pay for unusually heavy expenses resulting from extraordinary conditions. The applicability of the ER program to a natural disaster is based on the extent and intensity of the disaster. Damage to highways must be severe, occur over a wide area, and result in unusually high expenses to the highway agency. Applicability of ER to a catastrophic failure due to an external cause is based on the criteria that the failure was not the result of an inherent flaw in the facility, but was sudden, caused a disastrous impact on transportation services, and resulted in unusually high expenses to the highway agency.



Disaster Assistance and Emergency Relief for Individuals and Businesses

Other - Tax Relief

Department or Organization	Internal Revenue Service, Department of Treasury
Type of Mitigation Action	Local Planning and Regulations
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	U.S. taxpayers, including individuals and businesses affected by federally declared disasters
Funding Available	N/A (tax relief)
Cost Sharing	N/A
Restrictions	Varies by specific program; must be affected by disaster
Website	irs.gov/businesses/small-businesses-self-employed/disaster-assistance-and-emergency-relief-for-individuals-and-businesses
Next Steps for Texas Communities	Decisions are made based on individual disaster declarations. Refer to the IRS website for more information about your community's situation.

About the Resource

Special tax law provisions may help taxpayers and businesses recover financially from the impact of a disaster, especially when the federal government declares their location to be a major disaster area. Depending on the circumstances, the Internal Revenue Service (IRS) may grant additional time to file returns and pay taxes. Both individuals and businesses in a federally declared disaster area can get a faster refund by claiming losses related to the disaster on the tax return for the previous year, usually by filing an amended return. The IRS also offers audio presentations on planning for disaster. These presentations discuss business continuity planning, insurance coverage, record keeping, and other tips to stay in business after a major disaster.



Climate Adaptation Fund

Grant

Department or Organization	Wildlife Conservation Society
Type of Mitigation Action	Natural Systems Protection
Hazard Addressed	All
Specific to Recovery	No
National Mitigation Framework Core Capability	Long-Term Vulnerability Reduction
Eligible Applicants	Conservation nonprofits
Funding Available	The WCS Climate Adaptation Fund provides a total of \$2.5 million in grant awards (between \$50,000 and \$250,000 each) to conservation non-profit organizations each year.
Cost Sharing	Unknown
Restrictions	Project proposals must: Focus on the functionality of ecosystems, rather than conserving individual species.

	• Be designed for long-term conservation impact. • Create the potential for impact at a landscape scale. • Use strategic, targeted communication activities to amplify adaptation outcomes. • Be designed with climate adaptation for wildlife and ecosystems as a core goal or outcome of the work. • Propose conservation goals and actions that are grounded in the best available science. • Conduct on-the-ground implementation, not research, planning, or tool development.
Website	wscclimateadaptationfund.org/program-information
Next Steps for Texas Communities	More resources from this nonprofit program are available at the website.

About the Resource

The Wildlife Conservation Society's (WCS) Climate Adaptation Fund provides grant awards to conservation non-profits across the United States to catalyze innovative, science-driven projects responding to the impacts of climate change on wildlife and people.



FEMA



Mitigation Ideas

A Resource for Reducing Risk to Natural Hazards

January 2013



FEMA

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Introduction

The purpose of this document is to provide a resource that communities can use to identify and evaluate a range of potential mitigation actions for reducing risk to natural hazards and disasters.

The focus of this document is mitigation, which is action taken to reduce or eliminate long-term risk to hazards. Mitigation is different from preparedness, which is action taken to improve emergency response or operational preparedness.

Ideas for mitigation actions are presented for the following natural hazards:

- Drought
- Earthquake
- Erosion
- Extreme temperatures
- Flood
- Hail
- Landslide
- Lightning
- Sea level rise
- Severe wind
- Severe winter weather
- Storm surge
- Subsidence
- Tornado
- Tsunami
- Wildfire

Examples of mitigation actions are planning and zoning, floodplain protection, property acquisition and relocation, or public outreach projects.

Examples of preparedness actions are installing disaster warning systems, purchasing radio communications equipment, or conducting emergency response training.

Actions that may mitigate multiple hazards are presented in the last section, entitled “Multiple Hazards.”

The suggested mitigation actions are summarized into four types: (1) Local Planning and Regulations, (2) Structure and Infrastructure Projects, (3) Natural Systems Protection, and (4) Education and Awareness Programs. Examples of activities that can be used to accomplish each mitigation goal are identified, as well as the relevant FEMA publications or resources, if applicable.

This document is intended to be a starting point for gathering ideas and should not be used as the only source for identifying actions. Communities should seek innovative and different ideas for reducing risk that meet their unique needs. The actions listed are not necessarily eligible for Federal assistance programs. Users should review specific program guidance and contact their State Hazard Mitigation Officer (SHMO) or regional FEMA office for more information.



Drought

A drought is a period of unusually constant dry weather that persists long enough to cause deficiencies in water supply (surface or underground). Droughts are slow-onset hazards, but, over time, they can severely affect crops, municipal water supplies, recreational resources, and wildlife. If drought conditions extend over a number of years, the direct and indirect economic impacts can be significant. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. In addition, human actions and demands for water resources can accelerate drought-related impacts.

Local Planning and Regulations

D-1 Assess Vulnerability to Drought Risk

To better understand and assess local vulnerability to drought, consider actions such as:

- Gathering and analyzing water and climate data to gain a better understanding of local climate and drought history.
- Identifying factors that affect the severity of a drought.
- Identifying available water supplies.
- Determining how the community and its water sources have been impacted by droughts in the past.

D-2 Monitor Drought Conditions

Monitoring drought conditions can provide early warning for policymakers and planners to make decisions through actions including:

- Identifying local drought indicators, such as precipitation, temperature, surface water levels, soil moisture, etc.
- Establishing a regular schedule to monitor and report conditions on at least a monthly basis.

D-3 Monitor Water Supply

Monitoring the water supply and its functions can save water in the long run through actions such as:

- Regularly checking for leaks to minimize water supply losses.
- Improving water supply monitoring.

D-4 Plan for Drought

Plan for future drought events in your area through actions such as:

- Developing a drought emergency plan.
- Developing criteria or triggers for drought-related actions.
- Developing a drought communication plan and early warning system to facilitate timely communication of relevant information to officials, decision makers, emergency managers, and the general public.
- Developing agreements for secondary water sources that may be used during drought conditions.
- Establishing an irrigation time/scheduling program or process so that all agricultural land gets the required amount of water. Through incremental timing, each area is irrigated at different times so that all water is not consumed at the same time. Spacing usage may also help with recharge of groundwater.

D-5 Require Water Conservation During Drought Conditions

Require mandatory water conservation measures during drought emergencies, including:

- Developing an ordinance to restrict the use of public water resources for non-essential usage, such as landscaping, washing cars, filling swimming pools, etc.
- Adopting ordinances to prioritize or control water use, particularly for emergency situations like fire fighting.

D-6 Prevent Overgrazing

Prevent overgrazing, which has been linked to drought vulnerability, through actions such as:

- Establishing a grazing policy or permitting program to prevent overgrazing.
- Reducing the number of animals and improving range management.

Structure and Infrastructure Projects

D-7 Retrofit Water Supply Systems

Improve water supply and delivery systems to save water through actions such as:

- Designing water delivery systems to accommodate drought events.
- Developing new or upgrading existing water delivery systems to eliminate breaks and leaks.

Natural Systems Protection

D-8 Enhance Landscaping and Design Measures

Encourage drought-tolerant landscape design through measures such as:

- Incorporating drought tolerant or xeriscape practices into landscape ordinances to reduce dependence on irrigation.
- Providing incentives for xeriscaping.
- Using permeable driveways and surfaces to reduce runoff and promote groundwater recharge.

Education and Awareness Programs

D-9 Educate Residents on Water Saving Techniques

Encourage citizens to take water-saving measures, such as the following:

- Installing low-flow water saving showerheads and toilets.
- Turning water flow off while brushing teeth or during other cleaning activities.
- Adjusting sprinklers to water the lawn and not the sidewalk or street.
- Running the dishwasher and washing machine only when they are full.
- Checking for leaks in plumbing or dripping faucets.
- Installing rain-capturing devices for irrigation.
- Encouraging the installation of graywater systems in homes to encourage water reuse.

D-10 Educate Farmers on Soil and Water Conservation Practices

Encourage farmers to implement soil and water conservation practices that foster soil health and improve soil quality to help increase resiliency and mitigate the impacts of droughts. Potential conservation practices include the following:

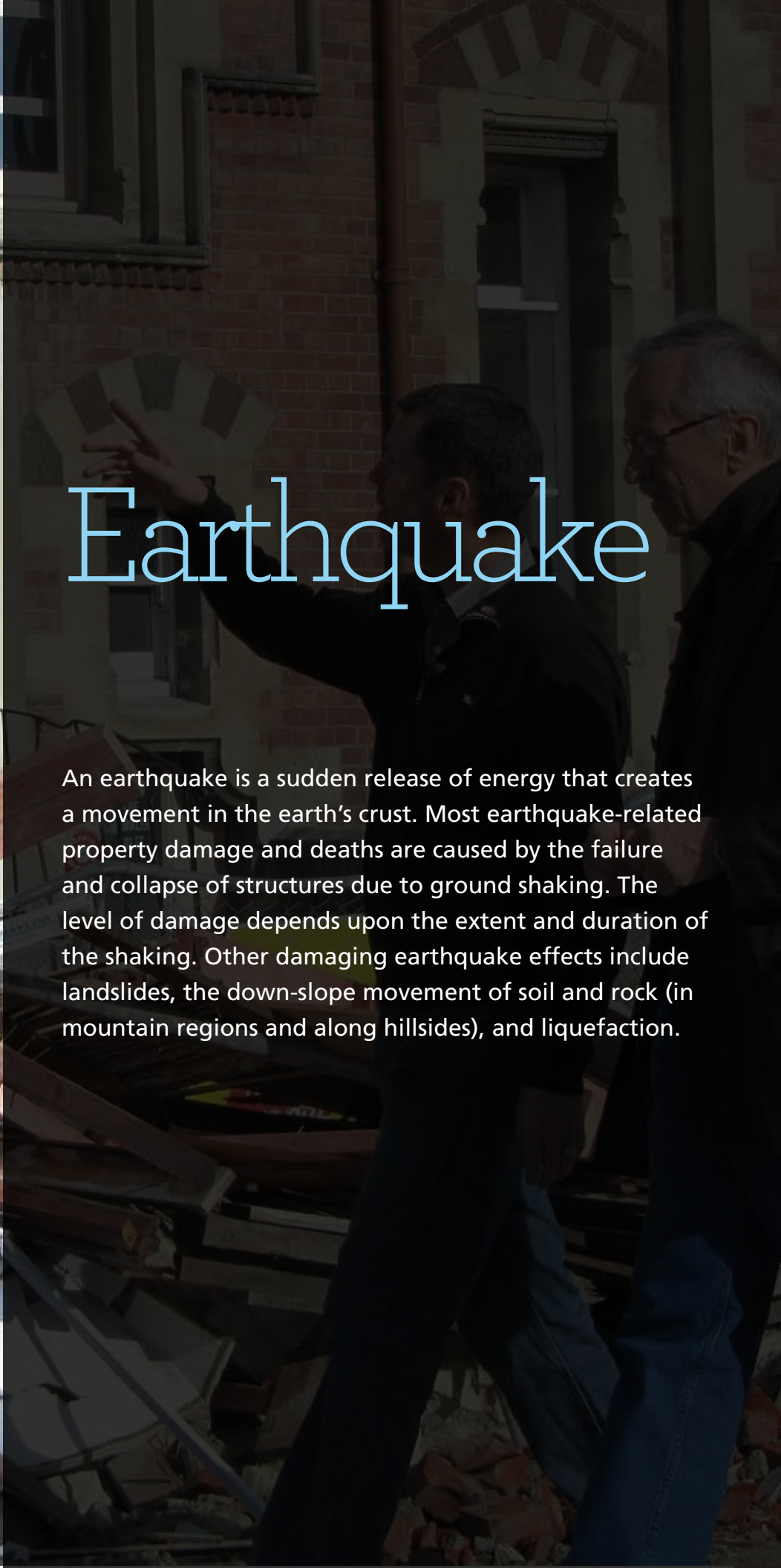
- Rotating crops by growing a series of different types of crops on the same fields every season to reduce soil erosion.
- Practicing contour farming by farming along elevation contour lines to slow water runoff during rainstorms and prevent soil erosion, allowing the water time to absorb into the soil.
- Using terracing on hilly or mountainous terrain to decrease soil erosion and surface runoff.
- Planting “cover crops,” such as oats, wheat, and buckwheat, to prevent soil erosion.
- Using zero and reduced tillage to minimize soil disturbance and leave crop residue on the ground to prevent soil erosion.
- Constructing windbreaks to prevent evaporation from reclaiming salt-affected soil.
- Collecting rainwater and using natural runoff to water plants.

D-11 Purchase Crop Insurance

*FEMA Resources/Publications
FEMA 20, P-85, 361, 453*

Preserve economic stability during a drought by encouraging agricultural interests to obtain crop insurance to cover potential losses due to drought.

Other drought-related mitigation actions may also apply to other hazards. See the sections entitled “Extreme Temperatures” and “Multiple Hazards” for other possible ideas.



Earthquake

An earthquake is a sudden release of energy that creates a movement in the earth's crust. Most earthquake-related property damage and deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the extent and duration of the shaking. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (in mountain regions and along hillsides), and liquefaction.

Local Planning and Regulations

EQ-1 Adopt and Enforce Building Codes

FEMA Resources/Publications
FEMA 83, 224, 232, 254, 266, 313, 349, P-749, P-750

Building codes reduce earthquake damage to structures. Consider actions such as:

- Adopting and enforcing updated building code provisions to reduce earthquake damage risk.
- Adopting the International Building Code (IBC) and International Residential Code (IRC).

EQ-2 Incorporate Earthquake Mitigation into Local Planning

FEMA Resources/Publications
FEMA 83, 224, 254, 266, 313, 349

Earthquake risk can be reduced through local planning, codes, and ordinances, including:

- Creating a seismic safety committee to provide policy recommendations, evaluate and recommend changes in seismic safety standards, and give an annual assessment of local and statewide implementation of seismic safety improvements.
- Developing and distributing guidelines or passing ordinances that require developers and building owners to locate lifelines, buildings, critical facilities, and hazardous materials out of areas subject to significant seismic hazards.
- Incorporating structural and non-structural seismic strengthening actions into ongoing building plans and activities in the capital improvement plan to ensure that facilities remain operational for years to come.
- Supporting financial incentives, such as low interest loans or tax breaks, for home and business owners who seismically retrofit their structures.

EQ-3 Map and Assess Community Vulnerability to Seismic Hazards

FEMA Resources/Publications
FEMA 83, 154, 366, ROVER

To better understand and assess local vulnerability to earthquakes, consider actions such as:

- Developing an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage, including pre-1940s homes and homes with cripple wall foundations.
- Collecting geologic information on seismic sources, soil conditions, and related potential hazards.
- Creating an earthquake scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop earthquake mitigation priorities.
- Using Hazus to quantitatively estimate potential losses from an earthquake.
- Maintaining a database to track community vulnerability to earthquake risk.
- Using GIS to map hazard areas, at-risk structures, and associated hazards (e.g., liquefaction and landslides) to assess high-risk areas.

EQ-4 Conduct Inspections of Building Safety

FEMA Resources/Publications

FEMA 154, 155, 202, 221, 224, 225, 226, 233, 306, 307, 395, ROVER

Inspections can be used to assess earthquake risk, such as:

- Establishing a school survey procedure and guidance document to inventory structural and non-structural hazards in and around school buildings.
- Using rapid visual screening to quickly inspect a building and identify disaster damage or potential seismic structural and non-structural weaknesses to prioritize retrofit efforts, inventory high-risk structures and critical facilities, or assess post-disaster risk to determine if buildings are safe to re-occupy.
- Consulting industry standard publications such as American Society of Civil Engineers (ASCE) 31 - *Seismic Evaluation of Existing Buildings*, ASCE 41 - *Seismic Rehabilitation of Existing Buildings*, and Applied Technology Council (ATC) 20 - *Procedures for Postearthquake Safety Evaluation of Buildings*.



Structure and Infrastructure Projects

EQ-5 Protect Critical Facilities and Infrastructure

Reduce potential damage to critical facilities and infrastructure from future seismic events through actions such as:

- Conducting seismic retrofitting for critical public facilities most at risk to earthquakes.
- Requiring bracing of generators, elevators, and other vital equipment in hospitals.
- Identifying and hardening critical lifeline systems (i.e., critical public services such as utilities and roads) to meet “Seismic Design Guidelines and Standards for Lifelines” or equivalent standards such as American Lifelines Alliance (ALA) guidance. This may distinguish a manageable earthquake from a social and economic catastrophe.
- Reviewing construction plans for all bridges to determine their susceptibility to collapse and retrofitting problem bridges.
- Using flexible piping when extending water, sewer, or natural gas service.
- Installing shutoff valves and emergency connector hoses where water mains cross fault lines.

EQ-6 Implement Structural Mitigation Techniques

FEMA Resources/Publications
FEMA 307, 320, 345, 356, 361,
395, 396, 412, 453, 547, P-774

Use structural mitigation measures to reduce damage from future seismic events, such as:

- Strengthening and retrofitting non-reinforced masonry buildings and non-ductile concrete facilities that are particularly vulnerable to ground shaking.
- Retrofitting building veneers to prevent failure.
- Building a safe room to provide protection during an earthquake.
- Installing window film to prevent injuries from shattered glass.
- Anchoring rooftop-mounted equipment (i.e., HVAC units, satellite dishes, etc).
- Constructing masonry chimneys greater than 6 feet above a roof with continuous reinforced steel bracing.



Education and Awareness Programs

EQ-7 Increase Earthquake Risk Awareness

FEMA Resources/Publications

FEMA E-74, 474, 526, 527, 528, 529, 530, P-811; EMI IS-22

There are many ways to increase awareness of earthquake risk, including:

- Working with insurance industry representatives to increase public awareness of the importance of earthquake insurance. Residential structural improvements can be factored into the process of obtaining insurance coverage or reduced deductibles.
- Developing an outreach program about earthquake risk and mitigation activities in homes, schools, and businesses.
- Educating homeowners on safety techniques to follow during and after an earthquake.
- Offering GIS hazard mapping online for residents and design professionals.

EQ-8 Conduct Outreach to Builders, Architects, Engineers, and Inspectors

FEMA Resources/Publications

FEMA 232, 313, 389, P-420, 454

Building susceptibility to earthquake damage can be improved if design professionals are made aware of proper design and building requirements. Outreach activities include:

- Conducting information sessions or other forms of outreach on seismic code provisions for new and existing buildings to enhance code use and enforcement by local architects, engineers, contractors, and code enforcement personnel.
- Training building department staff and officials on Form ATC-20 for post-earthquake building evaluation. The ATC-20 report and addendum, prepared by the Applied Technology Council, provide procedures and guidelines for making on-the-spot evaluations and decisions regarding continued use and occupancy of earthquake-damaged buildings.



EQ-9 Provide Information on Structural and Non-Structural Retrofitting

FEMA Resources/Publications

FEMA E-74, 412, 413, 414, 530, 547

Property owners can retrofit existing structures to reduce damage from seismic events. Potential actions include the following:

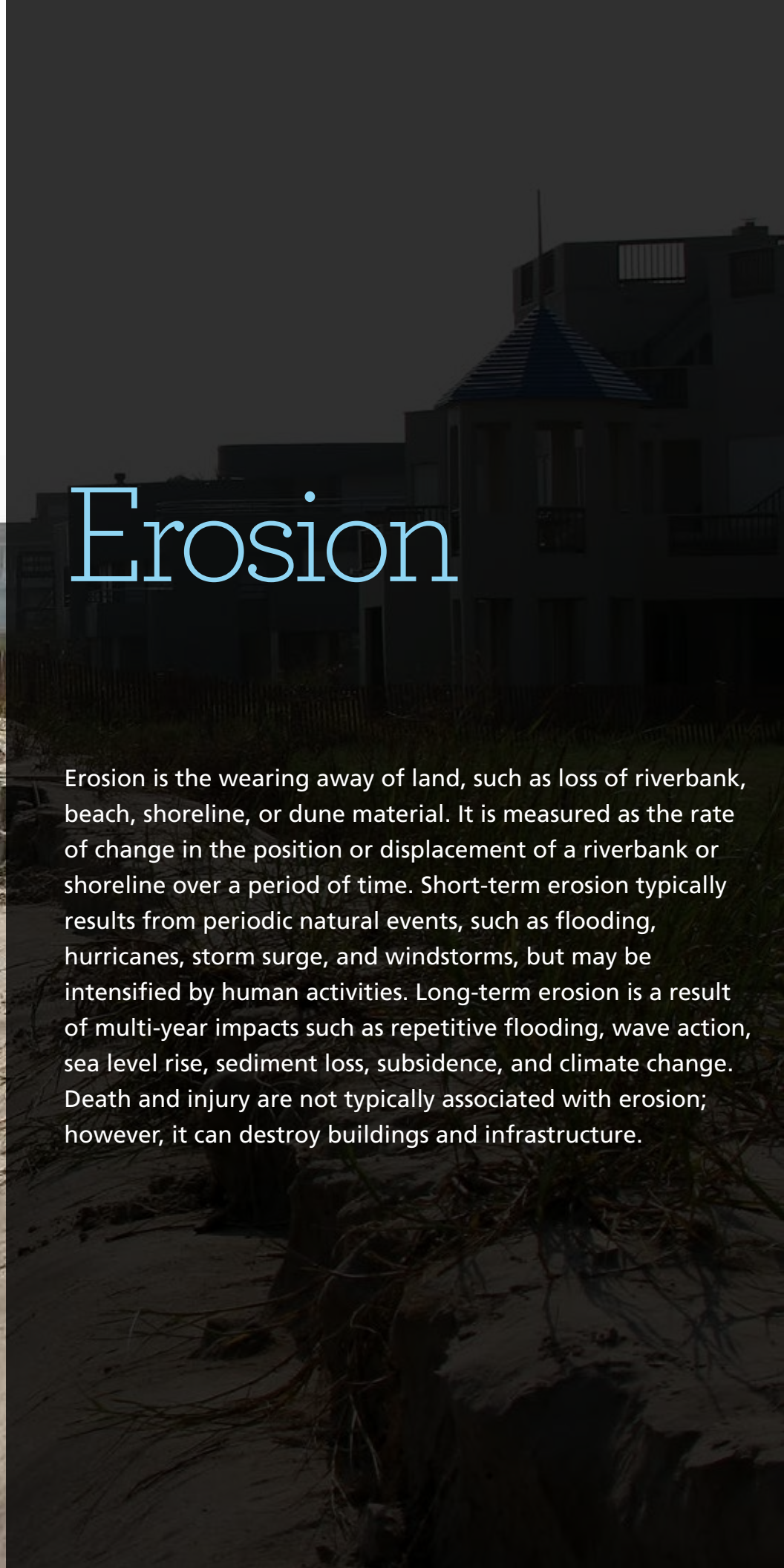
- Educating homeowners about structural and non-structural retrofitting of vulnerable homes and encouraging retrofit.
- Developing a technical assistance information program for homeowners. Teaching them how to seismically strengthen their houses can be an effective mitigation activity. The program can include providing local government building departments with copies of existing strengthening and repair information for distribution.
- Developing an outreach program to encourage homeowners to secure furnishings, storage cabinets, and utilities to prevent injuries and damage. Examples include anchoring tall bookcases and file cabinets, installing latches on drawers and cabinet doors, restraining desktop computers and appliances, using flexible connections on gas and water lines, mounting framed pictures and mirrors securely, and anchoring and bracing propane tanks and gas cylinders.
- Establishing a library of technical documents on structural and non-structural mitigation options as well as model ordinances and procedures that have been used by other jurisdictions to reduce earthquake risk.

Other earthquake-related mitigation actions may also apply to other hazards. See the section entitled “Multiple Hazards” for other possible ideas.



Erosion

Erosion is the wearing away of land, such as loss of riverbank, beach, shoreline, or dune material. It is measured as the rate of change in the position or displacement of a riverbank or shoreline over a period of time. Short-term erosion typically results from periodic natural events, such as flooding, hurricanes, storm surge, and windstorms, but may be intensified by human activities. Long-term erosion is a result of multi-year impacts such as repetitive flooding, wave action, sea level rise, sediment loss, subsidence, and climate change. Death and injury are not typically associated with erosion; however, it can destroy buildings and infrastructure.



Local Planning and Regulations

ER-1 Map and Assess Vulnerability to Erosion

Erosion risk can be better assessed and monitored with mapping techniques, including the following:

- Using GIS to identify and map erosion hazard areas.
- Developing and maintaining a database to track community vulnerability to erosion.
- Using GIS to identify concentrations of at-risk structures.
- Improving mapping of hazard areas to educate residents about unexpected risks.

ER-2 Manage Development in Erosion Hazard Areas

Erosion damage can be mitigated by regulating how development occurs in hazard areas, such as the following:

- Adopting sediment and erosion control regulations.
- Adopting zoning and erosion overlay districts.
- Developing an erosion protection program for high hazard areas.
- Employing erosion control easements.
- Prohibiting development in high-hazard areas.
- Developing and implementing an erosion management plan.
- Requiring mandatory erosion surcharges on homes.
- Locating utilities and critical facilities outside of areas susceptible to erosion to decrease the risk of service disruption.

ER-3 Promote or Require Site and Building Design Standards to Minimize Erosion Risk

Development can be designed to minimize damage due to erosion using the following techniques:

- Constructing open foundation systems on buildings to minimize scour.
- Constructing deep foundations in erosion hazard areas.
- Clustering buildings during building and site design.
- Designing and orienting infrastructure to deter erosion and accretion.

Structure and Infrastructure Projects

ER-4 Remove Existing Buildings and Infrastructure from Erosion Hazard Areas

To prevent damage to buildings and infrastructure from erosion, consider acquiring and demolishing or relocating at-risk buildings and infrastructure and enforcing permanent restrictions on development after land and structure acquisition.

FEMA Resources/Publications

FEMA P-55

ER-5 Stabilize Erosion Hazard Areas

To stabilize slopes susceptible to erosion, consider options such as:

- Preventing erosion with proper bank stabilization, sloping or grading techniques, planting vegetation on slopes, terracing hillsides, or installing riprap boulders or geotextile fabric.
- Stabilizing cliffs with terracing or plantings of grasses or other plants to hold soil together.
- Prohibiting removal of natural vegetation from dunes and slopes.
- Planting mature trees in the coastal riparian zone to assist in dissipation of the wind force in the breaking wave zone.
- Using a hybrid of hard/soft engineering techniques (i.e., combine low-profile rock, rubble, oyster reefs, or wood structures with vegetative planting or other soft stabilization techniques).
- Implementing marine riparian habitat reinstatement or revegetation.
- Using a rock splash pad to direct runoff and minimize the potential for erosion.
- Using bioengineered bank stabilization techniques.



Education and Awareness Programs

ER-6 Increase Awareness of Erosion Hazards

Consider ways to help citizens become more aware of specific erosion risks in your area, such as:

- Notifying property owners located in high-risk areas.
- Disclosing the location of high-risk areas to buyers.
- Developing a brochure describing risk and potential mitigation techniques.
- Offering GIS hazard mapping online for residents and design professionals.

Other erosion-related mitigation actions may also apply to other hazards. See the sections entitled “Subsidence,” “Landslide,” and “Multiple Hazards” for other possible ideas.





Extreme Temperatures

Extreme heat and extreme cold constitute different conditions in different parts of the country. Extreme cold can range from near freezing temperatures in the southern United States to temperatures well below zero in the northern states. Similarly, extreme heat is typically recognized as the condition where temperatures consistently stay ten degrees or more above a region's average high temperature for an extended period. Fatalities can result from extreme temperatures, as they can push the human body beyond its limits (hyperthermia and hypothermia).

Local Planning and Regulations

ET-1 Reduce Urban Heat Island Effect

As urban areas develop and buildings and roads replace open land and vegetation, urban regions become warmer than their rural surroundings, forming an “island” of heat. Several methods for reducing heat island effects include:

- Increasing tree plantings around buildings to shade parking lots and along public rights-of-way.
- Encouraging installation of green roofs, which provide shade and remove heat from the roof surface and surrounding air.
- Using cool roofing products that reflect sunlight and heat away from a building.

Education and Awareness Programs

ET-2 Increase Awareness of Extreme Temperature Risk and Safety

The impacts of extreme temperatures on public health can be lessened if citizens know how to prepare and protect themselves. Ideas for increasing awareness include the following:

- Educating citizens regarding the dangers of extreme heat and cold and the steps they can take to protect themselves when extreme temperatures occur.

ET-3 Assist Vulnerable Populations

Measures should be taken to ensure vulnerable populations are adequately protected from the impacts of extreme temperatures, such as:

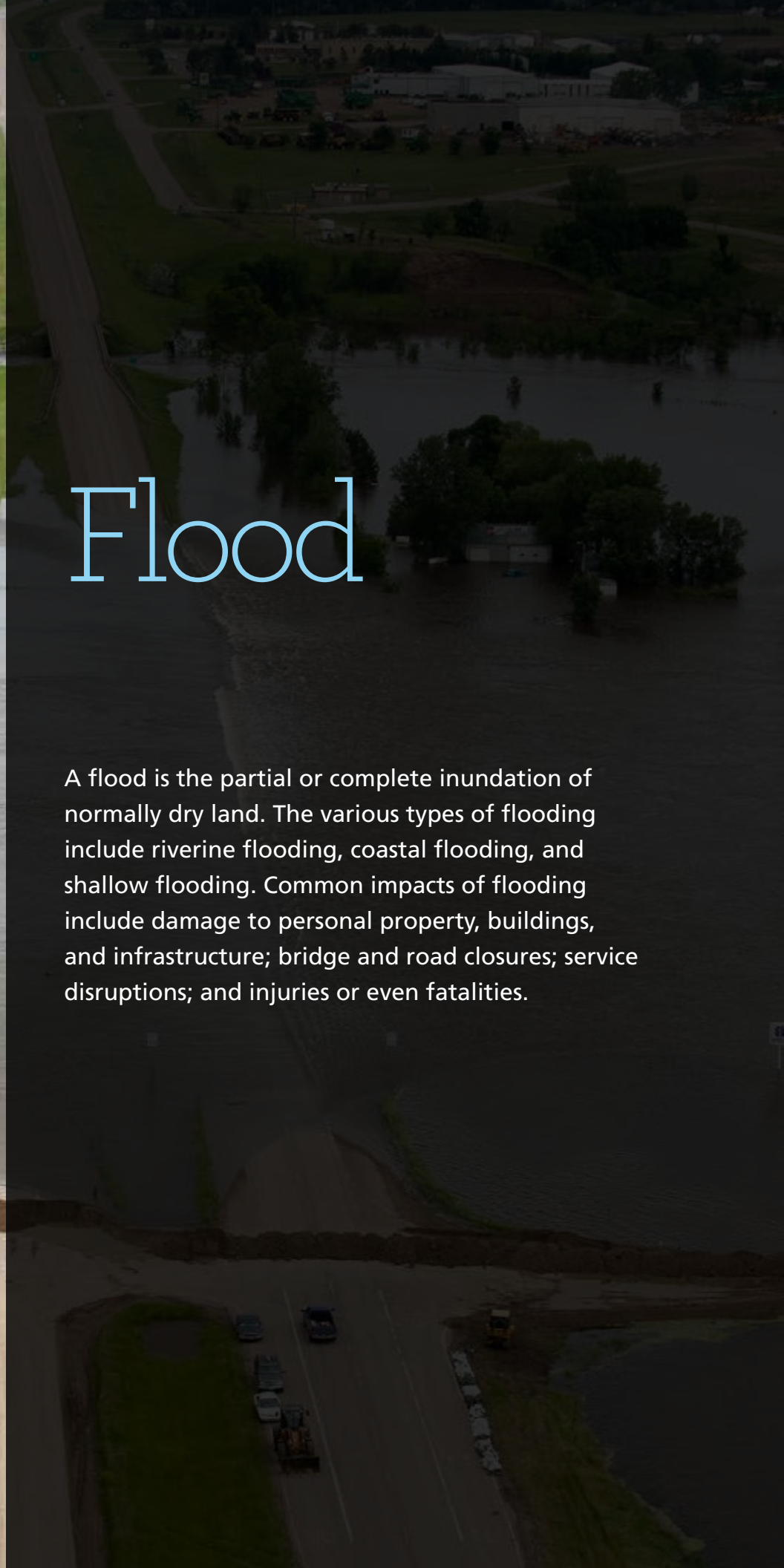
- Organizing outreach to vulnerable populations, including establishing and promoting accessible heating or cooling centers in the community.
- Requiring minimum temperatures in housing/landlord codes.
- Encouraging utility companies to offer special arrangements for paying heating bills, if not already required by state law.
- Creating a database to track those individuals at high risk of death, such as the elderly, homeless, etc.

ET-4 Educate Property Owners About Freezing Pipes

Extreme cold may cause water pipes to freeze and burst, which can cause flooding inside a building. Ideas for educating property owners include the following:

- Educating homeowners and builders on how to protect their pipes, including locating water pipes on the inside of building insulation or keeping them out of attics, crawl spaces, and vulnerable outside walls.
- Informing homeowners that letting a faucet drip during extreme cold weather can prevent the buildup of excessive pressure in the pipeline and avoid bursting.

Other extreme temperature-related mitigation actions may also apply to other hazards. See the sections entitled “Severe Winter Weather,” “Drought,” and “Multiple Hazards” for other possible ideas.



Flood

A flood is the partial or complete inundation of normally dry land. The various types of flooding include riverine flooding, coastal flooding, and shallow flooding. Common impacts of flooding include damage to personal property, buildings, and infrastructure; bridge and road closures; service disruptions; and injuries or even fatalities.

Local Planning and Regulations

F-1 Incorporate Flood Mitigation in Local Planning

FEMA Resources/Publications
FEMA 100, 268, 473

Comprehensive planning and floodplain management can mitigate flooding by influencing development. Strategies include:

- Determining and enforcing acceptable land uses to alleviate the risk of damage by limiting exposure in flood hazard areas. Floodplain and coastal zone management can be included in comprehensive planning.
- Developing a floodplain management plan and updating it regularly.
- Mitigating hazards during infrastructure planning. For example, decisions to extend roads or utilities to an area may increase exposure to flood hazards.
- Adopting a post-disaster recovery ordinance based on a plan to regulate repair activity, generally depending on property location.
- Passing and enforcing an ordinance that regulates dumping in streams and ditches.
- Establishing a “green infrastructure” program to link, manage, and expand existing parks, preserves, greenways, etc.
- Obtaining easements for planned and regulated public use of privately-owned land for temporary water retention and drainage.

F-2 Form Partnerships to Support Floodplain Management

Partnerships between local, state, and regional entities help expand resources and improve coordination. Consider the following actions:

- Developing a stormwater committee that meets regularly to discuss issues and recommend projects.
- Forming a regional watershed council to help bring together resources for comprehensive analysis, planning, decision-making, and cooperation.
- Establishing watershed-based planning initiatives to address the flood hazard with neighboring jurisdictions.
- Forming a citizen plan implementation steering committee to monitor progress on local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.



F-3 Limit or Restrict Development in Floodplain Areas

FEMA Resources/Publications
FEMA 100, 268, 473

Flooding can be mitigated by limiting or restricting how development occurs in floodplain areas through actions such as:

- Prohibiting or limiting floodplain development through regulatory and/or incentive-based measures.
- Limiting the density of developments in the floodplain.
- Requiring that floodplains be kept as open space.
- Limiting the percentage of allowable impervious surface within developed parcels.
- Developing a stream buffer ordinance to protect water resources and limit flood impacts.
- Prohibiting any fill in floodplain areas.

F-4 Adopt and Enforce Building Codes and Development Standards

FEMA Resources/Publications
FEMA 100, 268, P-762

The use of building codes and development standards can ensure structures are able to withstand flooding. Potential actions include:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Adopting ASCE 24-05 *Flood Resistant Design and Construction*. ASCE 24 is a referenced standard in the IBC that specifies minimum requirements and expected performance for the design and construction of buildings and structures in the flood hazard areas to make them more resistant to flood loads and flood damage.
- Adding or increasing “freeboard” requirements (feet above base flood elevation) in the flood damage ordinance.
- Prohibiting all first floor enclosures below base flood elevation for all structures in flood hazard areas.
- Considering orientation of new development during design (e.g., subdivisions, buildings, infrastructure, etc.).
- Setting the design flood elevation at or above the historical high water mark if it is above the mapped base flood elevation.
- Using subdivision design standards to require elevation data collection during platting and to have buildable space on lots above the base flood elevation.
- Requiring standard tie-downs of propane tanks.

F-5 Improve Stormwater Management Planning

Rainwater and snowmelt can cause flooding and erosion in developed areas. Stormwater management practices to prevent this include:

- Completing a stormwater drainage study for known problem areas.
- Preparing and adopting a stormwater drainage plan and ordinance.
- Preparing and adopting a community-wide stormwater management master plan.
- Regulating development in upland areas in order to reduce stormwater run-off through a stormwater ordinance.
- Linking flood hazard mitigation objectives with EPA Stormwater Phase II initiatives.
- Developing engineering guidelines for drainage from new development.
- Requiring a drainage study with new development.
- Encouraging the use of Low Impact Development techniques

F-6 Adopt Policies to Reduce Stormwater Runoff

In addition to stormwater management, techniques to reduce rain runoff can prevent flooding and erosion, such as:

- Designing a “natural runoff” or “zero discharge” policy for stormwater in subdivision design.
- Requiring more trees be preserved and planted in landscape designs to reduce the amount of stormwater runoff.
- Requiring developers to plan for on-site sediment retention.
- Requiring developers to construct on-site retention basins for excessive stormwater and as a firefighting water source.
- Encouraging the use of porous pavement, vegetative buffers, and islands in large parking areas.
- Conforming pavement to land contours so as not to provide easier avenues for stormwater.
- Encouraging the use of permeable driveways and surfaces to reduce runoff and increase groundwater recharge.
- Adopting erosion and sedimentation control regulations for construction and farming.

F-7 Improve Flood Risk Assessment

FEMA Resources/Publications
FEMA 416, 467-1, B-797

Heighten awareness of flood risk with the following:

- Incorporating the procedures for tracking high water marks following a flood into emergency response plans.
- Conducting cumulative impact analyses for multiple development projects within the same watershed.
- Conducting a verification study of FEMA's repetitive loss inventory and developing an associated tracking database.
- Regularly calculating and documenting the amount of flood-prone property preserved as open space.
- Requiring a thorough watershed analysis for all proposed dam or reservoir projects.
- Developing a dam failure study and emergency action plan.
- Using GIS to map areas that are at risk of flooding.
- Obtaining depth grid data and using it to illustrate flood risk to citizens.
- Incorporating digital floodplain and topographic data into GIS systems, in conjunction with Hazus, to assess risk.
- Developing and maintaining a database to track community exposure to flood risk.
- Revising and updating regulatory floodplain maps.

F-8 Join or Improve Compliance with NFIP

FEMA Resources/Publications
FEMA 100, 209, FIA-15A,
NFIP Technical Bulletins

The National Flood Insurance Program (NFIP) enables property owners in participating communities to purchase insurance protection against flood losses. Actions to achieve eligibility and maintain compliance include:

- Participating in NFIP.
- Adopting ordinances that meet minimum Federal and state requirements to comply with NFIP.
- Conducting NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.
- Designating a local floodplain manager and/or CRS coordinator who achieves CFM certification.
- Completing and maintaining FEMA elevation certificates for pre-FIRM and/or post-FIRM buildings.
- Requiring and maintaining FEMA elevation certificates for all new and improved buildings located in floodplains.

F-9 Manage the Floodplain Beyond Minimum Requirements

FEMA Resources/Publications

FEMA 100, 209, 213, 268, 480;

FIA-15A

In addition to participation in NFIP, implementing good floodplain management techniques that exceed minimum requirements can help minimize flood losses. Examples include:

- Incorporating the ASFPM's "No Adverse Impact" policy into local floodplain management programs.
- Revising the floodplain ordinance to incorporate cumulative substantial damage requirements.
- Adopting a "no-rise" in base flood elevation clause for the flood damage prevention ordinance.
- Extending the freeboard requirement past the mapped floodplain to include an equivalent land elevation.
- Including requirements in the local floodplain ordinance for homeowners to sign non-conversion agreements for areas below base flood elevation.
- Establishing and publicizing a user-friendly, publicly-accessible repository for inquirers to obtain Flood Insurance Rate Maps.
- Developing an educational flyer targeting NFIP policyholders on increased cost of compliance during post-flood damage assessments.
- Annually notifying the owners of repetitive loss properties of Flood Mitigation Assistance funding.
- Offering incentives for building above the required freeboard minimum (code plus).

F-10 Participate in the CRS

FEMA Resources/Publications

FEMA 100, 209, 213, 268, 480;

FIA-15A

The Community Rating System (CRS) rewards communities that exceed the minimum NFIP requirements. Depending upon the level of participation, flood insurance premium rates are discounted for policyholders. Potential activities that are eligible to receive credit include:

- Advising the public about the local flood hazard, flood insurance, and flood protection measures.
- Enacting and enforcing regulations that exceed NFIP minimum standards so that more flood protection is provided for new development.
- Implementing damage reduction measures for existing buildings such as acquisition, relocation, retrofitting, and maintenance of drainageways and retention basins.
- Taking action to minimize the effects of flooding on people, property, and building contents through measures including flood warning, emergency response, and evacuation planning.

F-11 Establish Local Funding Mechanisms for Flood Mitigation

Potential methods to develop local funding sources for flood mitigation include:

- Using taxes to support a regulatory system.
- Using impact fees to help fund public projects to mitigate impacts of land development (e.g., increased runoff).
- Levying taxes to finance maintenance of drainage systems and capital improvements.

Structure and Infrastructure Projects

F-12 Remove Existing Structures from Flood Hazard Areas

Communities may remove structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving lands subject to repetitive flooding.

F-13 Improve Stormwater Drainage System Capacity

Rainwater and snowmelt can cause flooding and erosion in developed areas. Structural stormwater management projects that prevent this include:

- Installing, re-routing, or increasing the capacity of a storm drainage system.
- Increasing drainage or absorption capacities with detention and retention basins, relief drains, spillways, drain widening/dredging or rerouting, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, or channel redirection.
- Increasing capacity of stormwater detention and retention basins.
- Increasing dimensions of drainage culverts in flood-prone areas.
- Using stream restoration to ensure adequate drainage and diversion of stormwater.
- Requiring developers to construct on-site retention basins for excessive stormwater and as a firefighting water source.
- Providing grassy swales along roadsides.

F-14 Conduct Regular Maintenance for Drainage Systems and Flood Control Structures

Regular maintenance will help drainage systems and flood control structures continue to function properly. Potential activities include:

- Performing regular drainage system maintenance, such as sediment and debris clearance, as well as detection and prevention of discharges into stormwater and sewer systems from home footing drains, downspouts, or sewer pumps.
- Implementing an inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams and levees.
- Routinely cleaning debris from support bracing underneath low-lying bridges.
- Routinely cleaning and repairing stormwater drains.
- Regularly clearing sediment build-up on riverbanks near aerial lines.
- Inspecting bridges and identifying if any repairs or retrofits are needed to prevent scour.
- Incorporating ice jam prevention techniques as appropriate.

F-15 Elevate or Retrofit Structures and Utilities

FEMA Resources/Publications

FEMA 54, P-85, 114, P-259, 347, P-348, P-499

Structures and utilities can be elevated to reduce flood damage, including:

- Elevating structures so that the lowest floor, including the basement, is raised above the base flood elevation.
- Raising utilities or other mechanical devices above expected flood levels.
- Elevating and anchoring manufactured homes or, preferably, keeping manufactured homes out of the floodplain.
- Relocating utilities and water heaters above base flood elevation and using tankless water heaters in limited spaces.

F-16 Floodproof Residential and Non-Residential Structures

FEMA Resources/Publications

FEMA P-55, 114, P-259

Floodproofing techniques may protect certain structures from flood damage, including:

- Wet floodproofing in a basement, which may be preferable to attempting to keep water out completely because it allows for controlled flooding to balance exterior and interior wall forces and discourages structural collapse.
- Encouraging wet floodproofing of areas above base flood elevation.
- Using water resistant paints or other materials to allow for easy cleanup after floodwater exposure in accessory structures or in a garage area below an elevated residential structure.
- Dry floodproofing non-residential structures by strengthening walls, sealing openings, or using waterproof compounds or plastic sheeting on walls to keep water out.



F-17 Protect Infrastructure

FEMA Resources/Publications

FEMA P-259, 345, 543, B-797

Mitigation techniques can be implemented to help minimize losses to infrastructure from flood events, such as:

- Elevating roads and bridges above the base flood elevation to maintain dry access. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage, but also stabilization or armoring of vulnerable shoulders or embankments.
- Raising low-lying bridges.
- Floodproofing wastewater treatment facilities located in flood hazard areas.
- Floodproofing water treatment facilities located in flood hazard areas.
- Depending on its infrastructure capabilities, using check valves, sump pumps, and backflow prevention devices in homes and buildings.
- Using bioengineered bank stabilization techniques.

F-18 Protect Critical Facilities

FEMA Resources/Publications

FEMA P-259, 345, 543, B-797

Techniques to protect critical facilities from flood events include:

- Requiring that all critical facilities including emergency operations centers (EOC), police stations, and fire department facilities be located outside of flood-prone areas.
- Requiring all critical facilities to meet requirements of Executive Order 11988 and be built 1 foot above the 500-year flood elevation.
- Installing/upgrading stormwater pumping stations.
- Raising electrical components of sewage lift stations above base flood elevation.
- Raising manhole openings using concrete pillars.
- Installing watertight covers or inflow guards on sewer manholes.
- Installing flood telemetry systems in sewage lift stations.
- Installing back-up generators for pumping and lift stations in sanitary sewer systems along with other measures (e.g., alarms, meters, remote controls, and switchgear upgrades).
- Building earthen dikes around flood-threatened critical facilities.
- Using bioengineered bank stabilization techniques.

F-19 Construct Flood Control Measures

Small flood control structures can be built to prevent flood damage. Examples include:

- Using minor structural projects that are smaller and more localized (e.g., floodwalls or small berms) in areas that cannot be mitigated through non-structural activities or where structural activities are not feasible due to low densities.
- Using revetments (hardened materials placed atop existing riverbanks or slopes) to protect against floods.
- Using bioengineered bank stabilization techniques.

Natural Systems Protection

F-20 Protect and Restore Natural Flood Mitigation Features

FEMA Resources/Publications
FEMA 100, 268

Natural resources provide floodplain protection, riparian buffers, and other ecosystem services that mitigate flooding. It is important to preserve such functionality with the following:

- Protecting and enhancing landforms that serve as natural mitigation features (i.e., riverbanks, wetlands, dunes, etc.).
- Using vegetative management, such as vegetative buffers, around streams and water sources.
- Protecting and preserving wetlands to help prevent flooding in other areas.
- Establishing and managing riparian buffers along rivers and streams.
- Retaining natural vegetative beds in stormwater channels.
- Retaining thick vegetative cover on public lands flanking rivers.

F-21 Preserve Floodplains as Open Space

FEMA Resources/Publications
FEMA 100, 268

Preserving natural areas and vegetation benefits natural resources while also mitigating potential flood losses. Techniques include:

- Developing an open space acquisition, reuse, and preservation plan targeting hazard areas.
- Developing a land banking program for the preservation of the natural and beneficial functions of flood hazard areas.
- Using transfer of development rights to allow a developer to increase densities on another parcel that is not at risk in return for keeping floodplain areas vacant.
- Compensating an owner for partial rights, such as easement or development rights, to prevent a property from being developed.

F-22 Increase Awareness of Flood Risk and Safety

Ideas for increasing flood risk awareness include the following:

- Encouraging homeowners to purchase flood insurance.
- Annually distributing flood protection safety pamphlets or brochures to the owners of flood-prone property.
- Educating citizens about safety during flood conditions, including the dangers of driving on flooded roads.
- Using outreach programs to advise homeowners of risks to life, health, and safety.
- Offering GIS hazard mapping online for residents and design professionals.
- Establishing a Program for Public Information (PPI) with a PPI committee (as suggested by Activity 332 of the CRS Coordinator's Manual).

Education and Awareness Programs

F-23 Educate Property Owners about Flood Mitigation Techniques

FEMA Resources/Publications

FEMA Building Code Tool Kit (FEMA CD)

Educate property owners regarding options for mitigating their properties from flooding through outreach activities such as:

- Using outreach activities to facilitate technical assistance programs that address measures that citizens can take or facilitate funding for mitigation measures.
- Encouraging homeowners to install backflow valves to prevent reverse-flow flood damages.
- Encouraging residents in flood-prone areas to elevate homes.
- Educating the public about securing debris, propane tanks, yard items, or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters.
- Asking residents to help keep storm drains clear of debris during storms (not to rely solely on Public Works).

Other flooding-related mitigation actions may also apply to other hazards. See the sections entitled “Storm Surge,” “Erosion,” and “Multiple Hazards” for other possible ideas.



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Hail

Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Hailstorms frequently accompany thunderstorms, so their locations and spatial extents overlap. Hail can cause substantial damage to vehicles, roofs, landscaping, and other areas of the built environment. U.S. agriculture is typically the area most affected by hail storms, which cause severe crop damage even during minor events.

Structure and Infrastructure Projects

HA-1 Locate Safe Rooms to Minimize Damage

FEMA Resources/Publications
FEMA 320, 453

Locate tornado safe rooms inside or directly adjacent to houses to prevent hail-induced injuries that may occur when taking shelter during a severe thunderstorm.

HA-2 Protect Buildings from Hail Damage

For new construction as well as retrofitting existing buildings, techniques to minimize hail damage include:

- Including measures such as structural bracing, shutters, laminated glass in window panes, and hail-resistant roof coverings or flashing in building design to minimize damage.
- Improving roof sheathing to prevent hail penetration.
- Installing hail resistant roofing and siding.
- Contacting the Insurance Institute for Business and Home Safety (IBHS) to learn more about the most appropriate type of roof covering for your geographic region.

Education and Awareness Programs

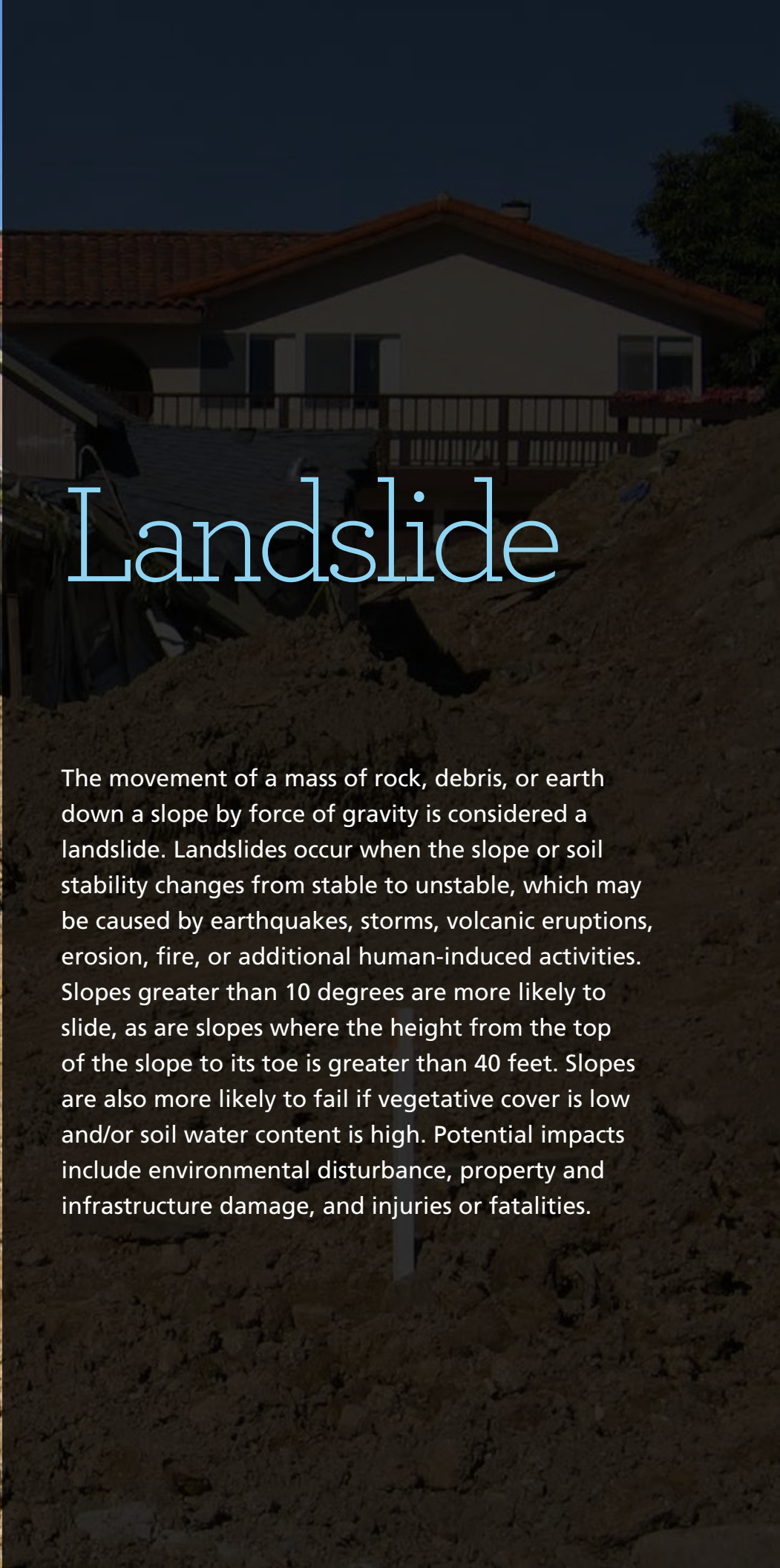
HA-3 Increase Hail Risk Awareness

Conduct outreach activities to increase public awareness of hail dangers, including:

- Mailing safety brochures with monthly water bills.
- Posting warning signage at local parks, county fairs, and other outdoor venues.
- Teaching school children about the dangers of hail and how to take safety precautions.

Other hail-related mitigation actions may also apply to other hazards. See the section entitled “Multiple Hazards” for other possible ideas.





Landslide

The movement of a mass of rock, debris, or earth down a slope by force of gravity is considered a landslide. Landslides occur when the slope or soil stability changes from stable to unstable, which may be caused by earthquakes, storms, volcanic eruptions, erosion, fire, or additional human-induced activities. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high. Potential impacts include environmental disturbance, property and infrastructure damage, and injuries or fatalities.

Local Planning and Regulations

LS-1 Map and Assess Vulnerability to Landslides

Improve data and mapping on specific landslide risks in the community by:

- Studying areas where riparian landslides may occur.
- Completing an inventory of locations where critical facilities, other buildings, and infrastructure are vulnerable to landslides.
- Using GIS to identify and map landslide hazard areas.
- Developing and maintaining a database to track community vulnerability to landslides.
- Assessing vegetation in wildfire-prone areas to prevent landslides after fires (e.g., encourage plants with strong root systems).

LS-2 Manage Development in Landslide Hazard Areas

Landslide risk can be mitigated by regulating development in landslide hazard areas through actions such as:

- Creating a plan to implement reinforcement measures in high-risk areas.
- Defining steep slope/high-risk areas in land use and comprehensive plans and creating guidelines or restricting new development in those areas.
- Creating or increasing setback limits on parcels near high-risk areas.
- Locating utilities outside of landslide areas to decrease the risk of service disruption.
- Restricting or limiting industrial activity that would strip slopes of essential top soil.
- Incorporating economic development activity restrictions in high-risk areas.

Structure and Infrastructure Projects

LS-3 Prevent Impacts to Roadways

To prevent roadway damage and traffic disruptions from landslides, consider options such as:

- Implementing monitoring mechanisms/procedures (i.e., visual inspection or electronic monitoring systems).
- Applying soil stabilization measures, such as planting soil-stabilizing vegetation on steep, publicly-owned slopes.
- Using debris-flow measures that may reduce damage in sloping areas, such as stabilization, energy dissipation, and flow control measures.
- Establishing setback requirements and using large setbacks when building roads near slopes of marginal stability.
- Installing catch-fall nets for rocks at steep slopes near roadways.

LS-4 Remove Existing Buildings and Infrastructure from Landslide Hazard Areas

To help mitigate landslide hazards, communities can acquire and demolish or relocate at-risk buildings and infrastructure and enforce permanent restrictions on development after land and structure acquisition.

FEMA Resources/Publications
FEMA 182

Other landslide-related mitigation actions may also apply to other hazards. See the sections entitled “Erosion,” “Subsidence,” and “Multiple Hazards” for other possible ideas.



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Lightning

Lightning is a discharge of electrical energy that results from the buildup of positive and negative charges in a thunderstorm, which creates a "bolt" when the buildup of charges becomes strong enough. On average, 55 people are killed and hundreds are injured each year by lightning strikes in the United States. Lightning can strike communications equipment (e.g., radio or cell towers, antennae, satellite dishes, etc.) and hamper communication and emergency response. Lightning strikes can also cause significant damage to buildings, critical facilities, and infrastructure, largely by igniting a fire. Lightning can also ignite a wildfire.

Structure and Infrastructure Projects

L-1 Protect Critical Facilities and Equipment

Protect critical facilities and infrastructure from lightning damage with the following measures:

- Installing lightning protection devices and methods, such as lightning rods and grounding, on communications infrastructure and other critical facilities.
- Installing and maintaining surge protection on critical electronic equipment.

Education and Awareness Programs

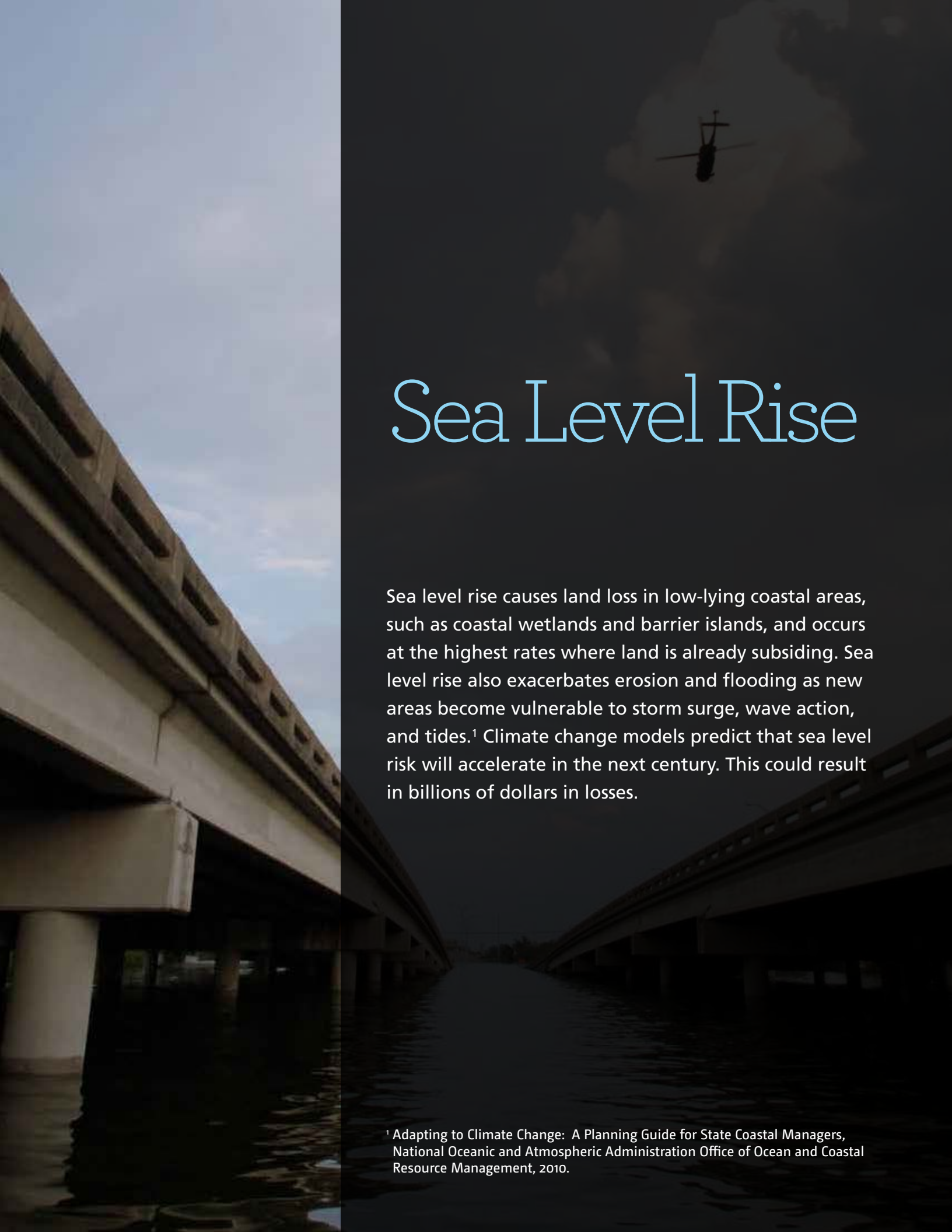
L-2 Conduct Lightning Awareness Programs

Use outreach programs to promote awareness of lightning dangers. This could include ideas such as:

- Developing a lightning brochure for distribution by recreation equipment retailers or outfitters in mountainous areas.
- Mailing safety brochures with monthly water bills.
- Posting warning signage at local parks.
- Teaching school children about the dangers of lightning and how to take safety precautions.

Other lightning-related mitigation actions may also apply to other hazards. See the section entitled “Multiple Hazards” for other possible ideas.





Sea Level Rise

Sea level rise causes land loss in low-lying coastal areas, such as coastal wetlands and barrier islands, and occurs at the highest rates where land is already subsiding. Sea level rise also exacerbates erosion and flooding as new areas become vulnerable to storm surge, wave action, and tides.¹ Climate change models predict that sea level risk will accelerate in the next century. This could result in billions of dollars in losses.

¹ Adapting to Climate Change: A Planning Guide for State Coastal Managers, National Oceanic and Atmospheric Administration Office of Ocean and Coastal Resource Management, 2010.

Local Planning and Regulations

SLR-1 Map and Assess Vulnerability to Sea Level Rise

To better understand and assess local vulnerability to sea level rise, consider actions such as:

- Modeling various “what-if” scenarios to estimate potential vulnerabilities in order to develop sea level rise mitigation priorities.
- Using GIS to map hazard areas, at-risk structures, and associated hazards (e.g., flood and storm surge) to assess high-risk areas.
- Developing an inventory of public buildings and infrastructure that may be particularly vulnerable to sea level rise.
- Adding future conditions hydrology and areas that may be inundated by sea level rise to Digital Flood Insurance Rate Maps (DFIRM).

SLR-2 Manage Development in High-Risk Areas

Local governments can mitigate future losses resulting from sea level rise by regulating development in potential hazard areas through land use planning, including:

- Using zoning, subdivision regulations, and/or a special sea level rise overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas.
- Promoting conservation and management of open space, wetlands, and/or sea level rise boundary zones to separate developed areas from high-hazard areas.
- Prohibiting the redevelopment of areas destroyed by storms or chronic erosion in order to prevent future losses.
- Encouraging compact community design in low-risk areas.
- Establishing setbacks in high-risk areas that account for potential sea level rise.

SRL-3 Prevent Infrastructure Expansion in High-Risk Areas

Future development can be protected from damage resulting from sea level rise through the following:

- Setting guidelines for annexation and service extensions in high-risk areas.
- Locating utilities and critical facilities outside of areas susceptible to sea level rise to decrease the risk of service disruption.
- Requiring all critical facilities to be built 1 foot above the 500-year flood elevation (considering wave action) or the predicted sea level rise level, whichever is higher.

Structure and Infrastructure Projects

SRL-4 Protect Buildings and Infrastructure

Existing structures, infrastructure, and critical facilities can be protected from sea level rise through the following:

- Acquiring and demolishing or relocating structures located in high-risk areas.
- Retrofitting structures to elevate them above potential sea level rise levels.
- Retrofitting critical facilities to be 1 foot above the 500-year flood elevation (considering wave action) or the predicted sea level rise level, whichever is higher.
- Replacing exterior building components with more hazard-resistant materials.

Natural Systems Protection

SLR-5 Preserve High-Hazard Areas as Open Space

Preserve open space to benefit natural resources and to reduce risk to structures from potential sea level rise. Techniques include:

- Developing an open space acquisition, reuse, and preservation plan targeting hazard areas.
- Developing a land banking program for the preservation and management of the natural and beneficial functions of flood hazard areas.
- Adopting rolling easements along the shoreline to promote natural migration of shorelines.
- Using transfer of development rights to allow a developer to increase densities on another parcel that is not at risk in return for keeping floodplain areas vacant.
- Compensating an owner for partial rights, such as easement or development rights, to prevent a property from being developed.

SLR-6 Protect and Restore Natural Buffers

Natural resources provide floodplain protection, riparian buffers, and other ecosystem services that mitigate sea level rise. It is important to preserve such functionality with the following:

- Examining the appropriate use of beach nourishment, sand scraping, dune-gap plugs, etc., for coastal hazards.
- Implementing dune restoration, plantings (e.g., sea oats), and use of natural materials.
- Examining the appropriate use of sediment-trapping vegetation, sediment mounds, etc., for coastal hazards.
- Planting sediment-trapping vegetation to buffer the coast against coastal storms by collecting sediment in protective features such as dunes or barrier islands.
- Performing sand scraping—using bulldozers to deposit the top foot of sand above the high-tide line—to reinforce the beach without adding new sand.
- Using sediment mounds to act as artificial dunes or plugs for natural dune gaps in order to slow the inland progress of storm-related wind and water.

Education and Awareness Programs

SLR-7 Increase Awareness of Sea Level Rise

Improve public awareness of risks due to sea level rise through outreach activities such as:

- Encouraging homeowners to purchase flood insurance.
- Using outreach programs to facilitate technical assistance programs that address measures that citizens can take or facilitate funding for mitigation measures.
- Annually distributing flood protection safety pamphlets or brochures to the owners of property in high-risk areas.
- Educating citizens about safety during flood conditions, including the dangers of driving on flooded roads.
- Using outreach programs to advise homeowners of risks to life, health, and safety.
- Offering GIS hazard mapping online for residents and design professionals.
- Disclosing the location of possible sea level rise areas to potential buyers.

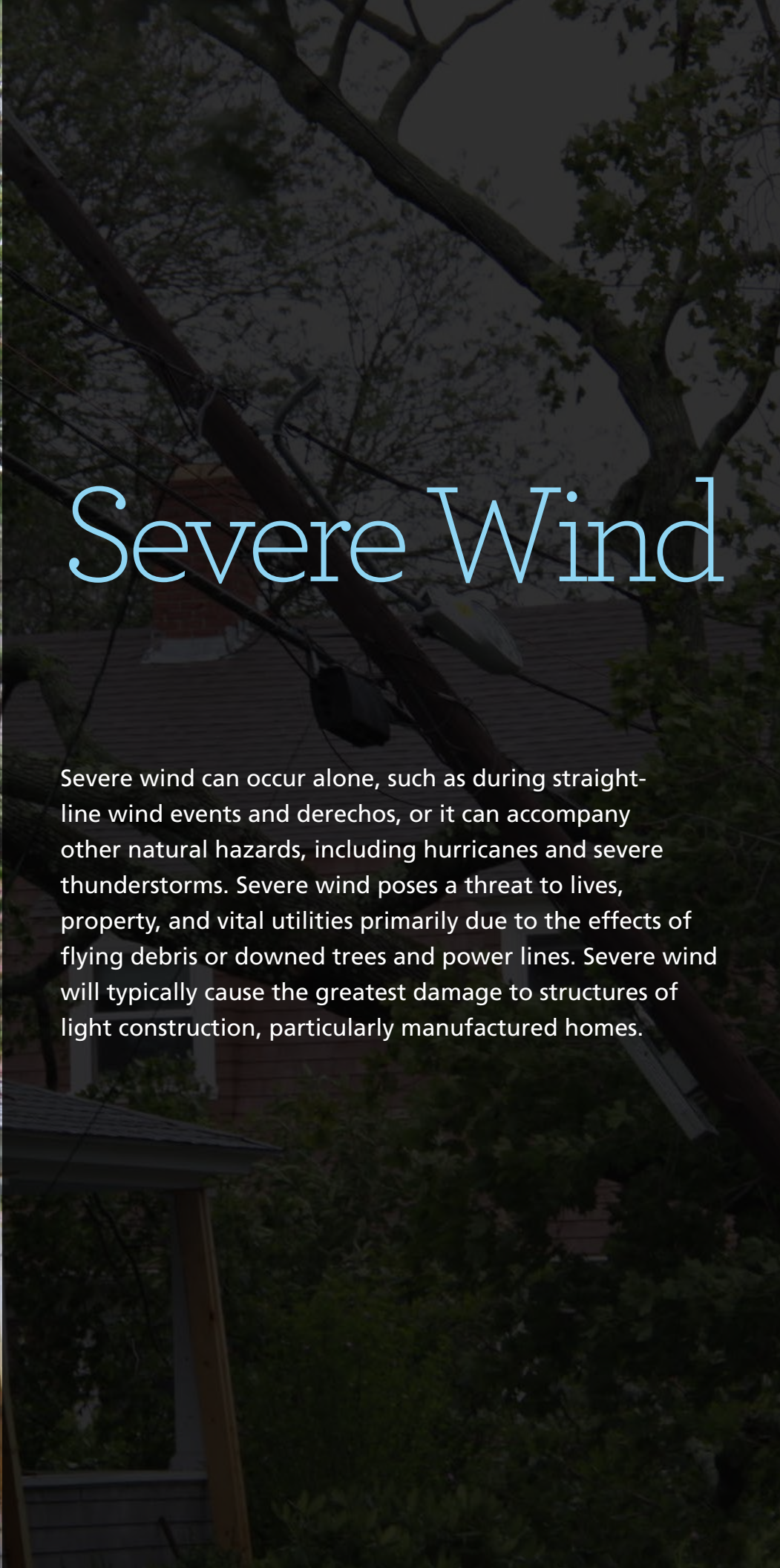
Other sea level rise-related mitigation actions may also apply to other hazards. See the sections entitled “Flood,” “Storm Surge,” “Erosion,” and “Multiple Hazards” for other possible ideas.

Climate change is likely to exacerbate the effects of other hazards as well. See the other sections for possible ideas.



Severe Wind

Severe wind can occur alone, such as during straight-line wind events and derechos, or it can accompany other natural hazards, including hurricanes and severe thunderstorms. Severe wind poses a threat to lives, property, and vital utilities primarily due to the effects of flying debris or downed trees and power lines. Severe wind will typically cause the greatest damage to structures of light construction, particularly manufactured homes.



Local Planning and Regulations

SW-1 Adopt and Enforce Building Codes

FEMA Resources/Publications

FEMA P-85, P-804

Adopt regulations governing residential construction to prevent wind damage. Examples of appropriate regulations are:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Adopting standards from International Code Council (ICC)-600 *Standard for Residential Construction in High-Wind Regions*.
- Reviewing building codes and structural policies to ensure they are adequate to protect older structures from wind damage.
- Requiring or encouraging wind engineering measures and construction techniques that may include structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced pedestrian and garage doors, window shutters, waterproof adhesive sealing strips, or interlocking roof shingles.
- Requiring tie-downs with anchors and ground anchors appropriate for the soil type for manufactured homes.
- Prohibiting the use of carports and open coverings attached to manufactured homes.
- Requiring the use of special interlocking shingles designed to interlock and resist uplift forces in extreme wind conditions to reduce damage to a roof or other structures.
- Improving nailing patterns.
- Requiring building foundation design, braced elevated platforms, and protections against the lateral forces of winds and waves.
- Requiring new masonry chimneys greater than 6 feet above a roof to have continuous reinforced steel bracing.
- Requiring structures on temporary foundations to be securely anchored to permanent foundations.

SW-2 Promote or Require Site and Building Design Standards to Minimize Wind Damage

FEMA Resources/Publications

FEMA P-499, 550

Damage associated with severe wind events can be reduced or prevented if considered during building and site design. Examples include the following:

- Using natural environmental features as wind buffers in site design.
- Incorporating passive ventilation in the building design.
- Incorporating passive ventilation in the site design. Passive ventilation systems use a series of vents in exterior walls or at exterior windows to allow outdoor air to enter the home in a controlled way.
- Encouraging architectural designs that limit potential for wind-borne debris.
- Improving architectural design standards for optimal wind conveyance.
- Encouraging wind-resistant roof shapes (e.g., hip over gable).

SW-3 Assess Vulnerability to Severe Wind

In order to better understand and assess local vulnerability to severe wind, consider actions such as:

- Developing and maintaining a database to track community vulnerability to severe wind.
- Using GIS to map areas that are at risk to the wind hazard associated with different hurricane conditions (e.g., Category 1, 2, 3, etc.) and to identify concentrations of at-risk structures.
- Creating a severe wind scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop severe wind mitigation priorities.
- Using Hazus to quantitatively estimate potential losses from hurricane wind.

SW-4 Protect Power Lines and Infrastructure

The regular maintenance and upkeep of utilities can help prevent wind damage. Possible strategies are:

- Establishing standards for all utilities regarding tree pruning around lines.
- Incorporating inspection and management of hazardous trees into the drainage system maintenance process.
- Preemptively testing power line holes to determine if they are rotting.
- Inspecting utility poles to ensure they meet specifications and are wind resistant.
- Burying power lines to provide uninterrupted power after severe winds, considering both maintenance and repair issues.
- Upgrading overhead utility lines (e.g., adjust utility pole sizes, utility pole span widths, and/or line strength).
- Avoiding use of aerial extensions to water, sewer, and gas lines.
- Using designed-failure mode for power line design to allow lines to fall or fail in small sections rather than as a complete system to enable faster restoration.
- Installing redundancies and loopfeeds.

Structure and Infrastructure Projects

SW-5 Retrofit Residential Buildings

FEMA Resources/Publications

FEMA 320, 361, 453, P-499, P-804

The following types of modifications or retrofits to existing residential buildings can reduce future wind damage:

- Improving the building envelope.
- Installing hurricane shutters or other protective measures.
- Retrofitting gable end walls to eliminate wall failures in high winds.
- Replacing existing non-ductile infrastructure with ductile infrastructure to reduce their exposure to hazardous events.
- Retrofitting buildings with load-path connectors to strengthen the structural frames.
- Installing safe rooms.
- Reinforcing garage doors.
- Inspecting and retrofitting roofs to adequate standards to provide wind resistance.

SW-6 Retrofit Public Buildings and Critical Facilities

FEMA Resources/Publications

FEMA 361, P-499, 550

Public buildings and critical facilities can be retrofitted to reduce future wind damage with the following actions:

- Improving roof coverings (e.g., no pebbles, remove ballast roof systems).
- Anchoring roof-mounted heating, ventilation, and air conditioning units.
- Retrofitting buildings with load-path connectors to strengthen the structural frames.
- Retrofitting or constructing the emergency operations center to FEMA 361 standards.
- Avoiding placing flag poles or antennas near buildings.
- Upgrading and maintaining existing lightning protection systems to prevent roof cover damage.
- Requiring upgrading of reused buildings that will house critical facilities.
- Protecting traffic lights and other traffic controls from high winds.
- Converting traffic lights to mast arms.

Education and Awareness Programs

SW-7 Increase Severe Wind Risk Awareness

FEMA Resources/Publications
FEMA P-431, P-804

Improve public awareness of severe wind through outreach activities such as:

- Informing residents of shelter locations and evacuation routes.
- Educating homeowners on the benefits of wind retrofits such as shutters, hurricane clips, etc.
- Ensuring that school officials are aware of the best area of refuge in school buildings.
- Instructing property owners on how to properly install temporary window coverings before a storm.
- Educating design professionals to include wind mitigation during building design.

Other severe wind-related mitigation actions may also apply to other hazards. See the sections entitled “Multiple Hazards” and “Tornadoes” for other possible ideas.



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A photograph of a city skyline with a large tree in the foreground covered in a thick layer of snow or ice. The tree's branches are heavily laden with white snow, and its trunk is also covered. In the background, several tall buildings are visible against a clear sky. The right side of the image is a dark, solid black background.

Severe Winter Weather

Severe winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Severe winter weather can down trees, cause widespread power outages, damage property, and cause fatalities and injuries.

Local Planning and Regulations

WW-1 Adopt and Enforce Building Codes

Buildings and infrastructure can be protected from the impacts of winter storms with the following regulations:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Ensuring the development and enforcement of building codes for roof snow loads.
- Discouraging flat roofs in areas that experience heavy snows.

Structure and Infrastructure Projects

WW-2 Protect Buildings and Infrastructure

Buildings and infrastructure can be protected from the impacts of winter storms with the following techniques:

- Adding building insulation to walls and attics.
- As buildings are modified, using new technology to create or increase structural stability.
- Retrofitting public buildings to withstand snow loads and prevent roof collapse.

WW-3 Protect Power Lines

Power lines can be protected from the impacts of winter storms with the following techniques:

- Establishing standards for all utilities regarding tree pruning around lines.
- Burying overhead power lines.
- Using designed-failure mode for power line design to allow lines to fall or fail in small sections rather than as a complete system to enable faster restoration.
- Installing redundancies and loopfeeds.

WW-4 Reduce Impacts to Roadways

The leading cause of death during winter storms is from automobile or other transportation accidents, so it is important to consider ways to lessen roadway impacts. Potential strategies include:

- Planning for and maintaining adequate road and debris clearing capabilities.
- Using snow fences or “living snow fences” (e.g., rows of trees or other vegetation) to limit blowing and drifting of snow over critical roadway segments.
- Installing roadway heating technology to prevent ice/snow buildup.

Education and Awareness Programs

WW-5 Conduct Winter Weather Risk Awareness Activities

Public awareness of severe winter storms can be improved through the following efforts:

- Informing the public about severe winter weather impacts.
- Producing and distributing family and traveler emergency preparedness information about severe winter weather hazards.
- Including safety strategies for severe weather in driver education classes and materials.
- Encouraging homeowners to install carbon monoxide monitors and alarms.
- Educating citizens that all fuel-burning equipment should be vented to the outside.

WW-6 Assist Vulnerable Populations

Protect vulnerable populations from the impacts of severe winter storms through the following efforts:

- Identifying specific at-risk populations that may be exceptionally vulnerable in the event of long-term power outages.
- Organizing outreach to vulnerable populations, including establishing and promoting accessible heating centers in the community.

Other winter weather-related mitigation actions may also apply to other hazards. See the sections entitled “Extreme Temperatures” and “Multiple Hazards” for other possible ideas.



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The image is a vertical split. The left side shows a photograph of a house that has been severely damaged, tilted at a sharp angle, with debris scattered around its base. The right side is a dark, atmospheric photograph of a flooded area with debris floating in the water.

Storm Surge

A storm surge is a large dome of water, often 50 to 100 miles wide, that rises anywhere from 4 to 5 feet in a Category 1 hurricane and up to more than 30 feet in a Category 5 storm. Storm surge arrives prior to a hurricane's landfall, and the greater the hurricane's intensity, the sooner the surge arrives. Storm surge can be devastating to coastal regions, causing flooding, severe beach erosion, and property damage along the immediate coast. Furthermore, water can rise very rapidly due to storm surge, posing a serious threat to people remaining in inundation areas.

Local Planning and Regulations

SS-1 Adopt Building Codes and Development Standards

Building codes and development standards can be established to mitigate storm surge damage. Possible regulations include:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Adopting ASCE-24-05 *Flood Resistant Design and Construction*. ASCE 24, created by the American Society of Civil Engineers, is a referenced standard in the IBC that specifies minimum requirements and expected performance for the design and construction of buildings and structures in flood hazard areas to make them more resistant to flood loads and flood damage.
- Establishing design standards for buildings located in areas susceptible to storm surge.
- Implementing V-zone construction requirements for new development located in coastal A-zones.
- Adopting building requirements for higher elevation in inundation zones.
- Requiring open foundations (e.g., piles or piers) in coastal areas.
- Requiring deep foundations in order to avoid erosion and scour.

SS-2 Improve Land Use Planning and Regulations

Land uses should be planned and regulated to minimize the impact of storm surge. Possible measures to implement include:

- Developing and maintaining a beach management plan.
- Adopting shoreline setback regulations and establishing coastal setback lines.
- Adopting coastal zone management regulations.
- Eliminating all obstructions in areas along the coast subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves (also known as the V-zone).
- Planning for future storm surge heights due to sea level rise.
- Limiting or prohibiting development in areas along the coast subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves (referred to as the V-zone on Flood Insurance Rate Maps).
- Adopting coastal A-zones, areas of special flood hazard that extend inland and are subject to breaking waves between 1.5 and 3 feet, and ensuring that they are mapped accurately.
- Adopting and enforcing coastal A-zones in A-zones.

SS-3 Minimize Risk to New Facilities and Infrastructure

FEMA Resources/Publications
FEMA P-55, P-499, B-797

Infrastructure and critical facilities can be protected from storm surge damage through the following:

- Locating future critical facilities outside of areas susceptible to storm surge.
- Requiring that all critical facilities meet requirements of Executive Order 11988 and be built 1 foot above the 500-year flood elevation (considering wave action).

SS-4 Map and Assess Vulnerability to Storm Surge

Storm surge risk can be better assessed and monitored with mapping techniques, including the following:

- Using GIS to map areas that are at risk to inundation by storm surge.
- Developing and maintaining a database to track community vulnerability to storm surge.

Structure and Infrastructure Projects

SS-5 Construct Structural Control Techniques

Structural controls can be used to lessen the impact of storm surge. Examples include the following:

- Constructing groins to capture material along the shoreline in order to trap and retain sand.
- Installing geotextile sand tubes to trap sand or protect beachfront properties.
- Building a coastal berm to absorb waves and protect the shoreline from erosion.
- Building a storm berm to keep rock protection in place and provide a slow supply of sediment to the coastal system.

SS-6 Protect Infrastructure and Critical Facilities

FEMA Resources/Publications
FEMA P-55, P-499, B-797

Infrastructure and critical facilities can be protected from damage by storm surge through the following:

- Reorienting near-shore roads so they are parallel (not perpendicular) to the beach to prevent the channelization of storm surge and wind inland.
- Constructing seawalls or other structures to protect critical facilities located on the shoreline.
- Relocating existing vulnerable critical facilities outside of high-risk areas.

Natural Systems Protection

SS-7 Protect and Restore Natural Buffers

Natural resources provide floodplain protection, riparian buffers, and other ecosystem services that mitigate storm surge risk. It is important to preserve such functionality with the following:

- Examining the appropriate use of beach nourishment, sand scraping, dune-gap plugs, etc., for coastal hazards.
- Implementing dune restoration, plantings (e.g., sea oats), and use of natural materials.
- Evaluating the appropriate use of sediment-trapping vegetation, sediment mounds, etc., for coastal hazards.
- Planting sediment-trapping vegetation to make the coast more resistant to coastal storms by collecting sediment in protective features such as dunes or barrier islands.
- Performing sand scraping—using bulldozers to deposit the top foot of sand above the high-tide line—to reinforce the beach without adding new sand.
- Using sediment mounds to act as artificial dunes or plugs for natural dune gaps in order to slow the inland progress of storm-related wind and water.

Education and Awareness Programs

SS-8 Provide Information on High-Risk Areas

Increase public awareness of storm surge risk through the following actions:

- Offering GIS hazard mapping online for residents and design professionals.
- More accurately mapping problem areas to educate residents about unanticipated risks. Upgrading maps provides a truer measure of risks to a community.
- Educating property owners in high-risk areas about mitigation options.
- Educating the public about risks, preparedness measures, and evacuation procedures.

Other storm surge-related mitigation actions may also apply to other hazards. See the sections entitled “Flood” and “Multiple Hazards” for other possible ideas.



Subsidence

Subsidence is the gradual settling or sudden sinking of the Earth's surface due to subsurface movement of earth materials. The level of subsidence ranges from a broad lowering to collapse of land surface. Most causes of subsidence are human-induced, such as groundwater pumpage, aquifer system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost. Areas located above or adjacent to karsts topography have a greater risk of experiencing subsidence. Sudden collapses of surface areas can damage and destroy buildings and infrastructure.

Local Planning and Regulations

SU-1 Map and Assess Vulnerability to Subsidence

Some areas with subsidence risk may not be fully identified in your community. Consider actions such as:

- Using GIS to map areas that are susceptible to subsidence.
- Identifying and mapping old mining areas or geologically unstable terrain so that development can be prevented or eliminated.
- Using ground-penetrating radar to detect lava tubes and map their location.
- Supporting mapping efforts to identify areas of existing permafrost.
- Improving accuracy of hazard area maps to educate residents about unanticipated risks. Upgrading maps provides a truer measure of risks to a community.

SU-2 Manage Development in High-Risk Areas

Development regulations should consider areas with poor soil conditions, including the following:

- Prohibiting development in areas that have been identified as at-risk to subsidence.
- Restricting development in areas with soil that is considered poor or unsuitable for development.

SU-3 Consider Subsidence in Building Design

If subsidence is considered during building design, future damage may be prevented. Potential actions include:

- Educating design professionals about where to locate information on subsidence rates and maps.
- Incorporating structural designs that can resist loading associated with subsidence.
- Adopting an ordinance promoting permafrost sensitive construction practices.
- Including potential subsidence in freeboard calculations for buildings in flood-prone areas.

SU-4 Monitor Subsidence Risk Factors

Several risk factors can be monitored to help predict subsidence, such as the following:

- Monitoring areas at risk to subsidence by remaining aware of changes in groundwater levels.
- Monitoring areas where natural resources are removed from underground.
- Filling or buttressing subterranean open spaces, as with abandoned mines, to prevent or alleviate collapse.

Structure and Infrastructure Projects

SU-5 Remove Existing Structures from Subsidence Hazard Areas

To prevent property loss, acquire and demolish or relocate buildings and infrastructure in high-risk areas.

FEMA Resources/Publications

FEMA 20, P-85, 361, 453

Education and Awareness Programs

SU-6 Educate Residents about Subsidence

Increase residents' knowledge of subsidence through the following:

- Promoting community awareness of subsidence risks and impacts.
- Offering GIS hazard mapping online for residents and design professionals.

Other subsidence-related mitigation actions may also apply to other hazards. See the sections entitled "Landslide," "Erosion," and "Multiple Hazards" for other possible ideas.



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Tornado

A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. The destruction caused by tornadoes ranges from light to catastrophic depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, including residential dwellings and particularly manufactured homes. Tornadoes are more likely to occur during the months of March through May and tend to form in the late afternoon and early evening.

Local Planning and Regulations

T-1 Encourage Construction of Safe Rooms

FEMA Resources/Publications

FEMA 20, P-85, 320, 361,

P-431, 453

Promote the construction and use of safe rooms by:

- Requiring construction of safe rooms in new schools, daycares, and nursing homes.
- Encouraging the construction and use of safe rooms in homes and shelter areas of manufactured home parks, fairgrounds, shopping malls, or other vulnerable public structures.
- Encouraging builders and homeowners to locate tornado safe rooms inside or directly adjacent to houses to prevent injuries due to flying debris or hail.
- Developing a local grant program to assist homeowners who wish to construct a new safe room.
- Consulting guidance from FEMA P-320 - *Taking Shelter From the Storm: Building a Safe Room For Your Home or Small Business* and International Code Council (ICC)-500 *Standard for the Design and Construction of Storm Shelters*.

T-2 Require Wind-Resistant Building Techniques

FEMA Resources/Publications

FEMA P-804

Require or encourage wind engineering measures and construction techniques that may include the following:

- Structural bracing
- Straps and clips
- Anchor bolts
- Laminated or impact-resistant glass
- Reinforced pedestrian and garage doors
- Window shutters
- Waterproof adhesive sealing strips
- Interlocking roof shingles

Also, improve the selection of building materials so that wind-resistant materials are more readily available to the public. Consult guidance from ICC-600 *Standard for Residential Construction in High-Wind Regions*.

Education and Awareness Programs

T-3 Conduct Tornado Awareness Activities

FEMA Resources/Publications

FEMA 182

Conduct outreach activities to increase awareness of tornado risk. Activities could include the following:

- Educating citizens through media outlets.
- Conducting tornado drills in schools and public buildings.
- Teaching school children about the dangers of tornadoes and how to take safety precautions.
- Distributing tornado shelter location information.
- Supporting severe weather awareness week.
- Promoting use of National Oceanic and Atmospheric Administration (NOAA) weather radios.

Other tornado wind-related mitigation actions may also apply to other hazards. See the sections entitled “Severe Wind” and “Multiple Hazards” for other possible ideas.



Tsunami

A tsunami is a series of great waves that are created by undersea disturbances, such as earthquakes or volcanic eruptions. As opposed to typical waves that crash at the shoreline, tsunamis bring a continuously flowing “wall of water” that has the potential to cause devastating damage in coastal areas immediately along the shore. Areas at greatest risk are less than 50 feet above sea level and within 1 mile of the shoreline. Most deaths that occur during a tsunami result from drowning. Associated risks include flooding, polluted water supplies, and damaged gas lines.

Local Planning and Regulations

TSU-1 Map and Assess Vulnerability to Tsunami

FEMA Resources/Publications
FEMA P-646, 646-A

Tsunami risk can be better assessed and monitored with mapping techniques, including the following:

- Using GIS to map areas that are vulnerable to inundation by tsunamis.
- Developing and maintaining a database to track community vulnerability to tsunamis.
- Offering GIS hazard mapping online for residents and design professionals.
- Educating map users on the appropriate uses and limitations of maps.
- More accurately mapping problem areas to educate residents about unanticipated risks. Upgrading maps provides a truer measure of risks to a community.

TSU-2 Manage Development in Tsunami Hazard Areas

FEMA Resources/Publications
FEMA P-55

Planning and regulations can mitigate tsunami damage in many ways, such as:

- Adopting and enforcing building codes and design standards that contain requirements for tsunami-resistant design.
- Limiting new development in tsunami run-up areas.
- Encouraging new development that is configured to minimize tsunami losses by using site planning strategies that slow water currents, steer water forces, and block water forces.

TSU-3 Protect Against Fire Following Tsunami

Communities can encourage wildfire mitigation measures (i.e., tree breaks) in tsunami-prone areas to reduce impacts of fires that may occur after a tsunami hits the coastline.



Structure and Infrastructure Projects

TSU-4 Build Tsunami Shelters

Ensure the population is adequately protected from tsunami inundation by constructing tsunami shelters.

TSU-5 Protect Buildings and Infrastructure

FEMA Resources/Publications
FEMA P-646, 646-A

Ensure buildings and infrastructure are adequately protected from tsunami inundation with the following:

- Requiring coastal structures to be built to standards that allow for proper vertical evacuation and to be specially designed and constructed to resist both tsunami and earthquake loads.
- Locating new and relocating existing infrastructure and critical facilities outside of the tsunami hazard area.
- Elevating existing buildings above the inundation level.
- Relocating fire-prone infrastructure such as electrical lines or case tanks.

Education and Awareness Programs

TSU-6 Increase Public Awareness of Tsunami Hazard

FEMA Resources/Publications
FEMA P-646, 646-A

Improve public awareness and better prepare citizens for evacuation during a tsunami by the following:

- Educating citizens regarding the dangers of tsunami and inform them of emergency procedures and routes to use should a tsunami warning be issued.
- Conducting tsunami drills.
- Designating tsunami inundation zones and marking evacuation routes.
- Developing maps showing possible tsunami inundation areas and steering developers away from high-risk areas.
- Participating in NOAA's TsunamiReady Community program.

Other tsunami-related mitigation actions may also apply to other hazards. See the sections entitled "Flood," "Storm Surge," and "Multiple Hazards" for other possible ideas.

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Wildfire

A wildfire is any outdoor fire that is not controlled, supervised, or arranged. Wildfire probability depends on local weather conditions; outdoor activities such as camping, debris burning, and construction; and the degree of public cooperation with fire prevention measures. Wildfires can result in widespread damage to property and loss of life.

Local Planning and Regulations

WF-1 Map and Assess Vulnerability to Wildfire

FEMA Resources/Publications
FEMA P-754

The first step in local planning is to identify wildfire hazard areas and assess overall community vulnerability. Potential actions include:

- Using GIS mapping of wildfire hazard areas to facilitate analysis and planning decisions through comparison with zoning, development, infrastructure, etc.
- Developing and maintaining a database to track community vulnerability to wildfire.
- Creating a wildfire scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop wildfire mitigation priorities.

WF-2 Incorporate Wildfire Mitigation in the Comprehensive Plan

Communities can review comprehensive plans to ensure wildfire mitigation has been addressed. The comprehensive plan may include the following:

- Recognizing the existence of wildfire hazards and identifying areas of risk based on a wildfire vulnerability assessment.
- Describing policies and recommendation for addressing wildfire risk and discouraging expansion in the wildland-urban interface.
- Including considerations of wildfire hazards in land use, public safety, and other elements of the comprehensive plan.

WF-3 Reduce Risk through Land Use Planning

Local governments can mitigate future losses by regulating development in wildfire hazard areas through land use planning, including:

- Using zoning and/or a special wildfire overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas.
- Addressing density and quantity of development, as well emergency access, landscaping and water supply.
- Promoting conservation of open space or wildland-urban boundary zones to separate developed areas from high-hazard areas.
- Setting guidelines for annexation and service extensions in high-risk areas.

WF-4 Develop a Wildland-Urban Interface Code

Communities can develop regulations for safer construction and incorporate mitigation considerations into the permitting process.

Potential actions include:

- Developing specific design guidelines and development review procedures for new construction, replacement, relocation, and substantial improvement in wildfire hazard areas.
- Addressing fire mitigation through access, signage, fire hydrants, water availability, vegetation management, and special building construction standards.
- Involving fire protection agencies in determining guidelines and standards and in development and site plan review procedures.
- Establishing wildfire mitigation planning requirements for large scale developments or planned unit developments.

WF-5 Require or Encourage Fire-Resistant Construction Techniques

FEMA Resources/Publications

FEMA P-737, P-754

A local government can encourage fire-resistant construction or may choose to require it through local regulations. Examples include:

- Encouraging the use of non-combustible materials (i.e., stone, brick, and stucco) for new construction in wildfire hazard areas.
- Using fire resistant roofing and building materials in remodels, upgrades, and new construction.
- Enclosing the foundations of homes and other buildings in wildfire-prone areas, rather than leaving them open and potentially exposing undersides to blown embers or other materials.
- Prohibiting wooden shingles/wood shake roofs on any new development in areas prone to wildfires.
- Encouraging the use of functional shutters on windows.

Structure and Infrastructure Projects

WF-6 Retrofit At-Risk Structures with Ignition-Resistant Materials

Existing structures in wildfire hazard areas can be protected through the use of non-combustible materials and technologies, including:

- Installing roof coverings, sheathing, flashing, skylights, roof and attic vents, eaves, and gutters that conform to ignition-resistant construction standards.
- Installing wall components that conform to ignition-resistant construction standards.
- Protecting propane tanks or other external fuel sources.
- Purchasing and installing external, structure-specific water hydration systems (sprinklers); dedicated power sources; and dedicated cisterns if no water source (e.g., lake, river, or swimming pool) is available.

WF-7 Create Defensible Space Around Structures and Infrastructure

Local governments can implement defensible space programs to reduce risk to structures and infrastructure, including:

- Creating buffers around residential and non-residential structures through the removal or reduction of flammable vegetation, including vertical clearance of tree branches.
- Replacing flammable vegetation with less flammable species.
- Creating defensible zones around power lines, oil and gas lines, and other infrastructure systems.

WF-8 Conduct Maintenance to Reduce Risk

Local governments can implement maintenance procedures to reduce wildfire risk, including:

- Performing arson prevention cleanup activities in areas of abandoned or collapsed structures, accumulated trash or debris, and with a history of storing flammable materials where spills or dumping may have occurred.
- Preventing or alleviating wildfires by proper maintenance and separation of power lines as well as efficient response to fallen power lines.
- Routinely inspecting the functionality of fire hydrants.
- Requiring and maintaining safe access for fire apparatus to wildland-urban interface neighborhoods and properties.

Natural Systems Protection

WF-9 Implement a Fuels Management Program

A fuels management program may be implemented to reduce hazardous vegetative fuels on public lands, near essential infrastructure, or on private lands by working with landowners. The program can include the following:

- Performing maintenance including fuel management techniques such as pruning and clearing dead vegetation, selective logging, cutting high grass, planting fire-resistant vegetation, and creating fuel/fire breaks (i.e., areas where the spread of wildfires will be slowed or stopped by the removal of fuels).
- Using prescribed burning to reduce fuel loads that threaten public safety and property.
- Identifying and clearing fuel loads created by downed trees.
- Cutting firebreaks into public wooded areas in the wildland-urban interface.
- Sponsoring local “slash and clean-up days” to reduce fuel loads along the wildland-urban interface.
- Linking wildfire safety with environmental protection strategies (i.e., improving forest ecology, wildlife habitat, etc.).
- Developing a vegetation management plan.

Education and Awareness Programs

WF-10 Participate in Firewise Program

The Firewise program provides a series of steps that individual residents and their neighbors can take to keep their homes and neighborhoods safer from fire. Consider actions such as:

- Joining the “Firewise Communities/USA” recognition program sponsored by the National Wildlife Coordinating Group (firewise.org).
- Sponsoring Firewise workshops for local officials, developers, civic groups, and neighborhood/homeowners’ associations.
- Consulting Firewise guidance and encouraging or requiring best practices in your community.

WF-11 Increase Wildfire Risk Awareness

Education and outreach programs can target citizens, businesses, developers, landscapers, and insurers among others to increase awareness of wildfire risk and strategies for protecting homes and infrastructure. Consider actions such as:

- Offering GIS hazard mapping online for residents, developers, and design professionals.
- Organizing a local fire department tour to show local elected officials and planners the most vulnerable areas of the community’s wildland-urban interface and increase their understanding of risks.
- Working with insurance companies, utility providers, and others to include wildfire safety information in materials provided to area residents.
- Developing partnerships with neighborhood groups, homeowners’ associations, and others to conduct outreach activities.
- Using local fire departments to conduct education programs in schools.
- Informing the public about proper evacuation procedures.
- Forming a citizen plan implementation steering committee to monitor progress of local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.

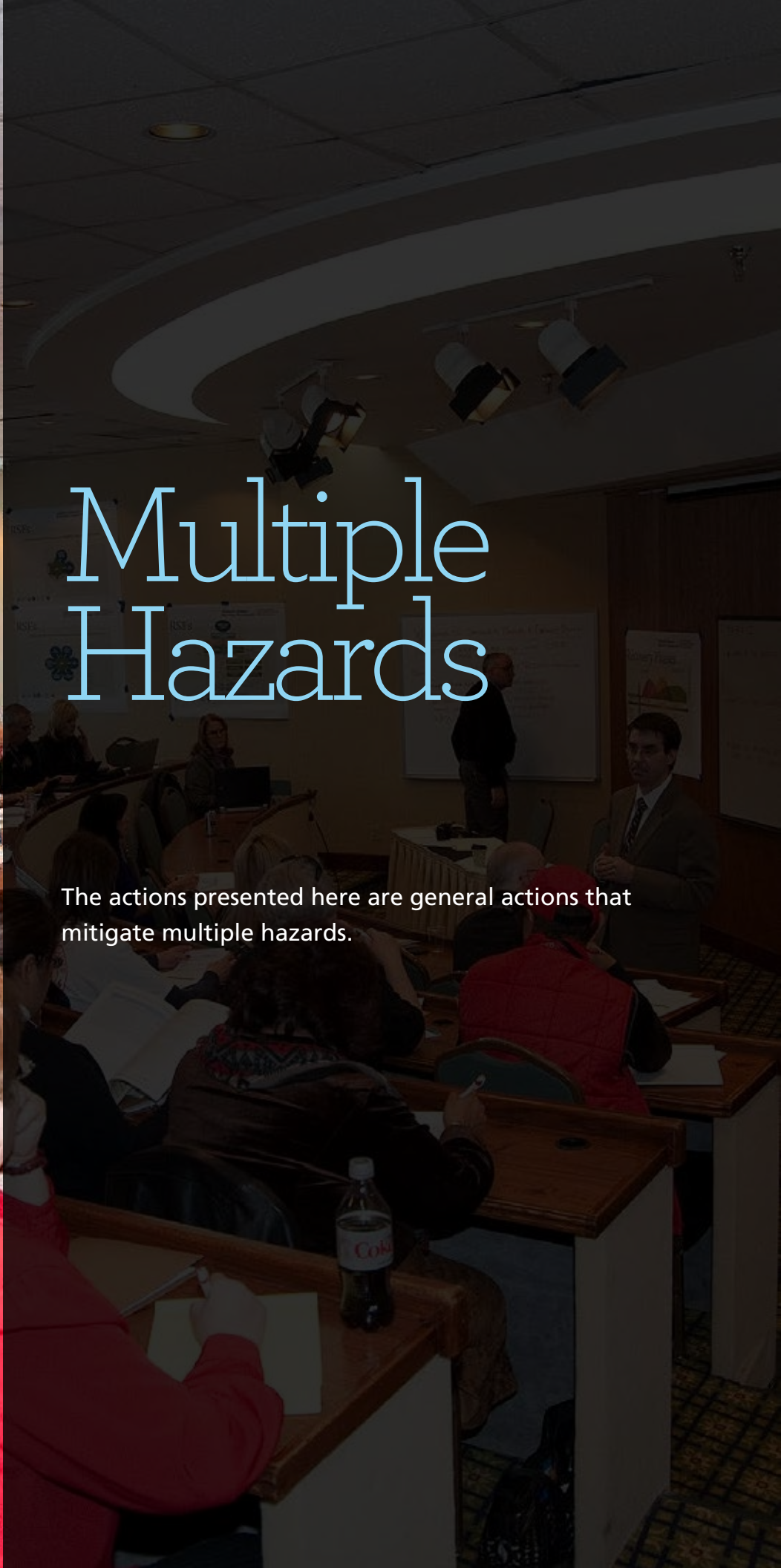
WF-12 Educate Property Owners about Wildfire Mitigation Techniques

Educate property owners on actions that they can take to reduce risk to property, such as the following:

- Installing fire mitigation systems such as interior and exterior sprinkler systems.
- Performing safe disposal of yard and household waste rather than open burning.
- Removing dead or dry leaves, needles, twigs, and combustibles from roofs, decks, eaves, porches, and yards.
- Creating a defensible space or buffer zone cleared of combustible materials around property.
- Installing and maintaining smoke detectors and fire extinguishers on each floor of their homes or other buildings.
- Safely using and storing necessary flammable materials, including machine fuels. Approved safety cans should be used for storing gasoline, oily rags, and other flammable materials. Firewood should be stacked at least 100 feet away and uphill from homes.
- Keeping flammables, such as curtains, secured away from windows or using heavy fire-resistant drapes.

Other wildfire-related mitigation actions may also apply to other hazards. See the section entitled “Multiple Hazards” for other possible ideas.





Multiple Hazards

The actions presented here are general actions that mitigate multiple hazards.

MU-1 Assess Community Risk

FEMA Resources/Publications

FEMA 366, 543

Understanding community vulnerability and level of risk is important to identify and prioritize mitigation alternatives. Improve risk assessment through the following:

- Obtaining local data including tax parcels, building footprints, critical facility locations, and other information for use in risk analysis.
- Developing and maintaining a database to track community vulnerability (i.e., exposure in known hazard areas).
- Establishing a process to coordinate with state and Federal agencies to maintain up-to-date hazard data, maps, and assessments.
- Keeping aerial photography current, especially in rapidly developing areas.
- Identifying the most at-risk critical facilities and evaluating potential mitigation techniques.

MU-2 Map Community Risk

Maps are an important tool for communicating risk. Consider the following for developing GIS capabilities:

- Developing a coordinated GIS Department. Find out who uses GIS, determine how it is used, and identify other potential uses.
- Incorporating a GIS system/management plan for tracking permitting, land use patterns, etc.
- Obtaining hazard data and using GIS to map risk for various hazards.

MU-3 Prevent Development in Hazard Areas

FEMA Resources/Publications

FEMA 476

Limit or prohibit development in high-hazard areas through the following types of actions:

- Encouraging clustering of residential lots outside of hazard areas in subdivision design/review.
- Prohibiting or limiting public expenditures for capital improvements in known hazard areas.
- Organizing a managed retreat from very high-risk areas.
- Purchasing the “right of first refusal” for hazard-prone parcels targeted for public acquisition.
- Purchasing land and title in the name of a local governing body to remove structures and enforce permanent restrictions on development.
- Acquiring and using easements (e.g., conservation) to prevent development in known hazard areas.
- Using conservation easements to protect environmentally significant portions of parcels from development.
- Acquiring hazardous areas for conservation or restoring as functional public parks.
- Acquiring safe sites for public facilities (e.g., schools, police/fire stations, etc.).
- Prohibiting new facilities for persons with special needs/mobility concerns in hazard areas.
- Prohibiting animal shelters in known hazard areas.

MU-4 Adopt Development Regulations in Hazard Areas

Regulate development in hazard areas. Examples include:

- Using subdivision and development regulations to regulate development in hazard-prone areas.
- Evaluating the use of performance/impact zoning to set risk-based standards for land development.
- Requiring setbacks from delineated hazard areas (e.g., shorelines, wetlands, steep slopes, etc.).
- Requiring conditional/special use permits for the development of known hazard areas.
- Offering expanded development rights to developers/businesses for performing mitigation retrofits.
- Incorporating restrictive covenants on properties located in known hazard areas.
- Designating high-risk zones as special assessment districts (to fund necessary hazard mitigation projects).

MU-5 Limit Density in Hazard Areas

Limit the density of development in the hazard areas through the following techniques:

- Increasing minimum lot size for development in known hazard areas.
- Designating “agricultural use districts” in the zoning ordinance to limit densities in known hazard areas.
- Ensuring the zoning ordinance encourages higher densities only outside of known hazards areas.
- Requiring clustering for planned unit developments (PUD) in the zoning ordinance to reduce densities in known hazard areas.
- Establishing a local transfer of development rights (TDR) program for risk in known hazard areas.
- Establishing a process to use floating zones to reduce densities in damaged areas following a disaster event.

MU-6 Integrate Mitigation into Local Planning

Hazard mitigation can be integrated into local planning efforts through the following:

- Incorporating risk assessment and hazard mitigation principles into comprehensive planning efforts.
- Incorporating a stand-alone element for hazard mitigation into the local comprehensive (land use) plan.
- Incorporating hazard mitigation into broader growth management (i.e., Smart Growth) initiatives.
- Incorporating a hazard risk assessment into the local development and subdivision review process.
- Adding hazard mitigation measures to existing adequate public facilities (APF) tests and programs.
- Ensuring natural hazards are considered in all land suitability analyses (LSA).
- Determining and enforcing acceptable land uses to alleviate the risk of damage by limiting exposure in such hazard areas.
- Developing a post-disaster reconstruction plan to facilitate decision making following a hazard event.
- Involving citizens in comprehensive planning activities that identify and mitigate hazards.

MU-7 Strengthen Land Use Regulations

FEMA Resources/Publications

FEMA 100, 268

Land use regulations can reduce hazard risk through the following:

- Using bonus/incentive zoning to encourage mitigation measures for private land development.
- Using conditional use zoning to require or exact mitigation measures for private land development.
- Establishing a process to use overlay zones to require mitigation techniques in high-hazard districts.
- Adopting a post-disaster recovery ordinance based on a plan to regulate repair activity, generally depending on property location.
- Adopting environmental review standards.
- Incorporating proper species selection, planting, and maintenance practices into landscape ordinances.

MU-8 Adopt and Enforce Building Codes

FEMA Resources/Publications

FEMA 421,P-762

Building codes and inspections help ensure buildings can adequately withstand damage during hazard events. Effective actions include:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Increasing the local Building Code Effectiveness Grading Schedule (BCEGS) classification through higher building code standards and enforcement practices.
- Incorporating higher standards for hazard resistance in local application of the building code.
- Providing advanced training to local building inspectors.
- Considering orientation of new development during design (e.g., subdivisions, buildings, infrastructure, etc.)
- Requiring standard tie-downs of propane tanks.
- Requiring tie-downs for all manufactured housing.
- Establishing moratorium procedures to guide the suspension of post-disaster reconstruction permits.
- Revising fire codes to limit hotel room occupancy to ensure timely evacuation of high-use and multi-floor structures.
- Establishing “value-added” incentives for hazard-resistant construction practices beyond code requirements.

MU-9 Create Local Funding Mechanisms for Hazard Mitigation

Local funding resources can be developed through the following measures:

- Establishing a local reserve fund for public mitigation measures.
- Using impact fees to help fund public hazard mitigation projects related to land development (i.e., increased runoff).
- Requiring a development impact tax on new construction to mitigate the impacts of that development.
- Recruiting local financial institutions to participate in “good neighbor” lending for private mitigation practices.
- Providing local match to Federal funds that can fund private mitigation practices.

MU-10 Incentivize Hazard Mitigation

Incentives and disincentives can be used to promote hazard mitigation through the following measures:

- Using special tax assessments to discourage builders from constructing in hazardous areas.
- Using insurance incentives and disincentives (i.e., incentives for best practices).
- Providing tax incentives for development of low-risk hazard parcels.
- Waiving permitting fees for home construction projects related to mitigation.
- Using tax abatements, public subsidies, and other incentives to encourage private mitigation practices.
- Reducing or deferring the tax burden for undeveloped hazard areas facing development pressure.
- Encouraging infill development through tax incentives, streamlined approval processes, etc.

MU-11 Monitor Mitigation Plan Implementation

Monitoring the implementation of the local mitigation plan can ensure that mitigation actions are being completed through:

- Forming a plan implementation steering committee to monitor progress on local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.
- Preparing a plan implementation monitoring schedule and outlining roles for those responsible for monitoring (i.e., local departments, agencies, and committees).
- Preparing and submitting an annual plan implementation progress report to the local elected body.

Structure and Infrastructure Projects

MU-12 Protect Structures

FEMA Resources/Publications

FEMA 577, P-798

Damage to structures can be prevented through the following actions:

- Acquiring or relocating structures located in hazard areas.
- Moving vulnerable structures to a less hazardous location.
- Relocating or retrofitting public buildings located in high-hazard areas.
- Relocating or retrofitting endangered public housing units in high-hazard areas.
- Retrofitting fire and police stations to become hazard resistant.
- Identifying and strengthening facilities to function as public shelters.

MU-13 Protect Infrastructure and Critical Facilities

FEMA Resources/Publications

FEMA 345, 476

Infrastructure and critical facilities can be protected from damage by the following:

- Incorporating hazard mitigation principles into all aspects of public-funded building.
- Incorporating mitigation retrofits for public facilities into the annual capital improvements program.
- Engineering or retrofitting roads and bridges to withstand hazards.
- Relocating or undergrounding electrical infrastructure.
- Designing and building water tanks or wells for use in times of water outage.
- Installing quick-connect emergency generator hook-ups for critical facilities

Education and Awareness Programs

MU-14 Increase Hazard Education and Risk Awareness

FEMA Resources/Publications

EMI IS-22

Hazard education and awareness activities that address multiple hazards include:

- Developing and implementing a multi-hazard public awareness program.
- Providing information on all types of hazards, preparedness and mitigation measures, and responses during hazard events.
- Establishing a “hazard awareness week” in coordination with the media to promote hazard awareness (seasonal).
- Establishing an interactive website for educating the public on hazard mitigation and preparedness measures.
- Annually hosting a public hazards workshop or exposition for all residents.
- Establishing hazard information centers.
- Creating a speakers bureau for disaster-related topics that focus on mitigation and preparedness measures.
- Enhancing hazard awareness of the private sector, particularly lenders, insurance agents, and realtors.
- Scheduling an annual “what’s new in mitigation” briefing for the local governing body (possibly with SHMO, etc.).

MU-15 Improve Household Disaster Preparedness

FEMA Resources/Publications
EMI IS-22

Educate the public on how to prepare for hazards and disasters, including the following:

- Encouraging property owners to purchase hazard insurance not as an alternative to mitigation, but rather to add financial protection if damage does occur.
- Encouraging residents to prepare by stocking up the necessary items and planning for how family members should respond during a disaster. Publicized information about household preparedness can be found at www.ready.gov.
- Providing hazard vulnerability checklists for homeowners to conduct their own inspections.
- Promoting the purchase and use of NOAA weather radios by residents.
- Encouraging citizens to secure loose items (i.e., patio furniture).
- Participating in Nation Weather Service StormReady Program.
- Purchasing and installing NOAA weather radios in schools, government buildings, parks, etc.
- Storing digital or hard copies of public records in low-risk, offsite locations.

MU-16 Promote Private Mitigation Efforts

FEMA Resources/Publications
EMI IS-22

Encourage private mitigation efforts that address multiple hazards through the following:

- Using outreach programs to: 1) advise homeowners of risks to life, health, and safety; 2) facilitate technical assistance programs that address measures that citizens can take; or 3) facilitate funding for mitigation measures.
- Establishing, maintaining, and publicizing a library section on hazard mitigation techniques for local residents.
- Identifying and recruiting civic groups and volunteer agencies for community mitigation projects.
- Establishing a network for a business-to-business mitigation mentoring program.
- Offering hazard susceptibility audits of local small businesses.
- Completing a “demonstration model” showing use of hazard mitigation techniques for public display.
- Establishing a technical assistance program for residents to access data or resources for mitigation purposes.
- Educating the public on tradeoffs associated with multi-hazard design.



Protecting Building Utilities From Flood Damage

Principles and Practices for the Design of Flood Resistant Building Utility Systems

FEMA P-348, Edition 1 / November 1999



FEMA



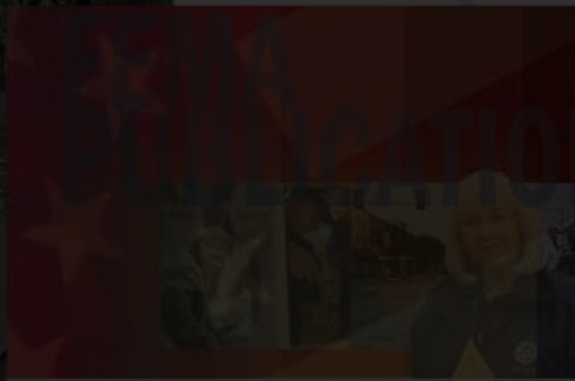
Engineering Principles and Practices

for Retrofitting Flood-Prone Residential Structures

(Third Edition)
FEMA P-259 / January 2012



FEMA



FEMA Publications Catalog

FEMA P-20 / February 2009

FEMA Resources/Publications

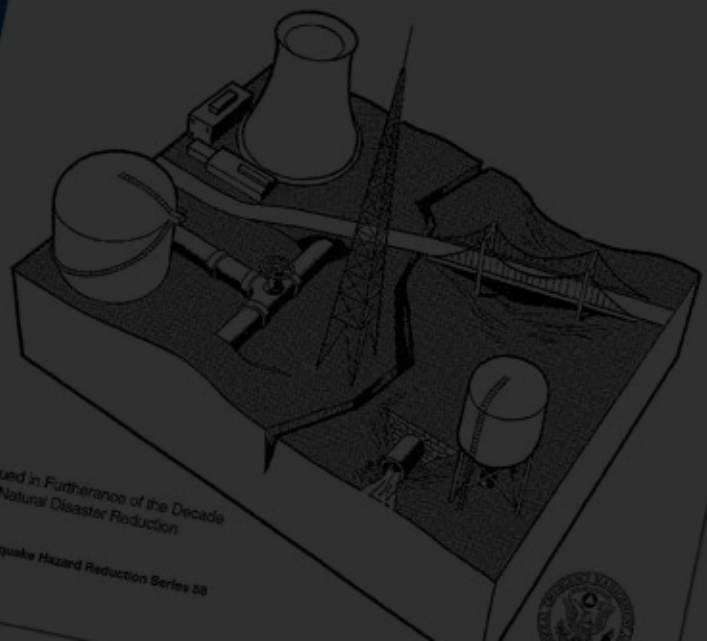
FEMA 306
EVALUATION OF EARTHQUAKE DAMAGED CONCRETE AND MASONRY WALL BUILDINGS
Basic Procedures Manual

Prepared by:
Applied Technology Council (ATC-43 Project)

Federal Emergency Management Agency

FEMA 224 / September 1991

Seismic Vulnerability and Impact of Disruption of Lifelines in the Conterminous United States



Issued in Furtherance of the Decade for Natural Disaster Reduction

Earthquake Hazard Reduction Series 28

1. **FEMA 20** FEMA Publications Catalog
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2894>
2. **FEMA 54** Elevated Residential Structures
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1670>
3. **FEMA P-55** Coastal Construction Manual: Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas (4th ed.)
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1671>
4. **FEMA E-74** Reducing the Risks of Nonstructural Earthquake Damage: A Practical Guide. Fourth Edition
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4626>
5. **FEMA 83** Seismic Considerations for Communities at Risk
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6. **FEMA P-85** Protecting Manufactured Homes from Floods and Other Hazards
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8. **FEMA 114** Design Manual for Retrofitting Flood-prone Residential Structures
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1414>
9. **FEMA 154** Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook. Second Edition
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3556>
10. **FEMA 155** Rapid Visual Screening of Buildings for Potential Seismic Hazards: Supporting Documentation. Second Edition
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3557>
11. **FEMA 182** Landslide Loss Reduction: A Guide for State and Local Government Planning
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1417>
12. **FEMA 202** Earthquake Resistant Construction of Electric Transmission and Telecommunication Facilities Serving the Federal Government
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1635>
13. **FEMA 209** Flood: Are You Protected From the Next Disaster
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1726>
14. **FEMA 213** Answers to Questions About Substantially Damaged Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1636>
15. **FEMA 221** Collocation Impacts on the Vulnerability of Lifelines during Earthquakes with Applications to the Cajon Pass, California: Study Overview
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1637>
16. **FEMA 224** Seismic Vulnerability and Impact of Disruption of Lifelines in the Conterminous United States
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1518>
17. **FEMA 225** Inventory of Lifelines in the Cajon Pass, California
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1746>
18. **FEMA 226** Collocation Impacts on the Vulnerability of Lifelines during Earthquakes with Applications to the Cajon Pass, California
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1748>
19. **FEMA 232** Homebuilders' Guide to Earthquake-Resistant Design and Construction
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2103>
20. **FEMA 233** Earthquake Resistant Construction of Gas and Liquid Fuel Pipeline Systems Serving or Regulated by the Federal Government
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1639>

21. **FEMA 254** Seismic Retrofit Incentive Programs: A Handbook for Local Governments
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1523>
22. **FEMA P-259** Engineering Principles and Practices of Retrofitting Flood-prone Residential Structures, Third Edition
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1645>
23. **FEMA 266** Creating a Seismic Safety Advisory Board: A Guide to Earthquake Risk Management
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1646>
24. **FEMA 268** Protecting Floodplain Resources – A Guidebook for Communities
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1419>
25. **FEMA 306** Evaluation of Earthquake Damaged Concrete and Masonry Wall Buildings: Basic Procedures Manual
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1651>
26. **FEMA 307** Evaluation of Earthquake Damaged Concrete and Masonry Wall Buildings: Technical Resources
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1652>
27. **FEMA 313** Promoting the Adoption and Enforcement of Seismic Building Codes: A Guidebook for State Earthquake and Mitigation Managers
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1421>
28. **FEMA 320 FEMA P-320** - Taking Shelter From the Storm: Construction Plans and Specifications
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=5788>
29. **FEMA 345** Hazard Mitigation Grant Program Brochure-Desk Reference
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1472>
30. **FEMA 347** Above the Flood: Elevating your Flood-prone House
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1424>
31. **FEMA P-348** Protecting Building Utilities from Flood Damage
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1750>
32. **FEMA 349** Action Plan for Performance Based Seismic Design
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1656>
33. **FEMA 356** Prestandard and Commentary for the Seismic Rehabilitation of Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1427>
34. **FEMA 361** Design and Construction Guidance for Community Safe Rooms
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1657>
35. **FEMA 366** HAZUS-MH Estimated Annualized Earthquake Losses for the United States
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3265>
36. **FEMA 389** Communicating with Owners and Managers of New Buildings on Earthquake Risk
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1431>
37. **FEMA 395** Incremental Seismic Rehabilitation of School Buildings (K-12) : Providing Protection to People and Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1980>
38. **FEMA 396** Incremental Seismic Rehabilitation of Hospital Buildings : Providing Protection to People and Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1981>
39. **FEMA 412** Installing Seismic Restraints for Mechanical Equipment
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1557>
40. **FEMA 413** Installing Seismic Restraints for Electrical Equipment
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1436>
41. **FEMA 414** Installing Seismic Restraints for Duct and Pipe
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1437>

42. **FEMA 416** Using GIS to Demonstrate Successful Floodplain Management
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1850>
43. **FEMA P-420** Engineering Guideline for Incremental Seismic Rehabilitation
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3792>
44. **FEMA 421** Planning for Post-Disaster Recovery and Reconstruction
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1558>
45. **FEMA P-431** Tornado Protection: Selecting Refuge Area in Buildings, Second Edition
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1563>
46. **FEMA 453** Safe Rooms and Shelters - Protecting People Against Terrorist Attacks
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1910>
47. **FEMA 454** Designing for Earthquakes: A Manual for Architects
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2418>
48. **FEMA 467-1** Floodplain Management Bulletin on the Elevation Certificate
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1727>
49. **FEMA 473** Technical Manual for Dam Owners: Impacts of Animals on Earthen Dams
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1441>
50. **FEMA 474** Promoting Seismic Safety: Guidance for Advocates
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1662>
51. **FEMA 476** Preparing for Disaster for People with Disabilities and other Special Needs
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1442>
52. **FEMA 480** National Flood Insurance Program, Floodplain Management Requirements, A Study Guide and Desk Reference for Local Officials, Federal Emergency Management Agency
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1443>
53. **FEMA P-499** Home Builder's Guide to Coastal Construction
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2138>
54. **FEMA 526** Earthquake Safety Checklist
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1664>
55. **FEMA 527** Earthquake Safety Activities for Children and Teachers
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1665>
56. **FEMA 528** Earthquake Home Hazard Hunt Poster
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1666>
57. **FEMA 529** Drop, Cover and Hold Poster
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1667>
58. **FEMA 530** Earthquake Safety Guide for Homeowners
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1449>
59. **FEMA 543** Design Guide for Improving Critical Facility Safety from Flooding and High Winds: Providing Protection to People and Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2441>
60. **FEMA 547** Techniques for the Seismic Rehabilitation of Existing Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2393>
61. **FEMA 550** Recommended Residential Construction for Coastal Areas: Building on Strong and Safe Foundations
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1853>

62. **FEMA 577** Design Guide for Improving Hospital Safety in Earthquakes, Floods, and High Winds: Providing Protection to People and Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2739>
63. **FEMA 646-A** Vertical Evacuation from Tsunamis: A Guide for Community Officials
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3808>
64. **FEMA P-646** Guidelines for Design of Structures for Vertical Evacuation from Tsunamis
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3463>
65. **FEMA P-737** Home Builder's Guide to Construction in Wildfire Zones
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3646>
66. **FEMA P-749** Earthquake-Resistant Design Concepts: An Introduction to the NEHRP Recommended Seismic Provisions for New Buildings and Other Structures
<http://www.fema.gov/library/viewRecord.do?sessionId=8BCBB8D4C6C901175A81648298D5380E.WorkerLibrary?fromSearch=fromsearch&id=4711>
67. **FEMA P-750** NEHRP Recommended Seismic Provisions for New Buildings and Other Structures. 2009 Edition
<http://www.fema.gov/library/viewRecord.do?sessionId=8BCBB8D4C6C901175A81648298D5380E.WorkerLibrary?fromSearch=fromsearch&id=4103>
68. **FEMA P-754** Wildfire Hazard Mitigation Handbook for Public Facilities (P-754)
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3723>
69. **FEMA P-762** Local Officials Guide for Coastal Construction
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=3647>
70. **FEMA P-774** Unreinforced Masonry Buildings and Earthquakes: Developing Successful Risk Reduction Programs
<http://www.fema.gov/library/viewRecord.do?sessionId=8BCBB8D4C6C901175A81648298D5380E.WorkerLibrary?fromSearch=fromsearch&id=4067>
71. **FEMA B-797** Hazard Mitigation Field Book - Roadways
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4271>
72. **FEMA P-798** Natural Hazards and Sustainability for Residential Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4347>
73. **FEMA P-804** Wind Retrofit Guide for Residential Buildings
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4569>
74. **FEMA P-811** QuakeSmart Toolkit
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4958>
75. **FEMA NFIP** Technical Bulletins
<http://www.fema.gov/national-flood-insurance-program-2/nfip-technical-bulletins>
76. **FEMA ROVER** Rapid Observation of Vulnerability and Estimation Risk (ROVER) Tool
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4616>
77. **FIA-15A** National Flood Insurance Program Community Rating System Coordinator's Manual
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1741>
78. **EMI IS-22** Are You Ready? An In-Depth Guide to Citizen Preparedness
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2314>
79. **HMA EHP at-a-Glance Guide:** Project Planning with Considerations for EHP Compliance
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=5904>
80. **Building Code Tool Kit** (FEMA CD, available in December 2012)
<http://www.fema.gov/earthquake>

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APPENDIX F. PLAN MAINTENANCE TOOLS

This appendix includes tools and worksheets to facilitate plan maintenance and review by the Galveston County Steering and Planning Committees.

In the first year of the performance period, an online performance progress reporting system, the BAToolSM will provide municipal and county representatives direct access to their mitigation initiatives to easily update the status of each project, document successes or obstacles to implementation, add or delete projects to maintain mitigation project implementation. This online program will capture information and roll all input into a report to summarize mitigation strategy progress.

The FEMA 386-4 guidance worksheets are also available to assist with progress reporting. These worksheets are provided below for ease of access to the HMP Coordinator and Planning Partnership to maintain the 2022 HMP throughout its period of performance.

Mitigation Action Progress Report Form

Progress Report Period	From Date:	To Date:
Action/Project Title		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Project Status	☐ Project completed ☐ Project canceled ☐ Project on schedule ☐ Anticipated completion date: _____ ☐ Project delayed Explain _____	

Summary of Project Progress for this Report Period

1. What was accomplished for this project during this reporting period?

2. What obstacles, problems, or delays did the project encounter?

3. If uncompleted, is the project still relevant? Should the project be changed or revised?

4. Other comments

Worksheet 7.1

Mitigation Action Progress Report Form

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Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Planning Process	Should new jurisdictions and/or districts be invited to participate in future plan updates?	
	Have any internal or external agencies been invaluable to the mitigation strategy?	
	Can any procedures (e.g., meeting announcements, plan updates) be done differently or more efficiently?	
	Has the Planning Team undertaken any public outreach activities?	
	How can public participation be improved?	
	Have there been any changes in public support and/or decision-maker priorities related to hazard mitigation?	
Capability Assessment	Have jurisdictions adopted new policies, plans, regulations, or reports that could be incorporated into this plan?	
	Are there different or additional administrative, human, technical, and financial resources available for mitigation planning?	
	Are there different or new education and outreach programs and resources available for mitigation activities?	
	Has NFIP participation changed in the participating jurisdictions?	
Risk Assessment	Has a natural and/or technical or human-caused disaster occurred?	
	Should the list of hazards addressed in the plan be modified?	
	Are there new data sources and/or additional maps and studies available? If so, what are they and what have they revealed? Should the information be incorporated into future plan updates?	
	Do any new critical facilities or infrastructure need to be added to the asset lists?	
	Have any changes in development trends occurred that could create additional risks?	
	Are there repetitive losses and/or severe repetitive losses to document?	

Worksheet 7.2

Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Mitigation Strategy	Is the mitigation strategy being implemented as anticipated? Were the cost and timeline estimates accurate?	
	Should new mitigation actions be added to the Action Plan? Should existing mitigation actions be revised or eliminated from the plan?	
	Are there new obstacles that were not anticipated in the plan that will need to be considered in the next plan update?	
	Are there new funding sources to consider?	
	Have elements of the plan been incorporated into other planning mechanisms?	
Plan Maintenance Procedures	Was the plan monitored and evaluated as anticipated?	
	What are needed improvements to the procedures?	

STATE AND LOCAL MITIGATION PLANNING
how-to guide

Bringing the Plan to Life

implementing the hazard
mitigation plan



FEMA

August 2003
FEMA 386-4

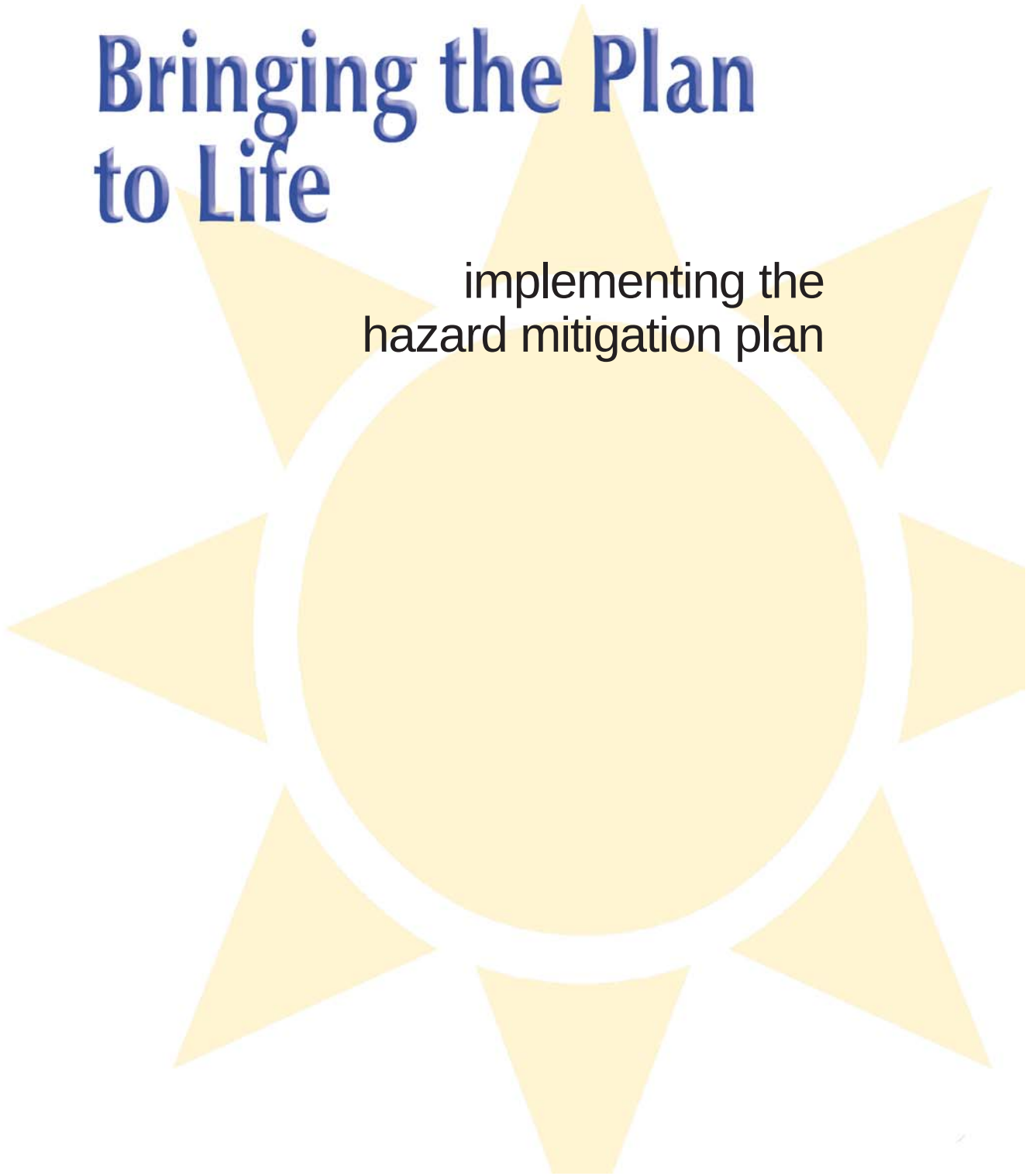
implementing the hazard mitigation plan

BRINGING THE PLAN TO LIFE

STATE AND LOCAL MITIGATION PLANNING
how-to guide

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the hazard mitigation planning process

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and manmade hazards. As shown in this diagram, the hazard mitigation planning process consists of four basic phases.

For illustration purposes, this diagram portrays a process that appears to proceed sequentially. However, the mitigation planning process is rarely a linear process. It is not unusual that ideas developed while assessing risks should need revision and additional information while developing the mitigation plan, or that implementing the plan may result in new goals or additional risk assessment.

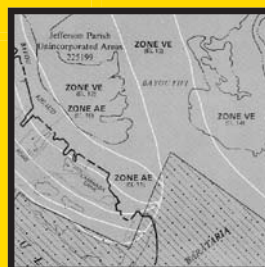
organize resources

From the start, communities should focus on the resources needed for a successful mitigation planning process. Essential steps include identifying and organizing interested members of the community as well as the technical expertise required during the planning process.



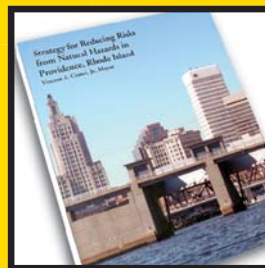
assess risks

Next, communities need to identify the characteristics and potential consequences of hazards. It is important to understand how much of the community can be affected by specific hazards and what the impacts would be on important community assets.



develop a mitigation plan

Armed with an understanding of the risks posed by hazards, communities need to determine what their priorities should be and then look at possible ways to avoid or minimize the undesired effects. The result is a hazard mitigation plan and strategy for implementation.



implement the plan and monitor progress

Communities can bring the plan to life in a variety of ways ranging from implementing specific mitigation projects to changes in the day-to-day operation of the local government. To ensure the success of an on-going program, it is critical that the plan remains relevant. Thus, it is important to conduct periodic evaluations and make revisions as needed.



foreword

foreword

The Federal Emergency Management Agency (FEMA) has developed this series of mitigation planning “how-to” guides to assist states, tribes, and communities in enhancing their hazard mitigation planning capabilities.

These guides are designed to provide the type of information states, tribes, and communities need to initiate and maintain a planning process that will result in safer and more disaster-resistant communities. These guides are applicable to states, tribes, and communities of various sizes and varying ranges of financial and technical resources.

This how-to series is not intended to be the last word on any of the subject matter covered; rather, it is meant to provide easy to understand guidance for the field practitioner. In practice, these guides may be supplemented with more extensive technical data and the use of experts when necessary.



mit-i-gate 1: to cause to become less harsh or hostile; 2: to make less severe or painful.

As defined by DMA 2000—

hazard mitigation : any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.

plan-ning : the act or process of making or carrying out plans; *specif*: the establishment of goals, policies and procedures for a social or economic unit.

DMA

The Disaster Mitigation Act of 2000

In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest legislation to improve the hazard mitigation planning process. DMA 2000 (Public Law 106-390) was signed by the President on October 30, 2000. The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, DMA 2000 establishes a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP).

Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels. This section identifies new requirements that allow HMGP funds to be used for planning actions, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States, tribes, and communities must have an approved mitigation plan in place before receiving HMGP funds. Local and tribal mitigation plans must demonstrate that their proposed mitigation actions are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

State governments have certain responsibilities for implementing Section 322, including:

- Preparing and submitting a standard or enhanced state mitigation plan;
- Reviewing and updating the state mitigation plan every three years;
- Providing technical assistance and training to local governments to assist them in developing local mitigation plans and applying for HMGP grants; and
- Reviewing and approving local plans if the state has an approved enhanced plan and is designated a managing state.

DMA 2000 is intended to facilitate cooperation between state and local authorities. It encourages and rewards local, tribal, and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network will better enable local, tribal, and state governments to articulate their needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects. To implement the new DMA 2000 requirements, FEMA prepared an Interim Final Rule, published in the Federal Register on February 26, 2002, at 44 CFR Parts 201 and 206, which establishes planning and funding criteria for states, tribes, and local communities.

The how-to guides cover the following topics:

- Getting started with the mitigation planning process, including important considerations for how you can organize your efforts to develop an effective mitigation plan (FEMA 386-1);
- Identifying hazards and assessing losses to your community, tribe, or state (FEMA 386-2);
- Setting mitigation priorities and goals for your community, tribe, or state and writing the plan (FEMA 386-3);
- Implementing the mitigation plan, including project funding and maintaining a dynamic plan that changes to meet new developments (FEMA 386-4);
- Evaluating and prioritizing potential mitigation actions through the use of benefit-cost analysis and other techniques (FEMA 386-5);
- Incorporating special considerations into hazard mitigation planning for historic structures and cultural resources (FEMA 386-6);
- Incorporating mitigation considerations for manmade hazards into hazard mitigation planning (FEMA 386-7);
- Using multi-jurisdictional approaches to mitigation planning (FEMA 386-8); and
- Finding and securing technical and financial resources for mitigation planning (FEMA 386-9).

Why should you spend the time to read these guides?

- It simply costs too much to address the effects of disasters only after they happen;
- State and federal aid is usually insufficient to cover the extent of physical and economic damages resulting from disasters;
- You can prevent a surprising amount of damage from hazards if you take the time to anticipate where and how they occur, and then take the appropriate action to minimize damages;
- You can lessen the impact of disasters and speed the response and recovery process for both natural and manmade hazards; and



- The most meaningful steps in avoiding the impacts of hazards are taken at the state, tribal, and local levels by officials and community members who have a personal stake in the outcome and the ability to follow through on a sustained process of planning and implementation.

The guides show how mitigation planning:

- Can help your community become more *sustainable and disaster resistant* through selecting the most appropriate mitigation actions, based on the knowledge you gained in the hazard identification and loss estimation process;
- Can be incorporated as an *integral component* of daily government business;
- Allows you to *focus your efforts on the hazard areas most important to you* by determining and setting priorities for mitigation planning efforts; and
- Can *save you money* by providing a forum for engaging in partnerships that provide the technical, financial, and staff resources in your effort to reduce the effects, and hence the costs, of natural and manmade hazards.

These guides present a range of approaches to preparing a hazard mitigation plan. There is no one right planning process; however, there are certain central themes to planning, such as engaging citizens, developing goals and objectives, and monitoring progress. Select the approach that works best for your state, tribe, or community.



The process used to develop a successful hazard mitigation plan is just as important as the plan itself.

This how-to guide focuses on the fourth phase of the hazard mitigation planning process and will help you develop a mitigation plan that meets DMA 2000 requirements.





introduction

introduction

Your community now has a plan that is a result of the planning team's effort and work with stakeholders concerned about reducing losses from hazards in your community. This plan resulted from a process that included a risk assessment, capability assessment, and the development of a mitigation strategy that features prioritized mitigation actions based upon your goals and objectives. The **implementation process** puts your planning team's hard work into motion and focuses on the actions necessary to establish and maintain the effectiveness of the plan as a fundamental tool for risk reduction.

An added benefit of having a plan is that its printed form is familiar, even reassuring, to citizens who have been part of a comprehensive planning process or, even more importantly, have suffered losses due to a hazard. In addition, those new to the community, as well as non-residents, will have easy access to this information as well. The text and accompanying graphics concisely and coherently document the hazards faced by the community, their location and extent, previous losses, actions to mitigate future hazards, and goals for a sustainable future. The development of the plan by community members increases the likelihood of hazard mitigation becoming, like transportation and education, one of the standard considerations in the evolution and growth of the community.

Once the plan has been adopted and the recommendations implemented, your accomplishments, issues, programs, policies, and project results should be accurately documented. This documentation will be very useful when it is time to evaluate, update, or revise the plan. Plans are living documents that require adjustments to maintain their relevance. You and the planning team prepared the mitigation plan to articulate your community's values and strategies at a particular point in time, but like every other plan, it must be reviewed periodically to remain a useful tool to guide growth and change in your community.

Updates and revisions may be necessary to incorporate changes in your community or tribe, new hazard information, new tribal, community, or state priorities, or lessons learned as mitigation projects are completed. It is recommended, but not required, that you com-

This series of guides shows how to identify, plan, and implement cost-effective actions through a comprehensive approach known as **Hazard Mitigation Planning**.



- **Organize resources** involves organizing resources, mobilizing the community, and getting started with the planning process;
- **Assess risks** identifies hazards and estimates the losses associated with these hazards;
- **Develop a mitigation plan** describes how to identify, plan, and initiate cost-effective actions; and
- **Implement the plan and monitor progress**, the topic of this guide—*Bringing the Plan to Life: Implementing the Hazard Mitigation Plan* (FEMA 386-4)—leads communities and states through the formal adoption of the plan and discusses how to implement, monitor, and evaluate the results of mitigation actions to keep the mitigation plan relevant over time.

The implementation and evaluation processes

ensure that you accomplish the mitigation actions in a timely way and provide the foundation for an ongoing mitigation program. This allows you to:



- Ensure that the mitigation strategy is implemented in an effective manner;
- Provide for the long-term institutionalization and monitoring of hazard mitigation practices so that the plan remains relevant in the face of change;
- Establish new protocols. The planning process educates community officials on their roles (and those of their departments) in reducing risks. Local officials will need to develop protocols for integrating mitigation principles into their daily job responsibilities; and
- Maintain momentum. The implementation phase is a good time to renew the spirit of cooperation among all partners in the planning process, particularly now that actions to reduce risk are imminent.

States should continually work with local jurisdictions to

ensure that local plans are in conformance with state guidelines and complement the goals and strategies outlined in the state hazard mitigation plan, particularly as state priorities change.



plete an internal review of the plan annually and revisit your plan after all hazard events. DMA 2000 regulations require updates every three years for state plans, and every five years for local plans, in order for states, tribes, and communities to remain eligible for disaster-related grants and assistance. This guide will help you determine when and how to review and revise your mitigation plan.

How do you use this how-to guide?

This guide will help you address the following questions:

1. How can we make sure the plan is officially recognized?

Proof of formal adoption is required under DMA 2000 regulations. Getting the plan adopted ensures the support and approval of the governing authority in your jurisdiction. Step 1, *Adopt the Mitigation Plan*, discusses ways of securing the adoption of the plan by your governing body.

2. What is the most effective mechanism to implement each recommendation? What resources are available? How can we keep the public informed and actively involved now that initiatives are underway?

Your mitigation strategy probably contains various short- and long-term recommendations. While you identified potential sources of funding in the plan, the actual sources of funding, staff time, and staffing needs may change before project implementation gets underway. The planning team always must be on the lookout for alternative sources of funding, new opportunities, and new partnerships through which to carry out the recommendations.

Determining who will bear responsibility for implementing planned actions is key to getting the implementation phase off to a successful start. Ensuring that there are appropriate authorities to implement actions is covered in Step 2, *Implement the Plan Recommendations*.

3. How will we know if our mitigation strategy is working?

Monitoring and evaluating the outcomes of the mitigation actions are essential to knowing whether to stay the course or change it. Step 3, *Evaluate Your Planning Results*, discusses how to determine whether or not the planned course of action has had the desired effect. The successes and limitations of your efforts should be documented as part of the evaluation process.

Celebrating successes, and keeping citizens actively involved and informed of the progress of the hazard mitigation initiatives, are



just as important in the adoption, implementation, and revision phases as in any other phase. Keeping everyone up to date on progress also will help sustain support for mitigation as a local, tribal, or state priority. During the implementation phase, the media will become an especially important tool in communicating the progress of the mitigation plan.

4. *When should we reexamine the plan?*

As has been noted throughout the how-to series, the community and its assets are constantly changing, requiring the mitigation plan to be updated periodically. While DMA 2000 regulations require a formal review and revision of the community plan once every five years for local jurisdictions and every three years for states, the planning team should reevaluate its implementation strategy as new opportunities, unforeseen challenges, and disasters arise. Additionally, as mitigation issues are resolved, the plan should be reexamined to determine whether there is a need to reprioritize, add, or reconfigure actions in light of what has been accomplished. Step 4, *Revise the Plan*, addresses how to incorporate new knowledge about the community, tribe, or state and ongoing mitigation efforts into your strategy.



Be sure to allow sufficient time

to complete Phase 4. If you decide to revise the plan, or if you are required to revise it as

described under DMA 2000, consider the time it will take to do the following:

- Include the public and identify any new stakeholders in the evaluation process;
- Gather and evaluate data;
- Brief the public and political leadership;
- Incorporate changes into planning documents; and
- Adopt the new plan.

Type of information found in the how-to series

The how-to series contains a wide variety of information, some of which is highlighted with icons. Additional information can be found in Appendix B, *Library*. To illustrate how the guide can be used, newspaper articles from the fictional Town of Hazardville are provided.

Icons



Guidance focused solely on the role of **states and tribes** that serve as grantees under HMGP is identified as a sidebar with the “**States**” icon. Tribes that choose to serve as grantees under HMGP should follow the state icons. Although much of the information will be the same for local, tribal, and state governments, there are different requirements for state and local mitigation plans. Furthermore, states have additional responsibilities to assist local entities in their planning efforts. For tribes that choose to serve as subgrantees under HMGP, guidance focusing on local governments applies to these entities as well.



Under DMA 2000 regulations,

local governments may be defined in many different ways. A local government may be defined

by a political boundary, such as an incorporated city, county, parish, or township, or it may not have a distinct political boundary, for example, a watershed or metropolitan region. “Local government” is formally defined in 44 CFR §201.2 of DMA regulations.





The “**Advanced**” icon indicates an additional step you can take or when specialists may be needed.



The “**Caution**” icon alerts you to important information and ways to avoid sticky situations later in the planning process.



The “**DMA**” icon provides information relating to the mitigation planning requirements outlined in the Disaster Mitigation Act of 2000 (DMA 2000).



The “**Glossary**” icon identifies terms and concepts for which a detailed explanation is provided in the Glossary included in Appendix A.



The “**Tips**” icon identifies helpful hints and useful information that can be used in the planning process.

Library

A mitigation planning “**Library**” has been included in Appendix B. This library has a wealth of information, including Web addresses, reference books, and other contact information to help get you started. All of the Web sites and references listed in the how-to guide are included in the library.

Town of Hazardville articles

Applications of the various steps in the mitigation planning process are illustrated through a fictional community, the Town of Hazardville, located in the State of Emergency. Hazardville, a small community with limited resources and multiple hazards, is in the process of developing a multi-hazard mitigation plan. Newspaper accounts illustrate the various steps in the mitigation planning process.

Worksheets

Finally, to help track your progress, worksheets have been developed that correspond with the structure of this guide. Worksheets have been completed with Hazardville examples to illustrate the

type of information to include. Blank worksheets are included in Appendix C. You can photocopy the worksheets to record your progress as you undertake the processes of implementing and evaluating the mitigation plan.

The Hazardville Post

Vol. CXIII No. 28

Tuesday, January 28, 2003

Public Responds to Hazardville Mitigation Plan

[Hazardville, EM] The Town of Hazardville Organization for Risk Reduction (THORR) has received over 50 comments regarding the Hazardville Mitigation Plan. The plan was created to help reduce the community's risk to hazards such as flooding, earthquakes, and other natural hazards.

Joe Norris, lead planner for THORR, said the team has been working closely with citizens, businesses, and other community representatives to develop a plan that would create a safer, more resilient Hazardville. THORR was committed to having community input throughout the planning process. "At first, we had a hard time getting the community interested. The citizens didn't know what to expect," Norris said.

Many in the community were skeptical of exactly what the plan was supposed to accomplish. Riley

Howard, an advocate for the town's less privileged citizens in the Raging River Views Park was perhaps the most outspoken opponent of the plan. At first, Howard worried that the benefits of this plan might not help the people he felt needed it the most.

"I have tried for years to get the community to help the poor residents in the low-income neighborhood who get flooded out every spring when the snow begins to melt. The town never knew how they could help the residents other than to assist in clean-up and debris removal. The residents could not afford to relocate on their own. All of the houses that are affected year after year were identified in the hazard identification and risk assessment as being in a 10-year flood zone, and are very vulnerable to any sort of flash floods or even a heavy rain." (A 10-year flood has a 10 per-

cent chance of occurring in any one year.)

"While I was deeply saddened by this information," Howard said, "I was relieved to see that it turned out to be a good thing after all. Once the town and the Council learned what a dangerous area that was, the entire neighborhood was prioritized for buyouts, which will allow these residents to get fair market value for their home and help them move out of harm's way."

In an interview, THORR's outreach coordinator, Charity Jones, who works for the Hazardville Department of Health and Human Services, said, "The citizens of Hazardville should feel good about what they did to develop this plan. I know I am proud of all the work that THORR and Hazardville community members have put into its creation. This is truly a plan driven by the community's concerns and needs."

step

1

adopt the
mitigation plan

2

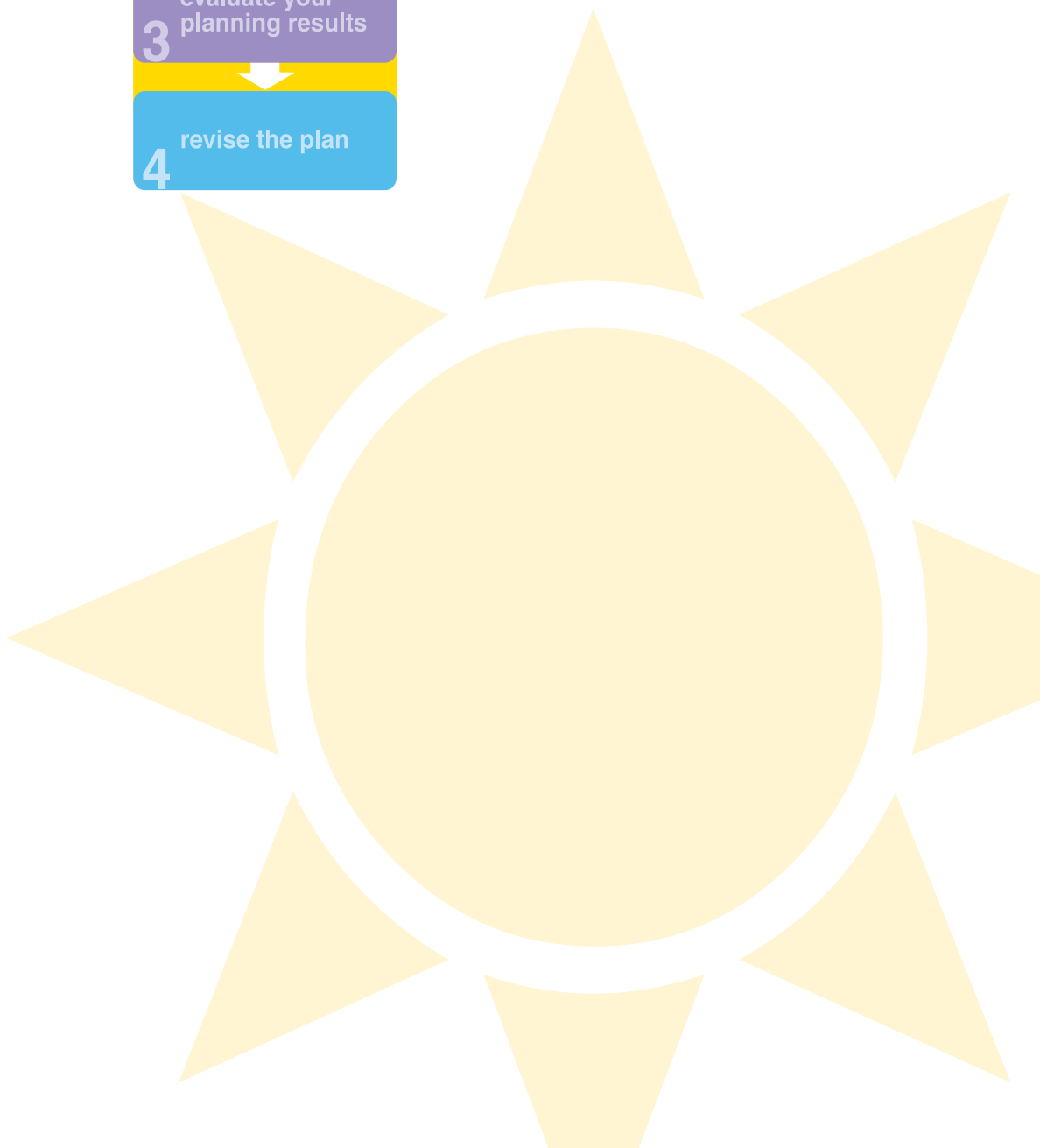
implement
the plan
recommendations

3

evaluate your
planning results

4

revise the plan



adopt the mitigation plan

Overview

Congratulations! You have reached Phase 4 of the planning process. After organizing resources, assessing risks, and developing a mitigation plan, you are now ready to take the first step in Phase 4—guiding the plan through a formal adoption process. Completion of this step will establish the plan’s authority and legitimacy. In order to meet DMA 2000 regulations, your jurisdiction’s governing body must formally adopt the plan in accordance with state and local laws. Their involvement and support of the process all along should help gain approval, as you will see below. Local plans are adopted by the lead governing body (City Council, Board of Supervisors, etc.) and state plans are usually submitted to the state director of emergency management for approval and signature. Adopting the mitigation plan is the final challenge for the planning team before plan implementation can begin. The relationships you have already established with stakeholders, elected officials, and government agencies, as well as the thorough nature of your work thus far, will be important assets during the adoption process.

In addition to being required by DMA 2000, adoption of the plan is necessary because:

- It lends authority to the plan to serve as a guiding document for all local and state government officials;
- It gives legal status to the plan in the event it is challenged in court;
- It certifies to program and grant administrators that the plan’s recommendations have been properly considered and approved by the governing authority and the jurisdiction’s citizens; and
- It helps ensure the continuity of mitigation programs and policies over time because elected officials, staff, and other community decision-makers can refer to the official document when making decisions about the community’s future.



Linking the plan’s policies

to those in other land development tools ensures that development decisions are made in

consideration of the loss reduction goals of the community. Formal adoption of the plan lets public or private funding sources know that the plan has the support of citizens, elected officials, and business owners. For example, land developers should use the adopted plan to make informed decisions about their ventures with respect to mitigation policies and potential hazards.



Before you seek adoption

of the plan, check with your State Hazard Mitigation Officer (SHMO) on administrative

procedures for reviewing plans under DMA 2000 requirements. The SHMO may have established a procedure with the FEMA Regional Office to review the draft plan to make sure you included all elements for meeting the DMA 2000 or other program requirements. This may include reviewing the planning process and your documentation before you ask the governing body to adopt the plan, a step to ensure that you have to submit the plan only once to the governing body for formal adoption. A tribal jurisdiction that submits a plan as a state-level entity works directly with the appropriate FEMA Regional Office.





Ensuring Plan Adoption

The planning team has already performed activities that will help ease passage of the plan:

Recognizing the Committee. As described in *Getting Started* (FEMA 386-1), the team is formally recognized by the community's governing body as the local authority on mitigation, and has been entrusted to make recommendations about mitigation on behalf of the community. This formal recognition by elected officials extends to the planning team's scope of work as well.

Garnering Public Input. As covered in *Getting Started* (FEMA 386-1) and *Developing the Mitigation Plan* (FEMA 386-3), the planning team identified stakeholders to join the planning team, briefed elected officials, informed the public of the team's progress and findings, and involved the public in its work. By including the citizens of the community throughout the planning process, you can expect that the adoption and implementation of the plan will be broadly supported by the public and elected officials.

Communicating Information. By keeping citizens involved in the planning process and informed of progress, the planning team can maintain the community's interest in mitigation. The community now knows and understands that there is a significant risk of losing assets because of hazards, that several alternatives are being considered, and that projects and initiatives will soon be underway.



Partners in Mitigation

Citizens, businesses, and technical experts in southwest Tulsa are partnering with the City of Tulsa and the National Park Service in the development of a greenway plan for a local creek (Mooser Creek). Flood mitigation, preservation of natural resources, recreation, and sustainable development are part of a community vision shared by both citizens and government. Community leaders got involved by forming committees and identifying issues important to them. The Mooser Creek Greenway Citizens and Technical Committees agreed upon a vision statement in an effort to preserve the natural functions and beauty of Mooser Creek and to create recreational and educational opportunities.

Procedures & Techniques

Task A. Brief local leadership.

An excellent way to facilitate adoption of the plan is to periodically brief community decision makers and elected officials on the progress of your planning efforts. This is a great opportunity to demonstrate to the governing body that the plan is sound and has broad support. Plan adoption should not be difficult if the planning team has conducted activities throughout the planning process that have lent credibility to the team, the plan, and the planning process. The briefings will also allow you to address any concerns of elected officials, and to obtain their input. Having the planning team recognized, garnering public input, and communicating the progress and successes of the team will help get the plan adopted.

Task B. Demonstrate the support of partner organizations.

One way to ensure the credibility and eventual passage of the mitigation plan is to present the adopting body with letters of support from organizations and agencies on the planning team, as well as those not on the team. The community's governing body may view the plan more favorably if it has the support of neighborhood and civic organizations. Some organizations may show their commitment to implementing the plan by passing a resolution supporting it and outlining specific responsibilities that they will assume. Furthermore, supporting organizations should be encouraged to provide testimony if the plan will be adopted at a public hearing. This testimony should provide specific information on the benefits that the mitigation plan will bring to the organization's constituencies. Such testimony becomes part of the public record of the hearing.

For example, if a member of a community watershed advocacy group was part of the planning team, that group might review the plan and give its full support to the plan by outlining the group's commitment to sponsor an annual watershed clean-up day or to plant native vegetation in the open space that resulted from the acquisition of flood-prone structures. See *Getting Started* (FEMA 386-1) for more details on garnering community support.



Task C. Have the plan adopted by the proper legislative or executive authorities.

The mitigation plan will be adopted through your government's normal legal process. Depending on the laws in your state and jurisdiction, adoption of the plan will give the jurisdiction legal authority to enact ordinances, policies, or programs to reduce hazard losses and to implement other mitigation actions. Generally, most local governing bodies will adopt a hazard mitigation plan by resolution.

Build time into your planning schedule to meet federal and state deadlines for submitting the plan. Make sure you allow sufficient time for formal adoption procedures. Your local governing body may meet only once a month and may require agenda items to be submitted well ahead of time.

Task D. Submit your plan for approval.

Once your local governing body has approved the plan, it must be submitted to the State Hazard Mitigation Officer (SHMO). The SHMO should already be familiar with your plan because he or she should have reviewed a draft to determine if the plan meets DMA 2000 and other state program requirements. Someone should be designated as the point of contact with the state to answer any questions about the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted by its respective governing body. The SHMO is responsible for forwarding the plan to the FEMA Regional Office for review.

Task E. Publicize the adoption and approval of the plan.

Once the plan has been approved, stakeholders should be informed of your success. You may want to package the message differently to reach various audiences. This can be accomplished by sending a press release to your local newspaper, holding a press conference with important civic leaders, sending a mailing, or posting a notice on the community's Web site. You may also want to celebrate your success by beginning a project immediately. For example, after the plan is approved, you may request that the governing body vote on a resolution or ordinance that is important to accomplishing your mitigation goals, or to authorize funding to undertake a highly visible project, such as flood-proofing City Hall or some other important public facility.



44 CFR §201.4(c)(6) and §201.6(c)(5) of the Interim Final Rule

require plans to be adopted before being submitted to FEMA for formal review and final approval. A copy of the resolution of adoption must be included with the plan.



Resolutions are expressions of a governing body's opinion, will, or intention and can be legally binding or not. Most planning

documents must undergo a legally binding council resolution, which, in order to be adopted, must be supported by an official vote of the majority of members.



Formal adoption of the state plan

will vary according to state protocols. Generally, states should obtain the signature of the state emergency management director as approval of the plan. The plan also can be distributed to members of the state legislature to broaden support for the plan and to potentially pave the way for any new legislation or budget items that may be necessary to carry out the plan recommendations. States must submit plans to their FEMA Regional Office for review and approval. Depending upon regional procedures, states also may opt to submit the results of the risk assessment or draft plan to FEMA for an informal review before officially adopting it and sending it to FEMA for official review and approval. Once any necessary changes have been made, the state can proceed with formal adoption and final FEMA review. If a tribal organization has developed a state-level plan, it should be submitted directly to the FEMA Regional Office.



Consider developing an executive summary

of the plan for use in publicizing it with other government agencies or partners. A brochure may be appropriate for citizens while you also make the executive summary or entire plan available to them.



Summary

By the time you finish Step 1, you will have a plan that has the support of the community, state, tribe, and elected officials. Adoption of the plan gives the plan greater authority, fulfills certain FEMA program eligibility requirements, and will ease implementation of your mitigation actions. Once the mitigation plan has been adopted, your state, tribe, or community is ready to begin implementing the mitigation strategy.



The Hazardville Post

Vol. CXIII No. 45

Friday, February 14, 2003

Town of Hazardville Adopts THORR's Plan

(Part 1 of a 4-Part Series on the Hazard Mitigation Implementation Process)

[Hazardville, EM] The Hazardville Town Council adopted the Hazardville Hazard Mitigation Plan on Thursday by resolution (included below) to serve as the town's guide in reducing risks to citizens and property. Marion Jackson, Chairperson of the Town Council, announced that "in light of the community's involvement and obvious support for the plan, indicated

by citizen turnout at the hearing and letters of support submitted for the record by respected community organizations, the Council unanimously voted to adopt the Hazardville Hazard Mitigation Plan as an official plan of the Town of Hazardville." The plan will take effect immediately.

The Town of Hazardville Organization for Risk Reduction (THORR)

was instrumental in developing the plan and marshaled its forces to support adoption of the plan through written support from the community. "This plan is one of the few community initiatives that is relatively unopposed, no doubt due to THORR's diligent public outreach efforts," Jackson said.

Resolution #2003-53

WHEREAS the Town of Hazardville has experienced severe damage from hurricanes, flooding, earthquakes, wildfires, landslides, and tornadoes on many occasions in the past century, resulting in property loss, loss of life, economic hardship, and threats to public health and safety;

WHEREAS a *Hazard Mitigation Plan* (the Plan) has been developed after more than one year of research and work by the Town of Hazardville Organization for Risk Reduction and the people of the Hazardville community;

WHEREAS the Plan recommends many hazard mitigation actions that will protect the people and property affected by the natural hazards that face Hazardville;

WHEREAS a public meeting was held to review the Plan as re-

quired by law;

NOW THEREFORE BE IT RESOLVED by the Mayor and Town Council of the Town of Hazardville that:

1. The *Hazard Mitigation Plan* is hereby adopted as an official plan of Hazardville.
2. The respective town officials identified in the strategy of the Plan are hereby directed to implement the recommended actions assigned to them. These officials will report quarterly on their activities, accomplishments, and progress to the Town of Hazardville Organization for Risk Reduction.
3. The Town of Hazardville Organization for Risk Reduction will provide annual progress reports on the status of implementation of the plan to the Mayor and Town

Council. This report shall be submitted to the Town Council by February 28th of each year.

PASSED by the Town Council of Hazardville, this 13th day of February 2003.


Council Chairperson

APPROVED by me this 13th day of February 2003.


Mayor

ATTESTED and FILED in my office this 13th day of February 2003.


Clerk



step

2

implement
the plan
recommendations

1

adopt the
mitigation plan

3

evaluate your
planning results

4

revise the plan



implement the plan recommendations

Overview

Citizens and officials who participated in creating the plan will expect to see results from their hard work and effort. This step describes how to place the recommendations of the plan within the administrative framework of your state, tribe, or community. The section presents ideas on how the planning team can get the recommendations implemented on schedule and, over time, integrate mitigation actions into the day-to-day operations of government agencies. It will also show how to bring action items within the mitigation strategy to fruition through creative use of available resources.



When implementing the plan, various stakeholders will have distinct roles and responsibilities:

The Planning Team. During the implementation of the mitigation strategy, the planning team's role may change to one of overseer. As the developers of the mitigation plan, the planning team should also regularly monitor its progress. The planning team can help ensure that the spirit of the plan is not sidetracked by political or personal concerns, and keep the community energized so citizens can hold the government accountable for the legitimate performance of the plan. The team can also alert officials to issues that may affect emergency management and hazard mitigation.

Elected Officials and Local Administrators. The executive or delegated administrator may be a likely candidate for keeping all participating local agencies or departments on track. Elected officials play a unique role in the implementation of the plan. They will be pressured by those opposed to the plan as well as those who expect to see it enacted as intended. Furthermore, elected officials have the capacity and responsibility to distribute resources among competing interests. The planning team will have identified supportive elected officials not only when organizing to prepare the plan (Phase 1, *Getting Started*, FEMA 386-1), but also when evaluating the relevant political factors of potential mitigation actions (see *Developing the Mitigation Plan*, FEMA 386-3, Step 2).

Elected officials and local administrators should provide:

- **Oversight.** Officials not only can assign staff and provide incentives to implement planning initiatives, they also can support the hard work of the professional staff and volunteers.
- **Visibility.** Community leaders must keep the spotlight on the identified hazard-related problems and opportunities and make sure that problems are not overlooked by any relevant department or office—community planning, emergency services, zoning, public service, and economic development, for example.
- **Budgets.** Elected officials and local administrators must ensure that the community's annual budget includes funding to implement previously adopted long-term actions. This includes commitments that the community has made to cost-share, maintain, operate, repair, or otherwise bear the burden for activities that may have been undertaken with outside assistance.

(continued on page 2-2)



(continued from page 2-1)

Partners–Nonprofit Organizations and Businesses. Throughout implementation of the plan, the planning team should consider innovative ways for its partners to facilitate the implementation of projects. The nonprofit and private sectors can help in a number of ways, including lending expertise, discounted materials, staff or volunteer time, or meeting space. The planning team can, in turn, offer the private organizations an opportunity for greater public exposure, and thus greater name recognition. The planning team can also offer tips and expertise in mitigation; businesses often do not realize the danger that their property or sources of income face from hazards. The planning team can inform partners about the hazards they potentially face, the ways they can mitigate these hazards, and how their staff can mitigate hazards at home.

Citizens. Citizens have an ongoing role to play in project implementation. The planning team should actively seek volunteers to help implement programs and activities. Knowledgeable citizens also can be recruited to provide expertise in specific subject areas. The more you involve people in implementing the plan, the greater the support it will receive.

State Agencies. State agencies can lend their time, expertise, and funds to the implementation of hazard mitigation projects. Make sure your list of state contacts is very broad, as the resources of one state agency may be unknown to another.

Academic Institutions. Colleges and universities can provide technical expertise to projects that may require Geographic Information System (GIS), engineering, planning, or other technical assistance. They can also provide meeting space, laboratories, and other logistical support.

In the third phase of the planning process, the planning team identified mitigation actions and implementation strategies that included target dates for the completion of projects and assigned responsibilities to agencies, departments, organizations, or specific people (see Steps 2 and 3 of *Developing the Mitigation Plan*, FEMA 386-3). This information should help the planning team meet the objectives of the plan on time and provide indicators by which the implementation will be monitored and evaluated.

It is important to decide how success will be determined before implementation and evaluation occur. From an administrative standpoint, success may be simply a measure of whether the project was finished on time, and within budget. On the other hand, even projects that are well thought out and executed may not be completed for a long period of time due to the nature of the project, the lack of available funding, or other reasons beyond the control of the community. In this case, it is important to identify successes in the short-term, even if completion is not in sight. For example, if a community decides to pursue zoning changes in flood hazard areas, the actual changes may not occur for years due to administrative procedures that must be followed within the context of local and state zoning and land use law. However, successes (in the form of completion of milestones) can and should be identified along the timeline that is appropriate for that type of mitigation action. In this zoning example, short-term successes can include key meetings or briefings held to present risk information to support zoning changes.



In Step 3, you will also measure the effectiveness of your mitigation actions. It will be therefore important in Step 2 to establish indicators of effectiveness.

The planning team should also determine the manner in which plan implementation will be monitored. In any incorporated community, there are elected or appointed officials who have the ultimate responsibility for carrying out specific community policies and programs. The planning team should continue to serve as a resource to the community by helping its leaders identify, measure, and publicize successes, and mobilize community members to contribute and participate where appropriate. The planning team can also work to secure funding to implement the plan.

Your team may decide that frequent meetings are no longer practical. It may consider an alternative, such as periodically issuing a memorandum to keep team members informed of progress in implementing the plan. An annual internal review of progress by the planning team is also a good monitoring method. Keep in mind that the need for maintaining sustained communication is more important than the form of communication selected.

Procedures & Techniques

Task A. Confirm and clarify responsibilities.

In Step 3 of *Developing the Mitigation Plan* (FEMA 386-3), the planning team identified who would be involved in implementation of the mitigation actions. Now is the time to revisit those assignments and confirm that the responsible parties understand their duties. One way to communicate your expectations to public agencies and other organizations with specific responsibilities is to draw up a Memorandum of Agreement (MOA) among the different agencies and organizations. An MOA is a non-binding statement that defines the duties, responsibilities, and commitment of the different parties or individuals as established by the hazard mitigation strategy developed in Phase 3. It provides a clear statement of values, principles, and community hazard mitigation goals, and establishes an organizational structure to assist in measuring and evaluating the plan's progress.

The MOA should include:

- A vision or goal statement;
- An organizational structure to maintain the effort over time;



- A statement that specifies the duration of the MOA and how it will be reviewed or revised;
- A statement indicating how decisions will be made to continue the MOA;
- A statement describing the circumstances under which partners should consult each other;
- A statement requiring the organization to submit periodic or annual reports on the progress of its projects or programs;
- A statement regarding responsibility for actions; and
- A resource commitment statement on the staffing, technical resources, and funding that the department, agency, or organization is expected to provide.



Example of a Memorandum of Agreement

Agreement is made this 4th day of March 2003 by these parties:

The Town of Hazardville (the Town) and its local corporate and nonprofit partners, and the State of Emergency and its partners

WHEREAS the parties:

Strive to create sustainable communities that are resistant to the human and economic costs of disasters;

Recognize that actions taken in advance of disasters are effective in reducing losses; that partnerships among government agencies, private companies, voluntary and professional associations, educational institutions, and community organizations are essential for the success of these efforts;

Recognize that vulnerable conditions exist in public and private facilities, and the utility and transportation systems that serve them; that increasing population growth and diversity, escalating disaster costs, and other factors increase the Town's vulnerability to disaster;

Recognize that financial support is necessary to enable the expansion and integration of public and private mitigation efforts;

Agree to continue to receive and encourage the input of stakeholders with the State, Town, businesses and nonprofit organizations in Hazardville, neighboring communities, citizens, and other appropriate partners;

NOW, THEREFORE, it is mutually agreed that the parties voluntarily enter into this non-binding Agreement to establish the Town of Hazardville Partnership for Disaster Mitigation (the Partnership).

The principal objective of this Agreement is to further develop private, volunteer, and public-sector capabilities (people, policies, resources, working relationships, long-term plans, and a schedule for accomplishments) necessary to carry out projects that will reduce vulnerability to risk and minimize losses.

- 1. MEMBERSHIP.** Membership in the Partnership is open and can be expanded to include new (additional) partners in the future. The Partnership will work together to advise the Town and participate in the implementation of the Town of Hazardville Hazard Mitigation Plan to further mutual loss-reduction goals subject to the terms and conditions recited below.
- 2. TERM.** The respective duties, responsibilities, and commitments of the parties hereto shall commence on the date this Agreement is signed by the parties and may be periodically renewed or revised at the option of the parties.

(continued on page 2-5)

(continued from page 2-4)

3. CONSULTATIONS. The Partners shall make their representatives available to consult with the Town of Hazardville on ways in which the Hazard Mitigation Initiative (see Appendix A below) can be improved and applied successfully. The Partners, in consultation and conjunction with other public-sector entities and related community-wide initiatives, shall consult with each other on:

- Identification and delineation of natural and manmade hazards within the Town;
- Assessment of risk to and vulnerability of buildings, facilities, utilities, communications, and transportation systems in the public and private sectors;
- Techniques to plan for, reduce, and manage expected losses; and
- Technical and financial assistance and incentives to facilitate loss reduction projects.

4. ANNUAL EVALUATION. The parties shall annually review the Partnership created by this Agreement to determine and document successes achieved over the past year and discuss actions to be undertaken in the following year. The Partnership will prepare an Annual Report describing accomplishments resulting from the Hazardville Hazard Mitigation Initiative and implementation of the Hazardville Hazard Mitigation Plan. The Partnership shall also make recommendations for improving this Agreement and other disaster mitigation/recovery strategies.

5. RESOURCE COMMITMENT. The parties will consider committing human, technical, and financial resources, coordinate with current and future partners, and carry out the fundamental actions of this voluntary, non-binding Agreement.

6. THE HAZARD MITIGATION INITIATIVE. This Agreement includes two Appendices. Appendix A offers an overview of the Hazardville Hazard Mitigation Initiative. Appendix B lists commitments made by the parties to be included as part of the Hazardville Hazard Mitigation Plan that will be acted upon after execution of this Agreement. These actions will constitute steps toward accomplishing the loss-reduction goal. The period of time for completing defined actions will be set and reported by the Partnership.

IN WITNESS WHEREOF, each party has caused this Agreement to be executed by its duly authorized representatives on the date first mentioned above.

Appendix A – Hazardville Hazard Mitigation Initiative – Proposed Actions:

The Hazardville Hazard Mitigation Initiative is an element of this Memorandum of Agreement. In summary, the Initiative addresses the following:

A. Reducing flood hazards to low-income, residential structures. The Town of Hazardville Emergency Management Agency, the Hazardville Department of Planning, and the Hazardville Habitat for Humanity are working to acquire flood-prone, low-income housing in the manufactured-housing park and other low-income areas in the floodplain, and to find appropriate, affordable housing for displaced residents.

B. Establishing public education and outreach projects. The Partnership will cooperate to inform the public about the accomplishments of the Hazardville Hazard Mitigation Initiative, progress of projects, and upcoming public planning efforts. Working with Hazardville Hardware, the Partnership will also educate the public on insurance, family disaster preparedness planning, and other safety tips to protect houses from natural and technological hazards.

C. Strengthening the community's resistance to seismic and landslide hazards by retrofitting vulnerable structures. This project component will strengthen the community's housing stock to resist damage from earthquakes by (1) developing a consistent, sustainable retrofit capability among local builders, contractors, and homeowners; (2) seismically retrofitting vulnerable structures in the downtown business district; and (3) incorporating standardized retrofit practices into home and downtown commercial rehabilitation programs.

Under this component, the Partnership will also strive to find additional funding to complete the retrofit of the Town's lighthouse, threatened by coastal erosion.

Appendix B – Hazardville Hazard Mitigation Initiative – Resource Commitments:

The Town of Hazardville will:

1. Provide leadership for the Partnership and serve as the point of contact for the Hazardville Hazard Mitigation Initiative.

(continued on page 2-6)

(continued from page 2-5)

2. Provide financial management of the grant funds provided to the Town for hazard mitigation projects, including Hazard Mitigation Grant Program funds, Flood Mitigation Assistance funds, Pre-Disaster Mitigation funds, etc.
3. Procure the support and assistance of appropriate Town departments and agencies to further the objectives of the Hazardville Hazard Mitigation Initiative.
4. Supply meeting space and other logistical support for Partnership meetings.

The State of Emergency will:

1. Supply peer review of plans, planning processes, and project implementation to identify potential problems, recommend solutions, or procure appropriate State support.
2. Attend project review meetings to meet with partners implementing the projects.
3. Facilitate Federal grants applied for by the Town and the Partnership.

Hazardville Department of Planning will:

1. Supervise the acquisition and demolition of vulnerable structures in the floodplain.
2. Designate the resultant publicly owned open space as an area precluded from future development.

Hazardville Department of Housing will:

1. Support the acquisition and demolition of the flood-prone houses of low-income residents by providing additional funding for replacement housing in non-hazardous areas.

Hazardville Habitat for Humanity will:

1. Solicit its corporate and other partners to supply building materials for new, affordable housing.
2. Organize volunteers to build new, affordable housing in non-hazard areas for current residents of the manufactured home park and other low income areas in the floodplain.

Hazardville Hardware will:

1. Design and fund public education brochures advising the public about hazard mitigation for homeowners, safety during hazard events, and the importance of purchasing insurance.
2. Develop a marketing display for the Hazardville Hardware store advertising hazard mitigation for homeowners and related products that can be purchased at the store.

Capability Assessment Results



In completing your capability assessment in Phase 3 of the planning process, you identified policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions. Consider developing an implementation strategy that addresses recommendations that can be easily implemented first, followed by those that need to be modified, and last, those that require the adoption of new regulations or policies or infusion of outside funding sources for implementation.

Task B. Begin to integrate mitigation actions throughout government operations.

The planning team should work with chief administrative officials to begin to integrate the newly adopted hazard mitigation goals and actions into the general operations of its government and partner organizations. By initially working within existing administrative mechanisms, communities and states can quickly and efficiently implement and finance their hazard mitigation projects and programs, and incorporate them into their governing systems. The following sections discuss several options to consider.

1. Use processes that already exist.

A good initial strategy is to take advantage of tools and procedures that were identified in your capability assessment in Step 2 of



Developing the Mitigation Plan, FEMA 386-3. Your research of Social, Technical, Administrative, Legal, Economic, and Environmental (STAPLEE) criteria for mitigation activity should have uncovered information on the administrative, financial, or legal mechanisms in your state, tribe, or community. These mechanisms are already in use and familiar to the governmental departments and organizations. This will give the planning implementation phase a strong initial boost, especially if your plan calls for expanding existing agency mandates or departmental funds, or creating new programs later on.

Administrative

- **Departmental or organizational work plans, policy, and procedural changes.** Updating the work plans, policies, or procedures to include hazard mitigation concepts and activities can help integrate the plan into daily operations. These changes can include how major development projects and subdivision reviews are addressed in hazard-prone areas or ensure that hazard mitigation concerns are considered in the approval of major capital improvement projects.
- **Job descriptions.** Working with department or agency heads to revise job descriptions of government staff to include mitigation-related duties could further institutionalize hazard mitigation. This change would not necessarily result in great financial expenditures or programmatic changes.

Budgetary

- **Capital and operational budgets.** Instead of solely relying on funding from hazard mitigation programs or other external sources of grant monies, states, tribes, and communities might consider a line item for mitigation project funding in their capital or operational budgets. Having a line item in these budgets may not guarantee funding every year, but it is certainly easier to get the money allocated if it is already there. Examples include a revolving fund to finance a buyout program or a low-interest program to fund retrofits.

Examples of using existing resources to accomplish mitigation:

- The Department of Public Works could adopt more rigorous procedures for inspecting and cleaning debris from streams and ditches. Instead of cleaning only after storms or complaints from citizens, the Department could require inspections of streams and ditches at least semi-annually.
- The Planning Department could add hazard vulnerability to subdivision and site plan review criteria and incorporate any necessary actions at the planning stage.
- A community conservation society or other interested voluntary organization could perform inventories of historic sites in hazard areas that might require special treatment to protect them from specific hazards.



You may want to add

some or all of the following language into job descriptions for a community planner, floodplain manager, emergency manager,

building code official, or water resources engineer in the Public Works Department:

Knowledge, Skills, and Abilities

Knowledge. Knowledge of the principles of emergency management, specifically hazard mitigation. Knowledge of the principles and practices of sustainable development and how it is incorporated into hazard mitigation planning. Knowledge of FEMA's pre- and post-disaster mitigation programs, as well as other federal agency programs (HUD, EPA, SBA) that provide technical and/or financial assistance for implementing pre- or post-disaster mitigation planning. Knowledge of private/non-governmental programs that can support reconstruction and mitigation strategies.

Skills. Consensus building and team building, communication (verbal and written)/interpersonal skills.

Abilities. Ability to apply planning principles and tools to the goals of hazard loss reduction.



See *Developing the Mitigation Plan (FEMA 386-3)* for more information on using the following implementation tools for hazard mitigation:



- Building Codes
- Zoning Ordinances
- Subdivision Ordinances
- Special Hazard Area Regulations

Integrating Hazard Elements into Comprehensive Planning



- For guidance on what to include in a local hazard element, see the American Planning Association's *Growing Smart Legislative Guidebook* at www.planning.org/growingSMART.
- In July 2002, the Institute for Business & Home Safety (IBHS) published a report entitled *Summary of State Land Use and Natural Hazards Planning Laws*. This report focused on the relationship between state planning laws and other statutes that addressed natural hazards and their effect on local-level comprehensive planning and land-use regulations. More information about the results of this report is available at http://www.ibhs.org/research_library/view.asp?id=302.
- Oregon has long been recognized as a pioneer in local planning for natural hazards. In 1969, Oregon adopted Senate Bill 10, which required every city and county in the state to have comprehensive land use plans that met state requirements. This mandate, however, did not grant any authority to enforce the requirement or provide for any technical support or training to the communities. Subsequently, Senate Bill 100 was passed to address these issues, creating the Land Conservation and Development Commission (LCDC). Among its responsibilities, the LCDC was charged with establishing statewide planning goals that were to be congruent with regional, county, and city concerns; preparing statewide planning guidelines, model ordinances, and regulations; and ensuring widespread citizen involvement and input throughout all phases of the planning process.

One of the state planning goals requires Oregon communities to inventory known natural hazards and to implement appropriate safeguards for development in hazard areas. On behalf of the LCDC, the Department of Land Conservation and Development (DLCD) developed *Planning for Natural Hazards: Oregon Technical Resource Guide* to help communities appraise and potentially improve the effectiveness of the natural hazard planning element in their comprehensive plans. The guide also provides useful information on how to identify and plan for a variety of natural hazards, and implement programs to address them. The publication is available online at <http://www.lcd.state.or.us/hazhtml/Guidehome.htm>.

Regulatory

- **Executive Orders, ordinances, and other directives.** The governing body or local executive often has the authority to issue directives to require departments and agencies to carry out certain hazard mitigation actions. Using one of these mechanisms, the governing body or executive can direct department heads to provide progress reports to the planning team on the hazard mitigation initiatives that the departments are responsible for carrying out.

- **Comprehensive planning.** Adding a hazard element to the comprehensive plan is one of the most effective mechanisms to institutionalize hazard mitigation for new construction. For communities with a comprehensive plan, *Getting Started* (FEMA 386-1) listed several reasons why a community should integrate mitigation planning and comprehensive planning. A primary benefit of combining these processes is that they both influence the location, type, and characteristics of physical growth, specifically buildings and infrastructure. While planning in and of itself may not be regulatory, it uses regulatory mechanisms (zoning, development ordinances, etc.) for implementing goals and objectives. Additionally, in many parts of the country, the comprehensive planning process is an established activity that is already familiar to the public, and it usually generates a great deal of interest and public participation.

2. *Secure traditional sources of financing.*

In Phase 3 of the planning process, potential sources of funding to implement the priorities in your mitigation strategy were identified. Now that the plan has been adopted, you have a strong basis for obtaining these resources. Communities and states have a range of tools to finance projects. Use of fees, taxes, bonds, and loans to finance projects are options if there is proper state enabling legislation, local author-



ity, and enough political will. Once the plan has been adopted, there is a legitimate basis for initiating the process required to use these financial tools.

All of your plan's mitigation recommendations probably cannot be implemented using local funding sources. Furthermore, it may take some time to work through the legal and administrative processes to use proceeds from bond issues and similar vehicles. To supplement local funds, communities can apply for grants from federal or state governments, nonprofit organizations, and foundations, as well as seek funding from other private sources. The advantage of applying for grants is that they do not have to be paid back or generate long-term debt; however, most federal grants require state and/or local governments to provide some matching funds.

State and federal grants are a logical source of funding for some of the larger, more costly mitigation initiatives. Many federal grant mechanisms allow local "in-kind services" as a match for federal dollars, as well as the possibility of using state grant funds to meet the local match requirements. Review your capability assessment from Phase 3 and consider looking to regional planning agencies, universities, or economic development districts, if present and active in your state, for research or grant-writing technical assistance. The adjacent sidebar describes three major FEMA mitigation grant programs. Don't forget the potential of other federal grant programs for community development, even if they are not specifically disaster or mitigation related—the U.S. Department of Housing and Urban Development's Community Development Block Grant (CDBG), for example. For more on funding sources, see *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Sustainability* (FEMA 364), and the *Mitigation Resources for Success CD* (FEMA 372).

3. Develop creative partnerships, funding, and incentives.

Incentives that minimize financial or administrative burden can stimulate momentum to undertake mitigation initiatives. For example, states and communities can provide tax rebates for code upgrades, offer reduced property taxes and insurance premiums for citizens and businesses that take steps to lower their exposure to hazards, or provide low interest loans for retrofit projects.

Some states, tribes, and communities have developed creative ways to get things done without spending a lot of their money. These



Three FEMA programs that provide funding for hazard mitigation actions are the **Pre-Disaster Mitigation Program**

(PDM), Flood Mitigation Assistance Program (FMA), and the Hazard Mitigation Grant Program (HMGP). Web access to information on these programs is available at www.fema.gov/fima/.

- PDM, authorized under DMA 2000, provides pre-disaster funding to states, tribal, and local governments, and tribal organizations for mitigation planning and projects through a competitive process. A FEMA- approved mitigation plan is required to receive project funding. Check with your FEMA Regional Office or SHMO for the latest information on availability of funds.
- FMA provides annual grants to communities, tribes, and states to reduce the risk of flood damage to structures with flood insurance coverage. This funding is available for mitigation planning, implementation of mitigation actions, and technical assistance. An approved flood mitigation plan is required to receive project grants, but is not required for planning or technical assistance grants. Interim final regulations implementing this program can be found at 44 CFR Part 78.
- HMGP provides post-disaster grants to states, tribes, and local governments to implement long-term hazard mitigation actions after a major disaster declaration. FEMA can fund up to 75% of the eligible costs of each project, and up to 7% of HMGP funds available per state may be used for planning. An approved mitigation plan is required to receive project funding. See Interim Final Rules at 44 CFR §201 and §206.



governments have engaged untapped resources by developing relationships with businesses, nonprofit organizations, and volunteers. Time spent earlier in the planning process developing relationships with citizens, businesses, and other communities can really pay off at this point in the process (see *Getting Started*, FEMA



Some examples of different types of partnerships that can provide funding or other resources to implement hazard mitigation actions are provided below. See *Mitigation Resources for Success* (FEMA 372) for additional examples and a more detailed discussion of funding mitigation actions.

Public-Private Partnerships. Partnership agreements between local governments and businesses or organizations can be advantageous for all parties involved. Private organizations and businesses routinely offer discounted or free goods and services to local governments in exchange for publicity or other benefits. In the end, the governments, organizations, businesses, and the public can all benefit from working together. Examples of successful public/private partnerships include the following:

- In Houston, Texas, FEMA and two prominent home improvement stores teamed up to provide information and advice on cleaning up and rebuilding after flooding caused by Tropical Storm Allison. FEMA Hazard Mitigation Teams staffed booths at both stores for three days, providing information on mitigation methods and techniques and the importance of flood insurance. By providing space, the stores played an important role in promoting community awareness of flooding hazards and helped foster public involvement in recovery.
- In Kinston, North Carolina, affordable housing was disproportionately affected by Hurricanes Fran and Floyd. The Permanent Housing Initiative, a partnership between the North Carolina Division of Emergency Management, the North Carolina Department of Corrections, and private sector home improvement companies, was formed to help address the housing shortage and subsequent housing acquisitions. Using a Habitat for Humanity housing model, energy efficient and hazard-resistant affordable housing was constructed in already established neighborhoods. Homes were constructed by volunteers using prefabricated wall panels (made by prison labor experienced in construction) and other donated tools and materials. The foundation, electrical system, and ductwork were done by certified professionals.
- In an effort to promote awareness of hurricanes and flooding in the coastal community of Virginia Beach, Virginia, the city held a Home Safety and Preparedness Exposition that included a section devoted to building disaster-resistant communities. More than 20 local businesses and organizations and the Virginia Department of Emergency Management sponsored the event. In return, sponsors were given display booths at the event to promote their goods and services.

Community Volunteers. State and local governments rely upon their citizens to perform work that might otherwise have to be paid for by money from government coffers. Some governments have institutionalized volunteerism by requiring students to contribute volunteer hours to local and regional initiatives. Others have partnered with nonprofit agencies, organizations, schools, and businesses to give their time and energy to help further community goals.

- Citizen Corps is a program within the USA Freedom Corps that promotes several initiatives to engage volunteers in Homeland Security efforts, including mitigation actions, across the country. These community-based efforts include Community Emergency Response Teams (CERTs), Neighborhood Watch, Volunteers in Police Service, Operation TIPS, and the Medical Reserve Corps.
- Following flooding in 1993, the City of Petersburg, Illinois, bought out riverfront property that had been flooded and engaged a group of high school students, the Community Problem Solvers (CmPS), to formulate a creative solution for rehabilitating the area as perpetual open space. The CmPS developed a garden and a preschool playground, a solution that was responsive to the needs of the neighborhood, city government requests, and federal government requirements. To fund the project, the CmPS team applied the same initiative and creativity that they had used to design it. The team organized a "Decorate an Abe" contest in honor of former Petersburg resident Abraham Lincoln. Area businesses sponsored and decorated Abe silhouettes, and residents paid to vote for their favorites. The "Abes" were later auctioned off to raise additional funds. In addition, the team designed and sold Historic Petersburg placemats. Volunteers from civic organizations donated funds to sponsor specific pieces of playground equipment, and a local business donated Lincoln Bears to be sold. Preschool children participated in a clean-up day at the site. Overall, many Petersburg residents



contributed their funds, talents, and energy to make the project successful. The CmPS members not only helped minimize its community's vulnerability to flooding, they did it in a way that promoted community pride and civic involvement.

- Oakland, California, developed a community partnership called Safety and Future Empowerment (SAFE). Two initiatives, the Week of Caring and Spring Break, brought together city firefighters, corporate employees, students, the California Office of Emergency Services, and AmeriCorps members to make homes in the community safer and less vulnerable to earthquakes and fire. Four volunteer teams spread out across the city for a week to make the homes of elderly and low-income residents more disaster resistant. The teams installed smoke alarms and cupboard latches, strapped water heaters and free-standing cabinets to house frames, and rigged safety releases on window security bars. Local businesses donated or provided supplies at reduced costs in support of the effort.

State cooperation. Local governments often underestimate the wealth of resources that their states can provide. States are excellent sources of funding, support, and technical assistance. State geological surveys, water resources agencies, and departments of planning or natural resources often have useful data related to hazard identification and risk assessments. Your state may also have a GIS department that can provide data and support.

Unfortunately, localities sometimes pay for studies that have already been conducted by the state. You can avoid these duplications by inviting your state officials to participate in the planning process to help ensure that studies or reports can be compiled from readily available sources.

State fairs and other state-sponsored events can be great places for displays on hazard reduction techniques and hazard awareness campaigns. States can further help publicize awareness and generate interest by declaring a Hazard Awareness Week and promoting related local events on their Web sites.

In-kind resources. Federal or state grants often require the awarded locality to provide matching funds to cover a percentage of hazard mitigation project costs. In-kind resources, however, substitute monetary outlay with services that the community can perform. For example, HMGP pays up to 75% of the eligible costs of a hazard mitigation project, but the remaining amount must also be contributed to the project by non-federal sources. A municipality without sufficient resources can ask the state to help fund the match through state or Community Development Block Grant funds, or it can use in-kind resources. In-kind resources can be labor or salaries contributed toward the implementation of the project (such as technical or administrative support from community officials and personnel). The dollar value of the resource must be calculated, and those costs must be allowable under the grant. Communities can have quite a bit of leeway in developing sources of in-kind resources; however, your state's specific program requirements must be verified first. Federal regulations regarding in-kind matches for FEMA's grant programs can be found at 44 CFR §13.24.

386-1). For more details on funding and creatively using planning resources, see FEMA 372, *Mitigation Resources for Success*.

Task C. Monitor and document the implementation of your projects and actions.

As mentioned earlier, the planning team must continuously monitor and document the progress of the plan's recommended actions. This documentation is essential for determining the progress made on the hazard mitigation initiatives.

The planning team may decide to ask the agencies, departments, organizations, or people with duties identified in the mitigation strategy to periodically submit a work progress report on those projects being implemented. This report will come in handy at evaluation time. If there is a problem with the project or program, the planning team will be better able to pinpoint where the prob-



lem lies. An example of the report agencies could use should include the following information:

- The hazard mitigation action's objectives;
- Who the lead and supporting agencies responsible for implementation are;
- How long the project should take, including a delineation of the various stages of work along with timelines (milestones should be included);
- Whether the resources needed for implementation, funding, staff time, and technical assistance are available, or if other arrangements must be made to obtain them;
- The types of permits or approvals necessary to implement the action;
- Details on the ways the actions will be accomplished within the organization, and whether the duties will be assigned to agency staff or contracted out; and
- Current status of the project, identifying any issues that may hinder implementation.

Requiring the responsible parties to explain exactly how and when the project or programs will be carried out helps determine the extent of the project's progress. It also helps break the implementation process into smaller, more manageable tasks. The responsible agency, department, or organization can decide the particulars of incorporating these additional considerations into their daily operations, while the planning team will know what to expect and when to expect it. See **Worksheet #1: Progress Report** to help you monitor progress.

Task D. Establish indicators of effectiveness or success.

In Step 3, you will measure or evaluate the effectiveness of your mitigation project and initiatives. It will be important to establish measurable indicators of effectiveness now so that those involved in the projects understand how their actions contribute to the success of the projects. Indicators should be tied to the goals and objectives of the plan and its projects. They are often expressed as numerical representations of planning objectives.

For example, if an objective of the planning process is to increase community participation in risk reduction, and a related initiative includes an outreach program to introduce new partners to



Worksheet #1

Progress Report

step **2**

Page 1 of 3

Progress Report Period: October 1, 2003 to December 31, 2003
(date) (date)

Project Title: Raging River Views Park Flood Acquisition Project Project ID#: HVMP-2003-01

Responsible Agency: Hazardville Department of Planning

Address: 1909 Burnham Way

City/County: Hazardville, Emergency

Contact Person: Eunice Euclid Title: Grants Administrator

Phone #(s): (555) 555-8473 email address: eeuclid@town.hazardville.em

List Supporting Agencies and Contacts:

Hazardville Department of Housing: Noah Hudson (555) 555-8465

Hazardville Habitat for Humanity: Carter Goodman (555) 555-9432

Total Project Cost: \$360,000

Anticipated Cost Overrun/Underrun: \$N/A

Date of Project Approval: July 21, 2003 Start date of the project: November 15, 2003

Anticipated completion date: Summer 2005

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase):

Acquire and demolish 14 structures located at the Raging River Views Park. Work with Habitat for Humanity and the Department of Housing to construct new housing or rehabilitate existing housing for displaced low-income residents. The Department of Housing will also provide funds for temporary housing to displaced residents.

Milestones	Complete	Projected Date of Completion
Conduct surveys of ground and first-floor elevations	✓	
Obtain Notices of Intent by owners	✓	
Conduct structure appraisals	✓	
Send letters of offer to homeowners		1/31/04
Perform title work		3/30/04
Acquire structures		6/30/04
Begin construction of new housing or reconstruction of existing housing for relocated residents		6/30/04
Send payment for relocation to renters		9/30/04
Finalize contract for demolition		1/12/05
Demolish structures		4/26/05
Landscape open parcels		6/30/05

Plan Goal(s)/Objective(s) Addressed:Goal: Minimize losses to existing and future structures within hazard areas.Objective: Reduce potential damages to the manufactured home park in the floodplain.**Indicator of Success** (e.g., losses avoided as a result of the acquisition program):

In most cases, you will list losses avoided as the indicator. In cases where it is difficult to quantify the benefits in dollar amounts, you will use other indicators, such as the number of people who now know about mitigation or who are taking mitigation actions to reduce their vulnerability to hazards.

Losses Avoided. After a major flood (100-year), the Department of Economic Development will assist the Planning Department in calculating the losses avoided.

Status (Please check pertinent information and provide explanations for items with an asterisk. For completed or canceled projects, see Worksheet #2 — to complete a project evaluation):

Project Status☒ Project on schedule☐ Project completed☐ Project delayed*

*explain: _____

☐ Project canceled**Project Cost Status**☒ Cost unchanged☐ Cost overrun*

*explain: _____

☐ Cost underrun*

*explain: _____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

The Department of Planning contacted the owners of the properties vulnerable to floods to determine their willingness to sell their properties. Of the 14 property owners contacted, 10 agreed to have their homes acquired. An appraiser contracted by the Department of Planning estimated the value of the 10 properties.

B. What obstacles, problems, or delays did you encounter, if any?

The owners of four properties refused to sell. There has been some limited neighborhood opposition to various suggestions for the community open space created by the acquisitions.

C. How was each problem resolved?

The Department of Planning has proposed to the residents a design charrette to develop alternatives for the open space that would be created, with the understanding that no permanent structures can be constructed on the open parcels after acquisition and demolition has been completed. Recreational activities will be limited to passive uses such as trails and bike paths.

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

1. Send offer letters to homeowners.

2. Do title work.

3. Work with the Department of Housing and Habitat for Humanity to identify existing housing for rehabilitation and viable vacant parcels to construct new housing for the displaced residents.

Other comments:

None

Adapted from the North Carolina HMGP Progress Report Form at http://www.dem.dcc.state.nc.us/mitigation/document_index.htm.

mitigation, an indicator could be the number of organizations that are on the planning team.

Task E. Celebrate success.

It is important to maintain community support throughout the implementation process. One particularly effective technique is to simply keep the community informed about the incremental progress and success of the program. Sharing the findings of progress reports with interested organizations, neighborhood groups, elected officials, and citizens keeps stakeholders up-to-date on your accomplishments and possible setbacks. Posting these findings on your local Web site or including them in your newsletter will help everyone stay informed of your progress. Consider holding events to recognize key milestones to keep the public interested. Step 3 contains more information about how to maintain this important part of the overall effort.

Summary

Implementation is the culmination of the initial planning process. Monitoring progress and maintaining momentum is key to ensuring success of the planning process. Through the implementation of your plan, you will draw upon the diverse resources of your state, tribe, or community. While many of the tools you use already exist in one form or another, your team should try to use as much creativity and resourcefulness as possible to advance your plan's goals and objectives.



The Hazardville Post

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Friday, September 9, 2005

Hazardville Partnership Completes First Home

(Part 2 of a 4-Part Series on the Hazard Mitigation Implementation Process)

[Hazardville, EM] “Yep, that’s my new house,” Susan Harris grinned. “I can’t believe how great it looks!” As Mrs. Harris showed off the interior of the nearly completed house, she noted where her furniture would go. “I would have put my mother’s sideboard over here,” frowning as she pointed to a spot in the dining room, “but it was ruined in the flood in 2002. It had been passed down from her mother, and I had wanted to pass it down to my daughter.”

Mrs. Harris is just one of the residents of Hazardville affected by flooding in 2002. She and nine of her neighbors have had their homes bought by the town and are working with town, state, and federal officials to build new homes out of the floodplain. “My house really wasn’t worth very much, and I don’t have enough income to handle a big mortgage payment,” Mrs. Harris said, “but the town has been working with the Hazardville Habitat for

Humanity to help me build a new one.”

Habitat for Humanity requires contributions of “sweat equity” in order to be eligible for participation in their program. Mrs. Harris claims that thanks to her contribution she is now quite capable of fixing just about everything in her new home. “Since my husband passed away almost 10 years ago, I have had to rely on my friends to help out with even simple repairs. Now that I have helped with the construction of several of my neighbor’s houses I am very comfortable using all kinds of tools!” Mrs. Harris is so comfortable with her new skills that she is thinking about building her own shed after she gets settled.

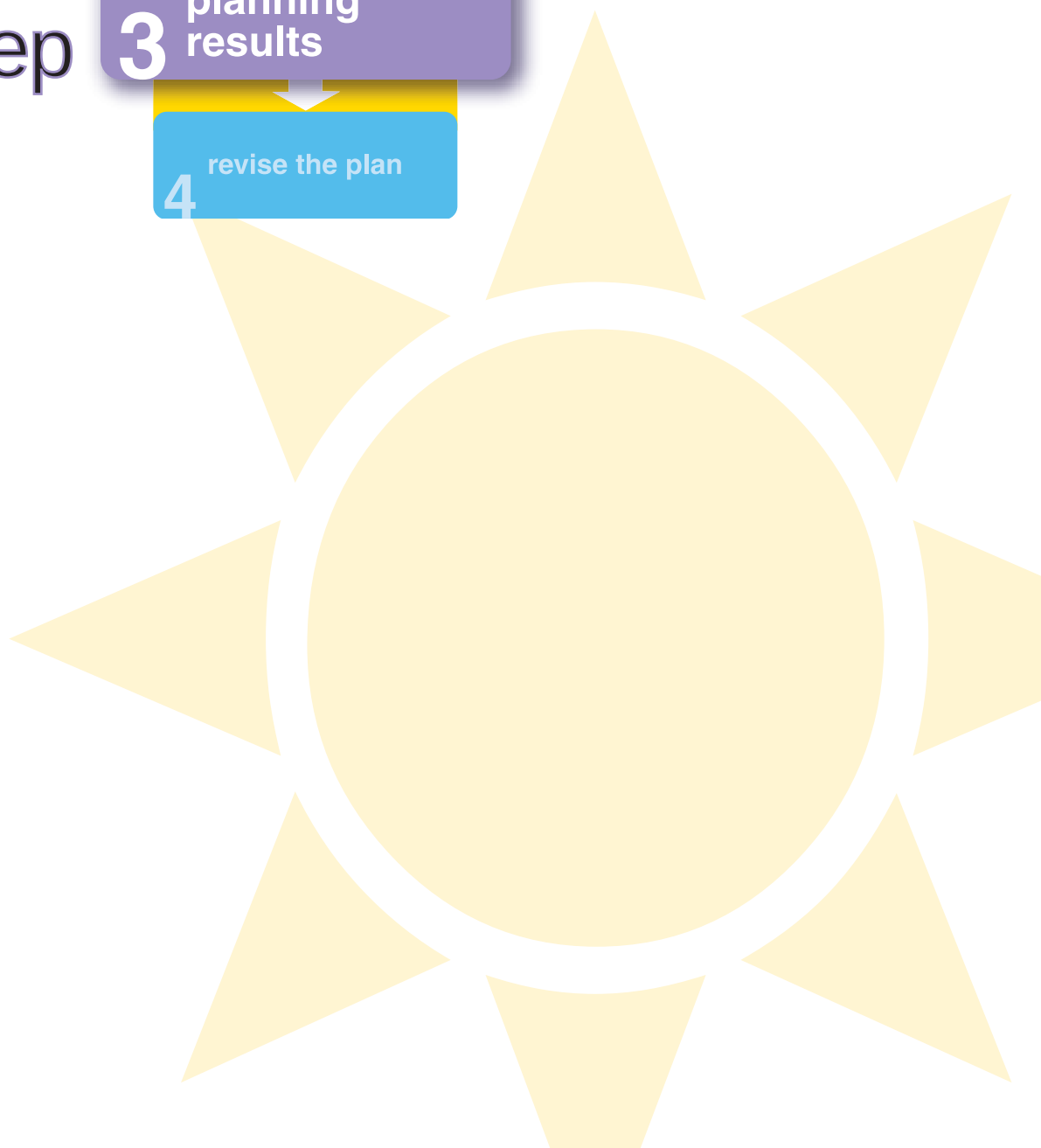
“The process is working!” beamed Joe Norris, lead planner for Hazardville. Norris, referring to the hazard mitigation plan adopted by the town in 2003, pointed to the emphasis the Town of Hazardville Organization for Risk Reduction

(THORR) had placed on reducing flooding and disaster-related damages to existing structures while recognizing the needs of residents with limited resources. Part of that emphasis was on creating and following through with community partnerships.

The Town of Hazardville Partnership for Disaster Mitigation is a partnership of nonprofits, businesses, and local, state, and federal agencies. The Partnership is an initiative that Hazardville established in 2003, following adoption of the hazard mitigation plan. Each partner contributed something to the effort. Funding from the FMA program was used to purchase ten repetitive loss structures. Local businesses contributed to the project by donating building materials and supplies. Community volunteers worked throughout the summer to make this a reality for Mrs. Harris and the other homeowners.



step



evaluate your planning results

Overview

The evaluation step of the planning process allows the planning team to review the plan, the planning process, and the results of implemented actions. The evaluation assesses whether the planning process and actions have been effective, if the community's goals are being reached, and whether changes are needed. The planning team should periodically evaluate the community's progress in implementing the plan. Regular evaluation keeps the community informed of the plan's status and, ideally, keeps those responsible for implementing the mitigation actions motivated. These periodic evaluations may reveal the need for small changes that may not be necessary to incorporate into the plan annually, but that accumulate over time until large-scale revision to the plan is needed (see Step 4, *Revise the Plan*).

Communities that commit to conducting periodic evaluations give themselves the opportunity to determine the effectiveness of their procedures and recommendations, identify new areas of concern, and renew enthusiasm for the cause of hazard mitigation. This step will show you how to keep the planning team, the planning process, and the implementation actions effective. The result is a hazard mitigation process that people have confidence in, and are willing to support.

What you learn in this evaluation will be used to determine whether or not to revise the plan document, to be described in Step 4. By looking impartially at what took place the previous year, the planning team will create a foundation on which to base its revision of the plan and a trigger to re-invigorate the cause for hazard mitigation in the community.

DMA

DMA 2000 requires communities to evaluate their hazard mitigation plan at least every five years.

The way in which this is to be done must also be documented in the plan. By including a provision in the adoption mechanism to evaluate the plan and the implementation process, you have a built-in mechanism to institutionalize and sustain the mitigation initiative beyond the creation of the original document.



Communities that want credit

for their hazard mitigation plan under the Community Rating System (CRS) must evaluate their plan annually.



The plan should also

be evaluated and revised following disasters, to determine if the recommended actions are appropriate given the impact of the event. The risk assessment should also be revisited to see if any changes are necessary based on the pattern of disaster damages.



According to DMA 2000 requirements,

states that want to be eligible for the 20% share of HMGP funds must develop a process to assess the effectiveness of a mitigation activity after its completion.



The evaluation phase should not

be anticipated with anxiety. If the planning team, citizens, government, and other stakeholders have diligently implemented the recommendations, the evaluation phase will give the community reasons to celebrate the success of its mitigation efforts.



DMA 2000 regulations

do not require annual evaluations. The recommendations presented here will help you to meet the five-year local update requirements.



Procedures & Techniques

Task A. Evaluate the effectiveness of the planning process.

To evaluate the results of your planning efforts, begin by stepping back and looking at the big picture. Governments must be highly accountable to their citizens and able to defend their decisions. Evaluating the planning process is a good way to discover if the plan is working for the good of your state, tribe, or community. A review of the planning process will give you an idea of how successfully mitigation has been integrated into your normal administrative processes so far, and what procedural areas may need to be refined or changed.

The first year of the planning process is the most critical because you are beginning to implement the plan. While the energy and momentum generated during this phase of planning are still present, your state, tribe, or community may have established an annual review process at the time of adoption to address the unanticipated problems that may affect the success of your planning efforts. An annual review is also a good opportunity to reflect on whether certain relationships developed during the process should be enhanced, and to initiate new partnerships based on experiences from developing and implementing the plan. The planning team should take this opportunity to reflect on the processes used so far to engage partners and the public, to develop loss reduction priorities, and to finance projects.

1. Reconvene the planning team.

The first step in evaluating the plan is to reconvene the planning team. Ideally, the planning team was established as a permanent working group within your state, tribe, or community to oversee the development and implementation of the mitigation strategy. Even after the plan is adopted, the planning team should meet at least semi-annually to review the progress of the mitigation planning efforts.

At this point, however, your team may want to think about inviting new stakeholders to join during the evaluation. These meetings are a good opportunity to bring new members up to speed on the planning team's history, mitigation strategy, and planning process. Use **Worksheet #2: Evaluate Your Planning Team** to assist you in this task.



Worksheet #2

Evaluate Your Planning Team

step **3**

When gearing up for the plan evaluation, the planning team should reassess its composition and ask the following questions:

	YES	NO
Have there been local staffing changes that would warrant inviting different members to the planning team?		✓
Comments/Proposed Action: NA		
Are there organizations that have been invaluable to the planning process or to project implementation that should be represented on the planning team?	✓	
Comments/Proposed Action: Hazardville Habitat for Humanity has been invaluable in assisting the relocation of former Raging River Views Park residents. The organization should be invited to participate in THORR.		
Are there any representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the planning team?	✓	
Comments/Proposed Action: It is essential that the Department of Public Works be represented at each meeting because so many mitigation actions involve them. However, representatives from the department have been unable to attend meetings consistently since the development of the plan. THORR will work with the departments director to find consistent, active representation.		
Are there procedures (e.g., signing of MOAs, commenting on submitted progress reports, distributing meeting minutes, etc.) that can be done more efficiently?	✓	
Comments/Proposed Action: Again, the Department of Public Works has been unable to provide timely progress reports of its mitigation actions. Administrative duties and paperwork have fallen through the cracks since the department has been assigned numerous new duties in Hazardville's mitigation efforts. Perhaps the department, in partnership with THORR, should approach the Town Council for funding for more department staff.		
Are there ways to gain more diverse and widespread cooperation?	✓	
Comments/Proposed Action: THORR members believe that better publicity about mitigation actions will garner more interest from the public, affected/interested organizations, and state agencies.		
Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?	✓	
Comments/Proposed Action: THORR has learned about new PDM funding. The state has asked that local jurisdictions submit applications for brick and mortar projects and risk assessments studies.		

If the planning team determines the answer to any of these questions is "yes," some changes may be necessary.



2. Review your planning process.

One of the first areas for the planning team to assess is the planning process itself. With a year of hindsight, you can now step back and see what you would have done differently had you known what you know today. Look at each of the key elements of your planning process, such as building the planning team, engaging the public, gathering data to conduct your risk and capability assessments, and coordinating with other agencies, and determine how well they worked. The following are some suggested questions to ask:

a. Building the Planning Team. In continually building your planning team, have you left anyone out? Are there roles that need to be clarified or better defined? Has the planning team met as agreed upon? Have meetings been productive? Are procedures for implementing, monitoring, and evaluating the plan being followed? Are the lead agency and staff still able to play the lead? Again, Worksheet #2 will help with this task.

b. Engaging the Public. When looking at public involvement, you may need to conduct a survey to gauge how the public perceived your planning effort. Determine whether stakeholders and citizens felt that they had enough opportunities to provide input; the extent to which they are now aware of their hazards and are willing to support your efforts; what they think of the progress you are making; and whether outreach efforts—public meetings, workshops, Web site, newspaper notices, etc. were effective. Ask them what they would like to see done differently to involve them or keep them informed. In many cases, this may be a matter of simply asking residents if they now understand what hazards they are susceptible to, and what “hazard mitigation” means to them.

c. Data Gathering and Analysis. Are data gathering procedures working? Did someone follow up with the local university or other agencies to obtain research findings or reports that were not available during the planning process? Have team members provided copies of studies that their agencies or organizations completed? Are there more efficient methods of collecting data and maintaining up-to-date information from established sources?

Evaluating Public Involvement in Hazard Mitigation



Surveys are a good tool to assess how well your public education and outreach projects are working, how the community perceives your hazard mitigation planning efforts, and to obtain feedback on proposed mitigation actions. Following are a few sample questions to ask:

- Do you have a greater understanding of the hazards to which you are susceptible? On a scale of 1-5 (1=very little; 5=a great deal), how much more do you know than you knew before planning efforts began?
- Do you now have a greater understanding of what you and your community can do to lessen the effects of natural hazards? (1=very little; 5=a great deal)

- d. Coordinating with other Agencies.** How well did coordination work? Did agencies have sufficient notice for meetings? Did they have enough time to review the draft plan? Have agreements been followed? Do MOAs need to be revised, due to changes in funding, priorities, staffing, or other events?

Look at what worked and what didn't as you prepared and implemented the plan, and identify ways to improve the process.

Task B. Evaluate the effectiveness of your actions.

Measuring the effectiveness of your programs, policies, practices, and projects is another important element of your evaluation. If your plan called for strategies with a relatively short implementation time frame, their overall success can be evaluated if they have been completed. Additionally, you can assess actual losses avoided as a result of projects implemented following a disaster. Most mitigation projects, however, are done gradually, as resources and conditions allow. The progress to date of these projects can therefore be evaluated by reviewing whether the project is on time, in line with the budget, and moving ahead as planned. Now is the time to gather data to assess your progress toward meeting your objectives, and ultimately meeting your plan goals. This is also a good time to pull together the progress reports agencies submitted to you periodically. These will enable you to answer the questions that follow and help your planning team evaluate how effective the mitigation projects and actions have been. Use **Worksheet #3: Evaluate Your Project Results** to assist you in completing this task.

1. What were the results of the implemented actions? Did the results achieve the goals/objectives outlined in the plan? Did the actions have the intended results?

Review the goals and objectives of your plan. Be able to show how (or whether) the project met the objective it was designed to achieve. This is where you can measure the results of the project against the identified indicator of success.

Sometimes projects have unintended results, which can be good if they provide an extra benefit to the state or community, or not as good if they did not achieve or protect everything to the extent planned. Examples of unintended results can extend to environmental, social, or economic impacts.



If you received federal funds

for the project, you have been submitting quarterly reports to the responsible agency on

its progress. These quarterly reports will be very helpful in showing the project's current status, such as percentage complete, total project costs obligated versus amount spent, problems with implementation, and anticipated completion date.



Project Name and Number:

Raging River Views Park Flood Acquisition Project (HVMP-2003-01)

Project Budget:

\$360,000

Project Description:

Acquisition and demolition of 14 flood-prone structures

Associated Goal and Objective(s):

Goal: Minimize losses to existing and future structures within hazard areas

Objective: Reduce potential damages to the manufactured home park in the floodplain

Indicator of Success (e.g., losses avoided):

Losses avoided by acquisition and demolition of flood-prone structures



Town of Hazardville Composite Loss Map developed previously during risk assessment (see FEMA 386-2).

Was the action implemented? ☒ YES ☐ NO

IF NO

Why not?

Was there political support for the action?

Were enough funds available?

Were workloads equitably or realistically distributed?

Was new information discovered about the risks or community that made implementation difficult or no longer sensible?

Was the estimated time of implementation reasonable?

Were sufficient resources (for example staff and technical assistance) available?

YES NO

☐ ☐

☐ ☐

☐ ☐

☐ ☐

☐ ☐

☐ ☐

IF YES

What were the results of the implemented action?

Of the 14 proposed properties, 10 were acquired. The benefit-cost ratio is 2.19, based on project benefits of \$789,000 and costs of \$360,274. Benefits are based on the net present value of the avoided damages over the project life. Furthermore, about 40 people are no longer in the path of a potential flood, making emergency rescue operations in that area less likely and evacuation easier.

page 2 of 2

	YES	NO
Were the outcomes as expected? If No, please explain:		
The project originally set out to acquire 14 properties. Four of the 14 owners did not want to participate in the buyout program.		
Did the results achieve the goal and objective(s)? Explain how:		
Despite four properties still in harm's way, the objective has been largely met. See additional comments.		
Was the action cost-effective? Explain how or how not:		
The FEMA Limited Data module was used to perform the benefit-cost analysis. Data for the analysis was collected from historical flood data and used as benchmarks in the before mitigation section of the analysis. The damages after mitigation section was left blank, due to the properties being permanently acquired, and the economic risk removed completely. The analysis resulted in a benefit-cost ratio of 2.19, with benefits totaling \$789,000 for 10 properties.		
What were the losses avoided after having completed the project?		
Total avoided losses are \$789,000 over the lifetime of the project (estimated at 100 years).		
If it was a structural project, how did it change the hazard profile?		
N/A		
Additional comments or other outcomes:		
The Planning Department has agreed to work with the remaining four homeowners in evaluating other flood-proofing options.		

Date: **October 12, 2005**

Prepared by: **Hazardville Department of Economic Development**
Hazardville Department of Planning



Sample Indicators to Measure Progress in Reducing Risk

There are a variety of ways to measure effectiveness of mitigation actions. You can look at dollar amounts in losses avoided, both expected (prior to implementing a project) and actual (following a disaster). You can also look at how the mitigation actions have changed the number of households, businesses, critical facilities, and environmental assets that are at risk. Some other indicators are listed below.

For more on indicators, see the publication *Hazard Mitigation in North Carolina: Measuring Success*, Chapter 6 available online at http://www.dem.dcc.state.nc.us/Mitigation/Library/Success_Stories/Measuring_Success_Vol2/Chapter6.pdf.

Housing	Business
Number of households living in unsafe areas.	Number of businesses in unsafe areas.
Number of households living in structures that are vulnerable to natural hazards.	Number of businesses in unsafe structures.
Number of repetitively damaged houses.	Number or percentage of businesses that have purchased adequate insurance to cover property casualty, fire, liability, loss of revenue, and flood damage.
Losses avoided as a result of the implementation of acquisitions.	
Losses avoided as a result of the implementation of elevations-in-place.	Number or percent of businesses that have conducted a business impact analysis, and have developed and implemented a business risk reduction plan.
Infrastructure and Critical Facilities	Environment
Number of infrastructure elements – water supply, roads, bridges, sewerage, telecommunications, port facilities – that are located in areas that are hazard-prone.	Number of unsafe land use activities that take place in the 100-year floodplain or in environmentally sensitive areas.
Number of repetitively damaged infrastructure elements.	
Number of critical facilities – hospitals, emergency operations centers, police and fire stations, schools – that are located in areas that are hazard-prone.	Number of commercial or industrial facilities in the 100-year floodplain that have undertaken structural or non-structural mitigation measures.
Number of repetitively damaged critical facilities.	

Source: *Hazard Mitigation in North Carolina: Measuring Success*, February 2000.



2. Were the actions cost-effective? Did (or would) the project result in the reduction of potential losses?

It is not always enough to say whether an action was generally effective or not, especially when considering publicly funded projects. This is particularly true for mitigation actions that may require a subsequent hazard event to truly determine effectiveness. Absent an event, the potential losses avoided can be estimated for most “brick and mortar” mitigation projects. The term “brick and mortar” mitigation actions in this context refers to projects such as retrofit, acquisition, demolition, or relocation, and flood works such as levees, dams, and floodwalls.

One of the most important indicators to evaluate the effectiveness of mitigation actions undertaken by the state, tribe, or community is **Losses Avoided**. This indicator provides a dollar value estimate of the structural, content, and displacement costs that would have occurred if the mitigation action were not taken. The losses avoided are most easily estimated for structural mitigation actions. Surveys and qualitative statements may have to suffice as indicators for educational or regulatory actions and to address other objectives that may be associated with specific mitigation actions.

If the cost-effectiveness of the hazard mitigation projects implemented was originally determined by benefit-cost analyses (BCA), the planning team may consider reviewing the old BCA to determine whether the costs and benefits were close to what was estimated, or whether there were unforeseen costs or benefits. The point of revisiting the BCA is to re-calculate what losses would actually be reduced if the event were to occur. If possible, repeat relevant portions of the risk assessment to see if the project reduced potential losses. If HAZUS was used to develop the initial loss estimate, you may want to re-run it using the post-project results.

An initiative that did not have a BCA performed still can be objectively evaluated for its cost-effectiveness. Projects that do not lend themselves to benefit-cost analyses (e.g., education and outreach campaigns) or those projects where public values and ethical considerations ended up weighing more heavily on the final selection of an action than the results of a BCA, may require other methods, such as surveys, to gauge their effectiveness.

Whether you used BCA or other defensible methods to determine the cost-effectiveness of your actions, remember to document your results. Citizens, as well as state, local, and federal officials, will want to know of the losses avoided or benefits gained from your



Displacement Costs

The dollar amount it would cost for a function (business or service) to be relocated to another structure because of a hazard event. In the case of residents, this would be the cost to relocate individuals or families to temporary housing.



Cost-effectiveness is a key

evaluation criterion for federal grant programs. Cost-effectiveness has several possible definitions, although for grant-making purposes FEMA defines a cost-effective project as one whose long-term benefits exceed its costs. An easier way to say this is that a project should prevent more expected damages over the course of its effective “life” than it costs to fund the effort. This is done to ensure that limited public funds are used in the most efficient manner possible. Benefit-cost analysis is one way to illustrate that a project is meritorious and deserves funding.



Be sure to stay in touch

with your state on a regular basis to ensure that you remain aware of any changes to state mitigation goals or priorities. Similarly, states must communicate such changes to all localities.



implemented actions. Let them know that their tax dollars are being well spent.

3. Document actions that were slow to get started or not implemented.

It is important to include a discussion of why certain actions were slow in getting underway, never finished, or didn't get started at all. The project may have been delayed or removed from the list of actions because of an unforeseen problem with the implementation. In the case of an elevation, acquisition, or relocation project, for example, the voluntary nature of the program gives the homeowner or business the right to change their minds *at any time*, all the way up to just before the physical work on the project begins or any financial compensation has been received.

Task C. Determine why the actions worked (or did not work).

After verifying that an action was or was not implemented and its overall results, the planning team should try to document why the action worked or did not work. If a mitigation activity or project was unsuccessful, it is important to ascertain why so that more appropriate alternatives can be developed next time. If a mitigation project ends up being only partially implemented, it is important to get to the root cause, such as exceeding the budget. On the other hand, be sure to evaluate and document what did work successfully, and why. Understanding the factors that contributed to the success of a project, program, or policy is particularly important when you want to replicate or expand it. Use **Worksheet #3** to complete this task.

Be sure to publicize

this information to other communities within the state. Don't be shy about it, either—let other states and FEMA know about your successes! If possible, also communicate caveats and warnings as a result of less positive outcomes. Everyone will benefit from lessons learned.



Several considerations to examine include:

- Availability of resources;
- The political or popular support for or against the action;
- The availability of funds;
- The workloads of the responsible parties; and
- The actual time necessary to implement the actions.





After a Disaster Strikes

If a disaster strikes after you have completed your hazard mitigation plan, don't let the document sit on the shelf—it is a valuable resource for the long-term recovery and reconstruction of your community. The initial period following a disaster can be very chaotic. So many issues require attention that any thoughts of long-term recovery are crowded out by immediate recovery efforts. Critical life and safety issues come first: search and rescue operations, treating the injured, re-establishing vital public services, and providing emergency shelter. But once the task of clearing debris is well underway, community decision-makers need to shift their attention to long-term recovery. This is the opportunity to reconvene the mitigation planning team and evaluate the list of hazard mitigation priorities in light of the recent disaster.

Critical policy issues that emerge following disasters require local governments to make difficult decisions about how best to rebuild. Disaster victims have an inherent desire to rebuild rapidly and return to normal—to the way things were before the disaster. Communities, however, must balance this need against the objective of building back better and stronger, and use the opportunity of the disaster to improve the community's disaster resilience. Pressure to restore normalcy can be so strong that safety, hazard mitigation, and community improvement goals can be compromised or abandoned. Communities have a very short period of time to introduce, and gain acceptance of, new approaches to reconstruction. The mitigation plan will provide an excellent foundation for introducing these new approaches.

The diagram on the following page shows how a disaster triggers the need to re-evaluate all aspects of the mitigation planning process to determine if changes are now warranted.

1. What opportunities for hazard mitigation are presented in light of the disaster damages?

If the hazard mitigation plan included a post-disaster recovery and reconstruction component to the implementation strategy, this section of the plan should be the initial focus for the recovery task force. Did the plan anticipate the type and intensity of disaster damages that actually occurred? Are there “off-the-shelf” mitigation actions that are relevant for this recovery effort? Are there other priority hazard mitigation actions that have not been implemented due to a lack of available resources?

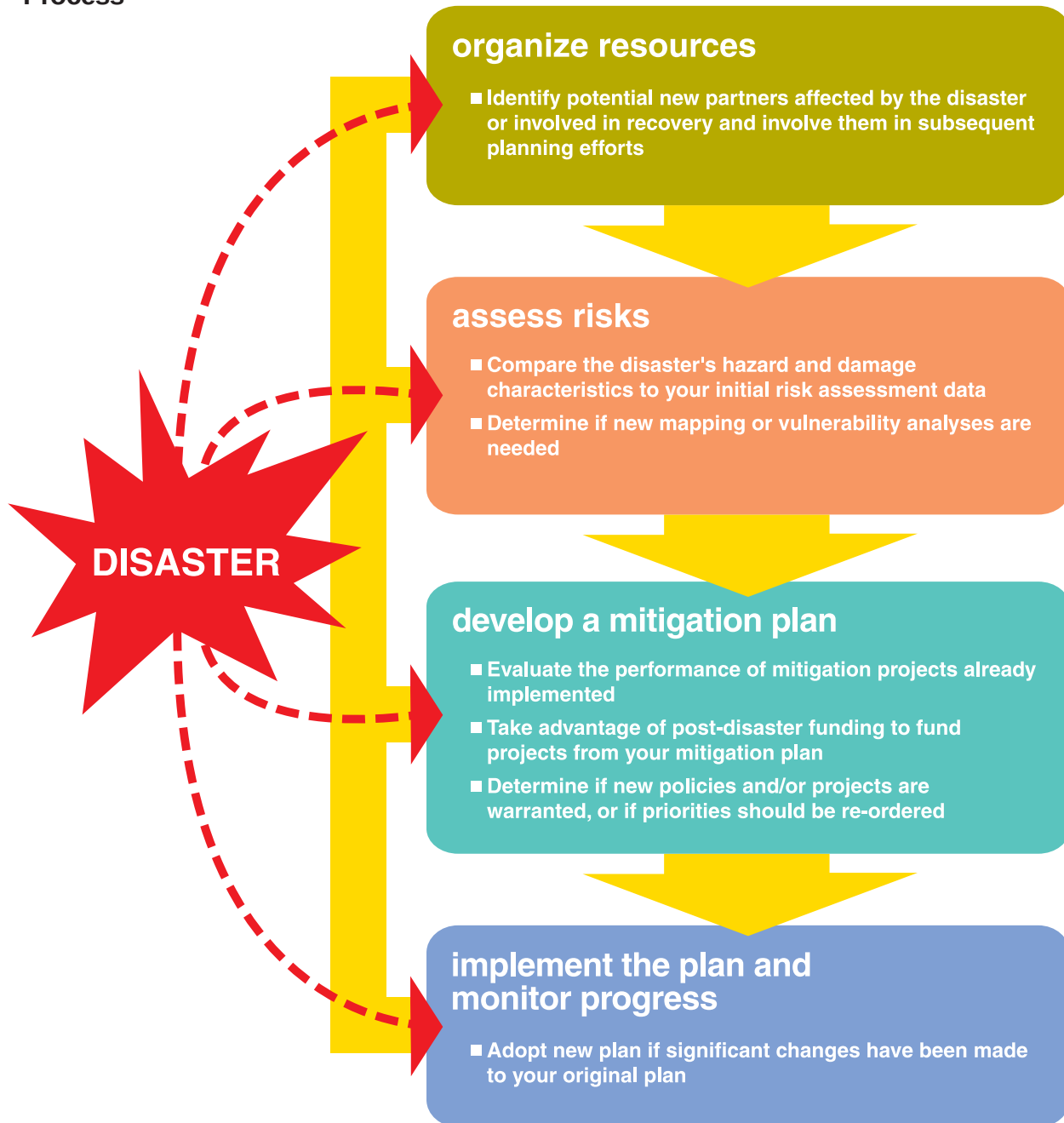
(continued on page 3-13)

Identifying potential mitigation

projects in a post-disaster scenario is the highest priority task for the planning team or recovery task force and the most time sensitive one. In a major disaster that has a presidential declaration, make sure that the SHMO and FEMA mitigation staff working out of the Disaster Field Office (DFO) have a copy of the hazard mitigation plan and have a clear understanding of community priorities for potential mitigation actions. State and federal mitigation planning staff can provide technical assistance to your community if necessary.



**After a Disaster:
Re-evaluate Your
Mitigation Plan and
the Planning
Process**





Applying for HMGP Funding

The purpose of the HMGP is to reduce the loss of life and property from natural disasters and enable mitigation actions to be implemented during the recovery process following a presidential disaster declaration.

Eligibility. Individual homeowners and businesses are not eligible, but a community may apply on their behalf. State governments, tribes and other tribal organizations, and certain nonprofit organizations are eligible, in addition to local governments.

Project possibilities. All eligible projects must provide a long-term mitigation solution. Additionally, a project's potential savings must be more than the cost of implementation. Funds may be used to protect either public or private property. Examples of possible projects include, but are not limited to: property acquisition and relocation/demolition, retrofitting of structures to minimize damage from natural hazards, elevation of flood-prone structures, and development and initial implementation of vegetative management programs. In addition, hazard mitigation planning initiatives are also eligible.

States prioritize and select project applications; however, all potential projects must meet certain minimum criteria addressing five issues:

1. Does the project conform to your State's Hazard Mitigation Plan?
2. Will the project beneficially impact the disaster area?
3. Does the application meet federal environmental requirements?
4. Does the project solve a problem independently?
5. Is the project cost-effective?

After a disaster declaration, the state will advertise the availability of HMGP funding and provide guidance on eligibility criteria. If you are interested in applying, you should contact the SHMO to find out about the application deadline and about the state's funding priorities.

Choosing a project and submitting your application. Consider your list of potential projects, and then choose the project that conforms to the state's priorities, meets all of the minimum criteria, and can be adequately funded (25% of the total cost). For additional information, contact your SHMO or the FEMA Mitigation Division in your Region, or visit FEMA's Web site at <http://www.fema.gov/fima/hmmp>. FEMA 345 (*Hazard Mitigation Grant Program Desk Reference*) contains more information as well.

Federal and state agencies

may have collected enough information from various sources to determine the reoccurrence interval for the recent event. This indicates the severity or degree of magnitude of the event. Technical assistance may be available to survey high-water marks (in the case of flooding) or to conduct a building performance assessment. Knowing the reoccurrence interval for the hazard will help you reevaluate the accuracy of the hazard information in the current plan. To do this for a flood, for example, you would compare the extent of the actual flooding to existing flood maps to determine whether the maps accurately portray the true hazard scenario.



(continued from page 3-11)

2. Following the initial recovery phase, re-evaluate the hazard profiles and vulnerability assessment.

Did the hazard information presented in the plan reflect the location, intensity, and duration of the recent event? There may be a need to collect additional data regarding the event and incorporate that information into the vulnerability assessment.

3. Following a disaster is a good time to evaluate the results of implemented projects.

How well did your mitigation actions perform? The best time to measure losses avoided is in the aftermath of a recent disaster, when you can actually see the difference that mitigation actions made. For example, if a house was protected from a flood because it was elevated above the Base Flood Elevation (BFE) before a disaster occurred, it should be relatively easy to obtain the actual flood height and determine what kind of damages would have occurred if the house had not been raised. Louisa County, Iowa, and Long Beach, Mississippi, illustrate the losses avoided due to flood mitigation actions implemented after floods in 1993 and 1998, respectively.

(continued on page 3-15)



Louisa County, Iowa

In 1993, a severe flood occurred in Louisa County, located along the Mississippi River, resulting in damage to more than 275 homes and the evacuation of nearly 200 families. Following this flood event, the County used both acquisition and relocation of affected properties to mitigate future flooding problems. In May 2001, the flood pattern of 1993 repeated itself, and the Mississippi River and its tributaries flooded Louisa County yet again. By comparing calculated damages from the 1993 flood to the 2001 flood, the effectiveness of the acquisition and relocation program could be measured. As shown in Tables 1 and 2 below, significant reductions in emergency shelter, family assistance, and public assistance expenditures were realized in 2001 as a result of the acquisitions and housing relocations that occurred in the aftermath of the 1993 flooding.

Furthermore, Table 3 shows the losses avoided as a result of the housing acquisitions that occurred. If Louisa County had chosen not to take any action following the 1993 flood, potential property damage to these structures in the 2001 flood would have exceeded one million dollars. Calculation of reduction in public assistance expenditures and losses avoided as a result of proactive mitigation can further highlight the value of hazard mitigation planning efforts to concerned citizens, local and federal governments, and potential funding agencies.

Table 1. Emergency Shelter and Family Assistance in Louisa County

	1993	2001
Number of families evacuated and temporarily sheltered due to displacement	200	11
Number of Red Cross cases (individuals requesting post-disaster assistance)	800	3
Disaster Housing Assistance (FEMA)	\$742,500	\$0

Source: Hazard Mitigation in Iowa: Measuring Success, FEMA 2003 (unpublished)

Table 2. Public Assistance Expenditures, 1993 and 2001 (2001 values)

		1993	2001
A	Debris Clearance	\$542,215	\$0
B	Emergency Protective Measures	\$44,367	\$0
C	Roads and Bridges, Culverts, Ditches	\$2,941	\$0
D	Water Control Facilities & Levees	\$0	\$0
E	Public Buildings & Contents	\$0	\$0
F	Utility Distribution Systems	\$0	\$0
G	Public Parks	\$0	\$0
H	Total Public Assistance	\$589,523	\$0

Source: Hazard Mitigation in Iowa: Measuring Success, FEMA 2003 (unpublished)

Table 3. Losses Avoided from Acquisition of Flood-Prone Properties in Louisa County, Aggregated by Building, Contents, Displacement, and Total for the Spring, 2001 Flood (DR-1367)

Depth of Flooding (Feet)	Avoided Losses to Buildings	Avoided Losses to Contents	Avoided Displacement Costs	Total
0	\$24,672	\$11,103	\$0	\$35,775
1	\$319,533	\$143,790	\$82,500	\$545,823
2	\$386,880	\$174,096	\$126,500	\$687,476
Total	\$731,085	\$328,989	\$209,000	\$1,269,074

Source: Hazard Mitigation in Iowa: Measuring Success, FEMA 2003 (unpublished)





Long Beach, Mississippi

Located along the Gulf of Mexico, the coastal city of Long Beach, Mississippi, has been affected by seven hurricanes and repetitive flooding, often as a result of spring storms. In addition to its vulnerability to flooding because of its coastal location, the City also suffered from poor drainage, resulting from three poorly maintained drainage channels. While these channels were better managed in the 1980s, the City, and particularly the areas around the canals, is still plagued by poor drainage. Following Hurricane Georges in 1998, the City began to take a proactive approach to flood damages, and identified 95 properties, many of them repetitive loss properties located adjacent to the canals, for an acquisition and demolition program. This long-term acquisition project had an estimated cost of \$7.7 million (see Table 1), with a portion of the funding coming from the Hazard Mitigation Grant Program. In 2001, midway through the acquisition and demolition project, Tropical Storm Allison struck the Gulf Coast. The storm caused an overflow from the drainage system, which flooded the neighborhoods located near the canals. Because 44 homes had already been purchased and demolished prior to the storm, the losses avoided from this single flood event were estimated to be \$690,033 (see Table 2). This figure only represents the losses avoided to houses, their contents, and displacement costs. It does not include the additional savings to the local government in emergency services and disaster assistance costs that would have been incurred had families remained in the floodplain. By combining much-needed improvements to its drainage system with the acquisition of many repetitive loss properties, the City of Long Beach shows that mitigation projects can lead to substantial savings for the local government and affected communities.

Table 1: Estimated Costs for Acquisition of 95 Properties in the City of Long Beach for the Master Watershed Plan

Item	Total Cost
Acquisition of Properties	\$6,578,924
Relocation Pay to Tenants	\$ 52,000
Demolition of Properties	\$ 918,065
Fees for Appraisals and Legal Assistance	\$ 171,000
Total	\$7,719,989

Source: Hazard Mitigation in Mississippi: Measuring Success, FEMA 2003 (unpublished)

Table 2: Losses Avoided during Tropical Storm Allison from Acquisition of 44 Flood-Prone Properties in the City of Long Beach, MS

Item	Total Cost
Estimated Avoided Losses to Buildings	\$502,917
Estimated Avoided Losses to Contents	\$ 85,826
Estimated Avoided Displacement Costs	\$101,290
Total	\$690,033

Source: Hazard Mitigation in Mississippi: Measuring Success, FEMA 2003 (unpublished)

(continued from page 3-13)

4. Depending upon the severity of the recent disaster, it may be necessary to re-evaluate the range and priority given to specific hazard mitigation actions.

Should the priority ranking of mitigation actions be re-evaluated given the type and intensity of the recent event? If the hazard event was not anticipated or given a low priority as a goal or objective, there may be a need to go through another round of identifying and prioritizing hazard mitigation actions for your community.

5. Consider including a special section in your mitigation plan devoted to post-disaster issues.

Many mitigation policies or projects are not politically or economically viable until after a disaster. Thinking through post-disaster operational and policy issues in the pre-disaster time frame enables your community to delve into these often emotional subjects in the relative luxury of a non-disaster scenario. FEMA 321, *Planning for Post-Disaster Recovery and Reconstruction*, provides more details.



Task D. Keep the community updated and involved, and celebrate your successes.

Project implementation brings the community's hard work to fruition. The planning team should be sure to keep all stakeholders in the community informed of the progress of the projects. Ways to engage the community may include staging events to showcase your accomplishments or taking advantage of media opportunities to publicize the completion or significant steps of specific projects. Refer to *Getting Started* (FEMA 386-1) for additional ways to communicate your success to the community.

Summary

The evaluation phase of the planning process helps your planning team determine whether its planning process and recommendations have been effective, and if your community's goals are being reached. Systematically evaluating the plan keeps your community informed and hopefully motivates those responsible for implementing the mitigation actions.

After you have evaluated your actions to determine what worked and did not work, go to Step 4, *Revise the Plan*, in which you will use the evaluation results to revise the hazard mitigation plan.



Local and state agencies

should keep in contact with each other about the progress of their mitigation actions. Each

entity should update its risk assessment data using this information. Agencies responsible for maintaining the state and local plans should update their plans accordingly, as well.

Methods of communicating with constituents during implementation of the recommended projects and programs include:

- Write a newsletter to provide details on projects;
- Create 15- or 30-second public service announcements and send them to local broadcasters;
- Work with your local news or public access cable station feature a news story about your efforts;
- Hold an annual event honoring local people who have contributed to hazard mitigation projects;
- Develop a Web site to post news articles, meeting notices, and event notices; and
- Establish a speaker's bureau to talk to schools, business groups, and other organizations about mitigation.

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Friday, September 29, 2006

Town Hall Retrofit Called a “Money Pit”

(Part 3 of a 4-Part Series on the Hazard Mitigation Implementation Process)

[Hazardville, EM] In response to a complaint about the progress of the seismic retrofit project of the historic Hazardville Town Hall, the Hazardville Board of Supervisors recently held an informal hearing on the matter. The retrofit, begun under Hazardville’s initiative to become more disaster resistant and overseen by the Town of Hazardville Organization for Risk Reduction (THORR), is now estimated to have cost taxpayers about double the original projected cost.

When asked about the escalating costs, Joe Norris, lead planner of THORR, commented that the overruns could be attributed to misjudgments THORR had made about the extent of repairs that the building needed. “We didn’t realize the ex-

tent of work that would have to be done to bring the building up to current code, much less to be seismically resistant.” Norris explained that much of the work had nothing to do with seismic standards. “Not only did the contractor discover asbestos-based insulation and ceiling tiles on the first floor where most of the work was to be done, but he also found lead-based paint on pipes that had not been removed during renovation in the late 1960s. These factors were not considered in our original project estimates, but they had to be addressed in the retrofit in order to comply with local, state, and federal laws,” Norris said.

Board of Supervisors Chairperson Seymour Hale likened the building

retrofit to a “money pit,” saying that THORR should have done its homework. Norris agreed, “As soon as we found out about these unexpected costs for the project, we began to re-evaluate all of our other projects to keep this from happening again. It seems that we placed a huge amount of work on our local building inspector. He had a tremendous work load, and did not have enough time to do in-depth investigation into some of the buildings before work began.” When asked how THORR planned to remedy this problem, Norris replied, “We are still in the process of evaluating our other hazard mitigation projects and will submit our findings to the Board by the end of the month.”

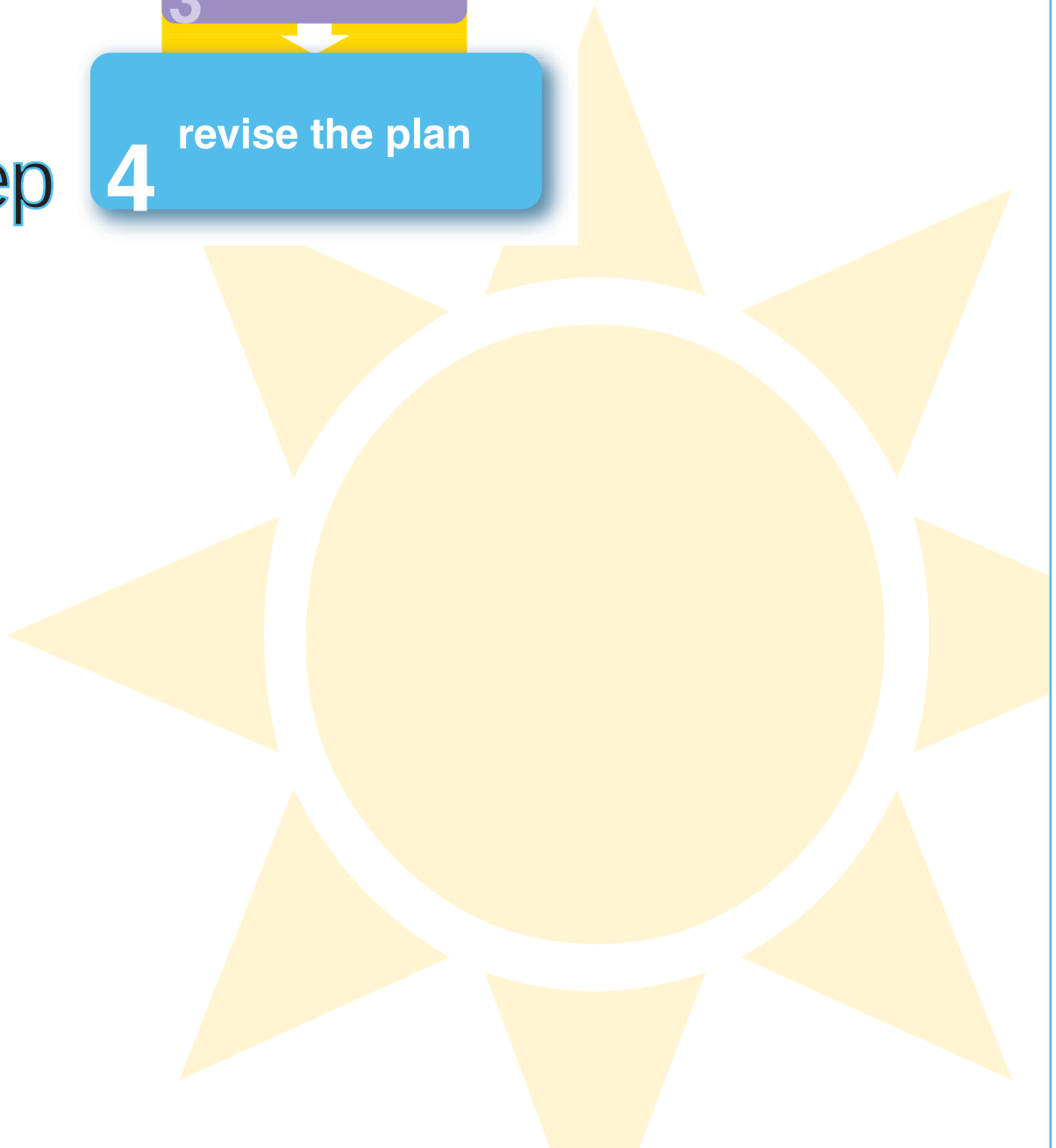




step

4

revise the plan



revise the plan

Overview

The final step in the mitigation planning process is to determine whether you need to make changes to the planning process or the mitigation plan. You will start with an evaluation of the factual underpinnings of the mitigation strategy: the risk assessment and the capability assessment. Using the results of the evaluations of the process and projects completed in Step 3, and taking into consideration the factors to be discussed under Task A below, you will determine whether you need to revise or update your mitigation plan or planning process.

The frequency of conducting a plan evaluation depends upon the speed and the intensity at which changes are occurring. For example, if your community is experiencing significant growth, or if you have experienced recent or frequent hazard or disaster events, this evaluation may have to be conducted more frequently. *Keep in mind, however, that DMA 2000 regulations require that local plans be reviewed and updated at least every five years, and state plans at least every three years, for a state or jurisdiction to remain eligible for assistance.*

Procedures & Techniques

Planning is an ongoing process, and your plan should be treated as a living document that must grow and adapt in order to keep pace with the community's growth and change as these issues affect hazard vulnerability, and with changes that may be external to the community but that affect the planning process. An annual "scan of the horizon" should be done, so that emerging trends in data availability or collection, land use and development, technology, and other factors can be documented. Just prior to the three- or five-year point, these annual observations should be evaluated to determine what types of changes should be made to your planning process and to the plan document. The results of your evaluations should be re-programmed back into each phase of the planning process and should yield decisions on how (or whether) to update each section of your plan.



Task A. Review those factors that affect your community's planning context.

Evaluating the following factors will help you determine what changes to the plan document are warranted. Extensive or widespread changes in any one of these categories may signal a need to reconsider some or all of your plan's fundamental assumptions.

1. Revisit the risk assessment to incorporate updated estimates of cost of living and replacement costs, new scientific data on hazard areas, the effect of hazards on the community, changes in growth patterns, and, particularly, reductions in vulnerability due to completion of projects.

Use **Worksheet #4: Revisit Your Risk Assessment** to complete this task. See *Understanding Your Risks* (FEMA 386-2) to review information on hazards and estimating losses.

- **Shifts in development.** The planning team should determine whether there are changes in development patterns that could influence the effects of hazards in your community or create additional risks. One common example of this is when upstream growth in a given watershed affects flood characteristics downstream in your community. For example, in Hazardville, coastal development caused the Planning Department to undertake a coastal development plan. The effects of erosion, wave action, and tidal surge hazards will be considered in this development plan, and corresponding policies and/or mitigation projects should be considered.
- **Areas affected by recent disasters.** Recent hazard events or disasters can provide new information about the ways in which your community can be affected. Compare the effects of the event against what the loss estimation analysis led you to expect.
- **New studies or technologies.** What have recent hydrologic, watershed, traffic, or demographic studies revealed about your community? Studies such as these may provide additional information about your community. You already should be continually researching mitigation techniques to discover whether new technologies or methods are being used.



- **Re-estimate losses.** For projects that have not yet been implemented, any new information the planning team has gathered should be used to recalculate losses or revise the benefit-cost analysis originally prepared. See *Understanding Your Risks* (FEMA 386-2) for the methodologies and considerations used to estimate losses.

2. Revisit your capability assessment to determine changes in laws, authorities, community and state resources, and availability of financial and technical tools that may affect what you can do.

Additionally, political will and priorities can change with the election cycle. See *Developing the Mitigation Plan* (FEMA 386-3) for more information on how to update your capability assessment.

- **Changes in community, state, or federal laws, policies, plans, or funding.** The strengthening, relaxing, or addition of land use, environmental, or other government regulations may present additional challenges or opportunities to the community.
- **Changes in the socioeconomic fabric of the community.** Broad social transformations often have repercussions on the community's sequence of mitigation priorities and the implementation of projects. Recessions, booming economies, cost of living increases, changes in the political climate, demographic shifts, or environmental justice issues may have some influence on the way mitigation is executed in your community. On a smaller scale, changes within the community, such as the departure of a large employer, may alter the socioeconomic balance.
- **Other changing conditions.** Have the successes achieved over the past few years created a political environment that may allow the planning team to propose a new mitigation initiative that would not have had the political support necessary earlier?



The review process
can be easier if you keep up
with annual reports.



Risk Assessment Steps	Questions	YES	NO	COMMENTS
Identify hazards	Are there new hazards that can affect your community?		✓	
Profile hazard events	Are new historical records available?		✓	
	Are additional maps or new hazard studies available?	✓		Recently completed maps and studies showing vulnerability of the new coastal development to erosion and tidal surge are available.
	Have chances of future events (along with their magnitude, extent, etc.) changed?		✓	
	Have recent and future development in the community been checked for their effect on hazard areas?	✓		
Inventory assets	Have inventories of existing structures in hazard areas been updated?	✓		
	Is future land development accounted for in the inventories?	✓		The Planning Department is preparing a coastal development plan to ensure that any future development is set back far enough to be outside the erosion zones and the coastal high hazard areas. Current and future road configurations will also be studied to ensure adequate evacuation times before hurricane events.
	Are there any new special high-risk populations?	✓		Coastal residents and business owners.
Estimate losses	Have loss estimates been updated to account for recent changes?	✓		

If you answered "Yes" to any of the above questions, review your data and update your risk assessment information accordingly.



Task B. Analyze your findings and determine whether to revise your planning process or mitigation strategy.

The planning team should use its new knowledge to identify the areas of the plan or planning process that should be changed. Some aspects of the planning process may warrant a briefer treatment the second time around, while others, because of additional knowledge or more readily available technical assistance, may warrant a more in-depth treatment.

Consider updating the goals, objectives, and actions in the plan.

One of the most important steps in plan revision is to update or refine the community's goals, objectives, and actions, particularly in light of experiences gained from implementing mitigation actions in the current plan. The planning team has undoubtedly learned something new about the state or community, the administration of government, or the value that the community places on certain objectives—all of which need to be included in a reevaluation of the strategies. As with every step in the planning process, updating goals and strategies should use consensus building and community-driven prioritization methods, which are explained in *Getting Started* (FEMA 386-1) and *Developing the Mitigation Plan* (FEMA 386-3).

Using the information gleaned in Step 3, and your results from Task B, the planning team should discuss what actions should be undertaken, reconsidered, or even eliminated, to further the plan's goals. This discussion should result in a preliminary list of alternative mitigation actions to incorporate into the update of the plan. As in any other step of the planning process, the community should be engaged in reviewing these alternatives. The planning team may choose to present these alternatives in a public forum at this stage or as part of the plan review process discussed in Task C. For more details on researching alternatives, see Phase 3, Step 2 of *Developing the Mitigation Plan* (FEMA 386-3).

Important questions to discuss with the team include the following:

1. Are the goals and objectives still applicable? Have any changes in the state or community made the goals or objectives obsolete or irrelevant?

Review the findings of changes in the community, including changes that your mitigation initiatives have brought, to determine whether you have met your goals and if they remain consistent with current conditions. If you determine that you need to add new



goals to the plan, see Phase 3, Step 1 of *Developing the Mitigation Plan* (FEMA 386-3) for formulating goal statements.

2. Do the plan's priorities correspond with state priorities?

Where applicable, make sure your actions are consistent with any changes to state priorities. You will continue to be aligned with state goals and priorities by doing this.

3. Do existing actions need to be reprioritized for implementation?

Now that you have implemented some of the actions, learned what works and doesn't, developed new actions, and discovered that some aspects of your community may have changed, you may need to reprioritize your actions. See *Developing the Mitigation Plan* (FEMA 386-3) for prioritizing methods.

4. Are actions appropriate for available resources?

Make sure that the community or state has enough resources to carry out the actions. You probably will have to research to find out what is currently available. Are past sources of funds still available? Are there new sources of funding that can be tapped? Are there new partnerships with nonprofit organizations or businesses that can be developed? What creative ways of implementing similar actions have other communities used? *Securing Resources for Mitigation Planning* (FEMA 386-9) covers these topics in greater detail.

In order to remain eligible

for disaster related funding, your updated local plan must be re-submitted to your state and/or FEMA Regional Office for review and approval every five years. State plans must be re-submitted to the FEMA Regional Office for review and approval every three years.

DMA

Task C. Incorporate your findings into the plan.

Include your most recent findings about the community, tribe, or state, your hazards and vulnerabilities, as well as the applicable original actions of the plan, into a revised plan. Update your description of the planning process to include the steps you took to revise the plan document and how you involved the public. Update the implementation strategy to identify who will be responsible for the new or revised actions, the time frame, and funding sources.

The revised plan must be reviewed by all stakeholders in the community for its validity, and proceed through a formal adoption process as required by local or state laws.

Use **Worksheet #5: Revise the Plan** to help you keep track of where the plan document may require revisions.



Worksheet #5**Revise the Plan****step 4**

page 1 of 4

Prepare to update the plan.*When preparing to update the plan:**Check the box when addressed:*

1. Gather information, including project evaluation worksheets, progress reports, studies, related plans, etc.	
Comments: THORR must work with the Department of Public Works to update their progress reports and stream maintenance plans. While the department has been effectively conducting their new duties, it has been unable to attend to administrative paperwork such as preparing progress reports and formally updating its standard operating procedures.	
2. Reconvene the planning team, making changes to the team composition as necessary (see results from Worksheet #2).	
Comments: Invited Habitat for Humanity to participate in THORR.	

Consider the results of the evaluation and new strategies for the future.*When examining the community consider:**Check the box when addressed:*

1. The results of the planning and outreach efforts.	
Comments: All but one of the the Raging River Views Park residents attended the design charette put on by the Department of Planning.	
<i>[Note: The information here only pertains to the one project highlighted in this guide. When actually completing the worksheet, you will reflect on all projects.]</i>	
2. The results of the mitigation efforts.	
Comments: The mitigation efforts have gone as planned, except the team was unable to obtain the cooperation of the remaining Raging River Views Park residents.	
<i>[Note: The information here only pertains to the one project highlighted in this guide. When actually completing the worksheet, you will reflect on all projects.]</i>	



3. Shifts in development trends.	✓
Comments: The continued unwillingness of the Council to adopt hazard-based zoning will continue to be an issue. The reauthorization and funding of the economic development program encourages development in hazard areas. Recent development along the coast has not taken into account coastal storm hazards.	
4. Areas affected by recent disasters.	✓
Comments: Coastal windstorms have continued to erode the hillside surrounding the lighthouse.	
5. The recent magnitude, location, and type of the most recent hazard or disaster.	✓
Comments: The spring coastal storm of 2002 was estimated by NOAA to have a 25-year recurrence interval and accelerated beach erosion in several areas.	
6. New studies or technologies.	✓
Comments: THORR is currently conducting a study to determine best mitigation methods for retrofitting historic structures in the downtown district.	
7. Changes in local, state, or federal laws, policies, plans, priorities, or funding.	✓
Comments: See #3.	



8. Changes in the socioeconomic fabric of the community.	✓
Comments: Most new residents along the coast are retired professionals and are new to the area.	
9. Other changing conditions.	✓
Comments: None	

Incorporate your findings into the plan.

When examining the plan consider:

Check the box when addressed:

1. Revisit the risk assessment. (See Worksheet #4)	✓
Comments: Acquisition of structures in the Raging River Views Park decreases the potential flood losses. Vulnerability assessment and loss data will be incorporated into the plan.	
2. Update your goals and strategies.	✓
Comments: N/A	
3. Recalculate benefit-cost analyses of projects to prioritize action items.	✓
Comments: N/A	



Use the following criteria to evaluate the plan:

Criteria	YES	NO	Solution
Are the goals still applicable?	✓		
Have any changes in the state or community made the goals obsolete or irrelevant?		✓	
Do existing actions need to be reprioritized for implementation?	✓		Staffing at the Department of Public Works is a high priority.
Do the plan's priorities correspond with state priorities?	✓		
Can actions be implemented with available resources?		✓	Need to identify funding for additional staff at the Department of Public Works.

Comments:

None

Summary

In order for the plan to remain a viable tool for your state, tribe, or community, you must regularly review your planning process and mitigation strategy. Communities are rarely static and new challenges will arise during every revision of the plan. Disasters also present a window of opportunity to evaluate the relative success of the mitigation plan. States, tribes, and communities should take advantage of funding that becomes available as a result of these events.

Revising the plan ensures it remains up-to-date and relevant, providing a good return on the time and resources invested in developing it.

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Thursday, January 16, 2007

The Hazard Mitigation Planning Cycle Set to Begin Again

(Part 4 of a 4-Part Series on the Hazard Mitigation Implementation Process)

[Hazardville, EM] A strategic planning meeting to update the Hazardville Hazard Mitigation Plan was held Wednesday at the Town Hall. The Town of Hazardville Organization for Risk Reduction (THORR), continuing in its planning capacity, led the strategy session by explaining to the community the changes the town has undergone since the initial adoption of the plan in 2003.

The first meeting was to review the results of the community per-

ception survey and to discuss the status of the mitigation actions that were prioritized in the town's mitigation plan. "Overall, our residents now seem to be more aware of the hazards to which the town is vulnerable, and a large majority of the survey respondents knew what they could do to reduce their own vulnerability," said Joe Norris, lead planner for THORR. "With the exception of the Town Hall seismic retrofit project, we are proud to inform the community that our

projects are all progressing as scheduled and under budget."

"We promised to make this community a safer place to live and work, and we will continue to strive to achieve this for our community," Mayor McDonald said at a press briefing yesterday. "That promise means we must diligently prepare for and mitigate against the many hazards our community is vulnerable to. Accountability and diligence are key to making this a reality."





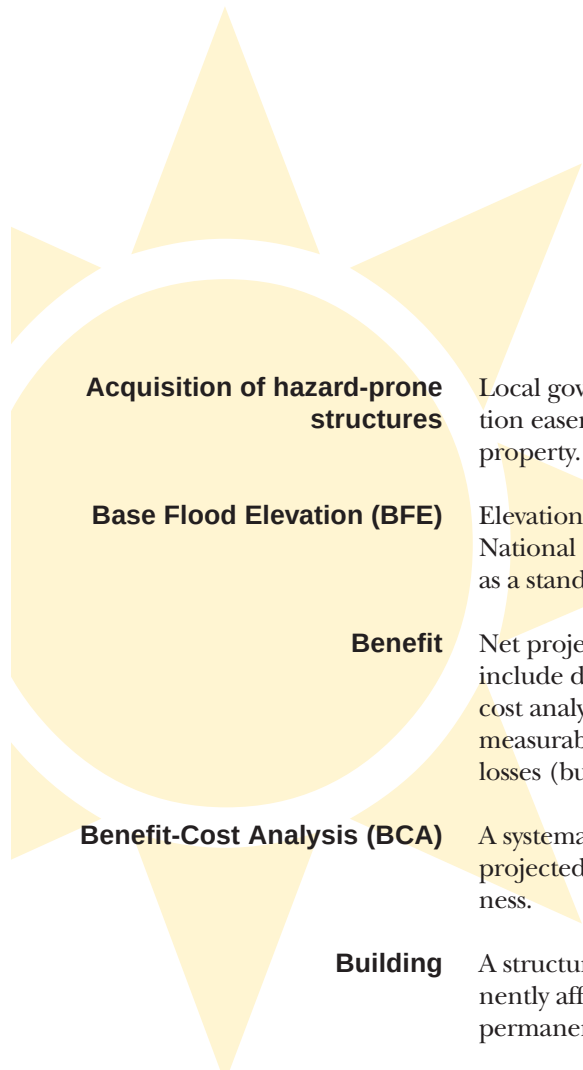
You have a mitigation plan. Now what?

The first plan your state, tribe, or community adopts establishes a baseline from which to measure progress. As you implement and evaluate actions, your knowledge of hazards and how to best reduce your vulnerabilities increases tremendously. In order to effectively monitor your progress, it is important to take advantage of the worksheets provided in the how-to series. Over time, new partners will become involved in the planning process, providing additional reservoirs of experience and support. Since the political and social arenas, as well as the natural environment, are continually changing, you must periodically revisit and update your plan. As your plan evolves over time, you should see a corresponding improvement in your state, tribe, or community's resilience to the damaging effects of disasters.





appendix a glossary



Acquisition of hazard-prone structures	Local governments can acquire lands in high hazard areas through conservation easements, purchase of development rights, or outright purchase of property.
Base Flood Elevation (BFE)	Elevation of the base flood in relation to a specified datum, such as the National Geodetic Vertical Datum of 1929. The Base Flood Elevation is used as a standard for the National Flood Insurance Program.
Benefit	Net project outcomes, usually defined in monetary terms. Benefits may include direct and indirect effects. For the purposes of conducting a benefit-cost analysis of proposed mitigation measures, benefits are limited to specific, measurable risk reduction factors, including a reduction in expected property losses (building, contents, and function) and protection of human life.
Benefit-Cost Analysis (BCA)	A systematic, quantitative method of comparing the projected benefits to projected costs of a project or policy. It is used as a measure of cost-effectiveness.
Building	A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheel and axles carry no weight.
Capability assessment	An assessment that provides a description and analysis of a community or state's current capacity to address the threats associated with hazards. The capability assessment attempts to identify and evaluate existing policies, regulations, programs, and practices that positively or negatively affect the community or state's vulnerability to hazards or specific threats.
Coastal zone	The area along the shore where the ocean meets the land as the surface of the land rises above the ocean. This land/water interface includes barrier islands, estuaries, beaches, coastal wetlands, and land areas with direct drainage to the ocean.
Community Emergency Response Team (CERT)	CERT is the mechanism to establish, train and maintain a local cadre of residents to act as first responders in the event of an emergency. A CERT team is especially critical in the first three days following a disaster when conditions may prevent access by emergency response personnel.
Community Rating System (CRS)	CRS is a program that provides incentives for National Flood Insurance Program communities to complete activities that reduce flood hazard risk. When the community completes specified activities, the insurance premiums of these policyholders in communities are reduced.



Comprehensive plan	A document, also known as a “general plan,” covering the entire geographic area of a community and expressing community goals and objectives. The plan lays out the vision, policies, and strategies for the future of the community, including all of the physical elements that will determine the community’s future development. This plan can discuss the community’s desired physical development, desired rate and quantity of growth, community character, transportation services, location of growth, and siting of public facilities and transportation. In most states, the comprehensive plan has no authority in and of itself, but serves as a guide for community decision-making.
Cost-effectiveness	Cost-effectiveness is a key evaluation criterion for federal grant programs. Cost-effectiveness has several possible definitions, although for grant-making purposes FEMA defines a cost-effective project as one whose long-term benefits exceed its costs. That is, a project should prevent more expected damages than it costs initially to fund the effort. This is done to ensure that limited public funds are used in the most efficient manner possible. Benefit-cost analysis is one way to illustrate that a project is cost-effective.
Critical facilities	Facilities vital to the health, safety, and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.
Debris	The scattered remains of assets broken or destroyed in a hazard event. Debris transported by a wind or water hazard event can cause additional damage to other assets.
Disaster Mitigation Act of 2000 (DMA 2000)	DMA 2000 (Public Law 106-390) is the latest legislation to improve the planning process. Signed into law on October 30, 2000, this legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur.
Earthquake	A sudden motion or trembling caused by a release of strain accumulated within or along the edge of the earth’s tectonic plates.
Elevation of structures	Raising structures above the base flood elevation to protect structures located in areas prone to flooding.
Emergency response services	The actions of first responders such as firefighters, police, and other emergency services personnel at the scene of a hazard event. The first responders take appropriate action to contain the hazard, protect property, conduct search and rescue operations, provide mass care, and ensure public safety.
Federal Emergency Management Agency (FEMA)	Agency created in 1979 to provide a single point of accountability for all federal activities related to disaster mitigation and emergency preparedness, response, and recovery. FEMA is now part of the Department of Homeland Security.
Flood Hazard Area	The area on a map shown to be inundated by a flood of a given magnitude.
Flood Insurance Rate Map (FIRM)	Map of a community, prepared by FEMA, which shows both the special flood hazard areas and the risk premium zones applicable to the community under the National Flood insurance Program.



Flood Mitigation Assistance (FMA) Program	A program created as part of the National Flood Insurance Reform Act of 1994. FMA provides funding to assist communities and states in implementing actions that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other NFIP insurable structures, with a focus on repetitive loss properties.
Floodplain	Any land area, including watercourse, susceptible to partial or complete inundation by water from any source.
Flood-proofing	Actions that prevent or minimize future flood damage. Making the areas below the anticipated flood level watertight or intentionally allowing floodwaters to enter the interior to equalize flood pressures are examples of flood-proofing.
Flood Zone	A geographical area shown on a Flood Insurance Rate Map (FIRM) that reflects the severity or type of flooding in the area.
Goals	General guidelines that explain what you want to achieve. They are usually broad policy-type statements, long term in nature, and represent global visions.
Hazard	A source of potential danger or adverse condition.
Hazard event	A specific occurrence of a particular type of hazard.
Hazard identification	The process of identifying hazards that threaten an area.
Hazard information center	Information booth, publication kiosk, exhibit, etc. that displays information to educate the public about hazards that affect the jurisdiction and hazard mitigation activities people can undertake.
Hazard mitigation	Sustained actions taken to reduce or eliminate long-term risk from hazards and their effects.
Hazard Mitigation Grant Program (HMGP)	Authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster.
Hazard profile	A description of the physical characteristics of hazards and a determination of various descriptors, including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.
HAZUS, HAZUS-MH	A GIS-based, nationally standardized, loss estimation tool developed by FEMA. HAZUS-MH is the new multi-hazard version that includes earthquake, wind, hurricane, and flood loss estimate components.



Hurricane	An intense tropical cyclone, formed in the atmosphere over warm ocean areas, in which wind speeds reach 74 miles per hour or more and blow in a large spiral around a relatively calm center or “eye.” Hurricanes develop over the north Atlantic Ocean, northeast Pacific Ocean, or the south Pacific Ocean east of 160°E longitude. Hurricane circulation is counter-clockwise in the northern hemisphere and clockwise in the southern hemisphere.
Infrastructure	Refers to the public facilities of a community that have a direct impact on the quality of life. Infrastructure includes communication technology, such as phone lines or Internet access; vital services, such as public water supplies and sewer treatment facilities; and an area’s transportation system: airports, heliports, highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, drydocks, piers, and regional dams.
Landslide	Downward movement of a slope and materials under the force of gravity.
Loss estimation	Forecasts of human and economic impacts and property damage from future hazard events, based on current scientific and engineering knowledge.
Memorandum of Agreement (MOA)	A non-binding statement that defines the duties, responsibilities, and commitment of the different parties or individuals; provides a clear statement of values, principles, and goals; and establishes an organizational structure to assist in measuring and evaluating progress.
Mitigate	To cause something to become less harsh or hostile; to make less severe or painful.
Mitigation actions	Activities or projects that help achieve the goals and objectives of a mitigation plan.
Mitigation plan	The document that articulates results from the systematic process of identifying hazards and evaluating vulnerability, identifying goals, objectives, and actions to reduce or eliminate the effects of identified hazards, and an implementation plan for carrying out the actions.
National Flood Insurance Program (NFIP)	Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum floodplain management regulations found in 44 CFR §60.3.
Objectives	Objectives define strategies or implementation steps to attain the identified goals. Unlike goals, objectives are specific and measurable.
Open space preservation	Preserving undeveloped areas from development through any number of methods, including low-density zoning, open space zoning, easements, or public or private acquisition. Open space preservation is a technique that can be used to prevent flood damage in flood-prone areas, land failures on steep slopes or liquefaction-prone soils, and can enhance the natural and beneficial functions of floodplains.
Ordinance	A term for a law or regulation adopted by a local government.



Planning	The act or process of making or carrying out plans; the establishment of goals, policies, and procedures for a social or economic unit.
Policy	A course of action or specific rule of conduct to be followed in achieving goals and objectives.
Post-disaster mitigation	Mitigation actions taken after a disaster has occurred, usually during recovery and reconstruction.
Post-disaster recovery ordinance	An ordinance authorizing certain governmental actions to be taken during the immediate aftermath of a hazard event to expedite implementation of recovery and reconstruction actions identified in a pre-event plan.
Post-disaster recovery planning	The process of planning those steps the jurisdiction will take to implement long-term reconstruction with a primary goal of mitigating its exposure to future hazards. The post-disaster recovery planning process can also involve coordination with other types of plans and agencies, but it is distinct from planning for emergency operations.
Preparedness	Actions that strengthen the capability of government, citizens, and communities to respond to disasters.
Probability	A statistical measure of the likelihood that a hazard event will occur.
Public education and outreach programs	Any campaign to make the public more aware of hazard mitigation and mitigation programs, including hazard information centers, mailings, public meetings, etc.
Recovery	The actions taken by an individual or community after a catastrophic event to restore order and lifelines in a community.
Regulation	Most states have granted local jurisdictions broad regulatory powers to enable the enactment and enforcement of ordinances that deal with public health, safety, and welfare. These include building codes, building inspections, zoning, floodplain and subdivision ordinances, and growth management initiatives.
Regulatory power	Local jurisdictions have the authority to regulate certain activities in their jurisdiction. With respect to mitigation planning, the focus is on such things as regulating land use development and construction through zoning, building codes, subdivision regulations, design standards, and floodplain regulations.
Relocation out of hazard areas	A mitigation technique that features the process of demolishing or moving a building to a new location outside the hazard area.
Resources	Resources include the people, materials, technologies, money, etc., required to implement strategies or processes. The costs of these resources are often included in a budget.
Response	The actions taken during and immediately after an event to address immediate life and safety needs and to minimize further damage to properties.



Resolutions	Expressions of a governing body's opinion, will, or intention that can be executive or administrative in nature. Most planning documents must undergo a council resolution, which must be supported in an official vote by a majority of representatives to be adopted. Other methods of making a statement or announcement about a particular issue or topic include proclamations and declarations.
Risk	The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.
Stafford Act	The Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-107 was signed into law November 23, 1988 and amended the Disaster Relief Act of 1974, PL 93-288. The Stafford Act is the statutory authority for most federal disaster response activities, especially as they pertain to FEMA and its programs.
Stakeholder	Stakeholders are individuals or groups, including businesses, private organizations, and citizens, that will be affected in any way by an action or policy.
State Hazard Mitigation Officer (SHMO)	The state government representative who is the primary point of contact with FEMA, other state and federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.
Structural retrofitting	Modifying existing buildings and infrastructure to protect them from hazards.
Subdivision	The division of a tract of land into two or more lots for sale or development.
Subdivision and development regulations	Regulations and standards governing the division of land for development or sale. Subdivision regulations can control the configuration of parcels, set standards for developer-built infrastructure, and set standards for minimizing runoff, impervious surfaces, and sediment during development. They can be used to minimize exposure of buildings and infrastructure to hazards.
Tornado	A violently rotating column of air extending from a thunderstorm to the ground.
Vulnerability	Describes how exposed or susceptible an asset is to damage. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power—if an electric substation is flooded, it not only affects the substation but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.



Vulnerability assessment	The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment should address the effects of hazard events on the existing and future built environment.
Wildfire	An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.
Zoning	The division of land within a local jurisdiction by local legislative regulation into zones of allowable types and intensities of land uses.
Zoning ordinance	Designation of allowable land use and intensities for a local jurisdiction. Zoning ordinances consist of two components: a zoning text and a zoning map.



appendix b library

General Contact Information

Federal Emergency Management Agency
(FEMA)

<http://www.fema.gov>
FEMA Headquarters:
500 C Street, SW, Washington, D.C. 20472
202-646-4600

FEMA Publications Warehouse

800-480-2520

FEMA Mitigation Publications Library

<http://www.fema.gov/library/prepandprev.shtm>

Web sites

American Planning Association (APA)

<http://www.planning.org>

APA, *Growing Smart
Legislative Guidebook*, 2002

<http://www.planning.org/growingsmart>

Catalog of Federal Domestic
Assistance Programs

<http://www.cfda.gov>

Community Rating System

<http://www.fema.gov/nfip/crs.shtm>

Developing the Implementation Strategy

[http://www.pro.gov.uk/recordsmanagement/eros/
framework.pdf](http://www.pro.gov.uk/recordsmanagement/eros/framework.pdf)

http://www.allhandsconsulting.com/ERI_books.htm

<http://www.esri.com/news/arcuser/0100/firetools.html>

[http://www.atlantahighered.org/memberservices/shelter/
literature.asp](http://www.atlantahighered.org/memberservices/shelter/literature.asp)

<http://www.pmel.noaa.gov/~bernard/hazard3.pdf>

Emergency Management Institute

<http://training.fema.gov/EMIWeb>

Federal Emergency Management
Agency Individual Assistance Program

<http://www.fema.gov/rrr/inassist.shtm>

FEMA Mitigation Planning

<http://www.fema.gov/fima/planning.shtm>

FEMA Public Assistance Program

<http://www.fema.gov/rrr/pa>



Flood Mitigation Assistance Program	http://www.fema.gov/fima/planfma.shtm
Habitat for Humanity	http://www.habitat.org/
Hazard Mitigation Grant Program	http://www.fema.gov/fima/hmgp
Hazard Mitigation in North Carolina: Measuring Success	http://www.dem.dcc.state.nc.us/Mitigation/Library/Success_Stories/Measuring_Success_Vol2/Chapter6.pdf
HAZUS and HAZUS-MH	http://www.fema.gov/hazus/index.shtm
HMGP Progress Report Form	http://www.dem.dcc.state.nc.us/mitigation/document_index.htm
Institute for Business & Home Safety (IBHS), Summary of State Land Use and Natural Hazards Planning Laws	http://www.ibhs.org/research_library/view.asp?id=302
Institute for Local Self Government	http://www.ilsg.org/
Mitigation Success Stories	http://www.fema.gov/fima/success.shtm
Multi-hazard Mapping Initiative	http://www.hazardmaps.gov/atlas.php
National Association of Regional Councils	http://www.narc.org
National Flood Insurance Program	http://www.fema.gov/nfip
National League of Cities	http://www.nlc.org
North Carolina Division of Emergency Management, Tools and Techniques for Mitigating the Effects of Natural Hazards	http://www.dem.dcc.state.nc.us/mitigation/Library/Full_Tools_and_Tech.pdf
Oregon Department of Land Conservation and Development (DLCD), Planning for Natural Hazards—Oregon Technical Resource Guide	http://www.lcd.state.or.us/hazhtml/Guidehome.htm
Pre-Disaster Mitigation Program	http://www.fema.gov/fima/pdm
Small Business Administration	http://www.sba.gov/disaster_recov/index.html
State Guidebook for Developing Partnerships	http://www.ibhs.org/research_library/downloads/280.pdf
U.S. Army Corps of Engineers	http://www.usace.army.mil
U.S. Department of Agriculture	http://disaster.fsa.usda.gov
U.S. Department of Agriculture, Natural Resources Conservation Service	http://www.nrcs.usda.gov



U.S. Department of Housing and Urban Development	http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/driquickfacts.cfm
U.S. Department of Transportation	http://www.fhwa.dot.gov/programadmin/erelief.html
U.S. Environmental Protection Agency	http://www.epa.gov
U.S. State and Local Government Gateway	http://www.firstgov.gov/Government/State_Local.shtml

NOTE: The World Wide Web is an ever-changing source of information. Web addresses and the information they contain can change over time.

Publications

- | | |
|-------------------------------|---|
| American Planning Association | <p><i>Capital Improvement Programming</i>, PAS Report No. 151, 1961.</p> <p><i>Capital Improvements Programs: Linking Budgeting and Planning</i>, PAS Report No. 442, 1993.</p> <p><i>Selecting and Retaining a Planning Consultant: RFPs, RFQs, Contracts, and Project Management</i>, PAS Report No. 443, 1993.</p> |
| Federal Register | <p>44 CFR Parts 201 and 206 (The Disaster Mitigation Act of 2000), February 26, 2002.</p> |
| FEMA | <p><i>Developing the Mitigation Plan: Identifying mitigation actions and implementation strategies</i> (FEMA 386-3), 2003.</p> <p><i>Getting Started: Building support for mitigation planning</i> (FEMA 386-1), 2002.</p> <p><i>Hazard Mitigation Grant Program Desk Reference</i> (FEMA 345), 1999.</p> <p><i>Hazard Mitigation in Iowa: Measuring Success</i>, 2003, unpublished to date.</p> <p><i>Hazard Mitigation in Mississippi: Measuring Success</i>, 2003, unpublished to date.</p> <p><i>Integrating Historic Property and Cultural Resource Considerations into Mitigation Planning</i> (FEMA 386-6), unpublished to date.</p> <p><i>Integrating Human-Caused Hazards into Mitigation Planning</i> (FEMA 386-7), 2002.</p> <p><i>Mitigation Resources for Success</i> (FEMA 372), 2000.</p> <p><i>Multi-jurisdictional Approaches to Mitigation Planning</i> (FEMA 386-8), unpublished to date.</p> <p><i>Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability</i> (FEMA 364), 2003.</p> |



Rebuilding for a More Sustainable Future: An Operational Framework (FEMA 365), 2000.

Securing Resources for Mitigation Planning (FEMA 386-9), unpublished to date.

Understanding Your Risks: Identifying hazards and estimating losses (FEMA 386-2), 2001.

Using Benefit-Cost Analysis in Mitigation Planning (FEMA 386-5), unpublished to date.

Gianakis, Gerasimos A. and
McCue, Clifford P., 1999

Local Government Budgeting: A Managerial Approach.

Schwab, Jim et al., 1998

Planning for Post-Disaster Recovery and Reconstruction, PAS Report Nos. 483/484.

Tyler Norris Associates, 1997

Community Indicators Handbook: Measuring Progress Toward Healthy and Sustainable Communities.



appendix c worksheets

Worksheet #1	Progress Report
Worksheet #2	Evaluate Your Planning Team
Worksheet #3	Evaluate Your Project Results
Worksheet #4	Revisit Your Risk Assessment
Worksheet #5	Revise the Plan



Plan Goal(s)/Objective(s) Addressed:

Goal: _____

Objective: _____

Indicator of Success (e.g., losses avoided as a result of the acquisition program):

In most cases, you will list losses avoided as the indicator. In cases where it is difficult to quantify the benefits in dollar amounts, you will use other indicators, such as the number of people who now know about mitigation or who are taking mitigation actions to reduce their vulnerability to hazards.

Status (Please check pertinent information and provide explanations for items with an asterisk. For completed or canceled projects, see Worksheet #2 — to complete a project evaluation):

Project Status☐ Project on schedule☐ Project completed☐ Project delayed*

*explain: _____

☐ Project canceled**Project Cost Status**☐ Cost unchanged☐ Cost overrun*

*explain: _____

☐ Cost underrun*

*explain: _____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

B. What obstacles, problems, or delays did you encounter, if any?

C. How was each problem resolved?

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

[illegible]

Other comments:

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Worksheet #2

Evaluate Your Planning Team

step 3

When gearing up for the plan evaluation, the planning team should reassess its composition and ask the following questions:

	YES	NO
Have there been local staffing changes that would warrant inviting different members to the planning team?		
Comments/Proposed Action:		
Are there organizations that have been invaluable to the planning process or to project implementation that should be represented on the planning team?		
Comments/Proposed Action:		
Are there any representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the planning team?		
Comments/Proposed Action:		
Are there procedures (e.g., signing of MOAs, commenting on submitted progress reports, distributing meeting minutes, etc.) that can be done more efficiently?		
Comments/Proposed Action:		
Are there ways to gain more diverse and widespread cooperation?		
Comments/Proposed Action:		
Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?		
Comments/Proposed Action:		

If the planning team determines the answer to any of these questions is “yes,” some changes may be necessary.

Worksheet #3 Evaluate Your Project Results

step 3

page 1 of 2

Project Name and Number: _____

Project Budget: _____

Project Description: _____

Associated Goal and Objective(s): _____

Indicator of Success (e.g., losses avoided): _____

*Insert location map.
Include before and after
photos if appropriate.*

Was the action implemented? ☐ YES ☐ NO

IF NO

Why not?

Was there political support for the action?

Were enough funds available?

Were workloads equitably or realistically distributed?

Was new information discovered about the risks or community that made implementation difficult or no longer sensible?

Was the estimated time of implementation reasonable?

Were sufficient resources (for example staff and technical assistance) available?

YES NO

☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐

IF YES

What were the results of the implemented action? _____

	YES	NO
Were the outcomes as expected? If No, please explain:		
Did the results achieve the goal and objective(s)? Explain how:		
Was the action cost-effective? Explain how or how not:		
What were the losses avoided after having completed the project?		
If it was a structural project, how did it change the hazard profile?		
Additional comments or other outcomes:		

Date: _____

Prepared by: _____

Risk Assessment Steps	Questions	YES	NO	COMMENTS
Identify hazards	Are there new hazards that can affect your community?			
Profile hazard events	Are new historical records available?			
	Are additional maps or new hazard studies available?			
	Have chances of future events (along with their magnitude, extent, etc.) changed?			
	Have recent and future development in the community been checked for their effect on hazard areas?			
Inventory assets	Have inventories of existing structures in hazard areas been updated?			
	Is future land development accounted for in the inventories?			
	Are there any new special high-risk populations?			
Estimate losses	Have loss estimates been updated to account for recent changes?			

If you answered "Yes" to any of the above questions, review your data and update your risk assessment information accordingly.

Prepare to update the plan.*When preparing to update the plan:**Check the box when addressed:*

1. Gather information, including project evaluation worksheets, progress reports, studies, related plans, etc.	
Comments:	
2. Reconvene the planning team, making changes to the team composition as necessary (see results from Worksheet #2).	
Comments:	

Consider the results of the evaluation and new strategies for the future.*When examining the community consider:**Check the box when addressed:*

1. The results of the planning and outreach efforts.	
Comments:	
2. The results of the mitigation efforts.	
Comments:	

3. Shifts in development trends.	
Comments:	
4. Areas affected by recent disasters.	
Comments:	
5. The recent magnitude, location, and type of the most recent hazard or disaster.	
Comments:	
6. New studies or technologies.	
Comments:	
7. Changes in local, state, or federal laws, policies, plans, priorities, or funding.	
Comments:	

8. Changes in the socioeconomic fabric of the community.	
Comments:	
9. Other changing conditions.	
Comments:	

Incorporate your findings into the plan.

When examining the plan consider:

Check the box when addressed:

1. Revisit the risk assessment. (See Worksheet #4)	
Comments:	
2. Update your goals and strategies.	
Comments:	
3. Recalculate benefit-cost analyses of projects to prioritize action items.	
Comments:	

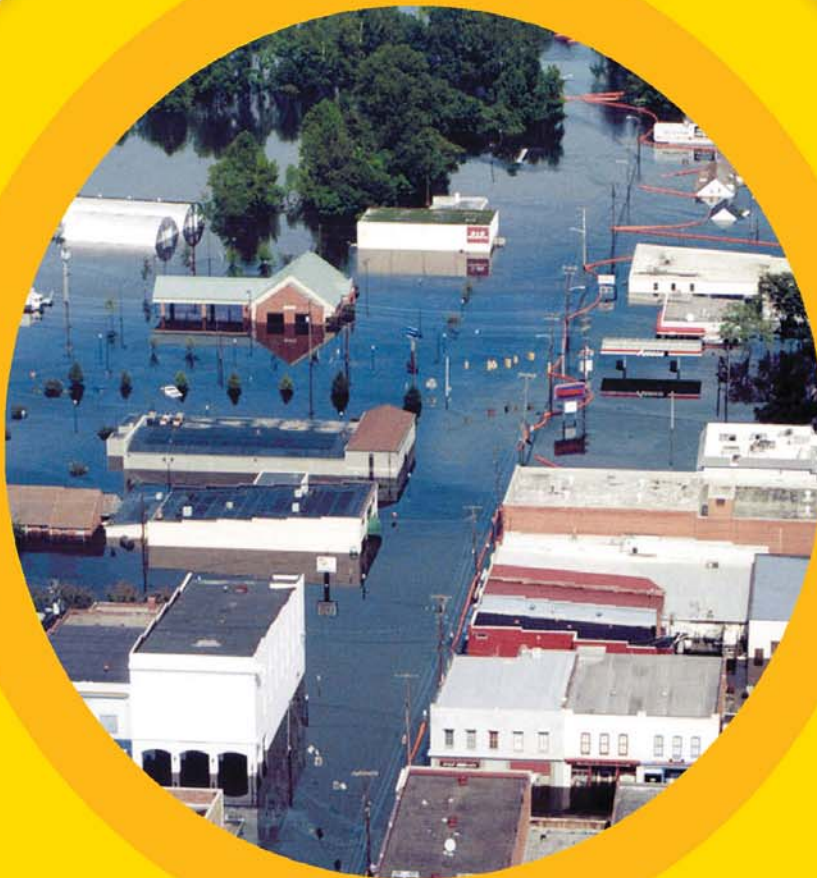
Use the following criteria to evaluate the plan:

Criteria	YES	NO	Solution
Are the goals still applicable?			
Have any changes in the state or community made the goals obsolete or irrelevant?			
Do existing actions need to be reprioritized for implementation?			
Do the plan's priorities correspond with state priorities?			
Can actions be implemented with available resources?			

Comments:

Those who cannot remember the past are condemned to repeat it

George Santayana



FEMA

August 2003
FEMA 386-4



APPENDIX H. CRITICAL FACILITIES

Due to the sensitive nature of this information, details of each have been redacted for the public document. A full list of critical facilities identified for the vulnerability analysis is available at the Galveston County Office of Emergency Management. Contact the Deputy Emergency Management Coordinator, Laura Norman, to view the list.



APPENDIX H. LINKAGE PROCEDURES

This Appendix contains the linkage procedures for the Galveston County Hazard Mitigation Plan 2022 Update.

H.1 Administrative Process for “Linkage” to the Galveston County Hazard Mitigation Plan

The 2022 Galveston County HMP update (the Plan) included 12 planning partners and not all eligible local governments within the defined planning area are included in this plan. Completed jurisdictional annexes are presented in Section 9. Any non-participating local governments and other local jurisdictions such as Fire Districts, Utility Districts, School Districts and any other eligible local government as defined in 44 CFR 201.2 within the Galveston County planning area can join this plan as a participating jurisdiction and to ultimately achieve approved status by following the linkage procedures defined in this appendix

It is assumed that some or all these non-participating local governments may choose to “link” to the Plan at some point in time to gain eligibility for programs under the DMA. In addition, some of the current partnership may not continue to meet eligibility requirements due to the lack of active participation as prescribed by the plan. These “linkage” procedures will define the requirements established by the Galveston County HMP Planning Committee and all planning partners for dealing with the increase or decrease in planning partners linked to this plan. It should be noted that currently non-participating jurisdictions within the defined planning area are not obligated to link to this plan. These jurisdictions can choose to do their own “complete” plan that addresses all required elements of section 201.6 of 44CFR.

H.1.1 Increasing the Partnership Through Linkage

Eligibility

Eligible jurisdictions located in the planning area may link to this plan at any point during the plan’s performance period. Eligible jurisdictions located in the planning area may link to this plan at any point during the plan’s performance period (5 years after final approval). Eligibility will be determined by the following factors:

- The linking jurisdiction is a local government as defined by the Disaster Mitigation Act.
- The boundaries or service area of the linking jurisdiction is completely contained within the boundaries of the planning area established during the 2022 Hazard Mitigation Plan development process.
- The linking jurisdiction’s critical facilities were included in the critical facility and infrastructure risk assessment completed during the 2022 Plan development process.

Requirements

It is expected that linking jurisdictions will complete the requirements outlined below and submit their completed template to the lead agency Galveston County Office of Emergency Management for review within six months of beginning the linkage process:

1. The Galveston County Hazard HMP Planning Committee has established an annual window for which linkage to the plan can occur. Linking jurisdictions are instructed to complete the following procedures during this time frame.



2. The current non-participating jurisdiction contacts the Galveston County Hazard Mitigation Planning Coordinator for the Plan and requests a "Linkage Package". The Galveston County Hazard Mitigation Project Contact is:

Laura M. Norman, Deputy Emergency Management Coordinator
Galveston County Office of Emergency Management
281-309-5013 | Laura.Norman@co.galveston.tx.us

3. The Galveston County Hazard Mitigation Planning Coordinator will provide a linkage packages that includes:
 - Copy of Volume 1 and 2 of the Plan (CD-ROM or flash drive).
 - Planning Partner's Expectations Sheet.
 - A Sample "Letter of Intent" to Link to the Plan.
 - A Jurisdictional Template and Instructions.
 - Catalog of Hazard Mitigation Alternatives or the Mitigation Catalog.
 - A copy of Section 201.6 of Chapter 44, the Code of Federal Regulations (44CFR), which defines the federal requirements for a local hazard mitigation plan.
4. The new jurisdiction will be required to review both volumes of the Plan which includes the following key components for the planning area:
 - The Galveston County risk assessment;
 - The plan's goals and objectives;
 - Plan implementation and maintenance procedures;
 - Catalog of potential mitigation actions; and
 - County-wide initiatives.

Once this review is complete, the jurisdiction will complete its specific jurisdictional annex by following the template and its instructions for completion provided by the Galveston County Hazard Mitigation Planning Coordinator. Technical assistance can be provided upon request by completing the request for technical assistance (TA) form provided in the linkage package. This TA may be provided by the Galveston County Hazard Mitigation Planning Coordinator or any other resource within the Planning Partnership such as a member of the HMP Planning Committee or a currently participating jurisdiction. The Galveston County Hazard Mitigation Planning Coordinator will determine who will provide the TA and the possible level of TA based on resources available at the time of the request.

5. The new jurisdiction will also be required to develop a public involvement strategy that ensures their public's ability to participate in the plan development process. At a minimum, the new jurisdiction must try to solicit public opinion on hazard mitigation at the onset of this linkage process and a minimum of one public meeting to present their draft jurisdiction specific annex for comment, prior to adoption by the governing body. The Planning Partnership will have available resources to aid in the public involvement strategy such as the Plan website. However, it will be the new jurisdiction's responsibility to implement and document this strategy for incorporation into their annex.

It should be noted that the Jurisdictional Annex templates do not include a section for the description of the public process. This is because the original partnership was covered under a uniform public involvement strategy that covered the operational area that is described in volume 1 of the plan. Since the new partner was not addressed by that strategy, they will have to initiate a new strategy, and add a description of that strategy to their



annex. For consistency, new partners are encouraged to follow the public involvement format utilized by the initial planning effort as described in Volume I of the Plan.

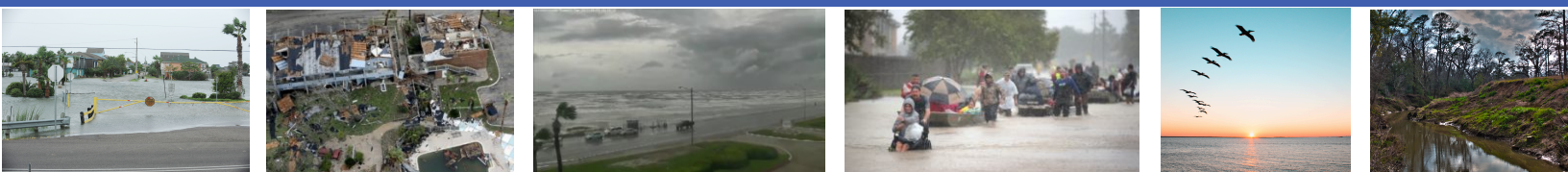
6. Once their public involvement strategy is completed and they have completed their template, the new jurisdiction will submit the completed package to the Galveston County Hazard Mitigation Planning Coordinator for a pre-adoption review to ensure conformance with the regional plan format.
7. The Galveston County Hazard Mitigation Planning Coordinator will review for the following:
 - Documentation of public involvement and mitigation action development strategies;
 - Conformance of template entries with guidelines outlined in instructions;
 - Chosen actions are consistent with goals, objectives, and mitigation catalog of Galveston County Hazard Mitigation Plan; and
 - Designated point of contact.

The Galveston County Hazard Mitigation Planning Coordinator may utilize members of the HMP Planning Committee or other resources to complete this review. All proposed linked annexes will be submitted to the HMP Planning Committee for their review and comment prior to submittal to the TDEM.

8. Plans approved and accepted by the HMP Planning Committee will then be forwarded to TDEM for review with cover letter stating the forwarded plan meets local approved plan standards and whether the plan is submitted with local adoption or for criteria met/plan not adopted review.
9. The TDEM will review plans for state and federal compliance. Non-compliant plans are returned to the jurisdiction for correction. Compliant plans are forwarded to FEMA Region VI office for review with annotation as to the adoption status.
10. FEMA Region VI reviews the new jurisdiction's plan in association with the approved plan to ensure DMA compliance. Region VI notifies new jurisdiction of results of review with copies to the TDEM and approved planning authority.
11. New jurisdiction corrects plan's shortfalls (if necessary) and resubmits to the TDEM through the approved plan lead agency.
12. For plans with no shortfalls that have not been adopted from the Region VI review or outstanding corrected shortfalls, the new jurisdiction governing authority adopts the plan (if not already accomplished) and forwards adoption resolution to Region VI with copies to lead agency and the TDEM.
13. Region VI Director notifies new jurisdiction governing authority of plan approval.

The new jurisdiction plan is then included with the Galveston County HMP 2022 update, and the linking jurisdiction is committed to participate in the ongoing plan implementation and maintenance identified in Volume 1 of the HMP.

Galveston County **2022 Multi-Jurisdictional Hazard Mitigation Plan**



Volume II

May 2022





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SECTION 8. PLANNING PARTNERSHIP

This section provides a description of the Galveston County's HMP update planning partnership, their responsibilities throughout the planning process, and the jurisdictional annexes developed as a result of their plan update efforts.

8.1 PLAN MAINTENANCE PROCEDURES

The Federal Emergency Management Agency (FEMA) encourages multi-jurisdictional planning for hazard mitigation. All participating jurisdictions must meet the requirements of Chapter 44 of the Code of Federal Regulations (44 CFR):

“Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan” [Section 201.6a(4)]

Members of the Planning Partnership have the expertise to develop the plan and have their jurisdiction's authority to implement the mitigation strategy developed during the planning process. The Planning Partnership is responsible for developing and reviewing draft sections of the plan, updating their respective annex, creating the mitigation strategy for their jurisdiction, and adopting the final plan.

For the Galveston County HMP update, a Planning Partnership was formed to leverage resources and to meet requirements for the federal Disaster Mitigation Action of 2000 (DMA) for as many eligible governments as possible. Members of the Planning Partnership consisted of representatives from each jurisdiction. The DMA defines a local government as follows:

Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

Each participating planning partner has prepared a jurisdictional annex to this plan. These annexes, as well as information on the process by which they were created, are contained in this volume.

8.2 INITIAL SOLICITATION AND LETTERS OF INTENT

Galveston County solicited the participation of all municipalities in the County at the commencement of this project. Galveston County and 11 municipalities in the County participated in the update process and have met the minimum requirements of participation as established by the County and Steering Committee.

8.3 PLANNING PARTNER EXPECTATIONS

The Planning Partners agreed to the following planning partner expectations, which were outlined in the letter sent by Galveston County on September 20, 2021 and confirmed at the kick-off meeting held on September 29, 2021 (see Appendix C [Meeting Documentation] for details):

- Provide representation at regular planning group meetings and workshops.
- Be responsible for providing data and information as requested.



- Review and comment on data and information compiled by the contract consultant relevant to their jurisdiction.
- Be responsible for completing plan documents specific to your municipality, using provided templates with guidance and assistance by the contract consultant.
- Assist with the identification of stakeholders within your community that should be informed and potentially involved with the planning process.
- Facilitate public outreach efforts with residents and local stakeholders within your community using materials provided by the contract consultant.
- Assist with the identification of strengths, weaknesses, opportunities and obstacles to implementing natural hazard mitigation within your community.
- Assist with the identification of past, ongoing and appropriate future mitigation strategies and activities within your municipality.
- Review and comment on plan documents, specifically the draft and final plans prior to submission to TDEM and FEMA.

As described in Section 7 (Plan Maintenance), the planning partnership is intended to remain active beyond the regulatory update to support plan maintenance. Regarding the composition of the Steering and Planning Committees, it is recognized that individual commitments change over time, and it will be the responsibility of each jurisdiction and its representatives to inform the HMP Coordinator of any changes in representation.

8.4 JURISDICTIONAL ANNEX PREPARATION PROCESS

New to the 2022 HMP, jurisdictional annexes were used to provide a unique, stand-alone guide to mitigation planning for each participating jurisdiction. The Galveston County HMP Update is organized so that there is an annex for Galveston County and for every participating jurisdiction. Section 9 (Jurisdictional Annexes) includes an annex for every jurisdiction in Galveston County.

8.4.1 Data Collection

Each jurisdiction was paired with a contract consultant mitigation planner to work with the mitigation team to update their annexes. Each jurisdiction was asked to participate in a municipal kick-off meeting, held on September 29, 2021 to review participant expectations and the updated information needed to support the annex update. It was made clear that the annexes are sections of the plan that can be enhanced if more information is available to further customize any and all aspects of mitigation planning.

8.4.2 Hazard Ranking Exercise

The presentation of the risk assessment and hazard ranking for each jurisdiction was conducted December 21, 2021. At this meeting, the consultant presented the overall risk assessment for the hazards of concern and distributed jurisdiction-specific handouts with risk assessment results relevant to each plan participant. In addition, each planning partner was asked to review the ranked hazards specific for its jurisdiction. Refer to Section 4.4 (Hazard Ranking) for the methodology of the hazard ranking process. The calculated ranking was presented to each jurisdiction and they were asked to review the ranking and revise based on history of events, probability of occurrence, and the potential impact on people, property, and the economy. In addition, each jurisdiction was asked to rank their adaptive capacity for each hazard. Refer to Appendix B (Participation Matrix) for the input submitted by each municipality. The objectives of this exercise were to familiarize the partnership with how to use the risk assessment as a tool to support other planning and hazard mitigation processes and to help prioritize types of mitigation actions that should be considered. Hazards that were ranked



as “high” for each jurisdiction as a result of this exercise were considered to be priorities for identifying appropriate mitigation actions, although jurisdictions also identified actions to mitigate “medium” or “low” ranked hazards as appropriate.

8.4.3 Strengths Weaknesses Obstacles and Opportunities (SWOO) Exercise

After the draft risk assessment results were presented and hazard ranking exercise at the second Steering Committee Meeting on November 18, 2021, attendees participated in a facilitated SWOO session to identify strengths, weakness or challenges, obstacles and opportunities in hazard mitigation for the County’s hazards of concern. All SWOO results were compiled and provided as a resource to plan participants at the Mitigation Strategy Workshop in December 2021. Refer to Appendix B (Participation Matrix) which provides the information captured by meeting participants during the SWOO session.

8.4.4 Mitigation Strategy Workshop

A mitigation strategy workshop was conducted by the contracted planning consultant on December 2, 2021, for all participating jurisdictions to support the development of the updated mitigation strategy. To assist with the identification of implementable and action-oriented mitigation actions, the participating jurisdictions were provided with tools to help identify mitigation strategies: public survey responses, potential mitigation actions for each jurisdiction, and FEMA *Mitigation Ideas*. The purpose of this workshop was to guide the planning partnership in completing this portion of the planning process and discuss how projects that are well developed and documented are more quickly identifiable for selection when grants become available.

At the workshop, the Planning Partnership focused on developing problem statements based on the impacts of hazards in the County and their communities. The results of the updated risk assessment, challenges and opportunities identified during the capability assessment update and SWOO sessions, and information gathered from the public survey were used to develop mitigation strategies. As a result, a mitigation workbook was compiled with potential mitigation actions for the County and participating jurisdictions. This workbook helped form a bridge between the hazard risk assessment, which quantifies impacts to each community, with the development of achievable mitigation strategies. Mitigation development worksheets were filled out by each municipality to identify additional problem statements and draft action worksheets were developed.

8.4.5 Municipal Support Conference Calls

In addition to the municipal kick-off meeting, municipal support conference calls were held throughout the planning process. During these calls, the consultant worked one-on-one with the planning partners to complete their jurisdictional annexes. Each section of the annex was discussed to ensure accuracy and completeness. This included, but not limited to, the following:

- Reviewing the calculated hazard ranking for the jurisdiction and provide input to adjust the ranking as necessary.
- Updating information regarding the jurisdiction’s capabilities and past integration of hazard mitigation concepts.
- Identify mitigation initiatives that have reasonable potential to be accomplished within the lifespan of the County HMP (five years), including both FEMA-eligible projects and those projects using funds from non-FEMA sources.

8.4.6 Jurisdictional Annexes



While the jurisdictional annex format is designed to document and assure local compliance with the DMA 2000 regulations, its greater purpose and function includes:

- Providing a locally-relevant synthesis of the overall mitigation plan that can be readily presented, distributed, and maintained;
- Facilitating local understanding of the community's risk to natural hazards;
- Facilitating local understanding of the community's capabilities to manage natural hazard risk, including opportunities to improve those capabilities;
- Facilitating local understanding of the efforts the community has taken, and plans to take, to reduce their natural hazard risk;
- Facilitating the implementation of mitigation strategies, including the development of grant applications;
- Providing a framework by which the community can continue to capture relevant data and information for future plan updates.

It is recognized that each jurisdiction's annex is a "living" document and will continue to be improved as resources permit. As such, its design is intended to promote and accommodate continued efforts to maintain the annex to be current and to improve the effectiveness of the annex as the key tool, reference and guiding document by which the jurisdiction will implement hazard mitigation locally.

The following provides a description of the various elements of the jurisdictional annex.

Section 9.X.1: Hazard Mitigation Planning Team: Identifies the hazard mitigation planning team who provided input during the planning process. Further detail is provided in Section 2 (Planning Process) and Appendix B (Participation Matrix).

Section 9.X.2: Jurisdictional Profile: Provides an overview and profile of the jurisdiction, including an identification of areas of known and anticipated future development and the vulnerability of those areas to the hazards of concern.

Section 9.X.3: Jurisdictional Capability Assessment and Integration: This subsection provides an inventory and evaluation of the jurisdiction's tools, mechanisms and resources available to support hazard mitigation and natural hazard risk reduction. Within the municipal annexes, tables provide an inventory of the municipality's planning and regulatory, administrative and technical, and fiscal, capabilities, respectively. Further, another table identifies the municipality's level of participation in state and federal programs designed to promote and incentivize local risk reduction efforts. Further information regarding Federal, State and local capabilities may be found in the Capability Assessment portion of Section 5.

Section 9.X.4: National Flood Insurance Program (NFIP) Compliance: A tabular summary of the specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Section 9.X.5: Growth/Development Trends: Identifies of areas of known and anticipated future development and the vulnerability of those areas to the hazards of concern.

Section 9.X.6: Jurisdictional Risk Assessment:

- **Hazard Extent and Location:** Each annex includes a map (or series of maps) illustrating identified hazard zones and critical facilities. Further, these maps show areas of known or anticipated future development, as available and provided by the jurisdiction.



- **Hazard Event History:** Identifies hazard events that have caused significant impacts within the jurisdiction, including a summary characterization of those impacts as identified by the jurisdiction. The documentation of events and losses is critical to supporting the identification and justification of appropriate mitigation actions, including providing critical data for benefit-cost analysis. It is recognized that this “inventory” of events and losses is a work-in-progress and may continue to be improved as resources permit. As such, the lack of data or information for a specific event does not necessarily mean that the jurisdiction did not suffer significant losses during that event.
- **Hazard Ranking and Vulnerabilities:** This subsection provides information regarding each plan participant’s vulnerability to the identified hazards. Full data and information on the hazards of concern, the methodology used to develop the vulnerability assessments, and the results of those assessments that serve as the basis of these local risk rankings may be found in Section 4 (Risk Assessment).

Section 9.X.7: Mitigation Strategy and Prioritization: This section discusses and provides the status of past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritization.

- **Past Mitigation Initiative Status:** Where applicable, a review of progress on the jurisdiction’s prior mitigation strategy is presented, identifying the disposition of each prior action, project or initiative in the jurisdiction’s updated mitigation strategy. Other completed or on-going mitigation activities that were not specifically part of a prior local mitigation strategy may be included in this sub-section as well.
- **Additional Mitigation Efforts:** Other completed or on-going mitigation activities that were not specifically part of a prior local mitigation strategy may be included in this subsection as well.
- **Proposed Hazard Mitigation Initiatives for the Plan Update:** Table 9.X-16 presents the jurisdiction’s updated mitigation strategy. As indicated, applicable mitigation actions, projects and initiatives are further documented on an Action Worksheet which provides details on the project identification, evaluation, prioritization and implementation process. Table 9.X-17 provides a summary of the local mitigation strategy prioritization process discussed in Section 6 (Mitigation Strategy).

8.4.7 Annex Review

Workshops and additional meetings (via email and/or teleconference) to complete the jurisdictional annexes were held with the Steering Committee and Planning Partnership throughout the planning process. In preparation for the draft plan public review, each jurisdiction was asked to have their ‘mitigation team’ review their annex to ensure it was complete and accurate for posting to the Galveston County Office of Emergency Management’s mitigation website. To demonstrate broad and comprehensive review and input, each jurisdiction collected signatures from these representatives. Refer to Appendix B (Participation Matrix) to review the annex signature pages.

In summary, all participating communities and the County completed the planning partner expectations and annex-preparation process. Details regarding these meetings are described further in Section 2 (Planning Process) and Section 6 (Mitigation Strategy). Completed jurisdictional annexes are presented in Section 9 (Jurisdictional Annexes).

8.5 COVERAGE UNDER THE PLAN

The County and 11 jurisdictions met the participation requirements specified by the Steering Committee. Any non-participating local jurisdiction within the Galveston County planning area can “dock” to this plan in the future following the linkage procedures defined in Appendix G (Linkage Procedures).



Table 8-1 lists the status of each participating jurisdiction and their ultimate status in this plan update. Refer to Appendix B (Participation Matrix) and Appendix C (Meeting Documentation) for details on participation and meeting attendance.

Table 8-1. Jurisdictional Status

Municipality	Attended Workshops and/or Meetings and Project Calls	Provided Update on Past Projects	Submitted Mitigation Actions for Current Plan	Seeking Approval for Adoption (meets all previous requirements)
Galveston County	X	X	X	X
Bayou Vista (C)	X	X	X	X
Clear Lake Shores (C)	X	X	X	X
Dickinson (C)	X	X	X	X
Friendswood (C)	X	X	X	X
Hitchcock (C)	X	X	X	X
Jamaica Beach (C)	X	X	X	X
Kemah (C)	X	X	X	X
La Marque (C)	X	X	X	X
League City (C)	X	X	X	X
Santa Fe (C)	X	X	X	X
Tiki Island (V)	X	X	X	X

N/A = Not applicable.



SECTION 9. JURISDICTIONAL ANNEXES

9.1 GALVESTON COUNTY

This section presents the jurisdictional annex for Galveston County and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of Galveston County and who in Galveston County participated in the planning process, an assessment of the Galveston County's risk and vulnerability, the different capabilities used in Galveston County, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.1.1 Hazard Mitigation Planning Team

Galveston County followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many Galveston County departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.1-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Laura Norman	Deputy Emergency Management Coordinator	Member of the Steering Committee and HMP Coordinator for the planning process; attended meetings; worked with municipalities; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Lee Crowder	Road Administrator, County Roads and Bridges	Member of the Steering Committee; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Martha Lee	Assistant Director, Parks and Cultural Services	Member of the Steering Committee; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Michael Shannon	County Engineer, Engineering & Right of Way	Member of the Steering Committee; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Randy Valcin	Director of Public Health Surveillance, Galveston County Health District	Member of the Steering Committee; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
William Riordan	Facilities Director, County Facilities	Member of the Steering Committee; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
James Gentile	Director of Contract Services, County Contract Services	Member of the Steering Committee; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback



Name	Title	Method of Participation
Julie Diaz	Director, Parks and Cultural Services	Member of the Steering Committee; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.1.2 County Profile

Refer to Section 3 (County Profile) for details.

9.1.3 Jurisdictional Capability Assessment and Integration

Galveston County performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities Galveston County identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to Galveston County, what is present in the jurisdiction, and code citation and date.

Table 9.1-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Texas Administrative Code § 5.4008 The 2018 International Building Code (IBC) The 2018 International Residential Code (IRC) NFPA	State	Texas Department of Insurance
<i>How does this reduce risk?</i> By using the IRC, IBC and NFPA, the highest standards are assured for County construction to reduce the risk of hazards and protect both lives and property.					
Zoning/Land Use Code	No	No	-	-	-



Section 9.1: Galveston County

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
<i>How does this reduce risk?</i>					
Subdivision Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Site Plan Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Stormwater Management Ordinance	Yes	Yes	Storm Water MS4 Pollution Control Order 2012	County	Galveston County Health District
<i>How does this reduce risk?</i> Stormwater Management reduces the risk of pollutants that may have the potential to endanger local residents.					
Post-Disaster Recovery/ Reconstruction Ordinance	Yes	No	-	-	-
<i>How does this reduce risk?</i> This is covered by both Nuisance Abatement and the Building Code to reduce the risk of hazards and protect both lives and property.					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> Real Estate Disclosure ensures that property owners are aware of historical disaster impacts and gives them information necessary to plan for and mitigate future disasters.					
Growth Management	No	No	-	-	-
<i>How does this reduce risk?</i>					
Environmental Protection Ordinance	Yes	Yes	Texas Administrative Code 30	TCEQ and GCHD	GCHD
<i>How does this reduce risk?</i> TAC 30 provides guidance to reduce risk to lives, property and the environment by setting standards for pollution control and impact mitigation. Environmental systems that protect development are identified and mapped through the County Engineering and Road and Bridge departments. Environmental policies protect air, land, and aquatic ecosystems.					
Flood Damage Prevention Ordinance	Yes	Yes	Galveston County Floodplain Regulations August 2019	County	Galveston County Engineering
<i>How does this reduce risk?</i> Floodplain regulations reduce risk to lives and property by ensuring mitigation measures are put into place for repetitive loss properties and new construction.					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Texas Government Code Chapter 418	State	Texas Division of Emergency Management
<i>How does this reduce risk?</i> Emergency Management requirements provide for the planning, mitigation, preparedness, response and recovery activities necessary for a high impact coastal community.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	-	-	-	-	-
Planning Documents					
Comprehensive Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Capital Improvement Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Disaster Debris Management Plan	Yes	No	Galveston County Debris Management Plan	County	Road and Bridge
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Planning in advance for the removal and management of disaster related debris reduces the risk to lives and property from dangerous debris and vermin and begins the rebuilding process for the entire community.					
Floodplain Management or Watershed Plan	Yes	No	Galveston County Floodplain Regulations August 2019	County	Engineering
<i>How does this reduce risk?</i> Floodplain regulations reduce risk to lives and property by ensuring mitigation measures are put into place for repetitive loss properties and new construction.					
Stormwater Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Open Space Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Shoreline Management Plan	Yes	Yes	Galveston County Dune Protection and Beach Access Plan September 2006, Texas Coastal Resiliency Master Plan 2019	Local, State	General Land Office
<i>How does this reduce risk?</i> Shoreline management reduces the risk to lives and property through regulations designed to minimize the impact of natural hazards and manmade activities to the coastal environment.					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Agriculture Plan	Yes	Yes	Texas Agri-Life Extension Service	Galveston County Agricultural Extension	Galveston County Agricultural Extension
<i>How does this reduce risk?</i> Agricultural planning reduces the risk to the animals and community during times of disaster.					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	-	-	-	-	-



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	Galveston County Emergency Management Plan 2017	County	GCOEM
<i>How does this reduce risk?</i> The Galveston County Emergency Management Plan details both short-term response and long-term recovery plans that address communications, evacuation, and housing necessary for a variety of hazards that impact the community.					
Continuity of Operations Plan	Yes	No	Each department maintains their own COOP	County	Individual Departments
<i>How does this reduce risk?</i> COOP plans ensure that disasters of all hazards will not interrupt essential services necessary for the protection of lives and property during times of disaster.					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	Yes	Yes	Galveston County is on the UASI Regional THIRA	UASI and HGAC	GCOEM
<i>How does this reduce risk?</i> By coordinating on a regional THIRA, Galveston County reduces the risks of hazards and threats that potentially impact the entire region.					
Post-Disaster Recovery Plan	Yes	No	Annex J	County	GCOEM and Long Term Recovery Group
<i>How does this reduce risk?</i> By preparing for recovery in advance, potential impact from hazards can be mitigated through planned response and recovery activities.					
Public Health Plan	Yes	No	Annex H	County	GCHD and GCOEM
<i>How does this reduce risk?</i> By preparing for public health emergencies, mitigation, response, and recovery activities can be coordinated throughout the County to reduce the risk to lives and impact to the community.					
Other	-	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of Galveston County to oversee and track development.

Table 9.1-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Engineering
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	Through Engineering
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Unknown	-

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to Galveston County and their current responsibilities which contribute to hazard mitigation.



Table 9.1-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	No	-
Zoning Board of Adjustments	No	-
Planning Department	Yes	GCOEM
Mitigation Planning Committee	Yes	GCOEM
Environmental Board/Commission	Yes	GCHD
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	Dane Carlson
Public Works/Highway Department	Yes	Lee Crowder
Construction/Building/Code Enforcement Department	Yes	Engineering
Emergency Management/Public Safety Department	Yes	GCOEM, Galveston County Sheriff's Office, and Galveston County Ambulance Authority
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	Blackboard Connect and IPAWS
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	Facilities, Parks, and Road & Bridge
Mutual aid agreements	No	-
Human Resources Manual	Yes	HR
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	Engineering
Engineers or professionals trained in building or infrastructure construction practices	Yes	Engineering
Planners or engineers with an understanding of natural hazards	Yes	Engineering
Staff with expertise or training in benefit/cost analysis	No	-
Professionals trained in conducting damage assessments	Yes	GCOEM, Nuisance Abatement, Road & Bridge, Parks
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	Yes	Engineering and GCOEM
Scientist familiar with natural hazards	Yes	GCHD
Surveyor(s)	No	-
Emergency Manager	Yes	GCOEM
Grant writer(s)	Yes	Grants Department
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to Galveston County.

Table 9.1-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Those are through utility districts



Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Impact fees for homebuyers or developers of new development/homes	No
Stormwater utility fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Unknown
Incur debt through private activity bonds	Unknown
Withhold public expenditures in hazard-prone areas	No
Other federal or state funding programs	Yes
Open Space Acquisition funding programs	No
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	No

Education and Outreach Capability

The table below summarizes the education and outreach resources available to Galveston County.

Table 9.1-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	Social media, press releases, website, community outreach and publications.
Personnel skilled or trained in website development	Yes	In GCOEM and IT
Hazard mitigation information available on your website	Yes	GCOEM.org provides preparedness information for all hazards.
Social media for hazard mitigation education and outreach	Yes	GCOEM uses social media to provide preparedness information for all hazards.
Citizen boards or commissions that address issues related to hazard mitigation	Yes	LEPC and the Texas City – La Marque Citizen Advisory Committee
Other programs already in place that could be used to communicate hazard-related information	Yes	GCOEM Community Outreach
Warning systems for hazard events	Yes	IPAWS and Blackboard Connect
Natural disaster/safety programs in place for schools	Yes	GCOEM provides Disaster and Emergency Guides to the schools for children and adults
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to Galveston County.

Table 9.1-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	N/A	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	N/A	-	-
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	5-7	
Storm Ready Certification	Yes	-	2020
Firewise Communities classification	No	-	-
Other	No	-	-



Note:

N/A Not applicable
 NP Not participating
 - Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.1-8. Adaptive Capacity

Hazard	Adaptive Capacity - Strong/Moderate/Weak*
Coastal and Inland Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricanes and Tropical Storm	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Thunderstorm Wind	Moderate
Tornadoes	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate

*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.1.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.1-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	Yes, it is maintained in the Grants Department.
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	The County has a list of approximately 3000 residents in unincorporated Galveston County who have property that has flooded two or more times. It is unknown if they are interested in mitigation.



NFIP Topic	Comments
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	Yes, after Hurricane Harvey two properties were listed as substantially damaged and were sent letters.
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	Approximately 1,000 homes have been mitigated in unincorporated Galveston County through FEMA and HUD funded projects.
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	No. The maps are based on outdated riverine modelling.
NFIP Compliance	
What local department is responsible for floodplain management?	Engineering
Are any certified floodplain managers on staff in your jurisdiction?	Yes, one.
Do you have access to resources to determine possible future flooding conditions from climate change?	No
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	Permit review, inspections, GIS
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	Inspect existing structure. Review labor / material bid. Bid cannot exceed 50% of structures appraised value.
What are the barriers to running an effective NFIP program in the community, if any?	Relatively new maps based on 40-year-old modeling.
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	2021
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Regulations of Galveston County, Texas for Floodplain Management August 15, 2019
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Exceeds minimum requirements by requiring permits both within and outside of Special Flood Hazard Areas.
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	No
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	No

Source:

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.1.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern.



The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.1-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	437	163	526	192	496	146	415	116	461	153	463	117
Multi-Family	1	0	0	0	3	0	1	0	1	0	0	0
Other (commercial, mixed-use, etc.)	520	0	420	0	424	0	388	0	423	0	465	0
Total Permits Issued	958	163	946	192	923	146	804	116	885	153	928	117
Property or Development Name	Type of Development		# of Units / Structures		Location (address and/or block and lot)			Known Hazard Zone(s)*		Description / Status of Development		
Recent Major Development and Infrastructure from 2016 to Present												
Pedregal	Residential		Unknown		3704 Pedregal Road, League City			N/A		Construction in progress		
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years												
Field Creek Crossing	Residential		360 manufactured homes		N/A			N/A		Anticipated		
Bolivar Beach Resort	RV Park and Entertainment Venue		207 RV spots		796 Highway 87, Crystal Beach			N/A		Construction in progress		
Morehead subdivision	Residential		86		N/A			N/A		Anticipated		

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.1.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Methodology and Tools), Section 4.2 (Identification of Hazards of Concern), Section 4.3 (Hazard Profiles), and Section 4.4 (Hazard Ranking) provide a detailed summary for the Galveston County's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the County of Galveston's risk assessment results and data used to determine the hazard ranking.



Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. Refer to Section 4.4 (Hazard Ranking) for the countywide hazard ranking.

9.1.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the 'Capability Assessment' presented previously in this annex.



Table 9.1-11. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
GC 2006-12	Develop GIS System to record locations of vulnerable population and structures	Office of Emergency Management	The County has a GIS system and record locations of structure flooding. Ongoing capability.	Yes (as 2022-Galveston County-023)	The County continues to grow and updated GIS maps are critical to mitigation and response.	GCOEM
GC 2011-3	Implement tree and vegetation trimming/removal program	Road and Bridge	Ongoing capability.	Yes (as 2022-Galveston County-024)	Continual trimming of vegetation is required to mitigation the impact of severe weather.	Road and Bridge
GC 2011-6	Develop and provide public information and awareness for hazards	GCOEM and applicable county departments, and state and federal agencies	Floodplain maps are available on County website. Community outreach for all hazard awareness is provided year round through website, social media, public appearances, newsletters, disaster guides, publications and training. Ongoing capability.	Yes (as 2022-Galveston County-020)	A variety of hazards impact Galveston County and information must be continually pushed out to keep the public prepared.	GCOEM, Engineering and Parks
GC 2011-10	Harden critical utility facilities by purchasing equipment and installing emergency backup power (generator) at Public Works, MUD water plant and MUD wastewater treatment facility	MUD and SUD	In progress. Most facilities have at least one generator, often aging, but lack redundancy and weather proofing. Paid for with MUD and SUD funds.	Yes (as 2022-Galveston County-004)	Without electricity, utilities cannot operate.	MUDs and SUD
GC 2011-21	Implement the Corp of Engineers study of the Texas City Hurricane Flood Protection Project to improve the current levee system to provide protection from a Category 5 storm	Engineering	This is an on-going process. The Corps of Engineers inspects levee every year that is funded by the County.	Yes (as 2022-Galveston County-010)	Levee was originally built for a Category 3 storm.	Engineering



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
GC 2016-1	Install severe weather warning systems	GCOEM and applicable jurisdictions	Ongoing Capability funded through the County and NOAA. Blackboard Connect and IPAWS.	Yes (as 2022-Galveston County-001)	Severe weather threats often occur with little or no warning on the coast.	GCOEM
GC 2016-2	Stormproof/retrofit critical facilities and infrastructure	County Administration	Ongoing capability with a completed project at the Agrilife Extension Building funded through FEMA.	Yes (as 2022-Galveston County-002)	Critical facilities in a coastal county require regular storm proofing.	Facilities
GC 2016-3	Build storm water detention ponds	Engineering coordinate with developers	The County has storm water detention regulations for developments and are administered by County Engineer. Ongoing capability.	Yes (as 2022-Galveston County-003)	More detention ponds were needed to mitigate flooding.	Engineering
GC 2016-4	Secure generators for existing and new critical facilities and infrastructure	GCOEM	Ongoing capability. Generators are being added to new facilities and to existing structures through County and FEMA funding.	Yes (as 2022-Galveston County-004)	Severe weather impacted electrical service to critical facilities.	Facilities
GC 2016-5	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties	GCOEM	Mitigation projects have been completed on the Dickinson Community Center and Pioneer House. Ongoing though out the County.	Yes (as 2022-Galveston County-005)	Flood waters damaged facilities.	Facilities
GC 2016-6	Develop applicable plans and studies to address hazard mitigation	GCOEM	Plans and annexes are maintained regularly by the GCOEM. Ongoing capability funded through the County.	Yes (as 2022-Galveston County-006)	Galveston County is regularly impacted by a variety of hazards.	GCOEM
GC 2016-7	Widen drainage systems and culverts	Engineering and applicable jurisdictions and water district	Ongoing. Ave L Drainage is being widened with CDBG funds. Several projects have been identified for improvements	Yes (as 2022-Galveston County-007)	Culverts at 9 locations in Algoa/Alta Loma area	Engineering



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
GC 2016-8	Install lightning grounding systems and protection devices on critical facilities/infrastructure	Engineering	Ongoing capability on County facilities.	Yes (as 2022-Galveston County-008)	Lightening causes damages to critical facilities.	Facilities
GC 2016-9	Improve and enforce regulations and permit requirements to promote hazard mitigation strategies	GCOEM and applicable departments	The County continues to enforce floodplain regulations. Ongoing capability paid for by County funds.	Yes (as 2022-Galveston County-009)	Hazard mitigation is an ongoing need.	Engineering
GC 2016-10	Construct High Island Community Shelter	GCOEM	Completed	No	-	-
GC 2016-11	Implement the Corp of Engineers study of the Galveston County Water Reservoir Dam and Levee system	GCOEM and applicable departments	In Progress	Yes (as 2022-Galveston County-010)	-	Engineering and Road/Bridge



Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.1-14, the County did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

Galveston County participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.1-12. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X		X	X	X		X	X		X
Dam & Levee Failure	X			X	X		X			X
Drought	X			X	X		X			X
Expansive Soils	X			X	X		X			X
Extreme Temperatures	X	X		X	X		X		X	X
Flood	X	X	X	X	X		X	X	X	X
Hail	X	X		X	X		X		X	X
Hurricane & Tropical Storm	X	X	X	X	X		X		X	X
Land Subsidence	X			X	X		X			X
Lightning	X	X		X	X		X		X	X
Pandemic	X			X	X		X			X
Severe Winter Storm	X	X	X	X	X		X	X	X	X
Thunderstorm Wind	X	X	X	X	X		X	X	X	X
Tornadoes	X	X	X	X	X		X	X	X	X
Tsunami	X	X		X	X		X		X	X
Utility Failure	X	X	X	X	X		X	X	X	X
Wildfire	X	X	X	X	X		X	X	X	X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives Galveston County would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.1-13. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Galveston County-001	Severe weather warning systems	Problem: Severe weather threats often occur with little or no warning on the coast. Solution: Install severe weather warning systems	Both	Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tsunami	1, 2, 3	1 to 5 years	Deputy Emergency Management Coordinator	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	EAP	PI
2022-Galveston County-002	Critical facilities storm proofing	Problem: Critical facilities in a coastal county require regular storm proofing. Solution: Stormproof/retrofit critical facilities and infrastructure	Both	Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure	1, 2	1 to 5 years	Facilities Director, County Facilities	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP
2022-Galveston County-003	Flood control	Problem: More detention ponds are needed to mitigate flooding. Solution: Build storm water detention ponds	Both	Flood, Hurricane & Tropical Storm	1, 2	1 to 5 years	County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of critical infrastructure.	High	High	SIP	SP
2022-Galveston County-004	Backup generators	Problem: Severe weather impacts electrical service to critical facilities. Solution: Secure generators for existing and new critical facilities and infrastructure, including Public Works, MUD water plant, and MUD wastewater treatment facility.	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes,	1, 2	1 to 5 years	Facilities Director, County Facilities	FEMA Grant Funding (HMGP, BRIC), MUD Funds, SUD Funds	Without electricity, utilities and critical facilities cannot operate.	High	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
				Tsunami, Utility Failure, Wildfire									
2022-Galveston County-005	Mitigation RFC/SRL properties	Problem: Flood waters damaged facilities. Solution: Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties.	Existing	Flood, Hurricane & Tropical Storm	1, 2	1 to 5 years	Facilities Director, County Facilities	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	High	High	SIP	SP
2022-Galveston County-006	Plan and study development	Problem: Galveston County is regularly impacted by a variety of hazards. Solution: Develop applicable plans and studies to address hazard mitigation.	Both	All Hazards	1, 2, 3, 4	1 to 5 years	Deputy Emergency Management Coordinator	FEMA Grant Funding (FMA, HMGP, BRIC)	Increase hazard awareness	Low	High	EAP	PI, ES
2022-Galveston County-007	Flood control systems	Problem: Culverts at 9 locations in Algoa/Alta Loma area are not adequate Solution: Widen drainage systems and culverts.	Both	Flood, Hail, Hurricane & Tropical Storm	1, 2	1 to 5 years	County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	Low	High	SIP	SP
2022-Galveston County-008	Lightning Grounding	Problem: Lightning causes damages to critical facilities. Solution: Install lightning grounding systems and protection devices on critical facilities/ infrastructure.	Both	Lightning	1, 2	1 to 5 years	Facilities Director, County Facilities	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP
2022-Galveston County-009	Integrate mitigation measures in County regulations and permits	Problem: Hazard mitigation is an ongoing need. Solution: Improve and enforce County regulations and permit requirements to	Both	All Hazards	1, 2, 3, 4	1 to 5 years	County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		promote hazard mitigation strategies. This includes restricting development or requiring enhanced building techniques in floodplains and mapped high-hazard areas.											
2022-Galveston County-010	Dam and Levee Study Implementation	Problem: The County lacks data on dams and levees. Solution: Implement the Corp of Engineers study of the Galveston County Water Reservoir Dam and Levee system and the Texas City Hurricane Flood Protection Project.	Both	Dam & Levee Failure	1, 2, 4	Ongoing	County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR
2022-Galveston County-011	Insulation	Problem: The Galveston County Emergency Management Facility is vulnerable to extreme cold on the second and third floors. Solution: Install insulation in the roof of the third floor and under the second-floor overhang.	Existing	Severe Winter Storm, Utility Failure	1, 2	Five Years	Facilities Director, County Facilities	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	\$200,000	High	SIP	SP
2022-Galveston County-012	Bacliff Stormwater Improvement	Problem: The Bacliff area of Galveston County has storm water restrictions due to a bowl effect of the surrounding state highways (SH 146, SH 646 Grand Ave) and high elevation bluff along Galveston Bay. Solution: Improve channel drains and culvert crossing thru the State Highways.	Both	Flood	1, 2	Five Years	TXDOT, County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Protect residential homes from flooding	\$10 million	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Galveston County-013	Bolivar Peninsula Beach Erosion (High Island to Gilchrist)	Problem: Beach erosion is impacting SH 87 between High Island and Gilchrist. Solution: Complete Beach and Dune replenishment project.	Both	Coastal Erosion	1, 2	Five Years	GLO, County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Reduce loss of life during evacuations from Hurricanes	\$20 million	High	NSP	NR
2022-Galveston County-014	Bolivar Peninsula Beach Erosion (Gilchrist to Crystal Beach)	Problem: Beach and Dune loss in the eroding beach from Gilchrist west to Crystal Beach. Solution: Design, permit & build an engineered beach and dune renourishment for all of the Bolivar Peninsula beaches.	Both	Coastal Erosion	1, 2	Five Years	GLO, County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Protect residential homes from flooding	\$5 million	High	NSP	NR
2022-Galveston County-015	Cloud Bayou Floodplain Management	Problem: Cloud Bayou is restricted and confined, limiting the volume of stormwater discharge to Galveston Bay. Solution: Complete channel and crossing improvements.	Both	Flood	1, 2	Five Years	GC DD#1, County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Protect residential homes from flooding	\$15 million	High	NSP	NR
2022-Galveston County-016	San Leon Stormwater Improvement	Problem: The San Leon area of Galveston County has storm water restrictions due undersized channels, culverts, and restrictions of the shallow Factory Bayou system. Factory Bayou is tidally influenced and often impacted by storm surges. Solution: Improve channel drains and culvert crossing , control sediment transfer in bayou, saltwater barrier.	Both	Flood, Hurricane & Tropical Storm, Tsunami	1, 2	Ten Years	TXDOT, County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Protect residential homes from flooding	\$20 million	High	SIP	SP
2022-Galveston County-017	Willow Bayou Floodplain Management	Problem: Willow Bayou is restricted and confined, limiting the volume of	Both	Flood	1, 2	Five Years	GC DD#1, County Engineer,	FEMA Grant Funding (FMA,	Protect residential homes from flooding	\$10 million	High	SIP	SP



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		stormwater discharge to Galveston Bay. Solution: Complete channel and crossing improvements.					Engineering & Right of Way	HMGP, BRIC)					
2022-Galveston County-018	Locate Safe Rooms to Minimize Damage	Problem: Severe storms can pose a significant risk of hail, tornadoes and windstorms in Galveston County. Solution: Identify and locate safe rooms and areas in County buildings.	Both	Hail, Tornado, Thunderstorm Wind	1, 2	Ongoing	Facilities Director, County Facilities	Staff Time	Prevention of loss of life.	N/A	High	EAP	PI
2022-Galveston County-019	Pandemic Planning / Mitigation	Problem: A pandemic of any nature poses high threat for Galveston County and critical infrastructure therewithin. As seen with COVID-19, impacts to the area are necessarily limited to the pandemic virus itself, but the measures put into place by local, state and federal governments. These measures impact the entire population on the individual level to their ability to work, seek medical treatment, and their ability to provide for their household. The nature of this hazard is unlike any other threat the county could face and requires a whole community approach for mitigation and response actions. Solution: There isn't a simple solution to a pandemic, but taking best practices and lessons	Both	Pandemic	1, 2, 3	One Year	Director of Public Health Surveillance, Galveston County Health District, Deputy Emergency Management Coordinator, UTMB, HCA, local governments, and EMs	Staff Time, General Funds	Risk reduction, mitigation actions delineated, workforce surge plans	\$2 million	High	LPR, EAP	PR, PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		learned from COVID-19 is an excellent starting point. Bringing public health, local government, emergency management, hospital systems, critical infrastructure, in-patient and outpatient medical/behavioral health services are just some of the disciplines needed for developing, training and exercising mitigation and response tactics and strategies in Galveston County.											
2022-Galveston County-020	Public Information: Mitigation, Preparedness, Response and Recovery	Problem: Mitigation, preparedness, response and recovery information specific to Galveston County needs to reach Galveston County residents using a variety of methodologies in order to enable the resilience of residents of Galveston County including vulnerable populations and those in high-risk areas. Solution: Develop and provide public information and awareness for hazards, including information on how residents can mitigate hazards at their properties. Communication must be pushed out in a variety of formats and the information must be tailored to specifically address the hazards and threats to Galveston County. Digital,	Both	All Hazards	1, 2, 3	Ongoing	Deputy Emergency Management Coordinator, County Engineer, Engineering & Right of Way, Assistant Director, Parks and Cultural Services	FEMA Grant Funding (FMA, HMGP, BRIC), General Fund	Critical information is received by the right people at the right time in order to save lives and property.	\$250,000 Annually	High	EAP	PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		hard copy and audio/visual products must be created and distributed within the County to address issues regarding residential mitigation recommendations, safety and security, access to food, water and shelter during disasters, health and medical, power and fuel, communications, transportation and hazardous materials response.											
2022-Galveston County-021	Map and Assess Vulnerability	Problem: Coastal communities may be at risk to powerful flooding and inundation. Solution: Using GIS, drones and LIDAR (light detection and ranging) to map areas that are vulnerable to inundation by tsunamis, coastal erosion and retreat and flooding (coastal and inland). Developing and maintaining a database to track community vulnerability to tsunamis, coastal erosion and retreat and flooding (coastal and inland). Offering hazard mapping online for residents and design professionals.	Both	Tsunami, Coastal Erosion, Flood	1, 2	Ongoing	Deputy Emergency Management Coordinator	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and critical infrastructure.	\$1 million	High	EAP	PI
2022-Galveston County-022	NFIP Compliance	Problem: Community may be at risk to flooding and inundation.	Both	Flood	1, 2, 3	Ongoing	County Engineer,	Staff Time, General Fund	Prevention of loss of life and critical infrastructure.	Low	High	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Solution: Implement floodplain management programs that, at a minimum, meet the NFIP requirements: - Enforce the flood damage prevention ordinance. - Participate in floodplain identification and mapping updates. - Provide public assistance/information on floodplain requirements and impacts.					Engineering & Right of Way						
2022-Galveston County-023	GIS Updates	Problem: As the County continues to grow, updated GIS maps are critical to mitigation and response. Solution: Update GIS System to record locations of vulnerable population and structures	New	All Hazards	1, 2	Ongoing	Deputy Emergency Management Coordinator	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and critical infrastructure.	Low	High	EAP	PI
2022-Galveston County-024	Tree and Vegetation Trimming / Removal	Problem: Continual trimming of vegetation is required to mitigate the impact of severe weather. Solution: Continue implementing the tree and vegetation trimming / removal program.	Both	Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Utility Failure, Wildfire	1, 2	Ongoing	Road Administrator, County Roads and Bridges	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of utility services, loss of life and damage to critical infrastructure.	Low	High	NSP	NR
2022-Galveston County-025	Galveston County Water Reservoir Dam Inundation Mapping	Problem: No inundation mapping available for the high-hazard dam located in the County. Solution: Pursue acquisition of inundation mapping from U.S. Army	Both	Dam & Levee Failure	1, 2, 4	Ongoing	County Engineer, Engineering & Right of Way	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Corps of Engineers, or other study sources.											
2022-Galveston County-026	Repetitive Loss and Severe Repetitive Loss Data Acquisition	Problem: Countywide RL and SRL data is not readily available. Solution: Pursue acquisition of RL and SRL data from the State Floodplain Management office or FEMA.	Both	Flood	1, 2, 3	Ongoing	Deputy Emergency Management Coordinator	Staff Time, General Fund	Prevention of loss of life and critical infrastructure.	Low	High	LPR	PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DPW	Department of Public Works
EHP	Environmental Planning and Historic Preservation
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
MUD	Municipal Utility District
N/A	Not applicable
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management
SUD	Special Utility District

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation

Cost:

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)** - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- **Preventative Measures (PR)** - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.





- **Property Protection (PP)** - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information (PI)** - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection (NR)** - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Structural Flood Control Projects (SP)** - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- **Emergency Services (ES)** - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.1-14. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Galveston County-01	Severe weather warning systems	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Galveston County-02	Critical facilities storm proofing	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Galveston County-03	Flood control	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Galveston County-04	Backup generators	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Galveston County-05	Mitigation RFC/SRL properties	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Galveston County-06	Plan and study development	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Galveston County-07	Flood control systems	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Galveston County-08	Lightning Grounding	1	1	1	1	1	1	-1	1	1	1	0	1	1	1	11	High
2022-Galveston County-09	Integrate mitigation measures in County regulations and permits	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Galveston County-10	Dam and Levee Study Implementation	1	1	1	1	1	1	1	1	1	1	0	1	1	1	13	High
2022-Galveston County-11	Insulation	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Galveston County-12	Bacliff Stormwater Improvement	0	1	1	1	1	1	-1	1	1	1	0	1	1	1	10	High



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Galveston County-13	Bolivar Peninsula Beach Erosion (High Island to Gilchrist)	0	1	1	1	1	1	-1	1	1	1	0	1	1	1	10	High
2022-Galveston County-14	Bolivar Peninsula Beach Erosion (Gilchrist to Crystal Beach)	0	1	1	1	1	1	-1	1	1	1	0	1	1	1	10	High
2022-Galveston County-15	Cloud Bayou Floodplain Management	0	1	1	1	1	1	-1	1	1	1	0	1	1	1	10	High
2022-Galveston County-16	San Leon Stormwater Improvement	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Galveston County-17	Willow Bayou Floodplain Management	0	1	1	1	1	1	-1	1	1	1	0	1	1	1	10	High
2022-Galveston County-18	Locate Safe Rooms to Minimize Damage	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Galveston County-19	Pandemic Planning / Mitigation	1	0	1	1	1	1	1	0	0	0	0	1	1	1	9	High
2022-Galveston County-20	Public Information: Mitigation, Preparedness, Response and Recovery	1	1	1	1	1	1	0	1	1	0	1	1	1	1	12	High
2022-Galveston County-21	Map and Assess Vulnerability	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Galveston County-022	NFIP Compliance	0	1	1	1	1	1	-1	1	1	1	0	1	1	1	10	High
2022-Galveston County-023	GIS Updates	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Galveston County-024	Tree and Vegetation Trimming / Removal	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Galveston County-025	Galveston County Water Industrial Reservoir Dam Inundation Mapping	1	1	1	1	1	1	1	1	1	1	0	1	1	1	13	High
2022-Galveston County-026	Repetitive Loss and Severe Repetitive Loss Data Acquisition	0	1	1	1	1	1	0	1	1	1	0	1	1	1	9	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions.
Low (0-4), Medium (5-8), High (9-14).



9.2 CITY OF BAYOU VISTA

This section presents the jurisdictional annex for the City of Bayou Vista and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City of Bayou Vista participated in the planning process, an assessment of the City of Bayou Vista's risk and vulnerability, the different capabilities used in the City of Bayou Vista, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.2.1 Hazard Mitigation Planning Team

The City of Bayou Vista followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many City departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.2-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Chief Jimmie Gillane	Emergency Management Coordinator	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Russel Buhler	Building Inspector	Provided information on capabilities, past event history, past action statuses

9.2.2 Jurisdictional Profile

The City of Bayou Vista is a municipality located in the southern portion of Galveston County. The City is developed on a series of man-made canals just north of Highland Bayou. According to the U.S. Census, the 2010 population for the City was 1,537. The estimated 2019 population was 1,763, a 14.7 percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 1.0 percent of the population is 5 years of age or younger and 35.1 percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.2.3 Jurisdictional Capability Assessment and Integration

The City of Bayou Vista performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.



- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of Bayou Vista identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of Bayou Vista, what is present in the jurisdiction, and code citation and date.

Table 9.2-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 3 – Building and Construction, 1/26/21	State and Local	Building Inspector
<i>How does this reduce risk?</i> The Building Code was adopted for the purpose of establishing rules and regulations for the erection, construction, enlargement, alteration, repair, moving, removal, conversion, demolition, occupancy, equipment, use, height, area, and maintenance of buildings or structures. The Building Inspector's responsibilities include the inspection and approval of bulkheads and other shoreline protections. In addition, this chapter includes Articles addressing flood damage prevention and hazard reduction.					
Zoning/Land Use Code	No	No	-	-	-
<i>How does this reduce risk?</i>					
Subdivision Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Site Plan Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Stormwater Management Ordinance	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Post-Disaster Recovery/ Reconstruction Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008 – Seller's Disclosure of Property Condition	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single family dwelling by answering Yes or No to being aware of any of the following conditions: • Present flood insurance coverage • Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir • Previous water penetration into a structure on the property due to a natural flood event					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
- Located wholly or partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) - Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) - Located wholly or partly in a floodway - Located wholly or partly in a flood pool - Located wholly or partly in a reservoir					
Growth Management	No	No	-	-	-
<i>How does this reduce risk?</i>					
Environmental Protection Ordinance	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Flood Damage Prevention Ordinance	Yes	Yes	Chapter 3 - Article 3.04.00 Flood Damage Prevention and Article 3.05 Provisions for Flood Hazard Reduction	Federal, State, County, and Local	Building Inspector
<i>How does this reduce risk?</i> It is the purpose of Article 3.04 to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by adopting methods of reducing flood losses. According to Article 3.05, in all areas of special flood hazards, provisions are required for all new construction and substantial improvements to be designed or modified to minimize flood damage and reduce flooding					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Chapter 1 – General Provisions – Article 1.12 – Emergency Management 12/27/15	State, County and Local	Emergency Management Director
<i>How does this reduce risk?</i> The operational cooperative emergency management organization is comprised of personnel of the Galveston County Office of Emergency Management and appointed personnel of the City of Bayou Vista as designated by the director in the emergency management plan, as well as volunteer individuals and groups. A comprehensive emergency management plan shall be developed and maintained in a current state. The emergency management plan shall be considered supplementary to this article and have the effect of law during the time of a disaster.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	No	-	-	-
Planning Documents					
Comprehensive Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Capital Improvement Plan	Yes	No	2021 – 2022 City Budget	State, County and Local	Mayor and City Council
<i>How does this reduce risk?</i> Although the City's Budget is not a Capital Improvement Plan it is comprised of a section to fund General Safety and Maintenance Projects, including flood protection, road and bulkhead repair and a line item for general capital improvements.					
Disaster Debris Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Stormwater Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Open Space Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Shoreline Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Agriculture Plan	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	No	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	-	Local	OEM/Police
<i>How does this reduce risk?</i>					
Continuity of Operations Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	No	No	-	-	-
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Other	No	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of Bayou Vista to oversee and track development.

Table 9.2-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	No	-
Are permits tracked by hazard area? (For example, floodplain development permits.)	No	-
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Yes	Only 6 – residential lots left in city.

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Bayou Vista and their current responsibilities which contribute to hazard mitigation.

Table 9.2-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	No	-
Zoning Board of Adjustment	No	-
Planning Department	No	-
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	No	-
Public Works/Highway Department	No	-
Construction/Building/Code Enforcement Department	Yes	The Building and Construction Code appoints a Building Inspector to enforce the building codes and restrictions of the City of Bayou Vista, and to inspect and approve construction work on an as needed basis under whatever arrangement the Board of Aldermen deems to be in the best interest the City.
Emergency Management/Public Safety Department	Yes	1, Emergency management, police, coordinate debris management. The operational cooperative emergency management organization is comprised of personnel of the Galveston County Office of Emergency Management and appointed personnel of the City of Bayou Vista as designated by the director in the emergency management plan, as well as volunteer individuals and groups
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	Warning siren
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	No	-



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Mutual aid agreements	Yes	-
Human Resources Manual	Yes	-
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	No	-
Engineers or professionals trained in building or infrastructure construction practices	No	-
Planners or engineers with an understanding of natural hazards	No	-
Staff with expertise or training in benefit/cost analysis	Yes	-
Professionals trained in conducting damage assessments	Yes	-
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	No	-
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	No	-
Grant writer(s)	No	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to the City of Bayou Vista.

Table 9.2-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	No
Capital improvements project funding	No
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	No
Impact fees for homebuyers or developers of new development/homes	No
Stormwater utility fee	No
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other federal or state funding programs	No
Open Space Acquisition funding programs	No
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	No

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Bayou Vista.



Table 9.2-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	City website
Personnel skilled or trained in website development	Yes	City secretary
Hazard mitigation information available on your website	Yes	The Flood Map is available on the City's Webpage under News and Notices and links are available on the Webpage to FEMA, the State Department of Emergency Management and the Galveston County Emergency Management
Social media for hazard mitigation education and outreach	Yes	-
Citizen boards or commissions that address issues related to hazard mitigation	No	-
Other programs already in place that could be used to communicate hazard-related information	Yes	-
Warning systems for hazard events	Yes	-
Natural disaster/safety programs in place for schools	No	-
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Bayou Vista.

Table 9.2-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	04	02/11/2016
Storm Ready Certification	No	-	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable
 NP Not participating
 - Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.



Table 9.2-8. Adaptive Capacity

Hazard	Rating
Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.2.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.2-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	None
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	None
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	None
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	Building inspector makes determination
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	None
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes
NFIP Compliance	
What local department is responsible for floodplain management?	Building Inspector
Are any certified floodplain managers on staff in your jurisdiction?	No
Do you have access to resources to determine possible future flooding conditions from climate change?	No



NFIP Topic	Comments
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes, training
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	Permit reviews, GIS, inspections
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	50% of valuation
What are the barriers to running an effective NFIP program in the community, if any?	None
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	None
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	03/02/2021
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Ordinance 3.04.07
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Yes
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	Section 3
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	No

Source:

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.2.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.2-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	9	9	0	0	0	0	3	3	9	9	10	10
Multi-Family	-	-	-	-	-	-	-	-	-	-	-	-
Other (commercial, mixed-use, etc.)	-	-	-	-	-	-	-	-	-	-	-	-
Total Permits Issued	-	-	-	-	-	-	-	-	-	-	-	-



Property or Development Name	Type of Development	# of Units / Structures	Location (address and/or block and lot)	Known Hazard Zone(s)*	Description / Status of Development
Recent Major Development and Infrastructure from 2016 to Present					
None identified					
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years					
None identified					

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.2.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of Bayou Vista's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City of Bayou Vista has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.2-1. Bayou Vista Area Extent and Location Map (Flood)

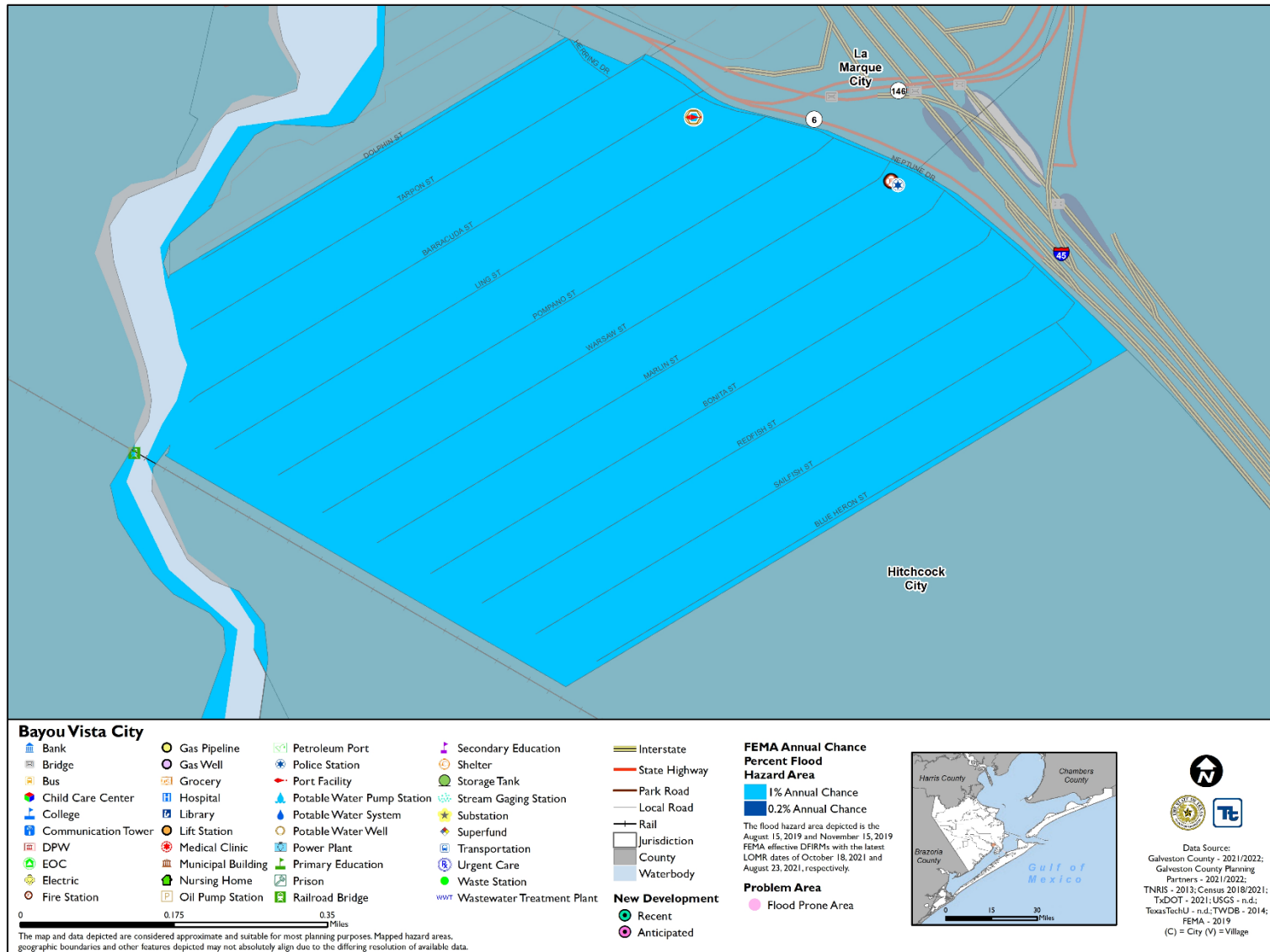




Figure 9.2-2. Bayou Vista Area Extent and Location Map (SLOSH, Tsunami)

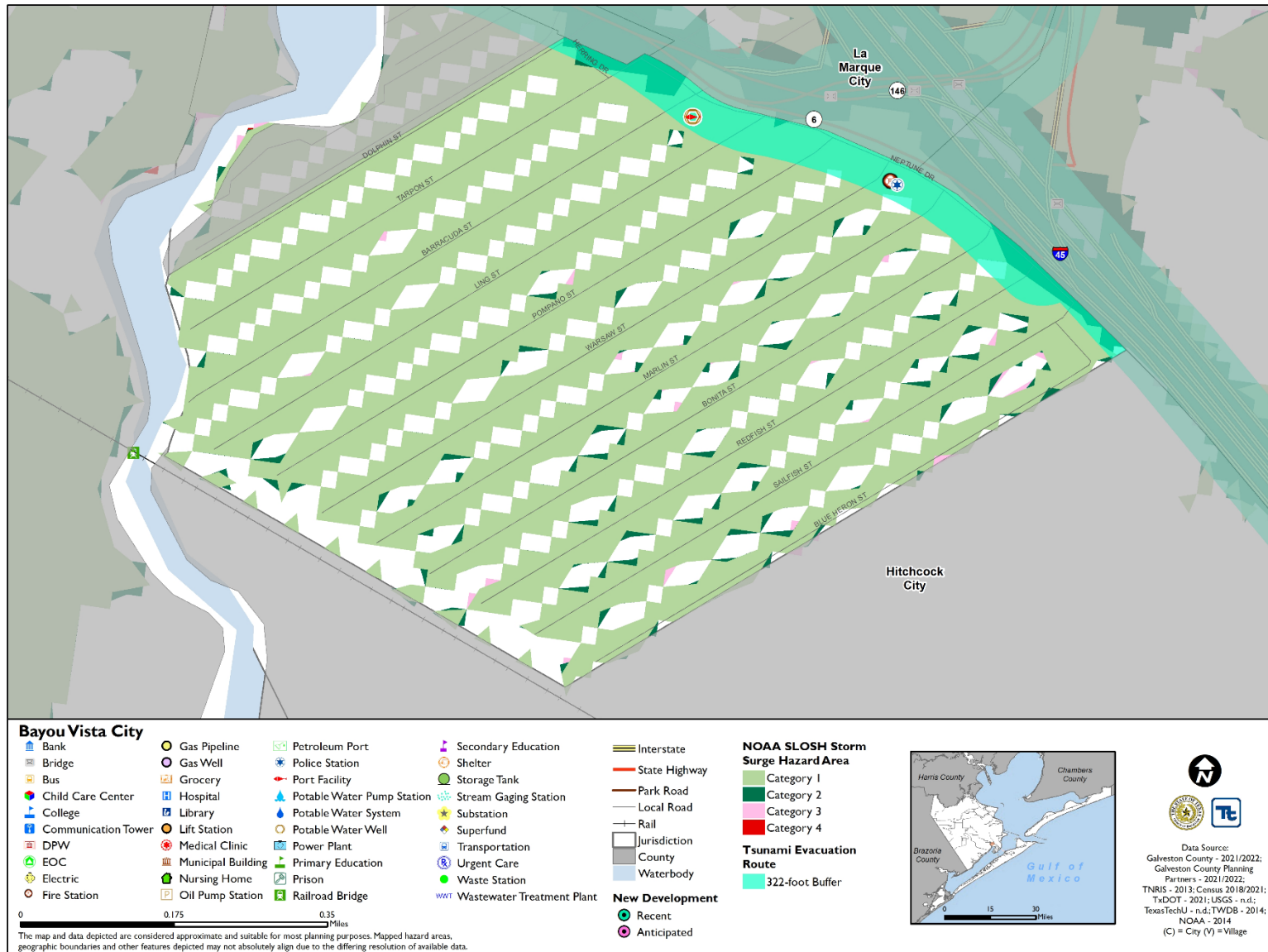




Figure 9.2-3. Bayou Vista Area Extent and Location Map (Sea Level Rise, WUI)





Bayou Vista City

Legend:

- Bank** (Blue square)
- Bridge** (Grey rectangle)
- Bus** (Yellow square)
- Child Care Center** (Green square)
- College** (Blue square)
- Communication Tower** (Red square)
- DPW** (Red square)
- EOC** (Green square)
- Electric** (Yellow square)
- Fire Station** (Red square)
- Gas Pipeline** (Yellow line)
- Petroleum Port** (Green square)
- Police Station** (Blue square)
- Port Facility** (Red square)
- Potable Water Pump Station** (Blue square)
- Potable Water System** (Blue line)
- Potable Water Well** (Blue square)
- Power Plant** (Green square)
- Primary Education** (Green square)
- Nursing Home** (Green square)
- Oil Pump Station** (Green square)
- Railroad Bridge** (Green square)
- Secondary Education** (Green square)
- Shelter** (Yellow square)
- Storage Tank** (Green square)
- Stream Gaging Station** (Green square)
- Substation** (Yellow square)
- Superfund** (Red square)
- Transportation** (Blue square)
- Urgent Care** (Blue square)
- Waste Station** (Green square)
- WWT Wastewater Treatment Plant** (Green square)
- Interstate** (Thick red line)
- State Highway** (Red line)
- Park Road** (Thin red line)
- Local Road** (Thin grey line)
- Rail** (Black line)
- Jurisdiction** (Grey area)
- County** (Light grey area)
- Waterbody** (Blue area)
- Expansive Soils Hazard Area** (Yellow area)
- Soil Erosion Hazard Area** (Green area)
- Coastal (100ft Shoreline Buffer)** (Green area)
- Inland (K Factor >0.49)** (Yellow area)
- New Development** (Green circle)
- Recent** (Green circle)
- Anticipated** (Yellow circle)

Scale: 0 to 0.35 Miles

Map Notes: The map and data depicted are considered approximate and suitable for most planning purposes. Mapped hazard areas, geographic boundaries and other features depicted may not absolutely align due to the differing resolution of available data.

Data Sources: Galveston County - 2021/2022; Galveston County Planning Partners - 2021/2022; TNRIS - 2013; Census 2018/2021; TxDOT - 2021; USGS - n.d.; TexasTechU - n.d.; TWDB - 2014; NOAA - 2011; USDA/NRCS - 2020 (C) = City (V) = Village



Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

Bayou Vista's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages the City of Bayou Vista experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.2-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	No damages identified by the municipality.
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes.
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson and Santa Fe. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	No damages identified by the municipality.
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads.
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects.
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding.	The storm brought gusty winds to most of the city Bayou Vista, causing power outages.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			Between six and nine inches of rain fell in the Galveston area.	

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Bayou Vista's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of Bayou Vista. The City of Bayou Vista reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of Bayou Vista agreed with the calculated rankings.

Table 9.2-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
Low	Low	Medium	High	Medium	High	Low	High	Low

Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire
Low	Low	Low	Medium	Medium	Low	Medium	Low

Note: The scale is based on the hazard rankings established in Section 4.4 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

9.2.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own



table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the ‘Capability Assessment’ presented previously in this annex.



Table 9.2-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
BV 2006-1	Develop and provide public information and awareness for hazards	City of Bayou Vista Administration	In Progress – CRF funding	Yes (as 2022-Bayou Vista-001)	-	-
BV-2011-4	Develop drainage improvement program to reduce standing water and runoff, and reduce minor flooding for residents located in District No.12	Galveston County MUD #12	-	(as 2022-Bayou Vista-002)	-	-
BV-2011-6	Implement stormwater management plan to improve drainage during flood and other weather events	Galveston County MUD #12	-	(as 2022-Bayou Vista-003)	-	-
BV-2011-7	Develop Master Drainage Plan to assist in reducing flooding through increased lowest finish floor requirements	Galveston County MUD #12	-	(as 2022-Bayou Vista-003)	-	-
BV-2011-8	Reconstruct/upgrade storm sewer systems to increase water flow	Galveston County MUD #12	-	(as 2022-Bayou Vista-002)	-	-
BV-2011-9	Implement water conservation measures	Galveston County MUD #12	-	(as 2022-Bayou Vista-004)	-	-
BV-2011-11	Implement best management practices for securing windblown debris in canals	Galveston County MUD #12	-	(as 2022-Bayou Vista-005)	-	-
BV-2011-12	Develop and implement a plan for canal dredging to reduce sediment deposited during storm events, reducing access in canals	Galveston County MUD #12	-	(as 2022-Bayou Vista-005)	-	-
BV-2011-13	Repair, upgrade or replace water and sewer infrastructure for 175 connections	Galveston County MUD #12	-	(as 2022-Bayou Vista-006)	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
BV-2011-15:	Implement water conservation awareness campaign for residents	Galveston County MUD #12	-	(as 2022-Bayou Vista-001)	-	-
BV-2011-16:	Purchase and install a deflective shield over two (2) clarifiers	Galveston County MUD #12	-	(as 2022-Bayou Vista-006)	-	-
BV-2011-17:	Implement a plan for shutting down water and sewer systems	Galveston County MUD #12	-	(as 2022-Bayou Vista-006)	-	-
BV-2011-19:	Implement a plan for the hardening the water system during freeze events	Galveston County MUD #12	-	(as 2022-Bayou Vista-006)	-	-
BV-2011-21:	Retrofit public buildings and critical facilities/infrastructure for flood proofing and hardening needs	Galveston County MUD #12	-	(as 2022-Bayou Vista-007)	-	-
BV 2016-1:	Purchase and install severe weather warning systems	City Administration	Complete	No	-	-
BV 2016-2:	Stormproof/retrofit critical facilities and infrastructure	City Administration	No Progress, no funding	No	-	-
BV 2016-3:	Purchase and install generators for existing and new critical facilities and infrastructure	City Administration	No Progress – no funding	(as 2022-Bayou Vista-008)	-	-
BV 2016-4:	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties	City Administration and applicable state and county agencies	No Progress	(as 2022-Bayou Vista-009)	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
BV 2016-5:	Purchase and install lightning grounding systems and protection devices on critical facilities/infrastructure	Engineering	No Progress	(as 2022-Bayou Vista-010)	-	-
BV 2016-6:	Update regulations and permit requirements to address enhanced hazard mitigation strategies	City Administration and applicable departments	No Progress	(as 2022-Bayou Vista-011)	-	-



Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.2-14, the City did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of Bayou Vista participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.2-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion (no hazard exposure)										
Dam & Levee Failure (no hazard exposure)										
Drought	X	X		X	X		X		X	X
Expansive Soils	X	X		X	X		X		X	X
Extreme Temperatures	X	X		X	X		X		X	X
Flood	X	X		X	X		X		X	X
Hail	X	X		X	X		X		X	X
Hurricane & Tropical Storm	X	X		X	X		X		X	X
Land Subsidence	X	X		X	X		X		X	X
Lightning	X	X		X	X		X		X	X
Pandemic	X	X		X	X		X		X	X
Severe Winter Storm	X	X		X	X		X		X	X
Thunderstorm Wind	X	X		X	X		X		X	X
Tornadoes	X	X		X	X		X		X	X
Tsunami	X	X		X	X		X		X	X
Utility Failure	X	X		X	X		X		X	X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of Bayou Vista would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.2-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Bayou Vista-001	Develop and provide public information for residential mitigation and awareness for hazards	Problem: Methods and operational equipment are needed to inform the public on how residents can mitigate hazards at their properties. Additionally, outreach methods are needed informing the community of immediate danger from an impending hazard or updating the public with an ongoing controlled hazard. Solution: Public outreach program will be designed to inform residents on how they can mitigate hazards at their properties and notify the public of immediate hazard threats or updated supplemental information of ongoing hazards through numerous methods that could include text messages, automated “robo calls”, emails, media outlet press releases, internet websites and social media accounts from city departments. Equipment would include social monitoring or crowd source programs, cameras and hard-shell cases, laptop, and a dedicated vehicle.	Both	All Hazards except Dam & Levee Failure, Coastal & Inland Erosion	1, 2	1-5 years	City Administration PIO, Emergency Management Coordinator	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	EAP	PI
2022-Bayou Vista-002	Drainage Improvements	Problem: Flooding impacts low-lying areas. Solution: Develop drainage improvement program and upgrade storm sewer systems to reduce standing water and runoff.	Both	Flood, Hurricane & Tropical Storm, Severe Winter Storm	1, 2	1-5 years	City Administration, MUD #12	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	High	High	SIP	SP



SECTION 9.2: City of Bayou Vista

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Bayou Vista-003	Drainage and Stormwater Planning	Problem: Lack of plans to address citywide drainage and stormwater hazards. Solution: Develop and Implement Master Drainage Plan and Stormwater Management Plan.	Both	Flood, Hurricane & Tropical Storm, Severe Winter Storm	1, 2	1-5 years	City Administration, MUD #12	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	High	High	LPR	PR
2022-Bayou Vista-004	Drought Conservation Program	Problem: Need to conserve water during periods of drought. Solution: Implement water conservation measures through a program to mitigate the drought hazard.	Both	Drought	1, 2	1-5 years	City Administration, MUD #12	FEMA Grant Funding (HMGP, BRIC)	Reduce economic impacts	Low	High	LPR	PR
2022-Bayou Vista-005	Canal Dredging and Debris Plan	Problem: Storms deposit sediment and other debris into canals, reducing access. Solution: Develop and implement a plan to dredge canals and remove windblown debris after storm events.	Existing	Flood, Hurricane & Tropical Storm, Land Subsidence, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami	1, 2	1-5 years	City Administration, MUD #12	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	Low	High	LPR	PR
2022-Bayou Vista-006	Water and Sewer System Upgrades	Problem: Substandard water and sewer system impacted by storm events. Solution: Upgrade water and sanitary sewer infrastructure including hardening for storm events, allowing system shutdowns during hazard events as needed to prevent damage to systems, and installing deflective shields over clarifiers.	Existing	Extreme Temperatures, Flood, Hurricane & Tropical Storm, Severe Winter Storm, Tsunami, Utility Failure	1, 2	1-5 years	City Administration, MUD #12	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of critical infrastructure.	High	High	SIP	SP
2022-Bayou Vista-007	Structure and Infrastructure Retrofits/Relocation	Problem: Structures and infrastructure are located in high hazard areas that are repeatedly impacted by hazard events.	Existing	All Hazards except Dam & Levee Failure, Coastal & Inland Erosion	1, 2	1-5 years	City Administration, MUD #12	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Solution: Where appropriate, support retrofitting, purchase or relocation of structures located in hazard areas, prioritizing those that have experienced repetitive losses and/or are located in high- or medium-risk hazard areas.						HMGP, BRIC)					
2022-Bayou Vista-008	Emergency Generators	Problem: Critical facilities lack backup power. Solution: Purchase and install emergency power generators and connection equipment to support critical facilities and infrastructure.	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure, Wildfire	1, 2	1-5 years	City Administration, Engineering	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP
2022-Bayou Vista-009	Mitigation RFC/SRL properties	Problem: Flood waters damaged facilities. Solution: Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties.	Existing	Flood, Hurricane & Tropical Storm	1, 2	1-5 years	City Administration, Engineering	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	High	High	SIP	SP
2022-Bayou Vista-0010	Lightning Grounding	Problem: Lightning causes damages to critical facilities. Solution: Install lightning grounding systems and protection devices on critical facilities/infrastructure.	Both	Lightning	1, 2	1 to 5 years	Engineering	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP
2022-Bayou Vista-011	Integrate mitigation measures in community	Problem: Hazard mitigation is an ongoing need.	Both	All Hazards except Dam & Levee Failure,	1, 2, 3, 4	1 to 5 years	City Administration,	FEMA Grant Funding (FMA,	Prevention of loss of life and protection of	Low	High	LPR	PR, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
	regulations and permits	Solution: Improve and enforce community regulations and permit requirements to promote hazard mitigation strategies. This includes restricting development or requiring enhanced building techniques in floodplains and mapped high-hazard areas.		Coastal & Inland Erosion			Building Inspector	HMGP, BRIC)	critical infrastructure.				

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DPW	Department of Public Works
EHP	Environmental Planning and Historic Preservation
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation

Cost:

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)** - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- **Preventative Measures (PR)** - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- **Property Protection (PP)** - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information (PI)** - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection (NR)** - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.



- *Structural Flood Control Projects (SP)* - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)* - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.2-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Bayou Vista-001	Develop and provide public information for residential mitigation and awareness for hazards	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Bayou Vista-002	Drainage Improvements	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Bayou Vista-003	Drainage and Stormwater Planning	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Bayou Vista-004	Drought Conservation Program	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Bayou Vista-005	Canal Dredging and Debris Plan	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Bayou Vista-006	Water and Sewer System Upgrades	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Bayou Vista-007	Structure and Infrastructure Retrofits/Relocation	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Bayou Vista-008	Emergency Generators	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Bayou Vista-009	Mitigation RFC/SRL properties	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Bayou Vista-0010	Lightning Grounding	1	1	1	1	1	1	-1	1	1	1	0	1	1	1	11	High
2022-Bayou Vista-0011	Integrate mitigation measures in community regulations and permits	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions. Low (0-4), Medium (5-8), High (9-14).



9.3 CITY OF CLEAR LAKE SHORES

This section presents the jurisdictional annex for the City of Clear Lake Shores and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City of Clear Lake Shores participated in the planning process, an assessment of the City of Clear Lake Shores' risk and vulnerability, the different capabilities used in the City of Lake Shores, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.3.1 Hazard Mitigation Planning Team

The City of Clear Lake Shores followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many Clear Lake Shores departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.3-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Brent Spier	City Admin/EMC	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Kevin Harrell	Building Official	Attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.3.2 Jurisdictional Profile

Clear Lake Shores is a city in Galveston County, located in the northern portion of the County. The City is located on Clear Lake, about 22 miles northwest of the City of Galveston. Clear Lake Shores is surrounded by water on three sides and lies about a mile west of Galveston Bay. The City is governed by a Mayor and five alderman or councilpersons.

According to the U.S. Census, the 2010 population for the City was 1,063. The estimated 2019 population was 1,258, a 18.3 percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 1.7-percent of the population is 5 years of age or younger and 24.2-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.3.3 Jurisdictional Capability Assessment and Integration

The City of Clear Lake Shores performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment)



describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities Clear Lake Shores identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of Clear Lake Shores, what is present in the jurisdiction, and code citation and date.

Table 9.3-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 14 – Buildings and Building Regulations, Adopted date 04/01/2008 last revised 7/07/2020	State and Local	Building Inspector
<i>How does this reduce risk?</i> It is unlawful for any person, firm or contractor to build, erect, construct, reconstruct or structurally alter any house, building, garage, fence or other structure without furnishing to the building inspector a plot plan and application as hereinafter provided for and procuring from the building inspector a written or printed permit for same. The City had adopted the applicable International Building Codes which incorporates building requirements for hazard protection.					
Zoning/Land Use Code	Yes	No	Chapter 82 – Zoning, Adopted date 01/01/1999 last revised 8/04/2020	Local	Zoning Administrator
<i>How does this reduce risk?</i> The zoning regulations and districts as herein established have been made in accordance with a comprehensive plan for the purpose of promoting health, safety, morals and the general welfare of the city. They have been designed to lessen congestion in the streets, to secure safety from fire and panic and other danger, to provide adequate light and air, to prevent the overcrowding of land, to avoid undue concentration of population, and to facilitate the adequate provision of transportation, water, sewerage, schools, parks and public facilities. The Chapter provides for a Marine Mixed Zone and a Waterfront Easement District to address flood hazard concerns.					
Subdivision Ordinance	Yes	No	Chapter 70 – Subdivisions, Adopted date: 12/05/2006	Local	Planning Commission
<i>How does this reduce risk?</i> A Development Plan is required for all divisions of land within the City and shall not be approved unless the proposed development conforms to the comprehensive plan, plans, rules and ordinances of the city concerning its current and future streets, sidewalks, alleys and public utility facilities; Receipt of a letter of approval from the city engineer, currently licensed in the State of Texas affirming the conformance of the					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
submitted drainage plan with chapter 66 articles II and III, and chapter 70 of the City Code of Ordinances. In addition, No subdivision of land shall be approved unless same complies in all respects with the city's flood damage prevention regulations, as found in this Code. Each final plat shall have depicted thereon applicable boundaries of all flood zones as provided in the latest edition of the federal insurance rate maps.					
Site Plan Ordinance	Yes	No	Chapter 82 – Zoning Adopted date 01/01/1999 last revised 8/04/2020	Local	Zoning Administrator/Council
<i>How does this reduce risk?</i> Site Plan review and approval are required by the Council for certain Zoning Districts or the City will not issue a permit for development. The application will be reviewed by the city administrator, city building official, fire marshal and police department and other officials as appropriate or required. The developer shall submit corrected documents, if necessary, before the application proceeds to council. Council shall hold a public hearing on the site plan and may approve, approve with conditions, or disapprove any application. Council may impose reasonable conditions or changes for approval.					
Stormwater Management Ordinance	Yes	Yes	Chapter 66 – Streets Sidewalks and Public Places Section 93 – Erosion and Stormwater Measures, Adopted date: 5/18/2004	Local	Floodplain Administrator
<i>How does this reduce risk?</i> Erosion control measures shall be implemented prior to commencement of any work. The user shall comply with stormwater management erosion control that complies with the city, state and federal laws, regulations, and guidelines. Requirements may include, but shall not be limited to, silt fencing around any excavation that will be left overnight, silt fencing in erosion areas until reasonable vegetation is established and barricade fencing around open holes. High erosion areas shall require wire-backed silt fencing.					
Post-Disaster Recovery/ Reconstruction Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008 Adopted date 1/1/1994.	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single family dwelling by answering Yes or No to being aware of any of the following conditions: • Present flood insurance coverage • Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir • Previous water penetration into a structure on the property due to a natural flood event • Located (X) wholly () partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) • Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) • Located wholly or partly in a floodway • Located wholly or partly in a flood pool • Located wholly or partly in a reservoir					
Growth Management	No	No	-	-	-
<i>How does this reduce risk?</i>					
Environmental Protection Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Flood Damage Prevention Ordinance	Yes	Yes	Chapter 38 – Flood Damage Prevention, Adopted date: 10/15/2013 last revised 9/07/2021	Federal, State, County and Local	Mayor/Floodplain Administrator
<i>How does this reduce risk?</i> It is the purpose of this chapter to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas. In order to accomplish its purposes, this chapter uses the following methods: (1) Restricting or prohibiting uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities; (2) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; (3) Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of floodwaters;					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
(4) Control filling, grading, dredging and other development which may increase flood damage; (5) Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands. This Chapter also requires new construction and substantial improvements of any residential structure shall have the lowest floor (including basement), elevated to 12 inches above the base flood elevation. New construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to 12 inches above the base flood level or together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Chapter 30 – Emergency Management, Adopted date 8/21/2012	Local	Emergency Management Director
<i>How does this reduce risk?</i> There exists the Office of Emergency Management Director of the City of Clear Lake Shores, which shall be held by the city mayor in accordance with the state law. (1) An emergency management coordinator may be appointed by and serve at the pleasure of the director. (2) The director shall be responsible for a program of comprehensive emergency management within the city and for carrying out the duties and responsibilities set forth in this article. He/she may delegate authority for execution of these duties to the coordinator, but ultimate responsibility for such execution shall remain with the director. (3) The operational cooperative emergency management organization is comprised of personnel of the Galveston County Office of Emergency Management and appointed personnel of the City of Clear Lake Shores as designated by the director in the emergency management plan, as well as volunteer individuals and groups. These functions and duties of this organization shall be distributed among such officers and employees of the city in accordance with the terms of the emergency management plan.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	-	-	-	-	-
Planning Documents					
Comprehensive Plan	Yes	No	Clear Lake Shores Strategic Plan – 5-Year Plan 2019 – 2024, 11/05/2019	Local	City Council & EDC
<i>How does this reduce risk?</i> The plan describes the City’s mission, vision, values, philosophy, and foundations. It also sets goals and action steps to improve four main strategic areas of emphasis: economic development, communications, community, and infrastructure. The Plan recommends the maximizing City and Emergency Services and to maintain the City’s voice on floodplain issues through infrastructure improvements and actively participating with local and federal partners in this regard. <i>Consider the following:</i> - Do infrastructure policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards? - Does the future land use map clearly identify natural hazard areas? - Do the land use policies discourage development or redevelopment with natural hazard areas? - Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?					
Capital Improvement Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Disaster Debris Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	Yes	No	Chapter 38 – Flood Damage Prevention, Adopted date 10/15/2013 last revised 9/07/2021	Local	Floodplain Administrator
<i>How does this reduce risk?</i> There is not a separate City Plan for Floodplain Management, but Chapter 38 of the City Code and applicable sections and appendixes of the International Building Code deal with floodplain management and apply to all construction done in Clear Lake Shores. The base flood					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
elevation (BFE) of the entire city is 11 feet and no new construction is allowed below this flood elevation that does not meet all applicable codes. All construction below BFE must be flood resistant and be used for parking, access to building, and light storage only.					
Stormwater Management Plan	Yes	No	-	-	-
<i>How does this reduce risk?</i> Stormwater is addressed by Ordinance. The City has a MS4 Plan that details Best Management Practices or BMPs for ensuring storm water quality and reducing pollution to receiving waters of Clear Lake and Galveston Bay.					
Open Space Plan	Yes	No	-	-	-
<i>How does this reduce risk?</i> This is part of the building ordinances and requires that each buildable residential lot maintain at least 40% greenspace to allow for proper water absorption.					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	Yes	No	Town Center Master Plan, 03/17/2009	Local	EDC Committee - City Administrator
<i>How does this reduce risk?</i> The Plan's vision is to encourage refinements in commercial areas to allow mixed-use, waterfront access and revitalization are a critically important way of maintaining and reinforcing a city's identity in an increasingly homogenous world. Clear Lake is host to the nation's third largest fleet of pleasure craft with slips for 10,000 boats. CLS is a critical part of this water oriented "neighborhood". The new Town Center should be a place that will protect and preserve CLS residents' way of life and unique "island living" lifestyle The Town Center Master Plan should respect the environment and call for responsible development in the commercial areas. Maintaining the existing park, bird habitat and wetland locations.					
Shoreline Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Agriculture Plan	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	Yes	No	Chapter 82 – Town Center Overlay. Adopted date: 2/16/2010	Local	Committee
<i>How does this reduce risk?</i> The town center overlay district is intended to provide a mixture of complimentary and cohesive land uses that include housing, retail, offices, commercial services, and civic uses; to create economic and social vitality and to encourage the town center overlay district to become a destination point; develop commercial (single use) and mixed use areas that are safe, comfortable and attractive to pedestrians; provide flexibility in the siting and design of new developments and redevelopment to anticipate changes in the marketplace; reinforce streets as public places that encourage pedestrian and bicycle travel; and facilitate compact, high-density development and minimizing the amount of land that is needed for surface parking.					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Other	-	-	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	Chapter 30 – Emergency Management. Adopted date: 8/21/2012	Local	Emergency Director
<i>How does this reduce risk?</i> The Ordinance requires an Emergency Management Plan.					
Continuity of Operations Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	Yes	No	Chapter 30 – Emergency Management. Adopted date: 8/21/2012	Local	City Administrator
<i>How does this reduce risk?</i>					
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i> The City considers local health guidance through the Galveston County Health District and Centers for Disease Control.					
Other	Yes	No	Windstorm Protection Program	County and Local	Windstorm Field Inspector
<i>How does this reduce risk?</i> Clear Lake Shores is in a county designated to require windstorm protection. The State of Texas Windstorm Inspection Program is a voluntary program, although participation in the program is recommended. The structure only needs to comply with the requirements of the building specifications adopted by the Texas Department of Insurance (TDI) if the structure requires the windstorm portion of the homeowner's insurance policy to be provided by the Texas Windstorm Insurance Association (TWIA) . For construction in the Seaward Zone (Clear Lake Shores), a three-second gust basic wind speed of 130 mph must be used.					

Development and Permitting Capability

The table below summarizes the capabilities of the City of Clear Lake Shores to oversee and track development.

Table 9.3-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Building Department
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	-
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Yes	The City has about 25 buildable lots available.

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Clear Lake Shores and their current responsibilities which contribute to hazard mitigation.



Table 9.3-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	The Planning & Zoning commission acts as an advisory body to the City Council on matters concerning amendments to the city's comprehensive plan text and/or map. The commission also reviews all plat applications for the division/ consolidation of lots or tracts of land. Oversee changes in zoning.
Zoning Board of Adjustments	Yes	The Zoning Board of Adjustment shall adopt rules of procedure in accordance with the provisions of this article.
Planning Department	No	-
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	Clear Lake Shores EDC's purpose is to promote, assist and enhance the economic development activities and quality of life opportunities within the city that promotes economic development as authorized by the Development Corporation Act of Texas.
Public Works/Highway Department	Yes	The mission of the Clear Lake Shores Roads and Drainage Committee is to ensure the maintenance and repair the city's roadways, roadside drainage ditches, and roadside right of ways to provide a safe and reliable transportation network and a stormwater system that minimizes flooding and protects the environment.
Construction/Building/Code Enforcement Department	Yes	Building Official
Emergency Management/Public Safety Department	Yes	Mayor, City Administrator, Police Chief
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	CLS CONNECT is an emergency notification system that allows residents to receive important alerts via email or text messages regarding threatening emergencies in the area such as severe weather, evacuation notices, fires, floods, and other emergency incidents where rapid and accurate notification is essential.
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	City Administrator/ Floodplain Manager
Mutual aid agreements	Yes	Police and Fire Departments
Human Resources Manual	No	-
Other	Yes	The Pool and Parks Committee is responsible for ensuring that the city's pool serves the needs of its residents and is maintained and operated in an efficient, cost-effective manner. Also, the committee is to ensure that the city's park system serves the needs of its residents and are well-maintained and operated in an efficient, cost-effective manner.
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	Retained City Engineer/City Attorney
Engineers or professionals trained in building or infrastructure construction practices	Yes	Retained City Engineer
Planners or engineers with an understanding of natural hazards	Yes	Retained City Engineer
Staff with expertise or training in benefit/cost analysis	No	-
Professionals trained in conducting damage assessments	Yes	Building Official



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	Yes	Building Official
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	Yes	Mayor/ City Administrator
Grant writer(s)	No	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	Yes	City Engineer/ Stormwater Inspector

Fiscal Capability

The table below summarizes financial resources available to the City of Clear Lake Shores.

Table 9.3-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	No
Capital improvements project funding	No
Authority to levy taxes for specific purposes	No
User fees for water, sewer, gas or electric service	No
Impact fees for homebuyers or developers of new development/homes	No
Stormwater utility fee	No
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other federal or state funding programs	Yes, Texas Parks and Wildlife/TDEM
Open Space Acquisition funding programs	No
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	No

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Clear Lake Shores.

Table 9.3-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	CLS Connect, Facebook, Instagram, Twitter, City Website
Personnel skilled or trained in website development	Yes	Communications Specialist
Hazard mitigation information available on your website	Yes	Hurricane Preparedness
Social media for hazard mitigation education and outreach	Yes	Facebook, Instagram, Twitter



Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Citizen boards or commissions that address issues related to hazard mitigation	Yes	Roads and Drainage, Plaza Ten -06 Corporation
Other programs already in place that could be used to communicate hazard-related information	No	-
Warning systems for hazard events	Yes	CLS Connect
Natural disaster/safety programs in place for schools	No	-
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Clear Lake Shores.

Table 9.3-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	2	June, 2021
Storm Ready Certification	No	-	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable
NP Not participating
- Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.3-8. Adaptive Capacity

Hazard	Rating
Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate



Hazard	Rating
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.3.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.3-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	Yes, The City maintains a list of repetitive damaged properties within the City of Clear Lake Shores
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	No.
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No.
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	The City's representative makes on-site inspections of damaged properties and using the FEMA Substantial Damage Estimator 3.0.
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	Nine properties have been elevated, and three properties have been mitigated since 2016
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes.
NFIP Compliance	
What local department is responsible for floodplain management?	Building Department
Are any certified floodplain managers on staff in your jurisdiction?	Yes.
Do you have access to resources to determine possible future flooding conditions from climate change?	Yes.
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No.
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	Permit review, Inspections, Education, and outreach to the community, Maintain enforcement of the floodplain. Requiring high building practices.
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	Updated appraisal of property value, Cost and construction estimates of proposed improvement.
What are the barriers to running an effective NFIP program in the community, if any?	Citizen's motivation to maintain compliance below the floodplain.
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	Yes. Plumbing below the BFE. Remodeling non-habitable spaces into habitable spaces below the BFE.



NFIP Topic	Comments
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	2020.
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Chapter 38 – Flood Damage Prevention. Adopted October, 10 2013 Revised September 7, 2021.
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Exceeds the minimum requirements. Higher freeboard. Maintain high building practices.
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	Yes. Planning and Zoning board considers all aspects of flood risk.
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	No. The City of Clear Lake Shores is currently working to join the CRS.

Source:

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.3.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.3-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	26	26	18	18	8	8	15	15	13	13	11	11
Multi-Family	0	0	0	0	0	0	0	0	0	0	0	0
Other (commercial, mixed-use, etc.)	4	4	1	1	1	1	3	3	2	2	4	4
Total Permits Issued	30	30	19	19	9	9	18	18	15	15	15	15
Property or Development Name	Type of Development		# of Units / Structures		Location (address and/or block and lot)			Known Hazard Zone(s)*		Description / Status of Development		
Recent Major Development and Infrastructure from 2016 to Present												
None identified												
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years												
Unknown	Mixed Use		N/A		Between Hanson Rd and FM518, west of Dror Ln			N/A		Anticipated; no approval date		

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.3.6 Jurisdictional Risk Assessment



The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of Clear Lake Shores' risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which Clear Lake Shores has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.3-1. Clear Lake Shores Area Extent and Location Map (Flood)

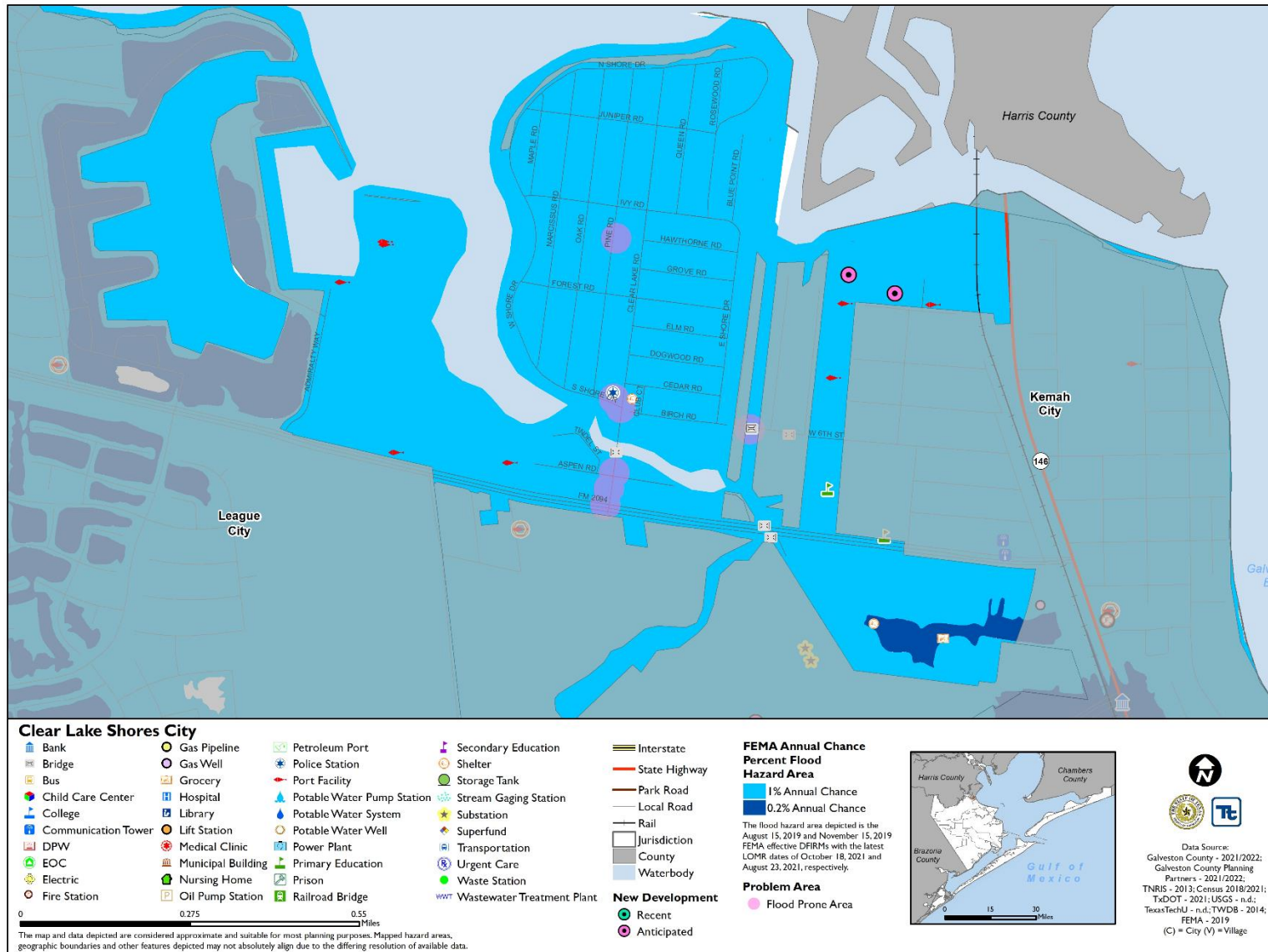




Figure 9.3-2. Clear Lake Shores Area Extent and Location Map (SLOSH, Tsunami)

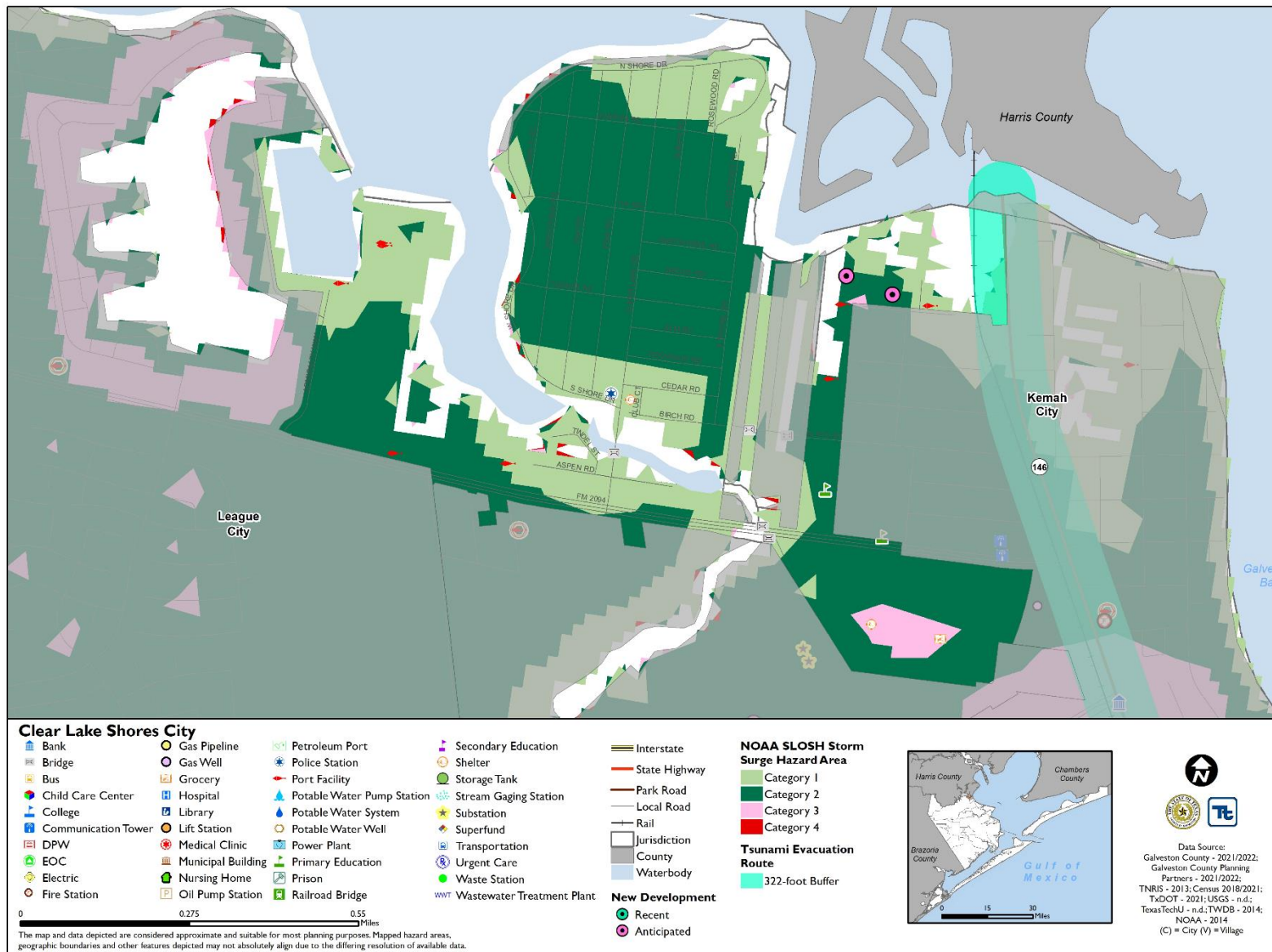




Figure 9.3-3. Clear Lake Shores Area Extent and Location Map (Sea Level Rise, WUI)

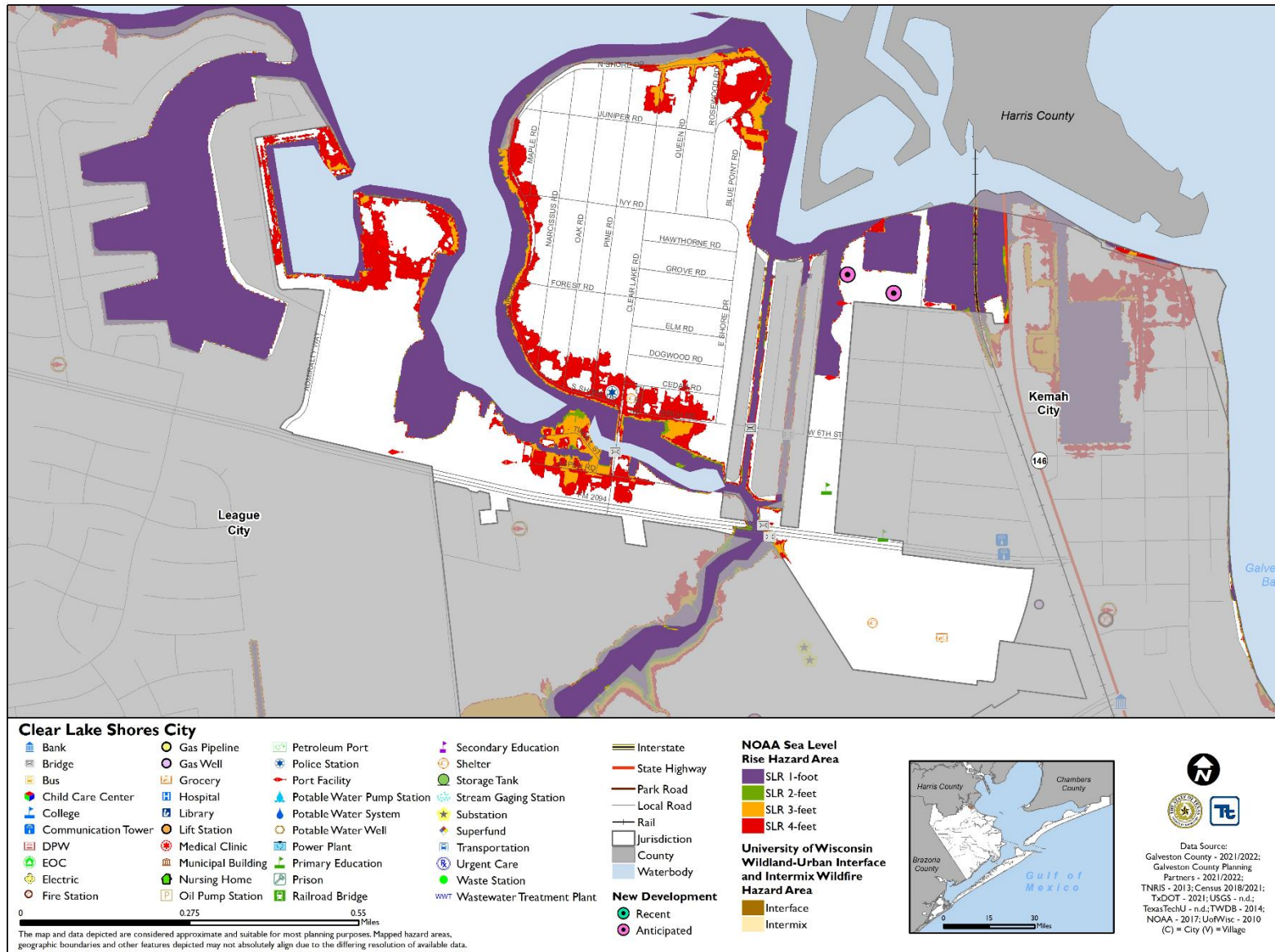
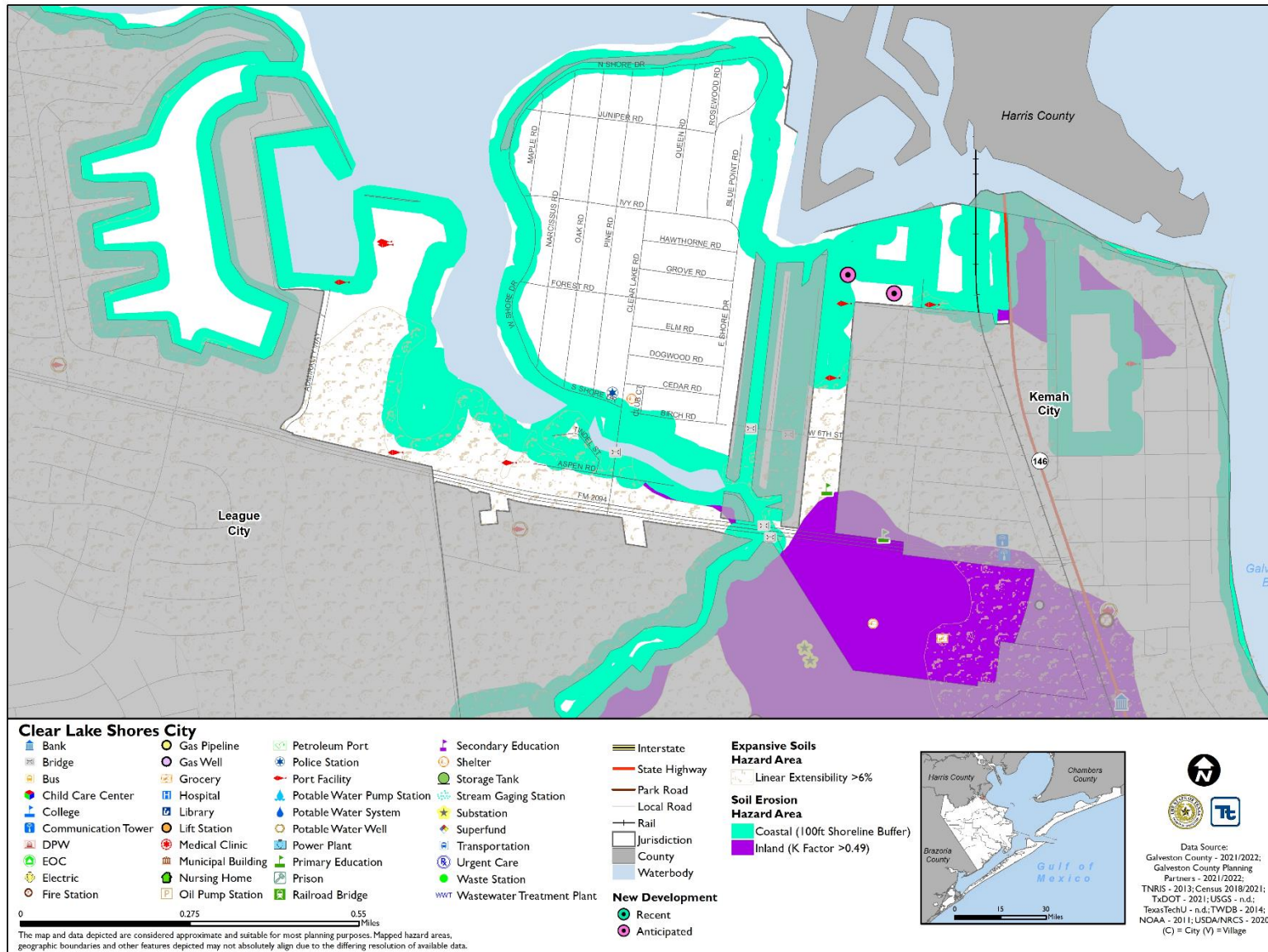




Figure 9.3-4. Clear Lake Shores Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of Clear Lake Shore's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages the City of Clear Lake Shores experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.3-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	No damages identified by the municipality
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	No damages identified by the municipality
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson and Santa Fe. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the	No damages identified by the municipality



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	No damages identified by the municipality
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	No damages identified by the municipality
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	No damages identified by the municipality
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	No damages identified by the municipality

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Clear Lake Shores' risk assessment results and data used to determine the hazard ranking.



Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for Clear Lake Shores. The City of Clear Lake Shores reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of Clear Lake Shores agreed with the calculated rankings.

Table 9.3-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
Low	Low	Low	Low	Medium	High	Low	High	Low

Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire
Low	Low	Low	Medium	Medium	Low	Medium	Low

Note: The scale is based on the hazard rankings established in Section 4.4 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

9.3.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the 'Capability Assessment' presented previously in this annex.



Table 9.3-14. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status?(e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
CLS-2006-2	Implement stormwater management practices	City of Clear Lake Shores	In Progress	Yes (as 2022-Clear Lake Shores-001)	Poorly maintained stormwater system	City Administrator Floodplain Administrator
CLS 2011-2	Implement drought plan	WCID 12	In Progress	Yes (as 2022-Clear Lake Shores-002)	-	-
CLS 2016-1	Develop and provide public awareness campaigns for natural hazards	Emergency Management and applicable departments/agencies	In Progress	Yes (as 2022-Clear Lake Shores-003)	No programs were available for educating the public	City Administrator Floodplain Administrator
CLS 2016-2	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties	City Administration and applicable state and county agencies	In Progress	Yes (as 2022-Clear Lake Shores-004)	No Proactive programs to mitigate repetitive loss properties	City Administrator Floodplain Administrator
CLS 2016-3	Widen drainage systems and culverts	City Administration and applicable department and water district staff	In Progress	Yes (as 2022-Clear Lake Shores-005)	Poorly maintained drainage system and culvert	City Administrator Floodplain Administrator
CLS 2016-4	Improve regulations and permit requirements to promote hazard mitigation strategies	City Administration and applicable departments	In Progress	Yes (2022-Clear Lake Shores-006)	Outdated regulations and ordinances	City Administrator Building Official
CLS 2016-5	Implement the Corp of Engineers study of the Galveston County Water Reservoir Dam and Levee system	City Administration and applicable departments	In Progress	Yes (as 2022-Clear Lake Shores-007)	-	City Administrator



Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.3-14, the City of Clear Lake Shores did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of Clear Lake Shores participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.3-15. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X			X	X		X			X
Dam & Levee Failure	X	X		X	X		X		X	X
Drought	X		X	X	X		X	X		X
Expansive Soils	X			X	X		X			X
Extreme Temperatures	X	X		X	X		X		X	X
Flood	X	X		X	X		X		X	X
Hail	X	X		X	X		X		X	X
Hurricane & Tropical Storm	X	X		X	X		X		X	X
Land Subsidence	X			X	X		X			X
Lightning	X	X		X	X		X		X	X
Pandemic	X			X	X		X			X
Severe Winter Storm	X	X		X	X		X		X	X
Thunderstorm Wind	X	X		X	X		X		X	X
Tornadoes	X	X		X	X		X		X	X
Tsunami	X	X		X	X		X		X	X
Utility Failure	X	X		X	X		X		X	X
Wildfire	X	X	X	X	X		X	X	X	X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.3-16) summarizes the comprehensive range of specific mitigation initiatives the City of Clear Lake Shores would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.3-17 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.3-16. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Clear Lake Shores-001	Stormwater Management	Problem: Poorly maintained stormwater system. Solution: Continue to implement stormwater management practices.	Both	Flood, Hurricane & Tropical Storm	1, 2	Ongoing	City Administrator \ Floodplain Administrator	City Budget; FEMA BRIC or HMGP	Protection of structures and critical infrastructure.	Low	High	SIP	SP
2022-Clear Lake Shores-002	Drought Plan	Problem: Drought is not properly addressed as a local hazard. Solution: Develop and implement drought plan to plan and prepare for drought conditions in the City.	Both	Drought	3	Ongoing	City Administrator	FEMA BRIC, City Budget	Conserve enough water to sustain drought periods	Low	Medium	NSP	NR
2022-Clear Lake Shores-003	Natural Hazards Public Awareness, Mitigation Strategy and Alert Campaign	Problem: No programs are available for educating the public. Solution: Develop and implement public awareness campaigns for natural hazards, including information on how residents can mitigate hazards at their properties. Push out warnings and alerts from the National Weather Service. Use social media, the city website and CLS Connect for mitigation outreach and alerts.	Both	All Hazards	3	Ongoing	City Administrator \ Floodplain Administrator	FEMA BRIC, City Budget	Prevention of loss of life and protection of critical infrastructure.	Low	High	EAP	PI, ES
2022-Clear Lake Shores-004	Mitigation RFC/SRL properties	Problem: No proactive programs to mitigate repetitive loss properties. Solution: Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties.	Existing	Flood, Hurricane & Tropical Storm	1, 2	1 to 5 years	City Administrator \ Floodplain Administrator	FEMA Grant Funding (FMA, HMGP, BRIC); City Budget	Protection of structures and critical infrastructure.	High	High	SIP	PP



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Clear Lake Shores-005	Drainage Improvements	Problem: Poorly maintained drainage system and culverts. Solution: Widen drainage systems and culverts.	Both	Flood, Hurricane & Tropical Storm	1, 2	Ongoing	City Administrator \ Floodplain Administrator	FEMA Grant Funding (FMA, HMGP, BRIC); City Budget	Protection of structures and critical infrastructure.	Low	High	SIP	SP
2022-Clear Lake Shores-006	Ordinance and Regulation Updates	Problem: Outdated regulations and ordinances. Solution: Improve plans, regulations and permit requirements to promote hazard mitigation strategies.	Both	All Hazards	1, 2	Ongoing	City Administrator \ Building Official	FEMA BRIC; City Budget	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR
2022-Clear Lake Shores-007	Dam and Levee Study Implementation	Problem: There is a lack of data on dams and levees. Solution: Implement the Corp of Engineers study of the Galveston County Water Reservoir Dam and Levee system.	Both	Dam & Levee Failure	1, 2, 4	Ongoing	City Administrator	City Budget; USACE Floodplain Management Services; FEMA National Dam Safety Program	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR
2022-Clear Lake Shores-008	Bridge Construction/ Inaccessibility	Problem: Clear Lake Road (CLR) Bridge becomes impassible during some larger rain events, flooding from high tide or surge. The island portion of the city that is primary residential is home to 98%+ of the city's population. Access from one of three bridges to this area, located on Clear Lake Road, and along Birch Rd/6Th Street, can become impassible. During weather events high tide coupled with prevailing winds and rainfall can cause isolation and damages throughout the city. Affecting structures,	Both	Flood, Hurricane & Tropical Storm, Thunderstorm Wind	1, 2	1 Year	City Administrator, Galveston County, State of TX	FEMA Grant Funding (FMA, HMGP, BRIC), State Bridge Program	Prevention of loss of life and protection of critical infrastructure and utilities. Ability to access mainland and island portions of the city, clear, rebuild, and reinhabit.	\$750,000	High	SIP	SP



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		vegetation, loss of life and property, debris washing up and/or causing damage, hazardous spills of fuel and chemicals from storage. Ability to access the city is impaired, stormwater cannot drain to the lake/bayou and further out to Galveston Bay. The CLR bridge is continually being downgraded due to deterioration from below, this results in reduced carrying capacity and axle limits that can affect new construction, recovery and rebuilding. Solution: Construct a new bridge to replace the CLR Bridge or retrofit existing bridge to withstand storm events.											
2022-Clear Lake Shores-009	Multi-jurisdictional Flood Warning and Communication	Problem: The city has no input on the maintenance and operation of any man-made facilities addressing this issue. Storm Surge as part of a larger storm is an anticipated/related event. During upstream weather events, other storm water conveyances in other jurisdictional areas bring water to the city. The receiving waters of Clear Creek, Jarboe Bayou and Galveston Bay all influence volume and velocity of storm water as it affects the island portion of the city. This island is home to 98%+ of	Both	Dam & Levee Failure, Flood, Hurricane & Tropical Storm	3	15-20 Years	City Administrator, Watershed Coalition, Upstream Control Units, State of TX, GLO, USACE	FEMA Grant Funding (FMA, HMGP, BRIC); City Budget	Prevention of loss of life and protection of critical infrastructure and utilities.	\$20,000 per year	High	EAP	PI, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		the city's population. Access from one of three bridges to this area, located on Clear Lake Road, and along Birch Rd/6Th Street, can become impassible. During weather events high tide coupled with prevailing winds and rainfall can cause isolation and damages throughout the city. Affecting structures, vegetation, loss of life and property, debris washing up and/or causing damage, hazardous spills of fuel and chemicals from storage. Ability to access the city is impaired, stormwater cannot drain to the lake/bayou and further out to Galveston Bay. Observing how current weather events are affecting surrounding areas can provide some warning as to severity and timing. Solution: Improve communication with upstream jurisdictions during storm events. This will allow for continuity of operations and better preparation before storms hit the city.											
2022-Clear Lake Shores-010	Rain Barrel Program	Problem: Lack of water collection systems to use for landscape irrigation during periods of drought. Solution: Implement rain barrel collection system at city buildings, following the example of the system in use	Both	Drought, Wildfire	1, 2	Ongoing	City Administrator	FEMA Grant Funding (FMA, HMGP, BRIC)	Reduce water usage for landscaping during dry periods. Green buffers provide fire breaks and protect critical facilities.	\$3,000 per year	High	NSP	NR



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		at the community center/clubhouse.											
2022-Clear Lake Shores-011	Backup Generators	Problem: Loss of utilities can stop the public information and education process flat. Loss of water/sewer can be a public health risk. Ensuring utilities are working and available can help in mitigating a situation and provide a much needed 'head start' in the recovery process. Solution: Collaborate with Electric and Gas utility to identify public areas that are critical customers. Working to redundancy in case the primary utility is cut off, such as electric out but need gas to run a generator. Collaborate with local water/sewer utility WCID#12 to provide storage for portable generators to pump down lift stations within the city. Have the utility provide the strategy for such pumping operations by identifying lift station location, duration of pump activity and in what order to accomplish objectives. City will provide needed security to utility locations as to prevent unauthorized use or access.	Both	Dam & Levee Failure, Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure, Wildfire	1, 2	3-6 months	City Administrator/ EMC	Utility funded	Protection of critical infrastructure and utilities	\$15,000 (electric plug upgrade to stations for generator)	High	SIP	SP, ES



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Clear Lake Shores-012	Heating and Cooling Centers	Problem: Vulnerable residents of Clear Lake Shores are particularly susceptible to extreme temperature events, especially the elderly. Solution: Collaborate with the Stewart Elementary School on using gyms and classroom spaces and other school area for heating and cooling centers to provide more locations for heating and cooling centers across the community.	Both	Extreme Temperatures	1, 3	1-2 months	City Administrator/ EMC	Staff Time	Prevention of loss of life.	Low	High	EAP	PI, ES
2022-Clear Lake Shores-013	Water Pipe Freeze Protection Outreach Program	Problem: Water system bursts, leakages, and outages because the water service lines are not properly insulated. Due to the typically temperate climate, many business owners and homeowners have not properly protected their water systems. Solution: Provide public education and awareness in the form of social media posts before and during extreme cold events so that the public is aware on how to avoid frozen water systems. Enclosure and insulation of exposed piping prone to exposure of elements.	Both	Extreme Temperatures	1, 3	Ongoing	City Administrator	FEMA Grant Funding (HMGP, BRIC)	Protection of structures and critical infrastructure.	Low	High	EAP	PI

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

Potential FEMA HMA Funding Sources:

Timeline:





CAV Community Assistance Visit
 CRS Community Rating System
 DPW Department of Public Works
 EHP Environmental Planning and Historic Preservation
 FEMA Federal Emergency Management Agency
 FPA Floodplain Administrator
 HMA Hazard Mitigation Assistance
 N/A Not applicable
 NFIP National Flood Insurance Program
 OEM Office of Emergency Management

FMA Flood Mitigation Assistance Grant Program
 HMGP Hazard Mitigation Grant Program
 BRIC Building Resilient Infrastructure and Communities Program

The time required for completion of the project upon implementation

Cost:
 The estimated cost for implementation.

Benefits:
 A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP) - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.3-17. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Clear Lake Shores-001	Stormwater Management	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Clear Lake Shores-002	Drought Plan	0	0	1	1	1	1	-1	1	1	1	-1	1	1	1	8	Medium
2022-Clear Lake Shores-003	Natural Hazards Public Awareness, Mitigation	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
	Strategy and Alert Campaign																
2022-Clear Lake Shores-004	Mitigation RFC/SRL properties	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Clear Lake Shores-005	Drainage Improvements	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Clear Lake Shores-006	Ordinance and Regulation Updates	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Clear Lake Shores-007	Dam and Levee Study Implementation	1	1	1	1	1	1	-1	1	1	1	-1	1	1	1	10	High
2022-Clear Lake Shores-008	Bridge Construction/ Inaccessibility	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Clear Lake Shores-009	Multi-jurisdictional Flood Warning and Communication	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Clear Lake Shores-010	Rain Barrel Program	0	0	1	1	1	1	-1	1	1	1	1	1	1	1	10	High
2022-Clear Lake Shores-011	Backup Generators	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Clear Lake Shores-012	Heating and Cooling Centers	1	0	1	1	1	1	1	1	1	1	-1	1	1	1	11	High
2022-Clear Lake Shores-013	Water Pipe Freeze Protection Outreach Program	0	1	1	1	1	1	-1	1	1	1	-1	1	1	1	9	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions. Low (0-4), Medium (5-8), High (9-14).



9.4 CITY OF DICKINSON

This section presents the jurisdictional annex for the City of Dickinson and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City of Dickinson participated in the planning process, an assessment of the City of Dickinson's risk and vulnerability, the different capabilities used in the City of Dickinson, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.4.1 Hazard Mitigation Planning Team

The City of Dickinson followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many City of Dickinson departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.4-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Greg Trantham	Co-Emergency Mgt Coordinator	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Derek Hunt	Co-Emergency Mgt Coordinator	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Selmer Ray Burgess, CBO, CFM	Building Official	Provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.4.2 Jurisdictional Profile

Dickinson is located on the beautiful Dickinson Bayou in Galveston County, midway between the Cities of Houston and Galveston along Interstate 45. Dickinson is located between League City, Texas City, Alvin, and Bacliff. Dickinson Bayou, a large navigable body of water, is lined by the largest stand of trees south of Houston, and as such, is readily discernible from the air. The Dickinson Bayou was once a dredged, industrial waterway, but now is a 20-foot deep recreational attraction for fishing, boating, swimming, and water-skiing.

The City of Dickinson is a Home Rule municipality with a council-manager form of government. The City Council consists of a Mayor and six Council Members, with one member designated as Mayor Pro Tem. The Mayor votes in the case of a tie. All members of the Council are elected at-large and serve three-year staggered terms. The Mayor and Council is the City's governing body tasked with enacting local legislation through ordinances and resolutions providing vision, policy, fiscal oversight and public safety.

According to the U.S. Census, the 2010 population for the City was 18,680. The estimated 2019 population was 20,847, a 11.6-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community



Survey indicate that 5.1-percent of the population is 5 years of age or younger and 13.4-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.4.3 Jurisdictional Capability Assessment and Integration

The City of Dickinson performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of Dickinson identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of Dickinson, what is present in the jurisdiction, and code citation and date.

Table 9.4-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 5, Article II Building Codes 02-23-2010	State and Local	Building Standards Commission
<i>How does this reduce risk?</i> The City has adopted the International Building Codes to further protect its residents by enforcing regulations including but not limited to substandard structures, snow loads, seismic design, frostline depth, weathering and flood hazards.					
Zoning/Land Use Code	Yes	No	Chapter 18 Zoning 07-24-2001	Local	Planning and Zoning Commission
<i>How does this reduce risk?</i> This chapter is adopted for the purpose of protecting the health, safety, and general welfare of the residents, citizens, and inhabitants of the City of Dickinson, Texas. These regulations are designed to: (1) Lessen congestion in the streets; (2) Secure safety from fire, panic, and other dangers; (3) Promote health and general welfare;					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
(4) Provide adequate light and air; (5) Prevent the overcrowding of land; (6) Avoid undue concentration of population; and, (7) Facilitate the adequate provision of transportation, water, sewers, schools, parks and other public requirements for the benefit of the citizens of Dickinson. Development of some areas within the City requires a site inventory analysis including a scale drawing showing existing vegetation, natural watercourses, creeks or bodies of water, and an analysis of planned changes in such natural features as a result of the development. This should include a delineation of any flood-prone areas.					
Subdivision Ordinance	Yes	No	Chapter 14, Planning and Development, Article V, Section 14-143 Standards for Subdivision proposals 8-13-19	Local	City Council
<i>How does this reduce risk?</i> This Chapter relates only to controls on subdivisions in a Flood Hazard Area and is not a Subdivision Ordinance. Chapter 18 Appendix A-Subdivisions provides development standards for the subdivision of land within the City of Dickinson.					
Site Plan Ordinance	Yes	No	Chapter 18, Article III, Section 18-40 Development Procedures 07-24-2001	Local and County	Planning and Zoning Commission
<i>How does this reduce risk?</i> No multiple family residential property zoned "HR", commercial property zoned "NC" or "GC", or industrial property zoned "GI" may be developed or redeveloped without a site development plan first having been submitted to and approved by the commission. The Site Plan requirements include the depiction of any land areas within the one hundred (100) year flood plain.					
Stormwater Management Ordinance	Yes	Yes	Chapter 12, Article X Storm Water Drainage Systems Regulations 8-11-2009	Local	City Manager
<i>How does this reduce risk?</i> Division 4. Post Construction Stormwater Runoff. The purpose of this division is to establish minimum storm water management requirements and controls to protect and safeguard the general health, safety, and welfare of the public residing in watersheds within the city. This division seeks to meet that purpose through the following objectives: (1) Minimize increases in storm water runoff from any development in order to reduce flooding, silting, increases in stream temperature, and stream bank erosion and maintain the integrity of stream channels; (2) Minimize increases in non-point source pollution caused by storm water runoff from development that would otherwise degrade local water quality; (3) Minimize the total annual volume of surface water runoff that flows from any specific site during and following development not to exceed the pre-development hydrologic regime to the maximum extent practicable; and (4) Reduce storm water runoff rates and volumes, soil erosion and non-point source pollution, wherever possible, through storm water management controls and to ensure that these management controls are properly maintained and pose no threat to public safety.					
Post-Disaster Recovery/ Reconstruction Ordinance	Yes	No	Chapter 6 Emergency Management 08-13-02	Local	Emergency Management Director
<i>How does this reduce risk?</i> There exists the Office of Emergency Management Director of the City of Dickinson which shall be held by the mayor. The director shall be responsible for a program of comprehensive emergency management within the city and for carrying out the duties and responsibilities set forth in this chapter. The Director shall carry out the provisions of the Emergency Management Plan. The emergency management plan shall be considered supplementary to this chapter and have the effect of law during the time of a disaster.					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single family dwelling by answering Yes or No to being aware of any of the following conditions: • Present flood insurance coverage • Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir • Previous water penetration into a structure on the property due to a natural flood event • Located wholly or partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) • Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) • Located wholly or partly in a floodway • Located wholly or partly in a flood pool • Located wholly or partly in a reservoir					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Growth Management	No	No	-	-	-
<i>How does this reduce risk?</i>					
Environmental Protection Ordinance	Yes	Yes	Chapter 8, Article IV, Division 2, Section 8-111 Environmental Protection 8-10-82	State	TWC, FEPA, TACB
<i>How does this reduce risk?</i> This Ordinance is specific to environmental protection related to drilling for oil or gas. It shall be unlawful for any person, acting either for himself or acting as agent, employee, independent contractor or servant of any other person to commence to drill, to drill, or to operate any well within the city limits, or to work upon or assist in any way in the prosecution or operation of any such well, without a permit for the drilling and operation of such well having first been issued by authority of the city council or its representative in accordance with the terms of this division.					
Flood Damage Prevention Ordinance	Yes	Yes	Chapter 14, Article V Flood Damage Prevention and Protection 11/8/11	Federal, State, County, and Local	State of Texas
<i>How does this reduce risk?</i> It is the purpose of this Chapter to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas. This Chapter also requires new construction and substantial improvements of any residential structure shall have the lowest floor (including basement), elevated to 18 inches above the base flood elevation. New construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to 18 inches above the base flood level or together with attendant utility and sanitary facilities, be designed so that below the base flood level plus 18 inches the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Chapter 6 Emergency Management 08-13-02	Local	Emergency Management Director
<i>How does this reduce risk?</i> There exists the Office of Emergency Management Director of the City of Dickinson which shall be held by the mayor. The director shall be responsible for a program of comprehensive emergency management within the city and for carrying out the duties and responsibilities set forth in this chapter. The Director shall carry out the provisions of the Emergency Management Plan. The emergency management plan shall be considered supplementary to this chapter and have the effect of law during the time of a disaster.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-
Planning Documents					
Comprehensive Plan	Yes	No	Part 1 Charter, Article IX, 9.01 Comprehensive Community Plan 5-5-21, Dickinson Comprehensive Plan 2015 – 2030, 9/17/2016	Local	City Council
<i>How does this reduce risk?</i> The comprehensive plan is the official document that guides decisions for future growth and development in Dickinson. The Texas Local Government Code established the legal basis for the comprehensive plan and it is used as the basis of subsequent zoning amendments. The comprehensive plan consists of interrelated chapters, or elements, analyzing the City of Dickinson's future land use, transportation, housing, and other infrastructure issues, needs, challenges, and opportunities. The comprehensive plan is important because it sets the overall policy context for future growth and development for Dickinson. The comprehensive plan addresses growth pressures in the city, future public facility's needs, preservation of community character and natural resources, economic growth and quality of life initiatives. One of the challenging driving forces of the plan is flood risk due to existing floodplains.					
Capital Improvement Plan	Yes	No	Part 1 Charter, Article VIII, 7-10 Capital Program 5-5-01 – CIP 11/23/2021	Local	City Council
<i>How does this reduce risk?</i> The Capital Improvement Program (CIP) is a fiscal plan or a schedule for financing public improvements over a period of time for major capital expenditures. This schedule balances the community's need for public improvements with its ability to finance these improvements. The schedule spreads these improvements over a number of years in order to stabilize expenditures and to avoid any sharp fluctuations in the city's					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
property tax rate. The Capital Project Fund accounts for financial resources used for the acquisition or construction of major capital facilities and projects such as buildings, streets, drainage improvements, and parks over a considerable amount of time.					
Disaster Debris Management Plan	Yes	No	Dickinson Hazard Mitigation Plan 11-2017	Local	OEM
<i>How does this reduce risk?</i> The Plan addresses debris management related to previous hazard events related to wind and flooding					
Floodplain Management or Watershed Plan	Yes	Yes	Chapter 14, Article V Flood Damage Prevention and Protection	Federal, State, County, and Local	State of Texas
<i>How does this reduce risk?</i> While not a Plan, the City's Ordinance regulates activities and floodways and floodplains.					
Stormwater Management Plan	Yes	Yes	Stormwater Management Plan 2014 -2019	Local	City Manager/Public Works
<i>How does this reduce risk?</i> The City of Dickinson, as an operator of a small MS4, is required to reduce the discharge of pollutants to water of the State and the United States to the "maximum extent practicable" to protect water quality. The primary purpose of the SWMP is intended to help the City fulfill certain State and Federal water quality requirements and to meet local water resources management objectives. Through the implementation of policies and management practices, Dickinson hopes to reduce the discharge of pollutants to surface waters of the United States..					
Open Space Plan	Yes	No	Chapter 18, Article IV, Section 18-48.1 Designation open space "DOS" district 8-9-05	Local	Planning and Zoning Commission
<i>How does this reduce risk?</i> The zoning of property as "DOS," designated open space, is intended to provide open space for outdoor recreational activities. The purpose of the "DOS" district is to create an aesthetically pleasing environment that may improve the quality of life for the citizens, enhance property values, provide adequate light and air space, prevent overcrowding of land, provide visual buffering between roadways and structures, and promote the beautification of the city.					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Shoreline Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	Yes	No	Chapter 12, Article IV Transportation of Dangerous Substances 8-22-95	State	Fire Marshal's Office
<i>How does this reduce risk?</i> Notwithstanding any provision herein to the contrary, delivery or transport of any substance identified in this Chapter to any retail, storage, processing, or manufacturing facility located within five hundred (500) feet of any railroad corridor or right-of-way south of FM 517 shall limit the approach to, and departure from, said facilities along the following route: Interstate 45 to FM 646 east of Interstate 45 to Farm to Market Road 1266 (FM 1266) to FM 517. Parking restrictions are also applied to regulated transporters. Consider the following: • Does the transportation plan limit access to hazard areas? • Is transportation policy used to guide growth to safe locations? • Are transportation systems designed to function under disaster conditions (e.g. evacuation)?					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Agriculture Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	City of Dickinson Basic Plan – 2020	Local	OEM
<i>How does this reduce risk?</i>					
Continuity of Operations Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of Dickinson to oversee and track development.

Table 9.4-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Community Development
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	-
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Yes	-



Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Dickinson and their current responsibilities which contribute to hazard mitigation.

Table 9.4-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	Ray Burgess - The Planning & Zoning Commission was formed by the City Council through the adoption of the City of Dickinson's Zoning Ordinance. The following items are the responsibilities of the Planning & Zoning Commission: - Hear testimony on behalf of applicants and consider the facts, findings, and recommendation of the zoning official; - Consider the interests of the public related to the public health, safety, morals and general welfare; - Identify the appropriateness of requested map and text amendments considering conformance with the adopted zoning regulations, official zoning district map, and land use policies; - Make recommendations to the city council, in the form of a final report, related to approval or denial of an application; - Perform other such duties and be vested with such powers as the city council shall from time to time prescribe
Zoning Board of Adjustments	Yes	Ray Burgess
Planning Department	Yes	Ray Burgess - The Community Development Department helps guide the development process from start to finish, with the goal of protecting the health and safety of each resident within the City of Dickinson. Ensuring that Dickinson's unique character is protected while introducing quality new land development is the Community Development departments utmost priority. The department assists policy makers, property owners, developers, and citizens in regard to growth and new development, and preserving and improving existing developments.
Mitigation Planning Committee	Yes	Greg Trantham – Derek Hunt - The City of Dickinson has created the Hazard Mitigation Task Force in 2017 for the purpose of gathering information and developing recommendations on possible mitigation actions to help with the reduction of loss of people and property in the wake of a hazard.
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	Robert Donley - The creation of Dickinson Economic Development Corporation was authorized by City Council on June 9, 1998 through Ordinance 347-98, with articles of incorporation approved the same day through Resolution 387-98. The Corporation is funded through the adoption of a sales and use tax pursuant to the provisions of Section 4B of the Development Corporation Act of 1979. The sales tax authorized by Section 4B, provides cities with a wide range of uses. It is intended to give communities an opportunity to undertake projects that improve the quality of life for the community. Section 4B tax can be used to fund projects that are considered community development initiatives such as purchase of land, buildings, equipment and expenditures to improve facilities, parks and entertainment venues.
Public Works/Highway Department	Yes	Lonnie Foley =- The mission of the Department of Public Works is to promote the economic vitality of the city through the efficient operation, maintenance, design, and construction of a safe, economical, and effective city roadway and drainage system.



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Construction/Building/Code Enforcement Department	Yes	Ray Burgess - The Building Permits & Inspections Division is established for the purpose of providing minimum standards to safeguard life, health, safety, property, and the public welfare by regulating and controlling the design, construction, quality of materials, location, and maintenance of all buildings and structures constructed within the City of Dickinson.
Emergency Management/Public Safety Department	Yes	Derek Hunt - The City of Dickinson Office of Emergency Management serves the Dickinson Community by coordinating disaster mitigation, preparedness, response, recovery and prevention activities, and is responsible for planning and coordinating the city's response to and recovery from any natural and man-made disasters. The Office of Emergency Management accomplishes this through the five phases of emergency management: Mitigation, Preparedness, Response, Recovery and Prevention. During times when the Emergency Operations Center (EOC) is activated, staff from City of Dickinson departments fill the various required positions.
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	Derek Hunt - The City of Dickinson and Dickinson Office of Emergency Management announced a major update and overhaul to the emergency notifications system. This system was formerly known as Connect-CTY provided by Blackboard, and has now been renamed DickinsonALERT, and is now provided by Inspiron Logistics. This system allows the Dickinson Office of Emergency Management to continue to provide city-to-residents and city-to-businesses emergency notifications for any incidents or events impacting the City of Dickinson. With this service, Dickinson Office of Emergency Management has the option to send personalized voice, text and email messages to registered residents and businesses within minutes, with specific information about time-sensitive issues related to emergency incidents and events impacting the City of Dickinson. Along with this, DickinsonALERT now allows registered users to sign-up for NOAA Weather Alerts
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	Austin Williams
Mutual aid agreements	Yes	OEM
Human Resources Manual	No	-
Other	-	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	Ray Burgess
Engineers or professionals trained in building or infrastructure construction practices	Yes	Ray Burgess Joe Myers
Planners or engineers with an understanding of natural hazards	Yes	Ray Burgess
Staff with expertise or training in benefit/cost analysis	Yes	Ray Burgess Jeff Pahlman
Professionals trained in conducting damage assessments	Yes	Ray Burgess
Personnel skilled or trained in GIS and/or Hazards United	No	-



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
States (HAZUS) – Multi-Hazards (MH) applications		
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	Yes	Derek Hunt – Greg Trantham
Grant writer(s)	No	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	Yes	Joe Myers

Fiscal Capability

The table below summarizes financial resources available to the City of Dickinson.

Table 9.4-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	Yes. Street/Drainage Projects, Gum Bayou Widening, home buyout/acquisition, and Mitigation Drainage.
Capital improvements project funding	Yes. Current and Future fiscal year funding.
Authority to levy taxes for specific purposes	Yes. Sales Tax for Street Maintenance Fund.
User fees for water, sewer, gas or electric service	No. City does not provide utility services.
Impact fees for homebuyers or developers of new development/homes	No. Could be possible in the future.
Stormwater utility fee	No. City does not provide utility services.
Incur debt through general obligation bonds	No. Not currently but could possibly be used in future.
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other federal or state funding programs	No
Open Space Acquisition funding programs	Yes. Per CDGB home buyout/acquisition.
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	No

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Dickinson.

Table 9.4-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	Blackboard connect, social media, auto phone dialer, group emails, stake holder groups
Personnel skilled or trained in website development	Yes	Public Information Officer
Hazard mitigation information available on your website	Yes	Information Released at time of need
Social media for hazard mitigation education and outreach	Yes	Information Released at time of need



Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Citizen boards or commissions that address issues related to hazard mitigation	Yes	The City of Dickinson has created the Hazard Mitigation Task Force in 2017 for the purpose of gathering information and developing recommendations on possible mitigation actions to help with the reduction of loss of people and property in the wake of a hazard.
Other programs already in place that could be used to communicate hazard-related information	No	-
Warning systems for hazard events	No	Blackboard connect, social media, auto phone dialer, group emails, stake holder groups
Natural disaster/safety programs in place for schools	No	-
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Dickinson .

Table 9.4-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	3	-
Storm Ready Certification	No	-	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable
NP Not participating
- Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.4-8. Adaptive Capacity

Hazard	Preliminary Ranking
Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate



Hazard	Preliminary Ranking
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.4.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.4-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	A significant portion of the City of Dickinson (City) is prone to flooding. Dickinson Bayou flows through the City and 5 tributaries. No formal list of flood damaged properties is maintained.
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	The City does not maintain a formal list of properties owners interested in flood mitigation. There was an attempt to develop a list at one time but the effort was not maintained due to staffing issues. There has been interest though in the past in elevating or acquisition.
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	The City does not make independent substantial damage determinations. The substantial damage (SD) determination is made at the time of permitting and is based on the contractor's estimate and the appraised value from the Galveston County Appraisal District (GCAD). No record of previous SDs.
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	There were approximately 8 – 10 structures mitigated after Hurricane Ike using FEMA funds. The City is currently using GLO grant funds to demolish and rebuild homes in the City.
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes
NFIP Compliance	
What local department is responsible for floodplain management?	Building Department
Are any certified floodplain managers on staff in your jurisdiction?	There is one (1) CFM on staff. The City utilizes staff augmentation to have access to two (2) more.
Do you have access to resources to determine possible future flooding conditions from climate change?	Yes
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	The Building Department permits all construction in the City. They perform or cause to perform the permit reviews, issuing of permits and inspections. If



NFIP Topic	Comments
	engineering assistance is required they contract with a private consulting firm for those services.
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	The SD is determined at the time of permitting. The contractor's estimate for the work is compared to the GCAD value. The City has developed their own tool to determine if the contractor's estimate is reasonable considering the level of flooding the structure experienced.
What are the barriers to running an effective NFIP program in the community, if any?	The City does not feel there are any barriers. They feel that they are providing the appropriate level of effectiveness.
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	None.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	The City had a CAV in late 2020 that was completed on March 26, 2021.
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Ordinance 957-2020, Chapter 14 – Planning and Development, Article V – Flood Damage Prevention and Protection Amended June 23, 2020
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Yes. The finished floor elevation requirement is 18 inches above the BFE.
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	No
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	Yes. The City is currently an eight (8). There is currently no interest in improving that classification

Source:

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.4.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.4-10. Recent and Expected Future Development

Type of Development	2016		2017		2018		2019		2020		2021	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	-	-	-	6	-	22	-	22	-	71	-	-
Multi-Family	-	-	-		-		-		-		-	-
Other (commercial	-	-	-	63	-	59	-	19	-	6	-	-



mixed-use, etc.)												
Total Permits Issued	-	-	-	69	-	81	-	41	-	77	-	-
Property or Development Name	Type of Development	# of Units / Structures	Location (address and/or block and lot)				Known Hazard Zone(s)*		Description / Status of Development			
Recent Major Development and Infrastructure from 2016 to Present												
None identified												
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years												
None identified												

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.4.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of Dickinson's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.4-1. Dickinson Area Extent and Location Map (Flood)

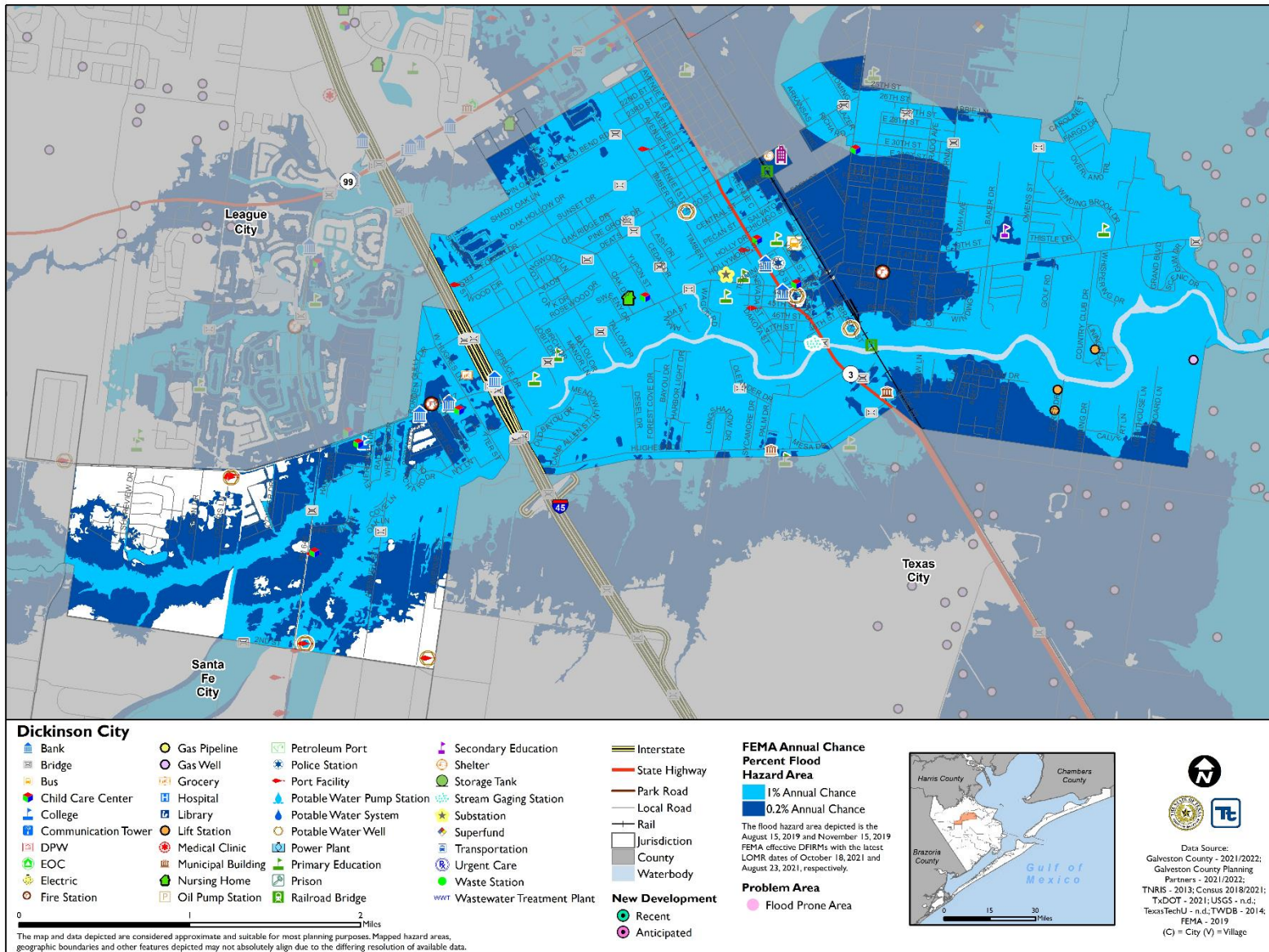




Figure 9.4-2. Dickinson Area Extent and Location Map (SLOSH, Tsunami)

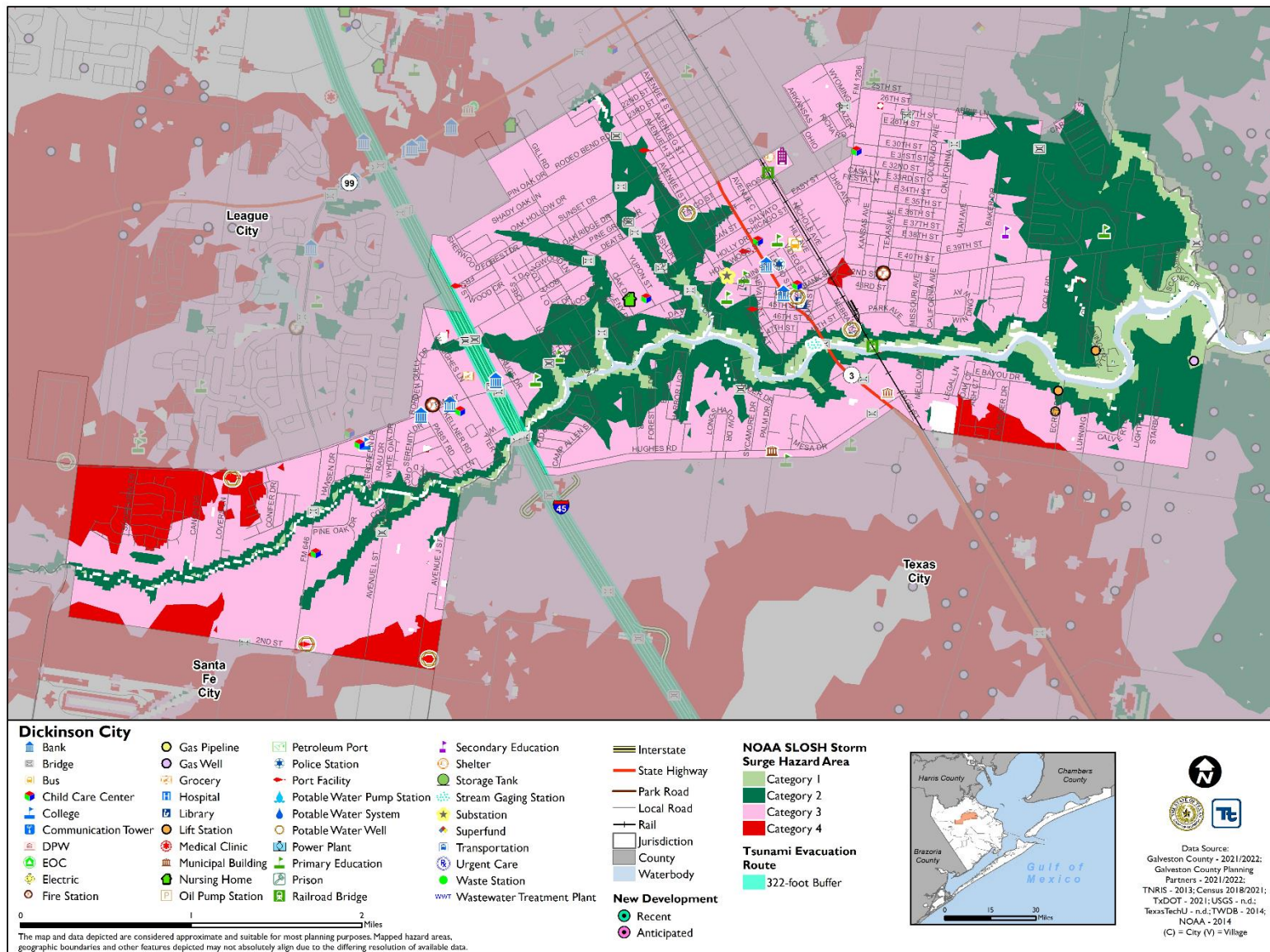
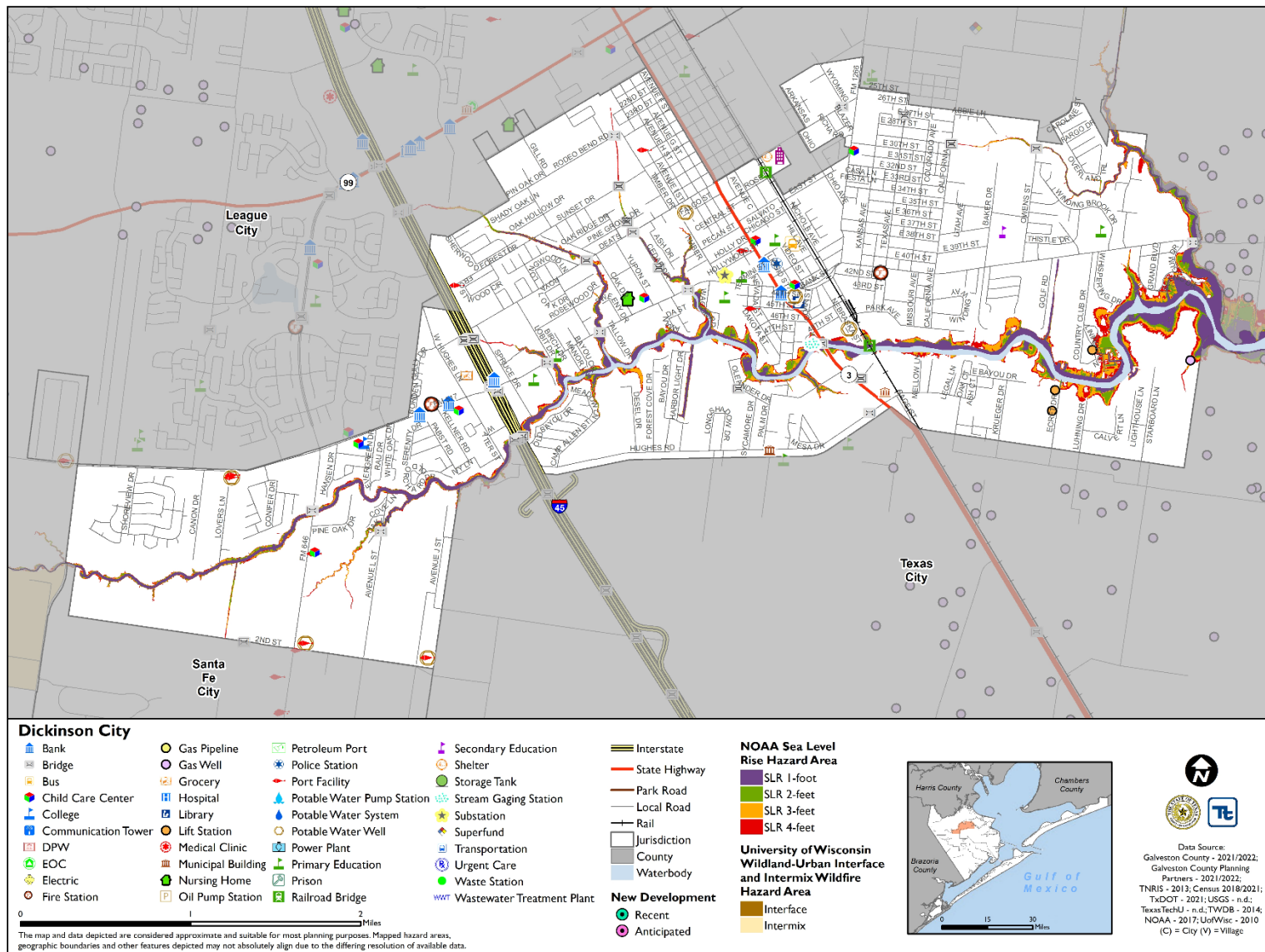




Figure 9.4-3. Dickinson Area Extent and Location Map (Sea Level Rise, WUI)





Dickinson City

- Bank
- Bridge
- Bus
- Child Care Center
- College
- Communication Tower
- DPW
- EOC
- Electric
- Fire Station
- Gas Pipeline
- Gas Well
- Grocery
- Hospital
- Library
- Life Station
- Medical Clinic
- Municipal Building
- Nursing Home
- Electric
- Fire Station
- Petroleum Port
- Police Station
- Port Facility
- Potable Water Pump Station
- Potable Water System
- Potable Water Well
- Power Plant
- Primary Education
- Prison
- Oil Pump Station
- Railroad Bridge
- Secondary Education
- Shelter
- Storage Tank
- Stream Gaging Station
- Substation
- Superfund
- Transportation
- Urgent Care
- Waste Station
- Wastewater Treatment Plant
- Interstate
- State Highway
- Park Road
- Local Road
- Rail
- Jurisdiction
- County
- Waterbody

Expansive Soils Hazard Area
Linear Extensibility >6%

Soil Erosion Hazard Area
Coastal (100ft Shoreline Buffer)
Inland (K Factor >0.49)

New Development
Recent
Anticipated

The map and data depicted are considered approximate and suitable for most planning purposes. Mapped hazard areas, geographic boundaries and other features depicted may not absolutely align due to the differing resolution of available data.

0 1 2 Miles

Galveston County - 2021/2022;
Galveston County Planning Partners - 2021/2022;
TNRIS - 2013; Census 2010/2021;
TXDOT - 2021; USGS - n.d.;
TexasTechJ - n.d.; TWDB - 2014;
NOAA - 2011; USDA/NRCS - 2020
(C) = City (V) = Village



Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of Dickinson's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages Dickinson experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.4-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
December 3, 2016	Flash Flood / Heavy Rain	No	Heavy rains caused street flooding in low lying areas close to Dickinson Bayou on East side of the City of Dickinson	No damages identified by the municipality
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey produced catastrophic flooding with 60 inches of rain overnight. The City of Dickinson is built along the banks of Dickinson Bayou and its tributaries. 9000 911 calls were received in 48 hours. 80% of the homes in Dickinson was damaged or flooded to some degree. Water rescues occurred across the City and the roads were impassible to traverse the City during the flood event. Debris cleanup took months to complete with over 1 million yards of debris removed.	No damages identified by the municipality
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	The City of Dickinson experienced mild street flooding in some areas and in the tropical gardens area some neighborhood streets were impassible during the event.	No damages identified by the municipality
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	The City of Dickinson experienced flooding along the areas close to Dickinson Bayou. Some homes were received flood damage and some city streets were impassible from flood waters during the event.	No damages identified by the municipality
September 20 th 2020	Tropical Storm Beta	Yes	Tropical Storm Beta made landfall in Matagorda Bay in Texas. The City of Dickinson experienced flooding along the areas close to Dickinson Bayou. Some homes were received flood damage and some city streets were impassible from flood waters during the event.	No damages identified by the municipality
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	The City of Dickinson lost all electrical power during first days of the severe cold weather. A warming station was established for citizens to seek shelter. A POD was set up to distribute bottled water to citizens in need.	No damages identified by the municipality
September 14-17, 2021	Hurricane Nicholas	N/A	The City of Dickinson experienced power losses in many areas due to high winds and falling tree limbs. Some minor street flooding occurred along low lying areas near the bayous.	No damages identified by the municipality

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Dickinson's risk assessment results and data used to determine the hazard ranking.



Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for Dickinson. The City reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of Dickinson agreed with the calculated rankings.

Table 9.4-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
Low	Low	Low	High	Medium	High	Low	High	Low
Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire	
Low	Low	Low	Medium	Medium	Low	Medium	Low	

Note: The scale is based on the hazard rankings established in Section 5.3 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

Identified Issues

Specific areas of concern based on resident response to the citizen survey include:

- The ditches on Rosewood Circle need to be dug out. The city or county recently fixed the ditches on Rosewood drive that connects to the circle, but the circle itself has very shallow ditches and the water does not flow properly to the main drains on Maple Dr. This causes the ditches to flood very rapidly during heavy rains and then the water lingers for long periods, encouraging the mosquito population.
- Flooding, wind damage, freeze damage, wind damage, power grid vulnerability
- Culverts need clearing/cleaning
- All the bayous
- The feeder roads between Dickinson and Galveston are very hazardous during heavy rains

9.4.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.



Past Mitigation Initiative Status

The following table indicates progress on the community’s mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the ‘Capability Assessment’ presented previously in this annex.



Table 9.4-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status?(e.g., In Progress, Ongoing Capability, or Completed)If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
-	Implement a public outreach program designed to educate the public about NFIP flood insurance, building above base flood elevation and floodplain regulations.	Community Development	-	Yes (as 2022-Dickinson-012)	-	-
-	Develop a Comprehensive Drainage Study to identify drainage issues and develop an action plan for implementation.	Public Works and City Administration	No Progress	Yes (as 2022-Dickinson-001)	The City has an inadequate drainage system and experiences frequent flooding	Public Works
-	Implement storm water drainage system improvements as identified by the Comprehensive Drainage Study to address flooding and improve back up caused by debris during events.	Public Works and City Administration	In Progress	Yes (as 2022-Dickinson-002)	The City has an inadequate drainage system and experiences frequent flooding	Public Works
-	Retrofit critical facilities and other public buildings that must function during and following an emergency hazards incident.	Police Department, Public Works, Public Safety/Fire Marshal	-	Yes (as 2022-Dickinson-013)	-	-
-	Review existing building codes and flood ordinance to ensure adequate protection of new construction in flood-prone areas.	Community Development	Completed, Chapter 14 was amended on June 23, 2020	-	-	-
-	Implement campaign for the elevation of structures in flood prone areas	City Administration, Community Development, Public Works	-	Yes (as 2022-Dickinson-013)	-	-
-	Potential of acquisition of flood prone properties	City Administration, Community Development, Public Works	-	Yes (as 2022-Dickinson-013)	-	-
-	Review existing building codes and flood ordinance to ensure adequate protection of new construction in flood-prone areas.	Community Development	Completed, Chapter 14 was amended on June 23, 2020	-	-	-



Project #	Project	Responsible Party	What is the status?(e.g., In Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
-	Implement Winding Way Street outfall storm sewer project	Public Works	Completed, Work was performed as a task work order in 2020	-	-	-
-	Implement a public outreach program designed to educate the public about Severe Thunderstorms -- Includes High Wind, Lightning, and Hail	Emergency Management and Public Works	-	Yes (as 2022-Dickinson-011)	-	-
-	Implement a public outreach program designed to educate the public about Tornadoes	Emergency Management and Public Works	-	Yes (as 2022-Dickinson-011)	-	-
-	Implement a public information and education campaign to educate residents and businesses about extreme heat.	Emergency Management and Public Works	-	Yes (as 2022-Dickinson-011)	-	-
-	Conduct a fire safety and prevention program	Public Safety/Fire Marshal	-	Yes (as 2022-Dickinson-014)	-	-
-	Implement point of distribution and cooling centers	Public Safety/Fire Marshal	-	Yes (as 2022-Dickinson-015)	-	-

Note: The City of Dickinson Mitigation Plan, 2017 did not use numbers to identify mitigation actions.

Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.4-14, the City of Dickinson did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of Dickinson participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 'Selecting Appropriate Mitigation Measures for Floodprone Structures' (March 2007) and FEMA 'Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards' (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.4-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion		X		X			X		X	X
Dam & Levee Failure (no hazard exposure)										



Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Drought		X	X	X			X	X	X	X
Expansive Soils		X		X			X		X	X
Extreme Temperatures		X		X			X		X	X
Flood	X	X		X	X		X		X	X
Hail		X		X			X		X	X
Hurricane & Tropical Storm	X	X		X	X		X		X	X
Land Subsidence		X		X			X		X	X
Lightning		X		X			X		X	X
Pandemic		X		X			X		X	X
Severe Winter Storm		X		X			X		X	X
Thunderstorm Wind		X		X			X		X	X
Tornadoes		X		X			X		X	X
Tsunami		X		X			X		X	X
Utility Failure		X		X			X		X	X
Wildfire		X		X			X		X	X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of Dickinson would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.4-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Dickinson-001	Drainage Study	Problem: The City has an inadequate drainage system and experiences frequent flooding. Solution: Develop a Comprehensive Drainage Study to identify drainage issues and develop an action plan for implementation.	Both	Flood, Hurricane & Tropical Storm	2	1-5 years	Public Works	FEMA Grant Funding (HMGP, BRIC)	Education leading to implementation of mitigation actions	High	High	LPR	PR
2022-Dickinson-002	Implement Findings of Drainage Study	Problem: The City has an inadequate drainage system and experiences frequent flooding. Solution: Implement storm water drainage system improvements as identified by the Comprehensive Drainage Study to address flooding and improve back up caused by debris during events.	Both	Flood, Hurricane & Tropical Storm	2	1-5 years	Public Works	FEMA Grant Funding (HMGP, BRIC)	Protect structures and critical infrastructure	High	High	SIP	SP
2022-Dickinson-003	Backup Generators for City Owned Facilities	Problem: Currently, only 2 city owned facilities have generator backup. The remaining 5 facilities, including City Hall, do not have generator backup. The main city network and phone system are housed at City Hall, thus during a power outage the city experiences the loss of the network and phone system. Solution: By placing backup generators at the remaining 5 facilities, this will allow for continued use of the city network and phone system, as well as the continued use of	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Utility Failure, Wildfire	1, 2, 3, 4	1-3 years	Emergency Management, City Council	FEMA Grant Funding (HMGP, BRIC)	Continuity of operations	High	High	SIP	SP, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		all city-owned facilities during times of a power outage.											
2022-Dickinson-004	Flood Alert System	Problem: City of Dickinson has several local tributaries within its boundaries. The city experiences flooding impacts during heavy rain events and elevated tides related to these tributaries. Solution: This project would add multiple rain/stream monitoring stations in strategic locations along these tributaries that provide real-time data related to stream level and rainfall data. Along with these stations, the city would add live video stations with cellular data connection that would stream live video data from selected locations along the tributaries.	Both	Flood, Hurricane & Tropical Storm	1, 2, 3, 4	1-2 Years	Public Works, Emergency Management	General Funds, FEMA Grant Funding (FMA, HMGP, BRIC)	Critical information is received by the right people at the right time in order to save lives and prevent flood damage to property and structures.	Medium to High	High	SIP, EAP	PI, ES
2022-Dickinson-005	California Ave Drainage Project	Problem: Flooding issues on California Ave and surrounding areas. Solution: Install underground storm sewers along California Avenue.	Both	Flood	1	2 Years	Public Works	Galveston County Bond, FEMA Grant Funding (FMA, HMGP, BRIC)	Protect structures and critical infrastructure	\$1 million	High	SIP	SP
2022-Dickinson-006	Deats Drainage	Problem: Flooding issues throughout the Deats Road – FM 1266 and surround areas. Solution: Installing underground storm sewers along Deats Rd, Hill St, to Nichols St, eventually discharging into the Dickinson	Both	Flood	1	2 Years	Public Works	GLO, FEMA Grant Funding (FMA, HMGP, BRIC)	Protect structures and critical infrastructure	\$21 million	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		bayou close to Nebraska St. 10-FT X 5-FT RCB and 12-FT X 10-FT RCB and 48-IN RCP											
2022-Dickinson-007	Ditch #1 - Drainage Improvement Project	Problem: Flooding issues within the area of Ditch #1 and surrounding areas. Solution: Implement the construction of improvements to Ditch #1 to add additional storm water detention.	Both	Flood	1	1 year	Public Works	General Fund	Protect structures and critical infrastructure	\$1.5 million	High	SIP	SP
2022-Dickinson-008	Hughes Drainage	Problem: Flooding issues throughout Hughes road – HWY 3 and surrounding areas. Solution: Implement the construction of Hughes Road storm sewer improvement project. 10-FT X 10-FT RCB.	Both	Flood	1	2 Years	Public Works	GLO, FEMA Grant Funding (FMA, HMGP, BRIC)	Protect structures and critical infrastructure	\$29 million	High	SIP	SP
2022-Dickinson-009	Moore's Addition Drainage Project	Problem: Flooding issues within the Moore's addition and surrounding areas. Solution: Implement the construction of a flood control siphon to drain a portion of the Moore's addition.	Both	Flood	1	1 Year	Public Works	General Fund	Protect structures and critical infrastructure	\$5 million	High	SIP	SP
2022-Dickinson-010	Emergency Operations Center Building	Problem: Methods and operational equipment needed to inform the public of immediate danger from an impending hazard or updating the public with an ongoing controlled hazard. Solution: The Dickinson Office of Emergency Management is without a dedicated Emergency Operations Center to run Incident Command operations	Both	All Hazards except Dam & Levee Failure	1	1-5 Years	City Council, City Administration, Emergency Management	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		from. The Dickinson OEM EOC has moved from the PD training room to a Fire/EMS station training room and may soon be moved again to the City Council public meeting chambers. The Dickinson Office of Emergency Management is in need of a permanent building to operate the EOC from, conduct training, public education and other OEM breakout operations during incidents or events impacting the city. Having a city owned facility will allow Dickinson OEM to serve the community in the greatest fashion.											
2022-Dickinson-011	Public Outreach	Problem: Methods and operational equipment are needed to inform the public on how residents can mitigate hazards at their properties. Additionally, outreach methods are needed informing the community of immediate danger from an impending hazard or updating the public with an ongoing controlled hazard. Solution: Public outreach program will be designed to inform residents on how they can mitigate hazards at their properties and notify the public of immediate hazard threats or updated supplemental information of ongoing hazards through numerous methods that could include text messages,	Both	All Hazards except Dam & Levee Failure	3	1-5 Years	City Council, Emergency Management	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Medium	High	EAP	PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		automated “robo calls”, emails, media outlet press releases, internet websites and social media accounts from city departments. Equipment would include social monitoring or crowd source programs, cameras and hard-shell cases, laptop, and a dedicated vehicle.											
2022-Dickinson-012	NFIP Compliance	Problem: Community may be at risk to flooding and inundation. Solution: Implement floodplain management programs that, at a minimum, meet the NFIP requirements: - Enforce the flood damage prevention ordinance. - Participate in floodplain identification and mapping updates. - Provide public assistance/information on floodplain requirements and impacts.	Both	Flood	1, 2, 3	Ongoing	Building Official	Staff Time, General Fund	Prevention of loss of life and critical infrastructure.	Low	High	LPR	PR
2022-Dickinson-013	Structural Retrofits, Elevations, Buyouts, Relocation	Problem: Structures and critical facilities are located in hazard areas. Solution: Where appropriate, support retrofitting, purchase or relocation of structures located in hazard areas, prioritizing those that have experienced repetitive losses and/or are located in high- or medium-risk hazard areas.	Existing	Coastal & Inland Erosion, Expansive Soils, Flood, Hail, Hurricane & Tropical Storm, Land Subsidence, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami,	1	1-5 years	Dickinson	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and critical infrastructure.	High	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
				Utility Failure, Wildfire									
2022-Dickinson-014	Fire Safety and Prevention Program	Problem: Public outreach and education is lacking for the wildfire hazard Solution: Conduct a fire safety and prevention program	Both	Wildfire	3	1-5 years	Emergency Management; Fire Department	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and critical infrastructure.	Low	High	EAP	PI
2022-Dickinson-015	Resilience Hubs	Problem: Lack of distribution and cooling centers. Solution: Designate and publicize locations where residents can obtain necessities to retrofit their home to withstand disaster events, gather for mitigation workshops, and find refuge during extreme temperature events.	Both	All Hazards except Dam & Levee Failure	1, 3	Within 3 years	Emergency Management	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life.	Low	High	EAP	PI, ES
2022-Dickinson-016	Drought-resistant Landscaping	Problem: Existing landscaping at city-owned facilities uses a lot of water to maintain. Solution: Identify and replace high-water usage landscapes at city-owned facilities with drought resistant landscapes.	Existing	Drought	1	1-5 years	Public Works	FEMA Grant Funding (HMGP, BRIC)	Reduce landscape water consumption so water is more readily available for the community during times of drought.	Low	High	NSP	NR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV Community Assistance Visit
 CRS Community Rating System
 DPW Department of Public Works
 EHP Environmental Planning and Historic Preservation
 FEMA Federal Emergency Management Agency
 FPA Floodplain Administrator

Potential FEMA HMA Funding Sources:

FMA Flood Mitigation Assistance Grant Program
 HMGP Hazard Mitigation Grant Program
 BRIC Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation

Cost:

The estimated cost for implementation.

Benefits:



GLO Texas General Land Office
HMA Hazard Mitigation Assistance
N/A Not applicable
NFIP National Flood Insurance Program
OEM Office of Emergency Management

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)** - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- **Preventative Measures (PR)** - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- **Property Protection (PP)** - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information (PI)** - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection (NR)** - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Structural Flood Control Projects (SP)** - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- **Emergency Services (ES)** - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.4-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Dickinson-001	Drainage Study	0	1	1	1	1	1	0	1	1	1	1	1	1	1	12	High
2022-Dickinson-002	Implement Findings of Drainage Study	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Dickinson-003	Backup Generators for City Owned Facilities	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Dickinson-004	Flood Alert System	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Dickinson-005	California Ave Drainage Project	1	1	1	1	0	0	0	1	0	1	1	1	1	1	10	High
2022-Dickinson-006	Deats Drainage	1	1	1	1	0	0	0	1	0	1	1	1	1	1	10	High
2022-Dickinson-007	Ditch #1 - Drainage Improvement Project	1	1	1	1	0	0	0	1	0	1	1	1	1	1	10	High
2022-Dickinson-008	Hughes Drainage	1	1	1	1	0	0	0	1	0	1	1	1	1	1	10	High
2022-Dickinson-009	Moore's Addition Drainage Project	1	1	1	1	0	0	0	1	0	1	1	1	1	1	10	High
2022-Dickinson-010	Emergency Operations Center Building	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Dickinson-011	Public Outreach	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Dickinson-012	NFIP Compliance	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Dickinson-013	Structural Retrofits, Elevations, Buyouts, Relocation	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Dickinson-014	Fire Safety and Prevention Program	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Dickinson-015	Resilience Hubs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Dickinson-016	Drought-resistant Landscaping	0	0	1	1	1	1	1	1	0	1	0	1	1	0	9	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions.
Low (0-4), Medium (5-8), High (9-14).



9.5 CITY OF FRIENDSWOOD

This section presents the jurisdictional annex for the City of Friendswood and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property. The annex includes a general overview of the municipality and who in the City participated in the planning process, an assessment of the City of Friendswood's risk and vulnerability, the different capabilities used in the City, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.5.1 Hazard Mitigation Planning Team

The City of Friendswood followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many Friendswood departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.5-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Steven Simmons	Deputy Fire Marshal	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Brian Rouane	Building Official	Provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Brian Mansfield	Fire Marshal / EMC	Attended internal Friendswood meetings regarding mitigation, reviewed Friendswood annex and provided feedback, provided direction for Friendswood regarding planning process.
Niki Bender	Deputy Fire Marshal	Attended Galveston County meetings as necessary, reviewed Friendswood annex and provided feedback.
Aubrey Harbin	Director of Community Development	Attended internal Friendswood meetings regarding mitigation, provided input to action items, reviewed action item worksheets, provided information regarding Friendswood ordinances.
Jill Arias	Director of Engineering	Attended internal Friendswood meetings regarding mitigation, provided input to action items, reviewed action item worksheets
Samantha Haritos	Deputy Director of Engineering	Attended internal Friendswood meetings regarding mitigation, provided input to action items, reviewed action item worksheets
Bria Whitmire	Project Coordinator	Attended internal Friendswood meetings regarding mitigation, provided input to action items, reviewed action item worksheets
Hailee Medwedeff	Engineering Technologist	Attended internal Friendswood meetings regarding mitigation, provided input to action items, reviewed action item worksheets
Rene Ibarra	Director of Public Works	Attended internal Friendswood meetings regarding mitigation, provided input to action items, reviewed action item worksheets
Steve Vavrecka	Deputy Director of Public Works	Attended internal Friendswood meetings regarding mitigation, provided input to action items, reviewed action item worksheets
James Toney	Director of Parks and Recreation	Attended internal Friendswood meetings regarding mitigation, provided input to action items, reviewed action item worksheets



9.5.2 Jurisdictional Profile

The City of Friendswood is located in the northwestern corner of Galveston County. It covers a total area of 21.2 square miles. Friendswood, Texas has a warm humid temperate climate with hot summers and no dry season. Over the course of a year, the temperature typically varies from 45° to 92° F and is rarely below 36° F or above 96° F.

The Mayor and six Councilmembers are elected from the City at large to serve three-year terms. A charter amendment was approved May 4, 1992, to extend terms from two to three years, to be phased in over a three year period beginning in 1993. A four-term limitation was approved in 2007.

According to the U.S. Census, the 2010 population for the City was 35,805. The estimated 2020 population was 41,213, a 15.1-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 6.1-percent of the population is 5 years of age or younger and 13.7-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.5.3 Jurisdictional Capability Assessment and Integration

The City of Friendswood performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of Friendswood identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of Friendswood, what is present in the jurisdiction, and code citation and date.



Table 9.5-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 14 – Buildings and Building Regulations, revised through 12/03/2018	State and Local	Building Official/Community Development
<i>How does this reduce risk?</i> Any person or agent who shall violate or cause to be violated any provision of this chapter, or who shall fail to comply with any of the requirements of this chapter, or who shall erect, construct, alter, demolish or move any structure or who shall have erected, constructed, altered, repaired, moved or demolished a building or structure in violation of a detailed statement or drawing submitted and approved under this chapter shall, upon conviction, be guilty of a misdemeanor. The City has adopted with amendments, the International Building Code, along with the Electrical, Plumbing, Mechanical and Energy Codes.					
Zoning/Land Use Code	Yes	No	Appendix C – Zoning, 11/18/1984	Local	Community Development Director
<i>How does this reduce risk?</i> The City is divided into Residential, Agricultural, Commercial and Industrial Zones with regulations related to light, air, open space and the general welfare of the public. The various zones shall be protected from higher density development and from the encroachment of incompatible uses. Internal stability, harmony, attractiveness, order, and efficiency are encouraged throughout the City.					
Subdivision Ordinance	Yes	No	Code of Ordinances, Appendix B – Subdivisions, 1/17/2000	Local	Community Development Director
<i>How does this reduce risk?</i> The purpose of this section is to establish the procedures and requirements for the submittal, review, consideration and action by the commission to provide the necessary details and orderly processing of the subdivision of land within the city and its extraterritorial jurisdiction. It shall be unlawful for any person to subdivide any tract, lot, or parcel of land within the city or its extraterritorial jurisdiction unless and until a preliminary and final plat of such subdivision has been approved, or an exemption satisfied, A preliminary drainage plan with calculations shall be provided. Floodplain information shall also be provided with the 100-year floodplain shown on the preliminary plat.					
Site Plan Ordinance	Yes	No	Appendix C, Zoning Ordinance – Section 9.H. Site Plan Process	Local	Community Development
<i>How does this reduce risk?</i> The purpose of the site plan is to ensure compliance with this appendix and to assist in the orderly and harmonious development of the city, to protect and enhance the general welfare, and to help prevent the impairment or depreciation of land values and development by the erection of structures, additions or alterations thereto without proper attention to site planning and preserving the intent of this appendix.					
Stormwater Management Ordinance	Yes	No	Code of Ordinances, Chapter 34 – Floods, Article II. – Flood Damage Prevention, Section 34-34 Stormwater Management; Chapter 86 – Utilities, Article V. – Regulation of Stormwater Runoff; Design Criteria Manual, March 2019	Local	Flood Plain Manager / Community Development City Engineer / Public Works Director
<i>How does this reduce risk?</i> Article V has two divisions addressing stormwater. The purpose of division 2 is to provide for the health, safety, and general welfare of the citizens of the city through the regulation of non-stormwater discharges to the stormwater system to the maximum extent practicable as required by federal and state law. This division establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the Texas Pollutant Discharge Elimination System (TPDES) permit process The purpose of division 3 is to safeguard persons, protect property, prevent damage to the environment and promote the public welfare by guiding, regulating, and controlling the design, construction, use, and maintenance of any development or other activity which disturbs or breaks the topsoil or results in the movement of earth on land in the city.					
Post-Disaster Recovery/ Reconstruction Ordinance	Yes	No	Emergency Operations Plan, Annex J – Recovery	Local	Office of Emergency Management / EMC
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single family dwelling by answering Yes or No to being aware of any of the following conditions: • Present flood insurance coverage • Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir • Previous water penetration into a structure on the property due to a natural flood event • Located in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) • Located in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) • Located in a floodway • Located in a flood pool • Located in a reservoir					
Growth Management	Yes	No	Code of Ordinances, Appendix B – Subdivisions & Appendix C - Zoning	Local	Community Development Director
<i>How does this reduce risk?</i> Both of the sited Ordinances place limitations and controls on new development and redevelopment but are not specifically considered Growth Management Ordinances. Agricultural lands are zoned but not lands limited as open space.					
Environmental Protection Ordinance	Yes	Yes	Code of Ordinances, Chapter 26 – Environment, 9/14/2020	Federal, State, and Local	Community Development / Fire Marshal's Office
<i>How does this reduce risk?</i> This Chapter sets forth environmental controls for general nuisances described as whatever is dangerous to human life or health, and whatever renders the ground, the water, the air or any food or drink unwholesome and a hazard to human life and health is hereby declared to be a nuisance.					
Flood Damage Prevention Ordinance	Yes	Yes	Code of Ordinances, Chapter 34 – Floods, Article II. – Flood Damage Prevention, Last revised 12/7/2020	Federal, State, County and Local	City Manager/ Floodplain Administrator
<i>How does this reduce risk?</i> It is the purpose of this article to promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to: (1) Protect human life and health; (2) Minimize expenditure of public money for costly flood control projects; (3) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; (4) Minimize prolonged business interruptions; (5) Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains; (6) Help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood blight areas; (7) Ensure that potential buyers are notified that property is in a flood area; and (8) Preserve floodplain storage through mitigation. New construction and substantial improvement of any residential structures shall have the lowest floor, including basement, elevated to 24 inches above the base flood elevation or at or above the 0.2 percent flood elevation, whichever is greater. New construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated to 24 inches above the base flood level at or above the 0.2 percent flood elevation, whichever is greater, or together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Code of Ordinances, Chapter 22 – Civil Emergencies, Texas Government Code – Chapters 418 & 433	Local	Emergency Management Director



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
<i>How does this reduce risk?</i> The mayor is authorized to join with the county judge and the mayors of the other cities in the county in the formation of an emergency management council for the county and shall have the authority to cooperate in the preparation of a joint emergency management plan and in the appointment of a joint emergency management coordinator, as well as all powers necessary to participate in a countywide program of emergency management insofar as such program may affect the city. The powers and duties of the emergency management director shall include an ongoing survey of actual or potential major hazards which threaten life and property within the city, and an ongoing program of identifying and requiring or recommending the implementation of measures which would tend to prevent the occurrence or reduce the impact of such hazards if a disaster did occur. As part of his responsibility in hazard mitigation, the director shall supervise the development of an emergency management plan for the city and shall recommend that plan for adoption by the city council along with any and all mutual aid plans and agreements which are deemed essential for the implementation of such emergency plan					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-
Planning Documents					
Comprehensive Plan	Yes	No	Comprehensive Plan, July 1998; with updates: Future Land Use Map (2008); Major Thoroughfare Plan (2018), Parks Master Plan (2010)	Local	Community Development / Parks and Recreation
<i>How does this reduce risk?</i> The Comprehensive Plan for Friendswood pertains to the elements of the urban structure and its expansion with three goals: - To guide the City in resolving current issues. - To guide future growth toward a specific, desirable and economic pattern. - To guide the use of land area and valuable resources to the betterment of everyone. One of the Plans objectives is to guide the protection of developed land area from damaging flooding and hazardous living conditions.					
Capital Improvement Plan	Yes	No	Capital Improvement Plan/Program 2017 - 2020	Local	Engineering
<i>How does this reduce risk?</i> Capital Improvement Program – The CIP is a 5-year planning tool. The City’s Capital Improvements Plan consists of a Capital Budget which includes projected expenditures for the current fiscal year. Capital Expenditures, defined as tangible or projects with an estimated cost of at least \$5,000.00 and a useful life of at least 5 years, as part of the Capital Budget. The Capital Plan includes projects that help to mitigate hazards and include emergency generators, critical facility improvements, street improvements, and water and utility improvements and flood proofing. The intent of the updated program is to identify, describe, and prioritize the infrastructure needs of the community as it grows and evolves. This task includes an effort to increase the accuracy of the program’s cost estimate for all prospective projects, but more specifically within the initial five-year period. The overall goal of the CIP is to maintain the same high quality of life for all citizens through the timely anticipation of the City’s needs, planning of improvement projects and determining funding sources as the community grows					
Disaster Debris Management Plan	Yes	No	Disaster Debris Management Plan, 2014	Local	Office of Emergency Management
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	Yes	No	City of Friendswood Flood Vulnerability and Mitigation Study April 2019	Local	Flood Plain Manager / Community Development
<i>How does this reduce risk?</i> This study evaluates the existing flood vulnerability of the City of Friendswood, TX in the context of Hurricane Harvey (2017) and the 100-yr. storms (HCFCD and NOAA ATLAS 14 - 2018 depths). A distributed hydrologic model (Vflo®) was used to simulate watershed response (i.e., stormwater runoff) for the various storms. Next, the study investigates various mitigation options to address the city’s flooding problem: bridge removal, de-snagging, grass terracing, diversion and detention. Among the five individual mitigation scenarios, the Terracing II option from Dixie Farm Rd to I45 provides the most flood reduction benefit, with an estimated peak water surface elevation reduction in the range of ~3-6 ft within Friendswood for the new (NOAA ATLAS 14) 100-yr storm.					
Stormwater Management Plan	Yes	No	Storm Water Management Program (SWMP); Master Drainage Plan - Phase II, 2007, last revised 2018	Local	Floodplain Manager / Community Development; Engineering, Public Works



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
<i>How does this reduce risk?</i> This Storm Water Management Program was developed in order to comply with the Texas Commission on Environmental Quality (TCEQ) Phase II requirements. The TCEQ's storm water program is divided into two phases. The first phase addressed storm water runoff from municipal separate storm sewer systems (MS4s) with a population of 100,000 or more. The second phase of the storm water program addresses storm water runoff from systems serving populations of less than 100,000. The Phase II areas are classified as: urbanized areas, areas that are becoming urbanized, and those which discharge to surface waters with impaired water quality. The City of Friendswood is classified as a Small Municipal Storm Sewer System (MS4) qualifying it for the Phase II requirements. With the implementation of the minimum controls, significant reductions in the pollutants discharged from the City of Friendswood should be achieved.					
Open Space Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	No	No			
<i>How does this reduce risk?</i>					
Shoreline Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	Yes	No	Major Thoroughfare Plan adopted in 2018, Ordinance 2018-05	Local	Community Development
<i>How does this reduce risk?</i>					
Agriculture Plan	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	Yes	No	Downtown District Improvement Plan approved by Council informally October 2017 (no resolution/ordinance)	Local	Community Development
<i>How does this reduce risk?</i> Downtown District Improvement Plan in order to identify and prioritize projects that will promote economic development, attract businesses and patrons, provide more retail and entertainment options in town, foster community and create a vibrant, distinct district. Public Improvement Projects are currently underway in the District. The FDEDC has begun a program of burying overhead utility lines.					
Other	-	-	-	-	-
Response/Recovery Planning					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Comprehensive Emergency Management Plan	Yes	Yes	Code of Ordinances, Chapter 22 – Civil Emergencies, Texas Government Code – Chapters 418 & 433	Local	Office of Emergency Management
<i>How does this reduce risk?</i>					
Continuity of Operations Plan	Yes	No	The COOP plan was signed by the City Manager in 2014.	Local	Office of Emergency Management
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	Yes (via region)	Yes	The City falls under the regional THIRA conducted by HGAC.	County	HGAC
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	Yes	No	Annex J – Recovery	Local	Office of Emergency Management / Community Development
<i>How does this reduce risk?</i>					
Public Health Plan	Yes	No	Emergency Operations Plan	County / Local	Galveston County Health District / Friendswood EMS
<i>How does this reduce risk?</i> Annex H – Health and Medical is a component of the Emergency Operations Plan and addresses public health, environmental health, and medical response capabilities. The City does not maintain a standalone Public Health Plan.					
Other	-	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of Friendswood to oversee and track development.

Table 9.5-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Community Development
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	Community Development
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	No	While the City does have an informal map of available land, an official list of lots and contacts does not exist that can be provided to builders.

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Friendswood and their current responsibilities which contribute to hazard mitigation.



Table 9.5-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	Community Development - The Planning and Zoning Commission shall submit recommendations to the City Council, after holding public hearings, on any change or amendment to any of the provisions of the Zoning Ordinance or the Zoning Districts Map; any request for a specific use permit or planned unit development; any change or amendment to the subdivision ordinance. In public meetings, the Commission also reviews and approves commercial site plans, preliminary and final plats, and subdivision developments. The Commission may be required to meet outside scheduled meetings with the City Council, consultants, and developers on extensive community projects.
Zoning Board of Adjustments	Yes	Community Development - The Zoning Board of Adjustment and Appeals hears and rules on requests for appeals, special exceptions, and variances to the Zoning Ordinance and authorizes variances from the Zoning Ordinance when not contrary to the public interest.
Planning Department	Yes	Community Development
Mitigation Planning Committee	Yes	This committee contains various staff members from OEM, Public Works, Engineering, Community Development, and CMO.
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	CEDC – Community economic development committee with two City staff members as liaison. FDEDC – Friendswood downtown economic development committee which is a 4b sales tax board appointed by council with City staff serving as liaisons.
Public Works/Highway Department	Yes	The City has a Public Works division.
Construction/Building/Code Enforcement Department	Yes	The City has two code enforcement officers and multiple building inspectors.
Emergency Management/Public Safety Department	Yes	The City maintains an Office of Emergency Management
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	The City has nine outdoor warning sirens as well as a mass notification system.
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	Public Works regularly maintains storm drains and trims trees as necessary.
Mutual aid agreements	Yes	The City maintains agreements with the County as well as neighboring jurisdictions.
Human Resources Manual	No	-
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	Community Development staff are knowledgeable in land development and land management practices.
Engineers or professionals trained in building or infrastructure construction practices	Yes	The City Engineering Department as well as Community Development maintains staff that are trained in construction practices.
Planners or engineers with an understanding of natural hazards	Yes	The City maintains multiple staff members with an understanding of natural hazards.
Staff with expertise or training in benefit/cost analysis	Yes	The City's Engineering Department have staff who are trained in cost benefit analysis.



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Professionals trained in conducting damage assessments	Yes	Community Development and Engineering staff are trained in damage assessment.
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	Yes	Community Development maintains GIS staff and programs.
Scientist familiar with natural hazards	No	The City does not have staff classified as “Scientist”
Surveyor(s)	No	The City does not have a surveyor on staff. Surveys are contracted out when necessary.
Emergency Manager	Yes	The City maintains an Emergency Management Coordinator who is appointed by the Emergency Management Director
Grant writer(s)	Yes	The City has staff that are capable of writing and submitting grants.
Resilience Officer	No	The City does not have a specified “resilience officer”
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to the City of Friendswood.

Table 9.5-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	Yes, the City was allocated CDBG-DR funds following Hurricane Harvey
Capital improvements project funding	Yes, the City funds some capital improvements via bond funds.
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Yes, the City charges fees for water, sewer, and trash services.
Impact fees for homebuyers or developers of new development/homes	Yes, impact fees are charged for new construction.
Stormwater utility fee	No, the City does not charge stormwater fees.
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other federal or state funding programs	Federal Programs / FEMA
Open Space Acquisition funding programs	Developers of 300 lots or more are required to provide green space and required contributions to parkland dedication.
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	No

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Friendswood.



Table 9.5-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	Yes, the City routinely provides safety information to the public via social media, email messages, and in person events and presentations.
Personnel skilled or trained in website development	Yes	Multiple staff members are capable of developing the City's website and updating information.
Hazard mitigation information available on your website	Yes	Safety information is available on the City's website.
Social media for hazard mitigation education and outreach	Yes	The City utilizes Facebook and Twitter to provide information to the public.
Citizen boards or commissions that address issues related to hazard mitigation	No	While the City did have a drainage subcommittee that formed and met following Hurricane Harvey, that committee currently does not meet.
Other programs already in place that could be used to communicate hazard-related information	No	-
Warning systems for hazard events	Yes	The City can communicate hazard information in a variety of ways, including: warning sirens, mass notification, website, AM radio, and social media.
Natural disaster/safety programs in place for schools	Yes / No	The ISDs do provide safety information to staff, students, and parents. The City does not have specific programs for the schools.
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Friendswood.

Table 9.5-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	Yes	6	October 1, 2021
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	Class 5- Residential Class 4- Commercial	February 10, 2017
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	3/ 3y	April 2017
Storm Ready Certification	Yes	NA	2018
Firewise Communities classification	No	-	-
Other	-	-	-

Note:

N/A Not applicable
NP Not participating
- Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.



Table 9.5-8. Adaptive Capacity

Hazard	Rating
Erosion	Strong
Dam and Levee Failure	NA – No dams effect Friendswood
Drought	Moderate
Expansive Soils	Strong – No documented losses from expansive soils.
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Strong
Lightning	Strong
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.5.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.5-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	The City has past damage assessments for flooding events.
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	Names and contact information of people interested were collected post-Harvey. Interest varied from elevation to acquisition.
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	MAAPNext studies being done
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	The last flooding events resulted in no substantial damage declarations. Harvey resulted in 46 structures substantially damaged.
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	20 structures have been mitigated: 9 acquisition (5 HMGP, 3 FMA, 1 City Bond), 11 self-mitigation through demo or demo/build to compliance, 2 self-elevation. – since Hurricane Harvey
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes, the flooding that occurred in Hurricane Harvey was accurately captured in the current effective FIRM.
NFIP Compliance	
What local department is responsible for floodplain management?	Community Development Department
Are any certified floodplain managers on staff in your jurisdiction?	Yes, 8 on staff.



NFIP Topic	Comments
Do you have access to resources to determine possible future flooding conditions from climate change?	Yes
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Not at this time
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	Permit review, provide elevation certificates on file, GIS mapping, outreach flyers, inspections,
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	Initial review of value added versus appraisal district value of structure.
What are the barriers to running an effective NFIP program in the community, if any?	None
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	The city is working through a CAV. The city is required to provide some retro-permitting of repairs in AE
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Ongoing as of February 2022
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	2020-45 12/7/2020
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Exceed, the city has higher requirements for free board and manage fill in the Shaded X flood zone
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	All permits are reviewed for flood zone and any added fill in AE and SX is required to be mitigated.
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	Yes, Jurisdiction is always looking for ways to improve CRS classification.

Source:

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.5.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.5-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	141	4	173	8	182	2	141	9	76	8	152	3
Multi-Family	-	-	-	-	-	-	-	-	-	-	-	-
Other (commercial, mixed-use, etc.)	8	2	15	2	13	-	9	-	10	4	5	-



Total Permits Issued	149	6	188	10	195	2	150	9	86	12	155	3
Property or Development Name	Type of Development	# of Units / Structures	Location (address and/or block and lot)	Known Hazard Zone(s)*	Description / Status of Development							
Recent Major Development and Infrastructure from 2016 to Present												
None identified												
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years												
None identified												

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.5.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of Friendswood's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City of Friendswood has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.5-1. Friendswood Area Extent and Location Map (Flood)

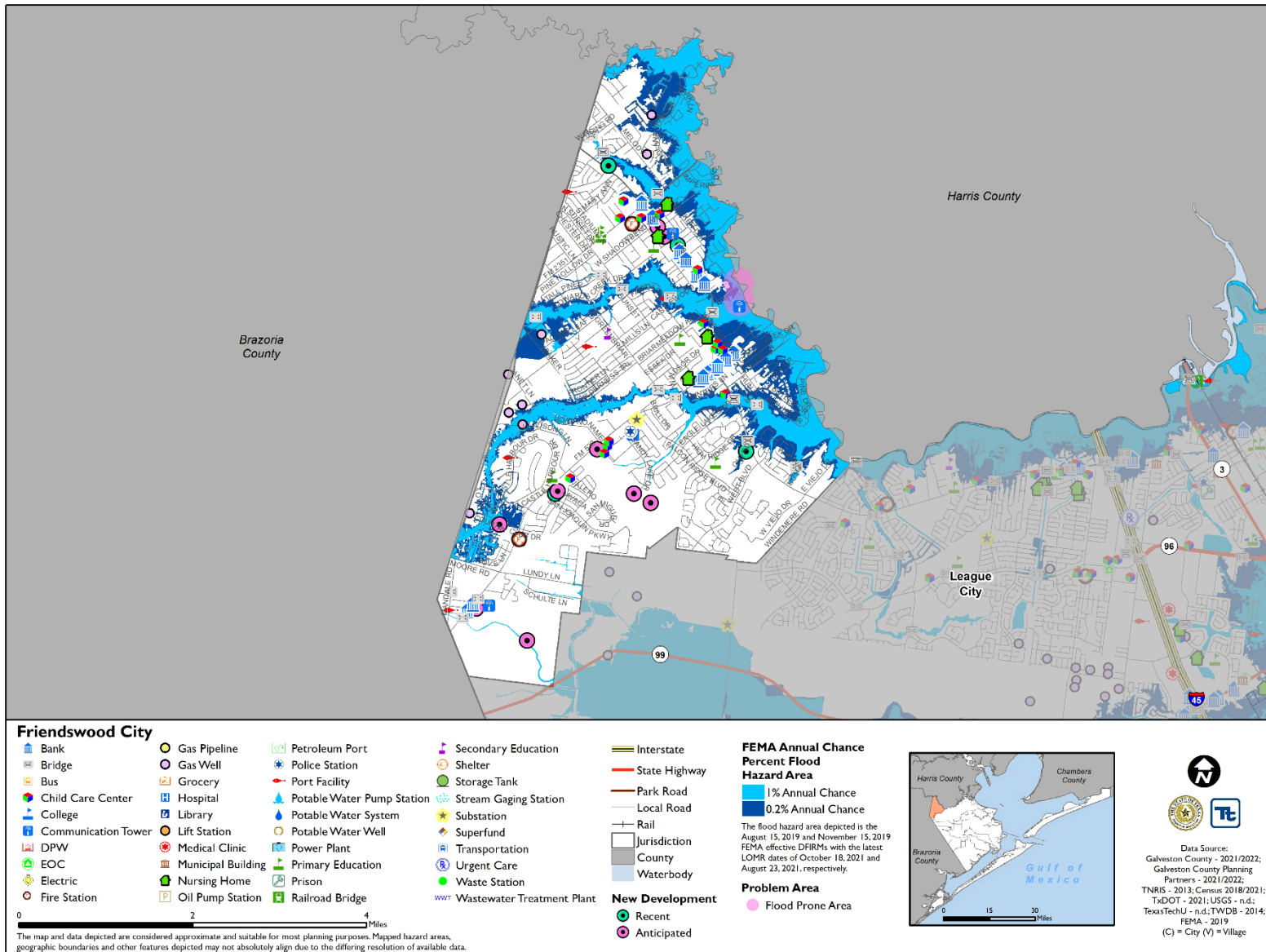




Figure 9.5-2. Friendswood Area Extent and Location Map (SLOSH, Tsunami)

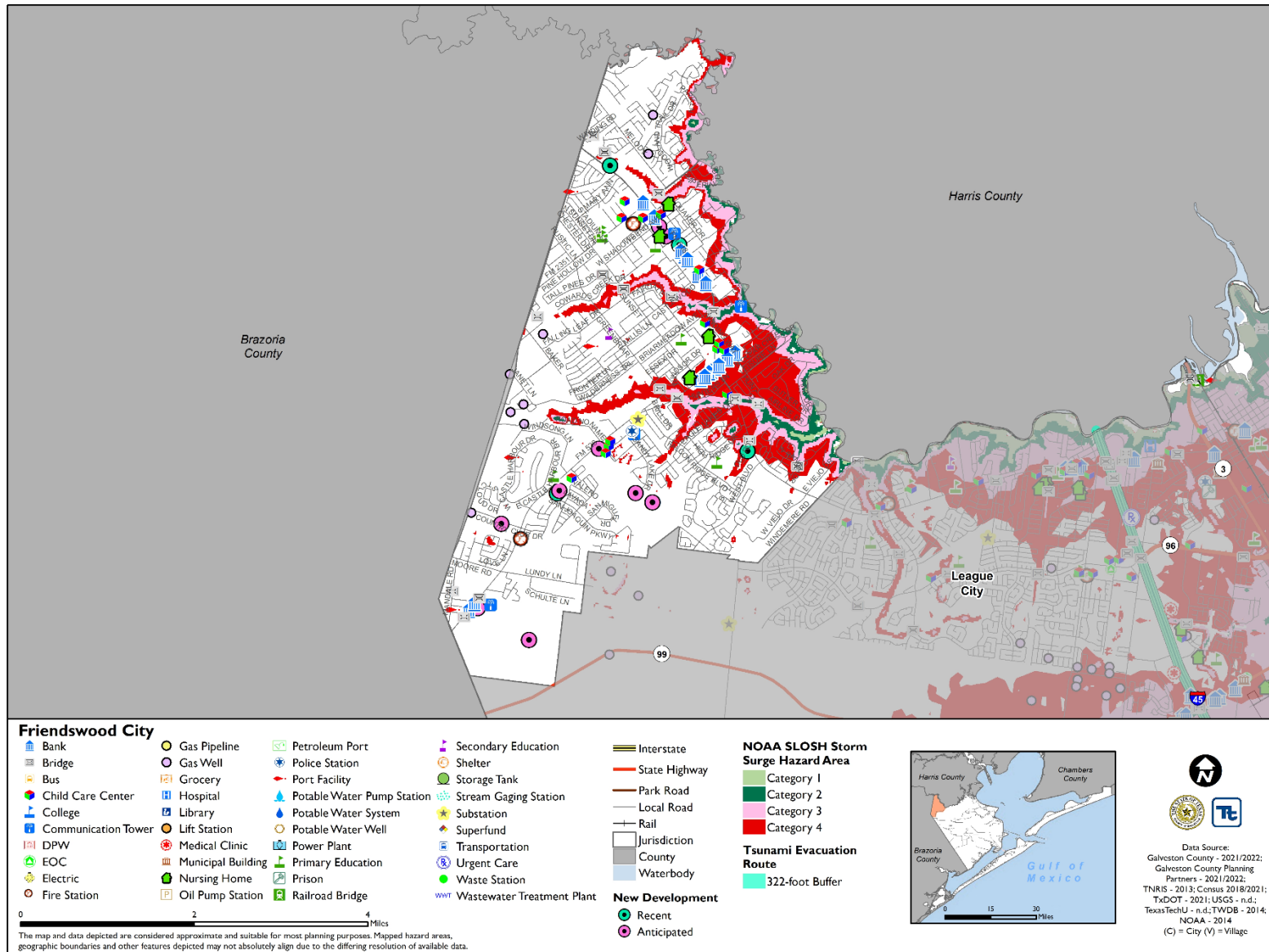




Figure 9.5-3. Friendswood Area Extent and Location Map (Sea Level Rise, WUI)

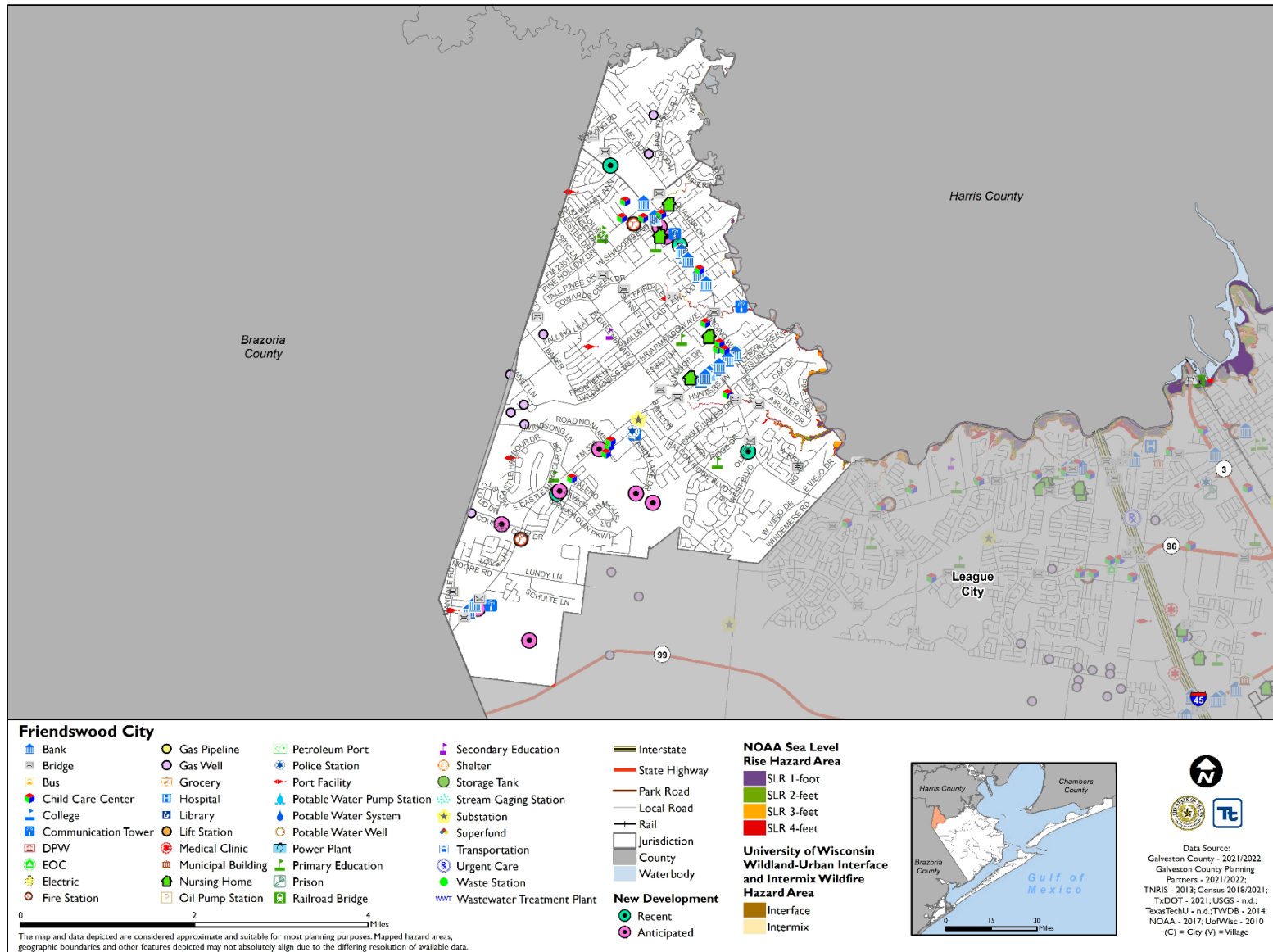
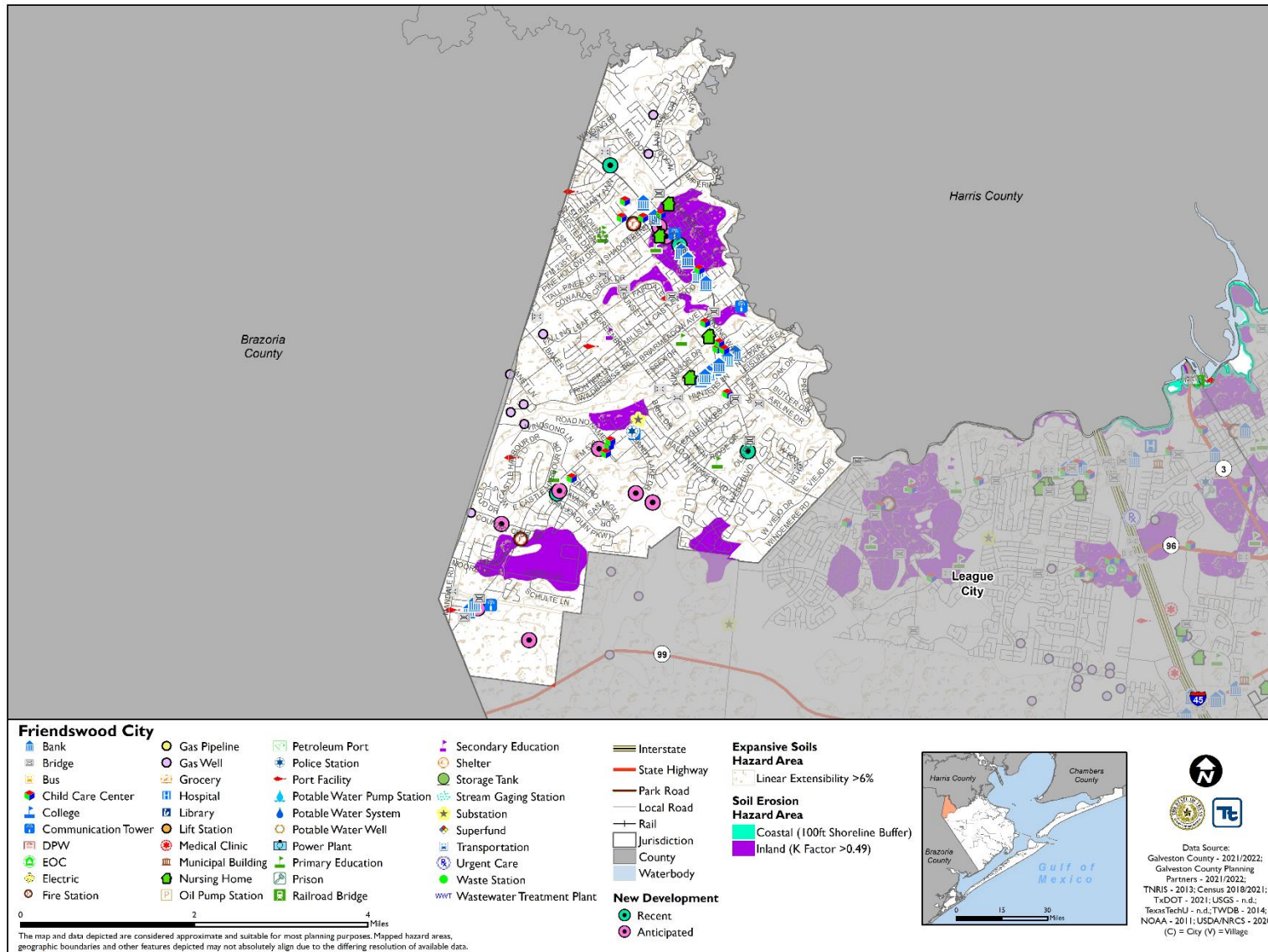




Figure 9.5-4. Friendswood Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of Friendswood's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages Friendswood experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.5-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	The City of Friendswood reported the following damage following the Halloween tornado: 200 homes affected, 36 homes with minor damage, 6 homes with major damage, and 1 home destroyed. One business sustained minor damage, estimated at \$20,000. Total losses were likely between \$2.5 and \$3 million. 11,300 cubic yards of debris was generated costing approximately \$201,000.
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	The municipality did not identify any damages associated with this event.
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson and Santa Fe. Approximately 7,000 homes and 125	Due to Hurricane Harvey, approximately 2,700 homes, 39 commercial properties, and 15 City facilities were flooded. This equated to approximately \$136 million in residential losses, \$9.45 million in commercial losses, and approximately \$9 million in City facility losses. A significant portion of the Public Works fleet vehicles and heavy equipment were destroyed along with contents of the City Deepwood facilities.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	The municipality did not identify any damages associated with this event.
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	The municipality did not identify any damages associated with this event.
2020	Tropical Storm Beta	No	Approximately 10 to 14 inches of rainfall fell within the City of Friendswood causing Clear Creek to breach its banks. 22 homes received damage within Friendswood. Multiple streets became impassible.	As a result of heavy rainfall from tropical storm Beta, 2 homes within Friendswood received major damage, 1 received minor damage, and 19 were affected.
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning	Due to the Winter Storm, the City of Friendswood reported the following damage: 128 homes affected and 183 homes with minor damage. 24 Businesses recorded damage. 13 City facilities / infrastructure received damage.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	The City of Friendswood received wind gusts up to 60 mph and approximately 6 inches of rainfall. Several thousand homes lost power. Several trees were downed across roadways and the Fire Department responded to multiple calls for service due to transformer and power line issues. Reported damage to structures was minimal.

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Friendswood's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of Friendswood. The City of Friendswood reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of Friendswood made changes to the calculated rankings. Expansive Soil risk was reduced from High to Low to reflect the ranking in the prior plan. Flood risk was changed from Low to High, also to reflect the ranking in the prior plan. The Lightning risk was changed from Low to Medium. Pandemic was increased from Low to Medium.

Table 9.5-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
Low	Low	Low	Low	Medium	High	Low	Medium	Low

Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire
Medium	Medium	Low	Medium	Medium	Low	Medium	Low



Note: The scale is based on the hazard rankings established in Section 5.3 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

Identified Issues

After review of the City of Friendswood's hazard event history, hazard rankings, jurisdiction specific vulnerabilities, hazard area extent and location, and current capabilities, the City of Friendswood has identified the following vulnerabilities within their community:

- Friendswood has recorded several million dollars of losses in the last 5 years due to lightning.

Specific areas of concern based on resident response to the citizen survey include:

- Floodprone from Clear Creek
- Utility failure

9.5.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the 'Capability Assessment' presented previously in this annex.



Table 9.5-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
F 2009-2	Mitigate Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties by elevation, reconstruction, acquisition, or demolition.	Community Development, Floodplain Manager, Office of Emergency Management and applicable state and county agencies	Ongoing capability. Since Hurricane Harvey, the City has bought out and demolished 9 residential structures. 5 were funded through HMGP for a total of \$1,888,034.90. 3 were funded through FMA for a total of \$1,979,212.70. One was purchased utilizing City of Friendswood bond funds for approximately \$750,000.	Yes (as 2022-Friendswood-001)	The City is prone to flooding with multiple flood events occurring in the past. During Harvey, several thousand homes flooded within the City.	Community Development, Floodplain Manager, Office of Emergency Management and applicable state and county agencies
F 2009-3	Maintain public notification and warning programs/systems	Community Development, Floodplain Manager, Office of Emergency Management and applicable state and county agencies	Ongoing Capability	No	-	-
F-2009-4	Construct and expand evacuation routes within the City.	Public Works, Engineering	Ongoing Capability. A portion of Friendswood Lakes Blvd was recently completed, providing additional emergency access to certain neighborhoods.	Yes (as 2022-Friendswood-002)	The City is susceptible to a variety of hazards that could necessitate an isolated or total evacuation. The last evacuation order occurred before Hurricane Ike in 2008.	Public Works, Engineering
F-2009-5	Monitor water supply and establish conservation regulations	Office of Emergency Management, Public Works Department, City	Ongoing Capability / Complete. Monitoring of the water supply is a continuous activity while the City has water rationing / drought policies in place.	No	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
		Manager, Public Information Officer				
F-2016-1	Purchase and install thunderstorm and lightning warning equipment within the nine city parks to provide early warning of approaching storms.	Parks and Recreation, Office of Emergency Management	No Progress	Yes (as 2022-Friendswood-003)	Multiple events are held each year in the parks where people are vulnerable to lightning and severe weather.	Parks and Recreation, Office of Emergency Management
F-2016-2	Purchase Tiger Dam Systems	Public Works Department, Parks & Recreation Department, Office of Emergency Management	No Progress	No	-	-
F-2016-3	Retrofit Public Works / Parks facility on Blackhawk to meet current codes	Engineering, Community Development, Public Works, Parks and Recreation	No Progress	Yes (as 2022-Friendswood-004)	The City purchased a replacement Public Works facility in January 2021 to replace the old facility which flooded during Harvey. The new facility needs to be retrofitted in order to meet current building codes.	Engineering, Community Development, Public Works, Parks and Recreation
F-2016-4	Purchase and installation of a back-up natural gas generator at the Activities Building	Parks and Recreation, Office of Emergency Management	No Progress	Yes (as 2022-Friendswood-005)	The Activities Building is used during emergencies as a shelter, warming / cooling center, and to house employees. Natural gas would allow full power without having to refuel the facility.	Parks and Recreation, Office of Emergency Management



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
F-2016-5	Purchase and installation of back-up natural gas generator for Friendswood Animal Control Facility and	Community Development Department, Capital Improvements, Fire Marshal's Office	No Progress	Yes (as 2022-Friendswood-006)	The City of Friendswood is susceptible to tropical cyclones, severe weather, and winter weather that can cause a disruption in electrical service. Without power, animal control operations would be disrupted. Animals inside the shelter would be at risk due to a lack of ventilation.	Police Department, Office of Emergency Management
F-2016-6	Relocate the Public Works fuel system and tanks outside of the floodplain	Public Works, Community Development, Office of Emergency Management	No Progress	Yes (as 2022-Friendswood-007)	The Public Works fuel system and tanks are located within the special flood hazard area.	Public Works, Engineering
F-2016-7	Purchase a portable reader board	Police Department, Fire Marshal's Office	No Progress	No	-	-
F-2016-8	Acquire portable lighting devices to be used at major intersections during power outages	Public Works, Office of Emergency Management	No Progress	No	-	-
F-2016-9	Upgrade drainage systems and culverts to accommodate increased flow	Community Development, Public Works-Engineering & Capital Projects	Ongoing Capability.	Yes (as 2022-Friendswood-008)	The City is susceptible to heavy rainfall which can cause flooding within the City.	Engineering, Public Works



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
F-2016-10	Maintain drainage systems and culverts	Public Works Department - Streets & Drainage and Engineering, Community Development - Floodplain Manager	Ongoing Capability	No	-	-
F-2016-11	Mary's Creek Bridge Elevation ("Devils Dip")	Public Works Department, Office of Emergency Management, Galveston County Consolidated Drainage District	In Progress. This project is scheduled to be completed by the Galveston County Consolidated Drainage District	No	-	-
F-2016-12	Protect power lines from wind sensitive exposures such as trees, shrubs, and other overhead obstacles. Burying power lines, tree trimming, and other accepted methods to be used.	Engineering, Public Works	No Progress	Yes (as 2022-Friendswood-009)	The City is susceptible to tropical cyclones, severe weather, and winter weather which can damage above ground power lines.	Engineering, Public Works
F-2016-13	Adopt higher codes and update ordinances and regulations to promote hazard mitigation strategies	Community Development - Design Review Committee (DRC)	Ongoing Capability. The City updates and adopts building codes as necessary.	Yes (as 2022-Friendswood-010)	The City is susceptible to many natural hazards which are mitigated by better building codes.	Community Development, Fire Marshal's Office
F-2016-14	Update City Storm Surge Maps to Reflect the NWS Predictions	Community Development, Office of Emergency Management	No Progress	Yes (as 2022-Friendswood-011)	The City is susceptible to saltwater inundation due to storm surge.	Community Development
F-2016-15	Develop, initiate, and enhance public information campaigns and awareness programs for hazards	Office of Emergency Management -	Ongoing Capability	No	-	-



SECTION 9.5: City of Friendswood

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
		Public Information Officer				
F-2016-16	Create a public information and warning mobile application for Android and Apple systems.	City Manager's Office, Office of Emergency Management	No Progress	Yes (as 2022-Friendswood-012)	The City is susceptible to a variety of hazards.	City Manager's Office, Office of Emergency Management
F-2016-17	Develop a Comprehensive Drainage Plan	Community Development, Floodplain Manager, Office of Emergency Management	No Progress	Yes (as 2022-Friendswood-013)	The City is susceptible to heavy rainfall which can cause flooding within the City.	Engineering



Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.5-14, the City did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of Friendswood participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.5-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X			X	X		X			X
Dam & Levee Failure (no hazard exposure)										
Drought	X			X	X		X			X
Expansive Soils	X			X	X		X			X
Extreme Temperatures	X	X		X	X		X		X	X
Flood	X	X		X	X		X		X	X
Hail	X			X	X		X			X
Hurricane & Tropical Storm	X	X		X	X		X		X	X
Land Subsidence	X			X	X		X			X
Lightning	X			X	X		X			X
Pandemic	X			X	X		X			X
Severe Winter Storm	X	X		X	X		X		X	X
Thunderstorm Wind	X	X		X	X		X		X	X
Tornadoes	X	X		X	X		X		X	X
Tsunami	X	X		X	X		X		X	X
Utility Failure	X	X		X	X		X		X	X
Wildfire	X			X	X		X			X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of Friendswood would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.5-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Friendswood-001	Mitigation RFC/SRL properties	Problem: The City of Friendswood is prone to flooding due to heavy rainfall. During Harvey, approximately 2,800 structures were flooded. The City is also susceptible to saltwater inundation due to storm surge. Solution: This project seeks to mitigate risk by elevating, reconstructing, or acquiring residential structures. Acquisition, or buy-outs, would see vulnerable structures demolished with the land being available for green space or future flood control.	Existing	Flood, Hurricane & Tropical Storm, Tsunami, Land Subsidence	Minimize loss of life, injury, damage to property, the economy, and natural systems	Ongoing	Community Development, Floodplain Manager, Office of Emergency Management and applicable state and county agencies	HMGP, FMA, CDBG, TWDB	Risk to individual structures will be reduced.	Millions	High	SIP	SP
2022-Friendswood-002	Evacuation Routes	Problem: The City is at risk from a variety of hazards that could necessitate evacuation. Population growth in the region limits existing roadway capacity. During floods, the City is inundated with water limiting access to many areas of the City. Solution: The City will construct new roadways to provide for additional capacity and connectivity.	Both	Flood, Hurricane & Tropical Storm, Tornado, Tsunami	Minimize loss of life, injury	5 to 20 years	Public Works, Engineering	Bond	Life Safety	\$10-100 million	Medium	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Existing throughfares to be expanded.											
2022-Friendswood-003	Lightning Warning System	Problem: The City is vulnerable to severe weather, including lightning, hail, and tornados. City parks are widely used by the public who may not be aware of approaching storms. City parks offer little indoor shelter, particularly when large crowds are present. Solution: The City will purchase and install outdoor warning equipment for nine City Parks. The equipment will be tied into existing lightning detection grids via an internet connection and service subscriptions. The warning process will be automated with local sirens alerting when lighting is detected within a pre-set range. This will provide early warning for park goers and sports leagues.	Both	Lightning, Hail, Tornado	Minimize loss of life	1-2 years after funding	Parks and Recreation, Office of Emergency Management	HMGP	Minimize loss of life or injury within City parks	\$150,000	High	SIP	SP
2022-Friendswood-004	Critical Facilities Retrofits	Problem: The City's "Blackhawk" Building was purchased in 2021 as a replacement Public Works and Parks Maintenance facility. The building was	Existing	Hurricane & Tropical Storm, Tornado, Thunderstorm Wind	Minimize damage to property	1-3 years after funding	Engineering, Public Works	HMGP	Protection of Critical Facility	\$100,000 to \$500,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		originally built in 1992 and does not meet current building codes. Solution: The building will be retrofitted so that it meets or exceeds all current building codes.											
2022-Friendswood-005	Activities Building Backup Generator	Problem: The City's Senior Activity Center serves as an emergency shelter and / or a warming / cooling center during emergencies. The facility is equipped with a diesel generator with a relatively small fuel tank. The City does not have the equipment or manpower to keep the tank fueled during prolonged power outages. Solution: The City will purchase and install a natural gas generator at the Activities building that will not have to be re-fueled during outages.	Existing	Extreme Temperatures, Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Utility Failure	Minimize loss of life, injury	2 years after funding	Parks and Recreation, Fire Marshal's Office, Engineering	HMGP	Reliable emergency shelter	\$80,000	Medium	SIP	SP
2022-Friendswood-006	Animal Control Building Backup Generator	Problem: The City's Animal Control facility is not equipped with an emergency generator. A loss of power at this facility would negatively affect the animals sheltered and	Existing	Extreme Temperatures, Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind,	Minimize loss of life, injury, damage to property	2 years after funding	Police Department, Fire Marshal's Office, Engineering	HMGP	Continuation of animal control services	\$100,000	Medium	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		could cause a disruption in service. Solution: A natural gas generator would be purchased and installed to provide backup power to the facility.		Tornadoes, Utility Failure									
2022-Friendswood-007	Relocate Public Works Fuel System	Problem: The City's Public Works fuel tanks and pumps are located within the 100-year flood plain. When flooding occurs, the tanks are not accessible. Solution: The tanks are to be relocated out of the floodplain.	Existing	Flood, Hurricane & Tropical Storm, Tsunami	Maintain and enhance emergency management/mitigation capabilities	1 to 2 years	Public Works, Engineering	CDBG, HMGP, FMA	Functional Fuel Pumps during floods	\$100,000 to \$300,000	Medium	SIP	SP
2022-Friendswood-008	Improve Stormwater Drainage & Culverts	Problem: The City is susceptible to heavy rainfall which can cause flooding. Solution: Upgrade drainage systems and culverts to accommodate increased flow.	Both	Flood, Hurricane & Tropical Storm	Minimize damage to property.	5 to 10 years	Engineering, Public Works	HMGP, CDBG, FMA	Street flooding and losses to residential structures to be reduced.	\$5 to \$30 million	Low	SIP	SP
2022-Friendswood-009	Power Line Protection	Problem: Overhead powerlines within the City are subject to damage from weather. Trees can fall or be blown into overhead lines. Power poles can be blown down. Ice accumulation can damage utilities. Solution: Power lines will be buried when	Both	Extreme Temperatures, Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Utility Failure	Minimize loss of life, injury, damage to property, and the economy	Ongoing	Engineering, Public Works	HMGP, CDBG	Maintain electrical utility	Millions	Low	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		possible. Tree trimming and other accepted methods will be used to protect lines from debris.											
2022-Friendswood-010	Update Codes, Ordinances, and Regulations	Problem: The City is at risk from many hazards that can be mitigated with better building codes and ordinances. Solution: The City will adopt codes so that it stays within 6 years of the newest version of codes. The City will adopt ordinances and regulations as necessary to mitigate losses from hazards.	New	All Hazards except Dam & Levee Failure	Minimize loss of life, injury, damage to property, the economy, and natural systems from natural and human-caused hazard events	6 months, once need identified	Community Development, Fire Marshal's Office	Staff Time	More resilient community	\$2,000	High	LPR	PR
2022-Friendswood-011	Update Storm Surge Maps	Problem: The City's GIS maps reflect storm surge related to category of storm. Since maps were created, categories of storms have been separated from potential surge. Surge maps should reflect storm-surge heights as well as feet above ground level. Solution: Maps are to be revised to reflect storm surge heights, independent of category of storm. Specific local maps to be available to residents pre-storm.	Both	Flood, Hurricane & Tropical Storm	Enhance and Maintain public education and awareness activities	6 months	Community Development	Staff Time	Public Education	\$5,000	Medium	EAP	PI, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Friendswood-012	Public Mitigation Information and Warning App	Problem: The City is susceptible to a variety of hazards that need to be communicated to the public, including how to mitigate hazards at their properties. Solution: Create a public information and warning mobile application for Android and Apple systems that will allow the public to access information on how to mitigate hazards at their properties and notify the public of impending hazard events.	Both	All Hazards except Dam & Levee Failure	Enhance and Maintain public education and awareness activities	1 to 2 years	City Manager's Office, Office of Emergency Management	Staff Time	Public Education	\$3,000	Low	EAP	PI, ES
2022-Friendswood-013	Drainage Plan	Problem: The City is prone to flooding due to heavy rainfall. During Harvey, approximately 2,800 structures were flooded within the City. Solution: A Comprehensive Drainage Plan will be developed that identifies specific and viable projects that will best benefit the City. The plan can be used to support future mitigation projects.	Both	Flood	Minimize loss of life, injury, damage to property, the economy, and natural systems from natural events	1 to 2 years	Engineering	HMGP, FMA	Plan developed to reduce flooding	\$700,000 to \$800,000	High	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Friendswood-014	Dunbar Estates Bridge Replacement	Problem: The Dunbar estates bridge is load zoned to 21,000 lbs. which prohibits the passage of fire engines. Bridge is classified by TDOT as structurally deficient. The bridge is subjected to damage during floods from rushing water and debris strikes. Solution: The bridge is to be torn down and replaced with a higher bridge with concrete and steel columns and supports.	Existing	Flood	Minimize loss of life, injury, damage to property, the economy, and natural systems from natural and human-caused hazard events	2 to 3 years from funding	Engineering, Public Works	HMGP, CDBG, FMA	Approximately 105 residential structures provided more reliable access for emergency vehicles	\$1 to \$5 Million	Low	SIP	SP
2022-Friendswood-015	Potable Water Redundancy	Problem: Several sections of the City's potable water system have dead end lines. A single break would eliminate water service to those areas until it could be restored. Solution: Create redundancy and loops throughout the potable water system to mitigate breaks throughout the city. Additional water pipe is to be installed in certain areas in order to loop the system.	Both	Utility Failure	1	Ongoing	Engineering, Public Works	HMGP, CDBG, FMA	N/A	Millions	Low	SIP	SP
2022-Friendswood-016	Flood Signage	Problem: The City has multiple low lying areas that are subject to routine flooding.	Both	Flood	1	1 year	Engineering	HMGP, FMA	N/A	\$5,000	Medium	EAP	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Traditional signage can be slow to deploy. Solution: Permanent flip down signs will be installed in flood prone areas that can be engaged or activated by any staff member or emergency services. Additional barricades to be purchased for use in preventing vehicles from driving through flood waters.											
2022-Friendswood-017	Brigadoon Drainage Improvements	Problem: Street flooding in this area occurs during moderate-heavy rain events. The current drainage system is not sized adequately, and the road is often impassible during these events. Solution: Upsize storm sewer, install box culverts and reconstruct and slope the concrete street to improve drainage.	Existing	Flood	1	1 year	Engineering, Public Works	HMGP, CDBG, FMA	Minimize injury and property damage	~\$5 million	High	SIP	SP
2022-Friendswood-018	Harden Lift Stations	Problem: Several lift stations within the City are vulnerable to flooding. Solution: Lift station electrical components to be elevated above the storm of record with wet wells being	Existing	Flood, Tsunami	1	2 to 5 years	Public Works, Engineering	HMGP, CDBG, FMA	Maintain wastewater system	\$1 to \$3 million	Medium	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		sealed from water intrusion.											
2022-Friendswood-019	Backup Power for Lift Stations	Problem: Four lift stations within the City do not have backup power and will not operate during blackouts. Solution: Installation of backup generators at lift stations that do not have standby generators.	Existing	Extreme Temperature, Hurricane and Tropical Storm, Severe Winter Weather, Tornado, Thunderstorm Wind, Utility Failure	1	1 to 2 years after funding	Public Works, Engineering	HMGP, CDBG	Maintain sewer system	\$400,000	Low	SIP	SP
2022-Friendswood-020	Generator for "Blackhawk Building"	Problem: The City's "Blackhawk Building" does not have a standby generator. The facility serves as Public Works, Parks Maintenance, and Engineering as well as a future emergency shelter. Backup power is needed to maintain operations during power failures. Solution: Purchase and install a natural gas generator with automatic switch gear.	Existing	Extreme Temperature, Hurricane and Tropical Storm, Severe Winter Weather, Tornado, Thunderstorm Wind, Utility Failure	1	1 to 2 years after funding	Public Works, Engineering, Fire Marshal's Office	FEMA Mitigation, HMGP	Maintain Operations	\$600,000	High	SIP	SP
2022-Friendswood-021	Implement flood mitigation measures	Problem: The City is prone to flooding during heavy rainfall. During Harvey, approximately 2,800 structures were flooded.	Both	Flood	1	Ongoing	Engineering	HMGP, CDBG, FMA	Residential structures to be removed from the floodplain.	\$100 million-\$200 million	Medium	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Solution: Terracing, detention, and other flood mitigation projects are to be implemented in the Clear Creek watershed in order to reduce flood risk. As land is available, terracing/shelving and detention activities will be conducted. Fill will be disposed out of the floodplain.											
2022-Friendswood-022	Protect windows of City facilities to meet current City code	Problem: Windows on City facilities are not well protected from wind driven debris. Window film was previously installed on most facilities, but this does not meet current codes for wind protection. Solution: Window shutters or hardened glass to be installed on City facilities, including the newly purchased Blackhawk Building.	Existing	Hurricane & Tropical Storm, Tornado, Thunderstorm Wind	1	1 to 2 years upon funding	Engineering, Fire Marshal's Office, Parks and Recreation	HMGP, CDBG	Wind protection for City facilities	\$200,000	Medium	SIP	SP
2022-Friendswood-023	SOP for NFIP Compliance	Problem: The City is prone to flooding. During Harvey, approximately 2,800 structures sustained damage due to flood waters. A Standard Operating Procedure (SOP) is needed to ensure substantial damage estimates are	Both	Flood, Tsunami	2	6 months	Community Development	N/A	Reduction of flood losses	N/A	High	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		uniformly completed following floods and that repairs are accurately recorded in the form of building permits. Solution: Create a Standard Operating Procedures (SOP) for Community Development to reference in future events with details on how to conduct Substantial Damage Estimates (SDE) and how to review, evaluate and issue building permits to ensure compliance with the NFIP.											
2022-Friendswood-024	Install / Replace and bury fiber cable	Problem: Overhead fiber optic cable is susceptible to damage from windstorms, winter weather and other related weather conditions. The telephone poles are also susceptible to damage from vehicle accidents and high loads passing through. City telephone systems and public safety programs are reliant on fiber connections, including non-emergency Police, OEM, and Fire Department numbers.	Both	Utility Failure, Hurricane and Tropical Storm, Severe Winter Weather, Tornado, Thunderstorm Wind	2	1 to 2 years	IT	HMGP, CDBG	Continuation of communication systems	\$700 thousand for each project (city hall to public works and city hall to public safety)	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Solution: A private, City owned, fiber optic cable is to be installed between City Hall and the City's Public Works facility and from City Hall to the Public Safety Building. The cable will be buried in order to protect it from damage.											
2022-Friendswood-025	Winterize critical infrastructure and facilities	Problem: In 2021, multiple City facilities sustained damage due to freezing water lines and equipment due to extreme cold. Several facilities are not insulated from the extreme cold. Solution: Heaters and insulation to be installed as necessary to prevent pipes and equipment from freezing during future extreme cold events. Facilities, parks, and infrastructure to be protected.	Both	Extreme Temperature, Severe Winter Weather	1	1 year	Public Works, Parks and Recreation	HMGP	Protection from freeze	\$30,000	Medium	SIP	SP
2022-Friendswood-026	External Threat Mitigation to SCADA System: Security measures to protect water & wastewater	Problem: The City's Public Works Department relies on the operation of the SCADA system for monitoring the communities' water and wastewater utilities. With cyber and external threats becoming more prevalent, software and	Existing	Cyber Terrorism	1	1 year	Engineering, Public Works	HMGP, CDBG, UASI, SHSP	Avoid threats to the City's water/wastewater	\$250,000-\$350,000	Medium	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		hardware updates need to be addressed to protect the City's resources. Solution: Security updates to the SCADA system's software and hardware.											

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DPW	Department of Public Works
EHP	Environmental Planning and Historic Preservation
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation

Cost:

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)** - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- **Preventative Measures (PR)** - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- **Property Protection (PP)** - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information (PI)** - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection (NR)** - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.



- *Structural Flood Control Projects (SP)* - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)* - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.5-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Friendswood-001	Mitigation RFC/SRL properties	1	1	0	1	1	1	0	1	0	1	1	0	1	1	10	High
2022-Friendswood-002	Evacuation Routes	1	0	0	1	1	1	-1	0	0	1	1	-1	0	1	5	Medium
2022-Friendswood-003	Lightning Warning System	1	0	1	1	0	1	1	1	1	1	1	1	0	0	10	High
2022-Friendswood-004	Critical Facilities Retrofits	1	1	0	1	1	1	0	0	1	1	1	0	1	1	10	High
2022-Friendswood-005	Activities Building Backup Generator	1	0	0	1	0	1	0	1	1	1	1	1	0	0	8	Medium
2022-Friendswood-006	Animal Control Building Backup Generator	0	1	0	1	1	1	0	0	1	1	1	1	0	0	8	Medium
2022-Friendswood-007	Relocate Public Works Fuel System	0	0	0	1	0	1	0	1	1	1	1	1	1	0	8	Medium
2022-Friendswood-008	Improve Stormwater Drainage & Culverts	1	1	0	1	1	1	-1	0	0	1	-1	-1	0	0	3	Low
2022-Friendswood-009	Power Line Protection	1	1	0	0	0	0	-1	0	1	0	1	0	0	0	3	Low
2022-Friendswood-010	Update Codes, Ordinances, and Regulations	1	1	1	1	0	1	1	1	0	1	1	1	0	0	10	High
2022-Friendswood-011	Update Storm Surge Maps	0	0	1	1	0	1	1	0	0	1	1	1	0	0	7	Medium
2022-Friendswood-012	Public Mitigation Information and Warning App	0	0	1	1	0	1	0	0	0	1	1	0	0	0	5	Low
2022-Friendswood-013	Drainage Plan	0	0	1	1	1	1	1	1	1	1	-1	1	1	1	10	High
2022-Friendswood-014	Dunbar Estates Bridge Replacement	1	1	-1	1	0	1	-1	0	0	1	-1	0	0	0	2	Low



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Friendswood-015	Potable Water Redundancy	1	1	0	0	0	1	0	0	0	1	-1	0	0	0	3	Low
2022-Friendswood-016	Flood Signage	1	1	1	1	0	1	1	0	0	1	0	1	0	0	8	Medium
2022-Friendswood-017	Brigadoon Drainage Improvements	1	1	0	0	1	1	0	1	1	1	1	0	1	0	9	High
2022-Friendswood-018	Harden Lift Stations	0	1	0	1	1	1	0	1	0	1	0	0	1	1	8	Medium
2022-Friendswood-019	Backup Power for Lift Stations	0	0	0	1	0	1	0	1	0	1	1	1	0	0	6	Low
2022-Friendswood-020	Generator for "Blackhawk Building"	1	0	1	1	1	1	1	1	1	1	1	1	0	0	11	High
2022-Friendswood-021	Implement flood mitigation measures	1	1	0	0	1	1	0	0	1	1	0	0	1	1	8	Medium
2022-Friendswood-022	Protect windows of City facilities to meet current City code	1	1	0	1	0	1	0	1	1	1	1	0	0	0	8	Medium
2022-Friendswood-023	SOP for NFIP Compliance	1	1	1	1	0	1	1	0	0	1	0	1	1	1	10	High
2022-Friendswood-024	Install / Replace and bury fiber cable	0	1	1	1	1	1	1	0	1	1	0	1	0	0	9	High
2022-Friendswood-025	Winterize critical infrastructure and facilities	0	1	1	1	1	1	1	0	1	1	0	1	0	0	9	Medium
2022-Friendswood-026	External Threat Mitigation to SCADA System: Security measures to protect water & wastewater	1	0	0	0	1	1	0	1	0	1	1	0	1	0	7	Medium

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions.
Low (0-4), Medium (5-8), High (9-14).



9.6 CITY OF HITCHCOCK

This section presents the jurisdictional annex for the City of Hitchcock and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in Hitchcock participated in the planning process, an assessment of the City's risk and vulnerability, the different capabilities used in Hitchcock, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.6.1 Hazard Mitigation Planning Team

The City of Hitchcock followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many Hitchcock departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.6-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Arnie Cross	Director of Community Development	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Wilmon Smith	Police Chief	Attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Ruth Ann Sorrell	City Secretary	Provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Leroy Thomas	Public Works	Provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.6.2 Jurisdictional Profile

The City of Hitchcock is located in the southwestern part of Galveston County. According to the U.S. Census, the 2010 population for the City was 6,961. The estimated 2019 population was 7,301, a 4.9-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 6.1-percent of the population is 5 years of age or younger and 14.4-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.6.3 Jurisdictional Capability Assessment and Integration

The City of Hitchcock performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the



components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of Hitchcock identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of Hitchcock, what is present in the jurisdiction, and code citation and date.

Table 9.6-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 150 – Building Regulations, last revised 1/27/2021	State and Local	Building Inspector/ Code Enforcement Officer
<i>How does this reduce risk?</i> The City has adopted the International Building Codes with amendments. All substandard buildings or structures within the terms of this chapter which shall constitute a menace to the health, safety or general welfare of its occupants or of the public are declared to be public nuisances and shall be ordered to be vacated, repaired or demolished. The Ordinance contains a bulkhead section requiring that all commercial and residential developments in the city adjacent to the water must install suitable bulkhead along the banks the entire length of the property shoreline. The bulkheads shall be designed and installed in such manner as to insure proper soil and land retention and the effective reduction of storm damage and erosion.					
Zoning/Land Use Code	Yes	No	Chapter 156 – Zoning Regulations	Local	Community Development
<i>How does this reduce risk?</i> This chapter is adopted for the purpose of protecting the health, safety, and general welfare of the residents, citizens, and inhabitants of the City of Hitchcock, Texas. These regulations are designed to: • Lessen congestion in the streets; • Secure safety from fire, panic, and other dangers; • Promote health and general welfare; • Provide adequate light and air; • Prevent the overcrowding of land; • Avoid undue concentration of population; and, • Facilitate the adequate provision of transportation, water, sewers, schools, parks and other public requirements for the benefit of the citizens of Hitchcock.					
Subdivision Ordinance	Yes	No	Chapter 155 – Subdivisions, 11/27/1979	Local	Community Development
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
The purpose of this Chapter is to provide for the orderly, safe and healthful development of the area within the city and within the area surrounding the city and to promote the health, safety, morals and general welfare of the community. The first-floor elevation of all developments should be described as a minimum of one foot above the flood hazard boundary map as provided by the Department of Housing and Urban Development, Federal Insurance Administration.					
Site Plan Ordinance	No	No	-	-	-
How does this reduce risk?					
Stormwater Management Ordinance	No	Yes	-	-	-
How does this reduce risk?					
Post-Disaster Recovery/ Reconstruction Ordinance	No	No	-	-	-
How does this reduce risk?					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
How does this reduce risk? The law requires disclosures of the seller of a single family dwelling by answering Yes or No to being aware of any of the following conditions: • Present flood insurance coverage • Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir • Previous water penetration into a structure on the property due to a natural flood event • Located wholly or partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) • Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) • Located wholly or partly in a floodway • Located wholly or partly in a flood pool • Located wholly or partly in a reservoir					
Growth Management	No	No	-	Local	-
How does this reduce risk?					
Environmental Protection Ordinance	No	Yes	-	-	-
How does this reduce risk?					
Flood Damage Prevention Ordinance	Yes	Yes	Chapter 152 – Flood Hazard Areas, 4/21/2008	Federal, State, County and Local	City Secretary / Floodplain Administrator
How does this reduce risk? It is the purpose of this Chapter to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by implementing the following mitigation methods; (1) Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities; (2) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; (3) Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters; (4) Control filling, grading, dredging and other development which may increase flood damage; (5) Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands. New construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to or above the base flood elevation. A registered professional engineer, architect, or land surveyor shall submit a certification to the Floodplain Administrator that the standard of this subsection as proposed in subsection 152.42(1)a. , is satisfied. New construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to or above the base flood level or together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.					
Wellhead Protection	No	No	-	-	-
How does this reduce risk?					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Emergency Management Ordinance	Yes	No	Chapter 37 – Emergency Management, 2/21/1994	Local	Emergency Management Director
<i>How does this reduce risk?</i> There exists the office of Emergency Management Director of the city which shall be held by the Mayor in accordance with state law. The duties and responsibilities of the Emergency Management Director shall include the following: (A) Conduct an on-going survey of actual or potential hazards which threaten life and property within the city and an on-going program of identifying and requiring or recommending the implementation of measures which would tend to prevent the occurrence or reduce the impact of such hazards if a disaster did occur. (B) Supervision of the development and approval of an emergency management plan for the city and shall recommend for adoption by the City Commission all mutual aid arrangements deemed necessary for the implementation of such plan. (C) Authority to declare a local state of disaster. A comprehensive emergency management plan shall be developed and maintained in a current state. The plan shall set forth the form of the organization, establish and designate divisions and functions, assign responsibilities, tasks, duties, and powers, and designate officers and employees to carry out the provisions of this chapter.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-
Planning Documents					
Comprehensive Plan	Yes	No	Comprehensive Plan, 2020-2040	Local	Community Development
<i>How does this reduce risk?</i> The City of Hitchcock is a resilient community dedicated to sustainable growth, high quality of life and attracting development to the area. The Comprehensive Plan 2020-2040 is designed to guide the City of Hitchcock for its future growth. Due to Hitchcock's inherent flood risk, extensive planning and measures should be taken to protect itself from an ever increasing threat of flooding. Implement low-impact development techniques to manage stormwater runoff. The planning team emphasizes the importance of conservation and use of on-site water retention to mitigate water quantity and quality. The city needs to evaluate and improve the water and sewer system. A conservation overlay district is proposed that would provide accountability from the local government to ensure the greatest method of flood mitigation in Hitchcock. The Plan contains recommended measures for flood mitigation and resiliency throughout and will be a useful guide for future projects and actions.					
Capital Improvement Plan	Yes	No	City Budget	Local	City Manager
<i>How does this reduce risk?</i> The City adopted its 2022 Capital Budget. It contains Capital Improvement project appropriations of \$1,000,000.00. The 5-year Capital Plan includes funding for street reconstruction, drainage improvements, critical facility elevation, and water and sanitary sewer upgrades.					
Disaster Debris Management Plan	Yes	No	-	-	-
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	Yes	No	Flood Plain SOP	Local	Community Development
<i>How does this reduce risk?</i>					
Stormwater Management Plan	Yes	No	Stormwater Management Program – Structural Control Guideline.	Federal	Community Development
<i>How does this reduce risk?</i> The City follows the processes necessary to comply with MS4.					
Open Space Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	No	No	-	-	-



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
<i>How does this reduce risk?</i>					
Shoreline Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Agriculture Plan	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	No	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	Hitchcock Emergency Response Plan	Local	Emergency Manager
<i>How does this reduce risk?</i>					
Continuity of Operations Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of Hitchcock to oversee and track development.



Table 9.6-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Community Development
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	-
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	No	-

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Hitchcock and their current responsibilities which contribute to hazard mitigation.

Table 9.6-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	Arnold Cross Jr., Community Development Director
Zoning Board of Adjustments	Yes	Arnold Cross Jr., Community Development Director - The Board of Adjustment consists of five (5) members with two alternates and all cases must be heard by at least seventy-five (75) percent of the members four (4). The Board is a quasi-judicial board. It is not a legislative body with the authority to amend ordinances or create new laws. The Board conducts hearings on matters dealing with the Hitchcock Zoning Ordinance and determines if strict compliance with the ordinance will create a hardship. The Board also considers whether the variance will comply with the spirit and intent of the ordinance.
Planning Department	Yes	Arnold Cross Jr., Community Development Director
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	Tyler Robert, EDC Director
Public Works/Highway Department	Yes	Leroy, Thomas, Utility Superintendent
Construction/Building/Code Enforcement Department	Yes	Cynthia Smith-Rex, Code Enforcement Officer
Emergency Management/Public Safety Department	Yes	Chief Wilmon Smith
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	Ruth Ann Sorrell, Internet, Text, Alerts
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	Leroy Thomas, Utility Superintendent
Mutual aid agreements	Yes	Chief Wilmon Smith
Human Resources Manual	No	-
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	No	-
Engineers or professionals trained in building or infrastructure construction practices	No	-
Planners or engineers with an understanding of natural hazards	No	-
Staff with expertise or training in benefit/cost analysis	No	-
Professionals trained in conducting damage assessments	No	-
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	No	-
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	No	-



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Grant writer(s)	No	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to the City of Hitchcock.

Table 9.6-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	Yes, current grants in use.
Capital improvements project funding	Yes, Budget reflects mitigation projects.
Authority to levy taxes for specific purposes	-
User fees for water, sewer, gas or electric service	-
Impact fees for homebuyers or developers of new development/homes	-
Stormwater utility fee	-
Incur debt through general obligation bonds	-
Incur debt through special tax bonds	-
Incur debt through private activity bonds	-
Withhold public expenditures in hazard-prone areas	-
Other federal or state funding programs	-
Open Space Acquisition funding programs	-
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	-

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Hitchcock.

Table 9.6-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	No	-
Personnel skilled or trained in website development	Yes	Maintains and updates website as needed
Hazard mitigation information available on your website	Yes	The City's website has an alert page where residents can sign up to receive e-notifications. Alerts include health, police, utilities/streets, and weather/hurricane. The main page of the City's website also posts latest news and events.
Social media for hazard mitigation education and outreach	Yes	Facebook, Twitter, Instagram and YouTube
Citizen boards or commissions that address issues related to hazard mitigation	No	-
Other programs already in place that could be used to communicate hazard-related information	No	-
Warning systems for hazard events	Yes	Internet, Text, Alerts



Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Natural disaster/safety programs in place for schools	No	-
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Hitchcock.

Table 9.6-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (ISO Fire Protection Classes 1 to 10)	No	-	-
Storm Ready Certification	No	-	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable
NP Not participating
- Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.6-8. Adaptive Capacity

Hazard	Preliminary Ranking
Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate



*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.6.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.6-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	Areas of Hitchcock where you are likely in a flood zone: All the Highland Bayou areas within 150 ft. of the bank; parts of Wood Acres along the canal side; the back part of Tacquard along the bayou; Greenwood subdivision along North Bayou; Temple Circle and Temple Drive; Hwy 6 from FM 2004 to Dixie Donuts and from Mike St. to Bayou Vista; Delaney Rd. at Magnolia to Prairie; all Bayou Glen and Memorial Drive areas; Crestview Subdivision; parts of Pecanwood, east and west Bayou St.; all Little Bend areas; all of the east end of town including Harborwalk; the south end of 2 nd St.; Meadowbrook Rd.; the east end of Robinson Rd.; north and south Redfish.
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	No
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No, currently investigating with Texas A&M
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	Yes, number uncertain
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	Some completed – Number unknown
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes, except for heavy rain events
NFIP Compliance	
What local department is responsible for floodplain management?	Community Development
Are any certified floodplain managers on staff in your jurisdiction?	No
Do you have access to resources to determine possible future flooding conditions from climate change?	Not currently – Working to develop
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes, staffing
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	Floorplan permit required. Permit review, process inspections, SDI determinations
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	FEMA, SDE/SDI process



NFIP Topic	Comments
What are the barriers to running an effective NFIP program in the community, if any?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	Yes, continuing to identify and require compliance with permit requirements
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	-
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Title XV, Chapter 152 April 21, 2008
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Yes, require elevation certificates for all new projects
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	No
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	The City does not participate in the CRS program.

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.6.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.6-10. Recent and Expected Future Development

Type of Development	2016		2017		2018		2019		2020		2021	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	-	-	-	-	-	-	-	-	-	-	-	-
Multi-Family	-	-	-	-	-	-	-	-	-	-	-	-
Other (commercial, mixed-use, etc.)	-	-	-	-	-	-	-	-	-	-	-	-
Total Permits Issued	-	-	-	-	-	-	-	102	-	695	-	-
Property or Development Name	Type of Development		# of Units / Structures		Location (address and/or block and lot)			Known Hazard Zone(s)*		Description / Status of Development		
Recent Major Development and Infrastructure from 2016 to Present												
None identified												
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years												
None identified												

SFHA Special Flood Hazard Area (1% annual chance flood event)



Number of building permits based on best available data during the drafting of this HMP

** Only location-specific hazard zones or vulnerabilities identified.*

9.6.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of Hitchcock's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City of Hitchcock has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.6-1. Hitchcock Area Extent and Location Map (Flood)

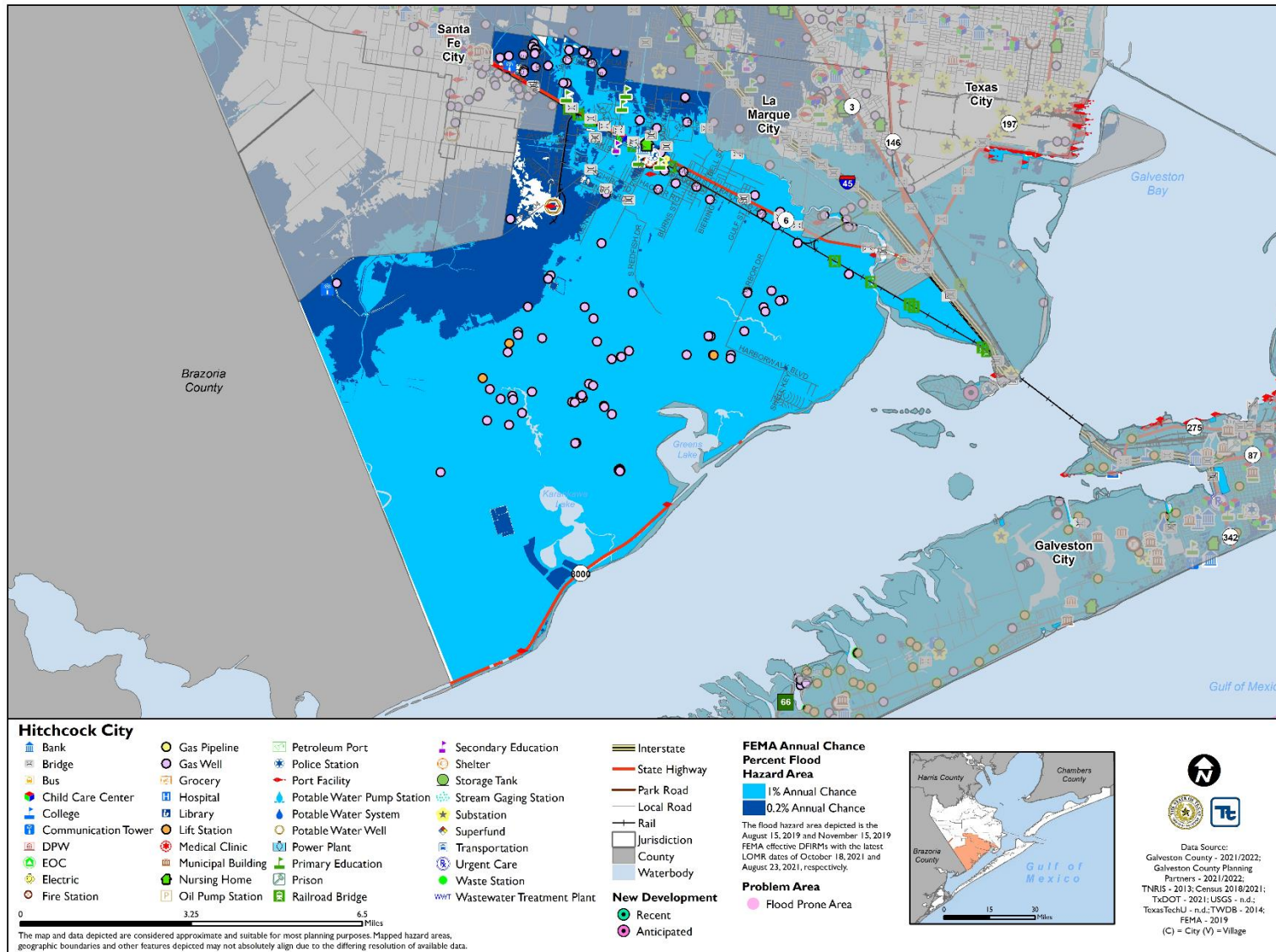




Figure 9.6-2. Hitchcock Area Extent and Location Map (SLOSH, Tsunami)

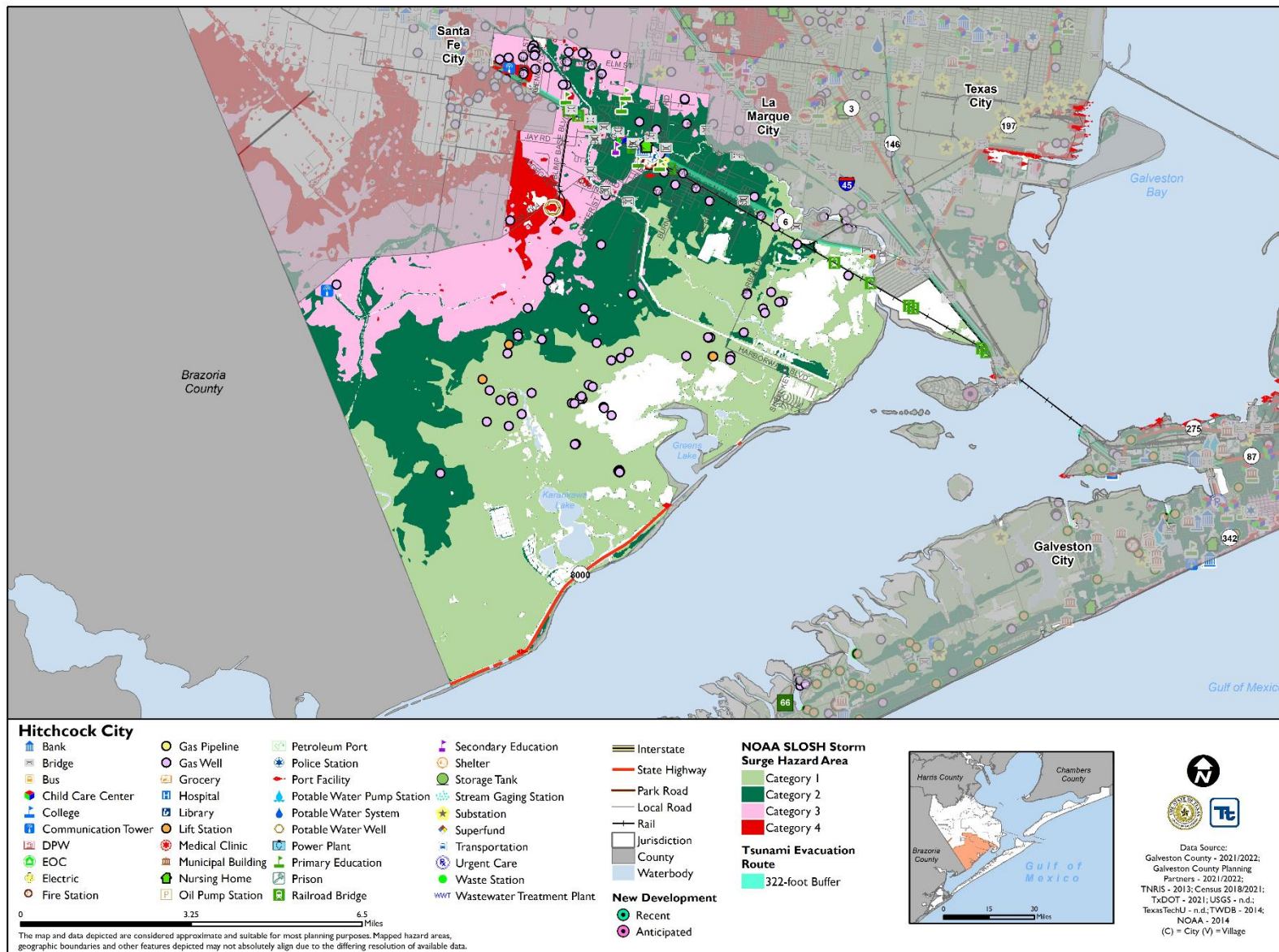




Figure 9.6-3. Hitchcock Area Extent and Location Map (Sea Level Rise, WUI)

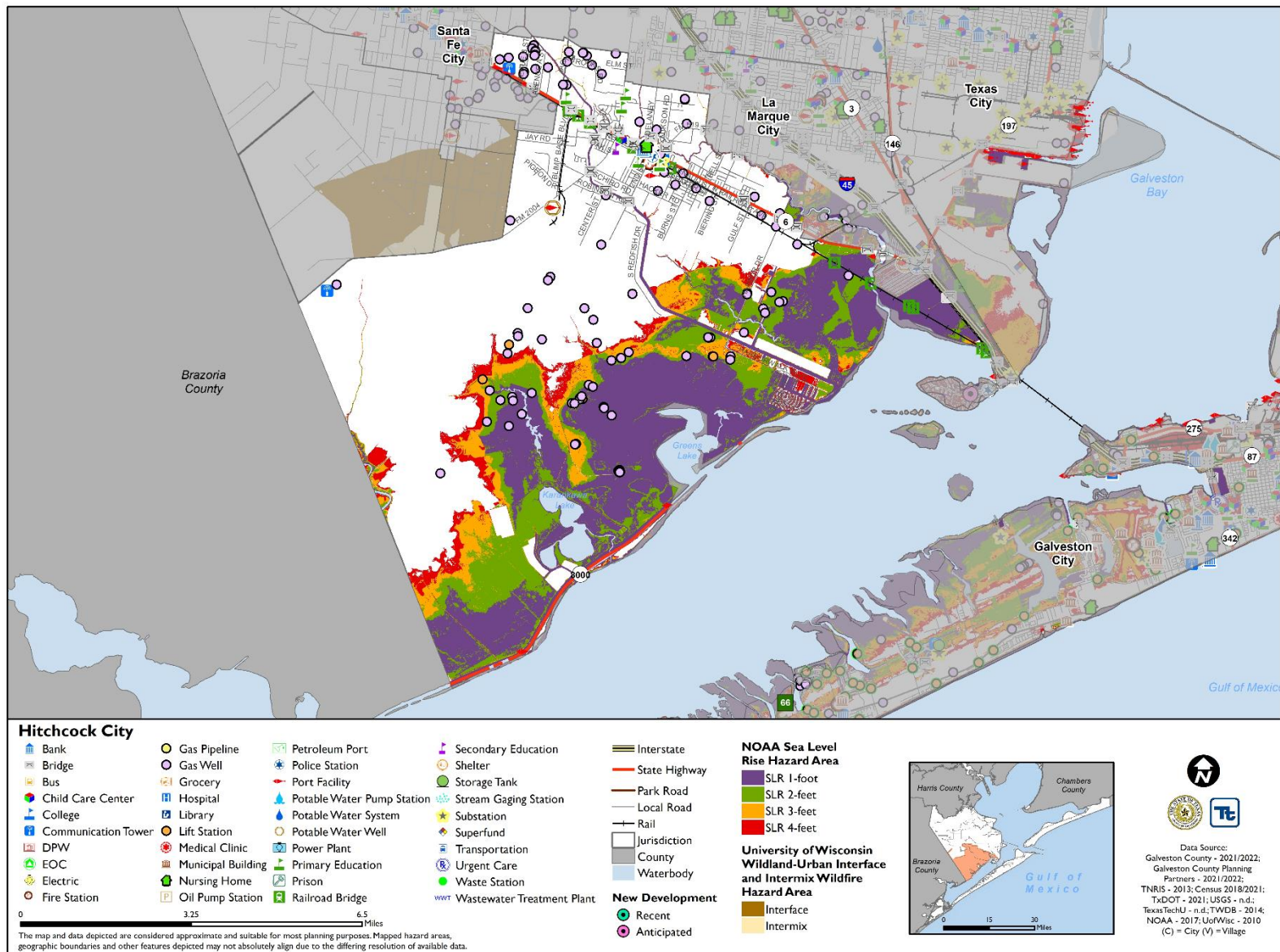
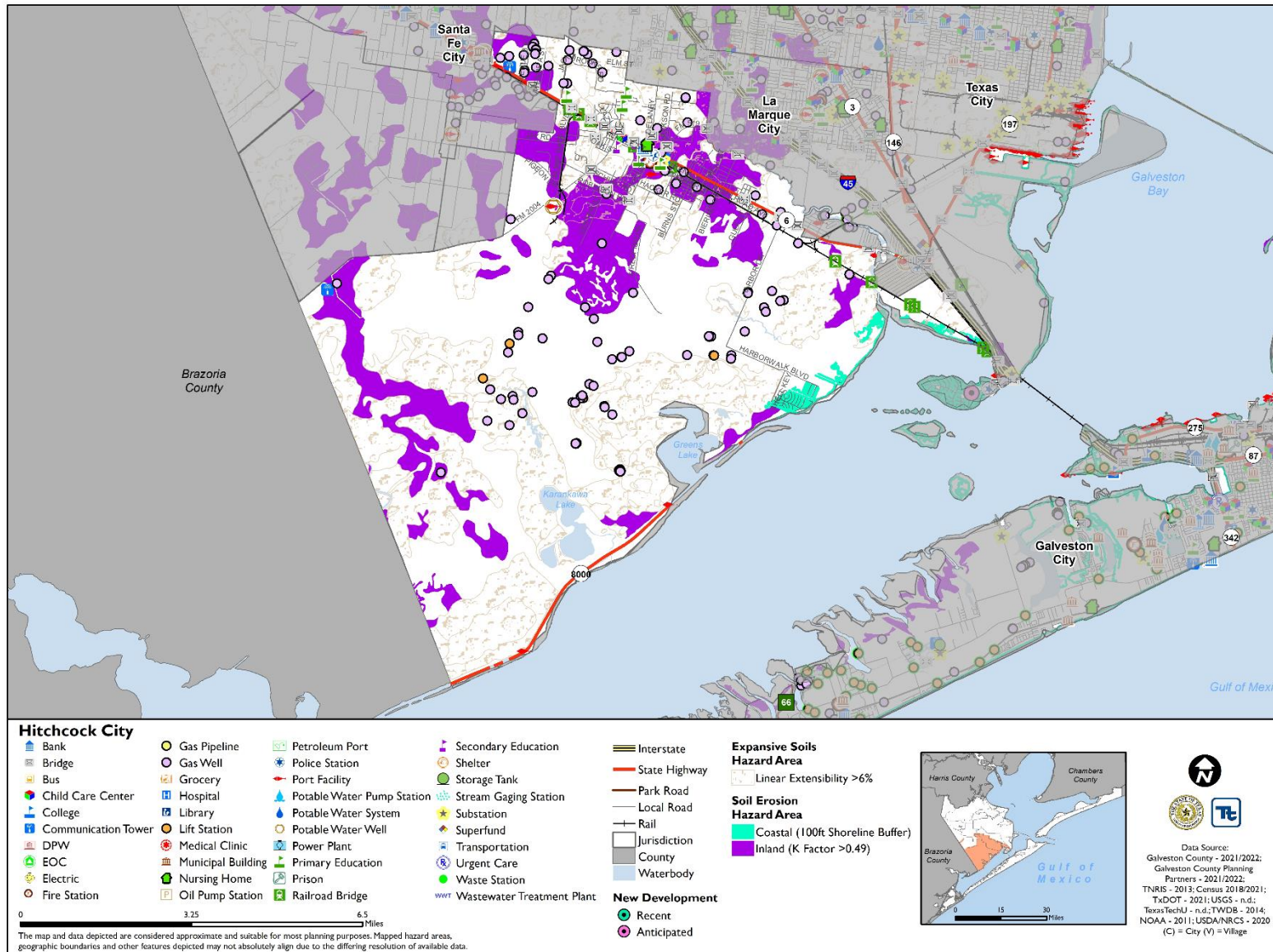




Figure 9.6-4. Hitchcock Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of Hitchcock's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages Hitchcock experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.6-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	The municipality did not identify specific losses or damages.
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	The municipality did not identify specific losses or damages.
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson and Santa Fe. Approximately	Approximately \$2 million in damages.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	The municipality did not identify specific losses or damages.
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	The municipality did not identify specific losses or damages.
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in	\$111,789.08 in damages. Extreme freeze. 1 death, broken pipes, no electricity



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			Galveston County, along with over \$12 million in property damages.	
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	High winds and power outages.

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Hitchcock's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of Hitchcock. The City of Hitchcock reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of Hitchcock agreed with the calculated rankings.

Table 9.6-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
High	Low	Low	High	Medium	High	Low	High	Low

Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire
Low	Low	Low	Medium	Medium	Low	Medium	Low

Note: The scale is based on the hazard rankings established in Section 5.3 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

9.6.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.



Past Mitigation Initiative Status

The following table indicates progress on the community’s mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the ‘Capability Assessment’ presented previously in this annex.



Table 9.6-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status?(e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
H-2006-2:	Increase flow capacity to drainage system on Lexington Dr.	City of Hitchcock	No progress. Routine maintenance.	No	Drains to TXDOT waterway; not a priority.	-
H-2006-3:	Increase flow capacity to drainage system on Concord Dr.	City of Hitchcock	No progress. Routine maintenance.	No	-	-
H-2006-4:	Increase flow capacity to drainage system on Lincoln Dr.	City of Hitchcock	No progress. Routine maintenance.	No	-	-
H-2006-5:	Increase flow capacity to drainage system on Willow Dr.	City of Hitchcock	No progress. Routine maintenance.	No	-	-
H-2006-6:	Increase flow capacity to drainage system on Meadowplace Dr.	City of Hitchcock	No progress. Routine maintenance.	No	-	-
H-2006-7:	Increase flow capacity to drainage system on Tacguard Dr.	City of Hitchcock	No progress. Routine maintenance.	Yes (as 2022-Hitchcock-001)	Regraded ditches 2022.	-
H-2006-8:	Increase flow capacity to drainage system on Barry St.	City of Hitchcock	No progress. Routine maintenance.	Yes (as 2022-Hitchcock-001)	Regraded ditches in 2022.	-
H-2006-9:	Increase flow capacity to drainage system Woodacres Dr.	City of Hitchcock	No progress. Routine maintenance.	No	-	-
H-2006-10:	Increase flow capacity to drainage system on Buins St.	City of Hitchcock	No progress. Routine maintenance.	No	-	-



Project #	Project	Responsible Party	What is the status?(e.g., In Progress, No Progress, Ongoing Capability, or Completed)If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
H-2006-11:	Increase flow capacity to drainage system on Jay Rd.	City of Hitchcock	Completed.	No	-	-
H-2006-12:	Increase flow capacity to drainage system on Hacker Rd.	City of Hitchcock	No progress. Routine maintenance.	No	Has new 52" culverts and grade. Drains to diversionary.	-
H-2006-16:	Increase flow capacity to drainage system on Steward Rd.	City of Hitchcock	No progress. Routine maintenance.	No	-	-
H-2006-18:	Increase flow capacity to drainage system on Hawthorne St.	City of Hitchcock	No progress. Routine maintenance.	No	-	-
H-2006-20:	Increase flow capacity to drainage system on Belring Rd.	City of Hitchcock	No progress. Routine maintenance.	Yes (as 2022-Hitchcock-001)	Regraded	-
H 2011-1:	Develop and provide public awareness materials and information at community events (food bank) and city website regarding hazards	Police and Fire Departments, Galveston County EMC	Ongoing community awareness.	-	-	-
H 2011-3:	Extend water and sewer lines to septic and well water customers not currently on City system	City departments	Completed on Neville \$150,000 city project.	-	At developer's expense.	-
H 2011-8:	Implement a tree trimming/vegetation removal program from public right of ways	City Administration	No progress	Yes (as 2022-Hitchcock-002)	-	-
H 2011-10:	Purchase and install emergency power generators and connections equipment to support critical facilities and infrastructure	City Administration	Ongoing progress	Yes (as 2022-Hitchcock-003)	-	-
H 2011-11:	Implement storm sewer system improvement projects to mitigate flooding	City Administration	Storm in progress; added PlacEDS and cycle event.	-	-	-



Project #	Project	Responsible Party	What is the status?(e.g., In Progress, No Progress, Ongoing Capability, or Completed)If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
H 2011-13:	Upgrade water and sanitary sewer distribution and collection system infrastructure to include backflow prevention valves	City Administration	Ongoing progress	Yes (as 2022-Hitchcock-004)	-	-
H 2011-19:	Evaluate, design, and implement hardening measures to protect existing critical facilities and critical infrastructure	City Administration	No progress	Yes (as 2022-Hitchcock-005)	-	-
H 2016-1:	Stormproof/retrofit new critical facilities and infrastructure	City Administration	No progress	Yes (as 2022-Hitchcock-006)	-	-
H 2016-2:	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties	City Administration and applicable state and county agencies	No progress	(as 2022-Hitchcock-007)	-	-
H 2016-3:	Improve regulations and permit requirements to promote hazard mitigation strategies	City Administration and applicable departments	No progress	(as 2022-Hitchcock-013)	-	-



Additional Mitigation Efforts

In addition to the completed actions identified in Table 9.6-14, the City of Hitchcock has identified the following mitigation projects/activities that have been completed over the last five years:

- Improve in-flow and infiltration in sanitary system. Contracted FEMA Hazard Mitigation. \$1.2 million.
- King Solutions regraded ditches and manhole rehab.
- Hazmat mitigation up size the water lines on main thoroughfares.
- \$3.6 million grant to upgrade wastewater treatment and collection system. SPI engineering is the coordinating firm.
- \$1.9 million from American Relief Fund for infrastructure rehab from the United States government.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of Hitchcock participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.6-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X			X	X		X			X
Dam & Levee Failure (no hazard exposure)										
Drought	X			X	X		X			X
Expansive Soils	X			X	X		X			X
Extreme Temperatures	X	X		X	X		X		X	X
Flood	X	X		X	X		X		X	X
Hail	X	X		X	X		X		X	X
Hurricane & Tropical Storm	X	X	X	X	X	X	X	X	X	X
Land Subsidence	X			X	X		X			X
Lightning	X	X		X	X		X		X	X
Pandemic	X			X	X		X			X
Severe Winter Storm	X	X	X	X	X	X	X	X	X	X
Thunderstorm Wind	X	X	X	X	X	X	X	X	X	X
Tornadoes	X	X	X	X	X	X	X	X	X	X
Tsunami	X	X		X	X		X		X	X
Utility Failure	X	X	X	X	X	X	X	X	X	X
Wildfire	X	X	X	X	X	X	X	X	X	X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of Hitchcock would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1)



for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.6-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Hitchcock-001	Drainage Ditch Maintenance and Upgrade	Problem: The city of Hitchcock is a low-lying area with storm water drainage via a city-wide system of culverts and ditches. Over time, the ditches become overgrown with vegetation and accumulate debris. Increasing development within the city places ever-increasing demands on the ditch system. Lack of city resources prevent sufficient attention to the ditch system. Maintenance tends to be more reactive than pro-active. This often contributes to flooding issues when unanticipated storm events occur. Solution: Resource and implement a drainage ditch management program.	Both	Flood, Hurricane & Tropical Storm, Thunderstorm, Severe Winter Storm	1	1-5 years	Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of critical infrastructure.	Medium	High	SIP	SP, PP
2022-Hitchcock-002	Tree and Vegetation Trimming / Removal	Problem: Continual trimming of vegetation is required to mitigation the impact of severe weather. Solution: Implement a tree trimming/vegetation removal program from public right of ways.	Both	Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Utility Failure, Wildfire	1	Ongoing	City Administration, Public Works	FEMA Grant Funding (HMGP)	Protection of critical infrastructure.	Medium	High	NSP	NR, PP
2022-Hitchcock-003	Emergency Generators	Problem: Critical facilities lack backup power. Solution: Purchase and install emergency power generators and connection equipment to support critical facilities and infrastructure.	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind,	1	1-5 years	City Administration, Public Works	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
				Tornadoes, Tsunami, Utility Failure, Wildfire									
2022-Hitchcock-004	Water and Sewer System Upgrades	Problem: Substandard water and sewer system impacted by storm events. Solution: Upgrade water and sanitary sewer distribution and collection system infrastructure to include backflow prevention valves.	Existing	Flood, Hurricane & Tropical Storm	1	1-5 years	City Administration, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of critical infrastructure.	High	High	SIP	SP, PP
2022-Hitchcock-005	Existing Critical Facilities Protection	Problem: Facilities need to be retrofit to withstand hazard events. Solution: Evaluate, design, and implement hardening measures to protect existing critical facilities and critical Infrastructure.	Existing	Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure	1	Ongoing	City Administration, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP, ES
2022-Hitchcock-006	New Critical Facilities Storm proofing	Problem: Design standards for new facilities are inadequate to withstand severe hazard events. Solution: Stormproof new critical facilities and infrastructure.	New	Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure	1	Ongoing	City Administration, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	LPR	PR, PP
2022-Hitchcock-007	Mitigation RFC/SRL properties	Problem: Flood waters damaged facilities. Solution: Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood	Existing	Flood, Hurricane & Tropical Storm	1	1-5 years	City Administration, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Claim / Severe Repetitive Loss (RFC/SRL) properties.											
2022-Hitchcock-008	Map and Develop Buildable Land Inventory	Problem: The city is confronting a period of rapid residential and commercial growth. Developers are proposing projects in out-lying areas of the city that are beyond the range of city utilities and current fire/police acceptable response times. Also, many of the locations are in environmentally sensitive areas. Development of such locations potentially reduces habitat of indigenous wildlife. The city needs a better process to rapidly assess suitability of land for development. Solution: Coordinate the hazard mapping in this HMP with a planning effort to map, develop and implement a comprehensive inventory of land within the city including risks and vulnerabilities associated with potential development.	New	Coastal and Inland Erosion, Flood, Hurricane & Tropical Storm, Thunderstorm, Severe Winter Storm, Land Subsidence, Utility Failure	1	Ongoing	City Administration, Director of Community Development	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR
2022-Hitchcock-009	Address outstanding NFIP compliance violations	Problem: The City of Hitchcock continues to experience severe damage from periodic flooding events. Many homes are rebuilt following flooding without city permits or substantial damage assessments. Builders purchase damaged homes, remodel and sell to unwary buyers without full disclosure of flooding history. Lack of city resources	N/A	Hurricane & Tropical Storm, Thunderstorm, Severe Winter Storm, Land Subsidence	1	Ongoing	City Administration, Director of Community Development, Public Works	FEMA Grant Funding (FMA, HMGP)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR, PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		has limited the ability to identify and address NFIP compliance violations in a timely fashion. This on-going situation negatively impacts the city's ability to qualify for preferred flood insurance rates by participation in the FEMA CRS program. Solution: Fund city resources to address the problem of non-compliance with NFIP requirements and begin the process of qualifying for the FEMA CRS program.											
2022-Hitchcock-010	Hire additional staff with knowledge of land development, land management practices and advanced mapping techniques	Problem: The City of Hitchcock continues to experience hazard events from a broad array of natural and man-made causes. Despite this history, the city is currently confronting rapid growth and development, both residential and commercial. To effectively manage this growth requires a broad knowledge of cause and effect. Advances in mapping technologies can allow city staff to visualize, understand and question many land development situations much more quickly and completely than in the past. This can only happen if staff is trained and familiar with the capabilities of mapping technology. Solution: Funding for additional city staff that can apply the latest mapping technologies to land development and management	N/A	Hurricane & Tropical Storm, Coastal Erosion, Flood, Thunderstorm, Severe Winter Storm, Land Subsidence, Pandemic	2	Ongoing	City Administration, Director of Community Development	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	EAP	PI, PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		practices, thereby avoiding land use decisions with unintended consequences.											
2022-Hitchcock-011	Develop and adopt a Stormwater Management Ordinance	Problem: The City of Hitchcock is a low-lying area with storm water drainage via a city-wide system of culverts and ditches. The city is confronting a period of rapid residential and commercial development. This development reduces the amount of permeable land available to absorb water during storm events. The result is increasing stormwater runoff that impacts surrounding properties and inundates roadways leading to flooding of structures and lack of transportation access during emergencies. Solution: Develop and implement a Stormwater Management Ordinance to control impact of development on land use.	Both	Hurricane & Tropical Storm, Thunderstorm, Severe Winter Storm	2	Ongoing	City Administration, Director of Community Development	FEMA Grant Funding (FMA, HMGP)	Protection of critical infrastructure.	Low	High	LPR	PR, PP
2022-Hitchcock-012	Purchase generators or upgrade existing installations for critical facilities and infrastructure that lack adequate backup power.	Problem: The City of Hitchcock experiences numerous instances of power loss throughout the year. Severe weather events damage fragile utility transmission systems and critical city facilities cannot operate to provide services during the event. The severe winter freezing conditions of February of 2021 highlighted the extent of the problem. In addition, existing generators in the city	Existing	Hurricane & Tropical Storm, Thunderstorm, Severe Winter Storm, Lightning, Utility Failure	1	1-5 years	City Administration, Public Works	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		are old and some are located below current floodplain requirements. Existing generators require upgrade and/or replacement along with elevation to prevent potential flooding damage. Solution: Develop a plan and secure funding to purchase and/or upgrade back-up power supply capabilities for city facilities. Ensure facilities are hardened and elevated to prevent damage from all hazards.											
2022-Hitchcock-013	Integrate mitigation measures in community regulations and permits	Problem: Hazard mitigation is an ongoing need. Solution: Improve and enforce community regulations and permit requirements to promote hazard mitigation strategies. This includes restricting development or requiring enhanced building techniques in floodplains and mapped high-hazard areas.	Both	All Hazards except Dam & Levee Failure	1, 2	Ongoing	City Administration, Director of Community Development	FEMA Grant Funding (FMA, HMGP)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR, ES
2022-Hitchcock-014	Public Outreach	Problem: Methods and operational equipment are needed to inform the public on how residents can mitigate hazards at their properties. Additionally, outreach methods are needed informing the community of immediate danger from an impending hazard or updating the public with an ongoing controlled hazard.	Both	All Hazards except Dam & Levee Failure	3	1-5 Years	City Administration, Director of Community Development	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	EAP	PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Solution: Public outreach program will be designed to inform residents on how they can mitigate hazards at their properties and notify the public of immediate hazard threats or updated supplemental information of ongoing hazards through numerous methods that could include text messages, automated "robo calls", emails, media outlet press releases, internet websites and social media accounts from city departments. Equipment would include social monitoring or crowd source programs, cameras and hard-shell cases, laptop, and a dedicated vehicle.											

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DPW	Department of Public Works
EHP	Environmental Planning and Historic Preservation
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation

Cost:

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)** - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:



- **Preventative Measures (PR)** - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- **Property Protection (PP)** - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information (PI)** - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection (NR)** - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Structural Flood Control Projects (SP)** - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- **Emergency Services (ES)** - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.6-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Hitchcock-001	Drainage Ditch Maintenance and Upgrade	0	1	1	1	1	1	0	1	1	1	1	1	1	1	12	High
2022-Hitchcock-002	Tree and Vegetation Trimming / Removal	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Hitchcock-003	Emergency Generators	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Hitchcock-004	Water and Sewer System Upgrades	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Hitchcock-005	Existing Critical Facilities Protection	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Hitchcock-006	New Critical Facilities Storm proofing	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Hitchcock-007	Mitigation RFC/SRL properties	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Hitchcock-008	Map and Develop Buildable Land Inventory	0	1	1	1	1	1	0	1	1	1	1	1	1	1	12	High
2022-Hitchcock-009	Address outstanding NFIP compliance violations	0	1	1	1	1	1	0	1	1	1	1	1	1	1	12	High
2022-Hitchcock-010	Hire additional staff with knowledge of land development, land management practices and advanced mapping techniques	0	1	1	1	1	1	0	1	1	1	1	1	1	1	12	High
2022-Hitchcock-011	Develop and adopt a Stormwater Management Ordinance	0	1	1	1	1	1	0	1	1	1	1	1	1	1	12	High



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Hitchcock-012	Purchase generators or upgrade existing installations for critical facilities and infrastructure that lack adequate backup power.	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Hitchcock-013	Integrate mitigation measures in community regulations and permits	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Hitchcock-014	Public Outreach	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions. Low (0-4), Medium (5-8), High (9-14).



9.7 JAMAICA BEACH

This section presents the jurisdictional annex for the City of Jamaica Beach and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City of Jamaica Beach participated in the planning process, an assessment of the City of Jamaica Beach's risk and vulnerability, the different capabilities used in the City of Jamaica Beach, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.7.1 Hazard Mitigation Planning Team

The City of Jamaica Beach followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many City of Jamaica Beach departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.7-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Brad Heiman	Police Chief	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Ana Mondragon	Director of Operations	Provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.7.2 Jurisdictional Profile

Jamaica Beach is a city in Galveston County located on Galveston Island. It is bordered to the east and west by the City of Galveston, the east bay to the north, and the Gulf of Mexico to the south. The City of Jamaica Beach is governed by a mayor and five councilpersons. According to the U.S. Census, the 2010 population for the City was 983. The estimated 2019 population was 1,078, a 9.7-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 1.9-percent of the population is 5 years of age or younger and 16.2-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.7.3 Jurisdictional Capability Assessment and Integration

The City of Jamaica Beach performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:



- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of Jamaica Beach identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of Jamaica Beach, what is present in the jurisdiction, and code citation and date.

Table 9.7-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	International Building Code 2019-8	State and Local	David Ewalt – Building Official
<i>How does this reduce risk?</i>					
Zoning/Land Use Code	Yes	No	City Ordinance 2019-7 Effective Date 10/21/2019	Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Subdivision Ordinance	Yes	No	City Ordinance 2019-7 Effective Date 10/21/2019	Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Site Plan Ordinance	Yes	No	City Ordinance 93-5 effective 12/6/1993	Local and County	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Stormwater Management Ordinance	Yes	Yes	City Ordinance 93-5 effective 12/6/1993	Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Post-Disaster Recovery/ Reconstruction Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single family dwelling by answering Yes or No to being aware of any of the following conditions: • Present flood insurance coverage • Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir • Previous water penetration into a structure on the property due to a natural flood event • Located wholly or partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) • Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) • Located wholly or partly in a floodway • Located wholly or partly in a flood pool • Located wholly or partly in a reservoir					
Growth Management	Yes	No	City Ordinance 2019-7 effective 10/21/2019	Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Environmental Protection Ordinance	Yes	Yes	City Ordinance 2019-7 effective 10/21/2019	Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Flood Damage Prevention Ordinance	Yes	Yes	City Ordinance 2020-06 effective 11/16/2020	Federal, State, County and Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	City Ordinance 94-2 established 3/21/1994	Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	-	-	-	-	-
Planning Documents					
Comprehensive Plan	Yes	No	City Ordinance 2017-1 established 4/17/2017	Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Capital Improvement Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Disaster Debris Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Stormwater Management Plan	Yes	No	City Ordinance 93-5 effective 12/6/1993	Local	Ana Mondragon / Director of Operations



SECTION 9.7: Jamaica Beach

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
<i>How does this reduce risk?</i>					
Open Space Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Shoreline Management Plan	Yes	No	City Ordinance 93-5 effective 12/6/1993	State, Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Agriculture Plan	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	No	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	City Ordinance 94-2 established 3/21/1994	Local	Ana Mondragon / Director of Operations
<i>How does this reduce risk?</i>					
Continuity of Operations Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	No	Yes	-	-	-



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	-	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of Jamaica Beach to oversee and track development.

Table 9.7-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	The Building Department is responsible for issuing permits
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	The City has certain regulations for beachfront permits
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Yes	Most of the City has already been built out

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Jamaica Beach and their current responsibilities which contribute to hazard mitigation.

Table 9.7-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	Volunteer staff of 5, responsible for mapping in the city, they support hazard mitigation
Zoning Board of Adjustments	Yes	Volunteer staff of 5, responsible for mapping in the City, they support hazard mitigation
Planning Department	No	Not Applicable
Mitigation Planning Committee	No	Not Applicable
Environmental Board/Commission	No	Not Applicable
Open Space Board/Committee	No	Not Applicable
Economic Development Commission/Committee	No	Not Applicable
Public Works/Highway Department	Yes	Responsible for maintenance that decreased flood risks
Construction/Building/Code Enforcement Department	Yes	This department ensures that construction work is completed with mitigation hazards in mind
Emergency Management/Public Safety Department	No	Not Applicable
Warning Systems / Services (mass notification system, outdoor warning signals)	No	Not Applicable
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	Tree trimming, clearing of the ditches, mowing and weed eating.
Mutual aid agreements	No	-



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Human Resources Manual	Yes	-
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	Contracted engineers develop projects in accordance with the City mitigation plan
Engineers or professionals trained in building or infrastructure construction practices	Yes	Contracted engineers develop projects in accordance with the City mitigation plan
Planners or engineers with an understanding of natural hazards	Yes	Contracted engineers develop projects in accordance with the City mitigation plan
Staff with expertise or training in benefit/cost analysis	No	Not Applicable
Professionals trained in conducting damage assessments	Yes	Contracted evaluators would be brought to the City in the event that they were needed
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	No	Not Applicable
Scientist familiar with natural hazards	No	Not Applicable
Surveyor(s)	No	Not Applicable
Emergency Manager	Yes	Leads the City team in case of an emergency
Grant writer(s)	No	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	No	Not Applicable

Fiscal Capability

The table below summarizes financial resources available to the City of Jamaica Beach.

Table 9.7-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	No
Capital improvements project funding	Yes, currently the city has several projects including street improvement projects and lift station repairs
Authority to levy taxes for specific purposes	Yes, City Council may increase taxes in an event it is needed
User fees for water, sewer, gas or electric service	Yes – the city is the city’s water distributors
Impact fees for homebuyers or developers of new development/homes	No
Stormwater utility fee	No
Incur debt through general obligation bonds	Yes, they would have to be put out for bond elections
Incur debt through special tax bonds	Yes, they would have to be put out for bond elections
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other federal or state funding programs	Yes, the city can always apply for granting
Open Space Acquisition funding programs	No
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	Yes

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Jamaica Beach.

**Table 9.7-6. Education and Outreach Capabilities**

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	Citizens can be informed through Facebook and the City website
Personnel skilled or trained in website development	No	Not Applicable
Hazard mitigation information available on your website	Yes	Citizens can be informed through Facebook and the City website
Social media for hazard mitigation education and outreach	Yes	Citizens can be informed through Facebook and the City website
Citizen boards or commissions that address issues related to hazard mitigation	Yes	Citizens can be informed by attending open meetings of the different boards and commissions
Other programs already in place that could be used to communicate hazard-related information	No	Not Applicable
Warning systems for hazard events	No	Not Applicable
Natural disaster/safety programs in place for schools	No	Not Applicable
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Jamaica Beach.

Table 9.7-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	Yes	8	10/1/2018
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	Unknown	Unknown
Storm Ready Certification	No	-	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable
NP Not participating
- Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.7-8. Adaptive Capacity

Hazard	Preliminary Ranking
Erosion	Moderate
Dam and Levee Failure	Moderate



Hazard	Preliminary Ranking
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.7.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.7-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	Beach Comber has moderate issues with drainage as well as the canal side of Jolly Roger. The Black Beard drainage canal could use some dredging
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	The City does not have a current list.
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	To the City's knowledge there are no Risk MAP projects underway.
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	The determination is based on valuation of the property and assessed cost of damage. To my knowledge there have been no structures that have been assessed as having Substantial Damage.
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	To the City's knowledge 6 structures have been mitigated and I am unsure of how the projects have been funded. It is the City's understanding that they were funded by the property owners.
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes, the flood hazard maps properly address the flood risk in the jurisdiction.
NFIP Compliance	
What local department is responsible for floodplain management?	Village of Jamaica Beach Building Department
Are any certified floodplain managers on staff in your jurisdiction?	Yes, the Building Official
Do you have access to resources to determine possible future flooding conditions from climate change?	No
Does your floodplain management staff need any assistance or training to support its floodplain management program?	Yes, the Director of Operations needs to re-certify as a flood plain manager.



NFIP Topic	Comments
If so, what type of assistance/training is needed?	
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	The City performs permit review, outreach, inspections and have engineering capabilities.
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	The City would determine this based on the valuation of the improvement in comparison to the valuation of the structure.
What are the barriers to running an effective NFIP program in the community, if any?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	To the City's knowledge, there are no outstanding
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	To the best of the City's knowledge, the City has never had a CAV or CAC.
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	City Ordinance 2020-6 dates 11/16/2020
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Yes it exceeds minimum standards because it includes a one foot freeboard requirement.
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	Yes, staff presents to the Planning and Zoning Commission as well as to the Board of Adjustments and ensures that they are aware of the flood risks when allotting variances.
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	Yes, the City participates in CRS and is very interested in improving the CRS rating.

Source:

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.7.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.7-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	-	-	16	16	20	20	7	7	4	4	8	8
Multi-Family	-	-	0	0	0	0	0	0	0	0	0	0
Other (commercial, mixed-use, etc.)	-	-	0	0	0	0	0	0	0	0	0	0
Total Permits Issued	-	-	16	16	20	20	7	7	4	4	8	8



Property or Development Name	Type of Development	# of Units / Structures	Location (address and/or block and lot)	Known Hazard Zone(s)*	Description / Status of Development
Recent Major Development and Infrastructure from 2016 to Present					
None identified					
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years					
None identified					

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.7.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of Jamaica Beach's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City of Jamaica Beach has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.7-1. Jamaica Beach Area Extent and Location Map (Flood)

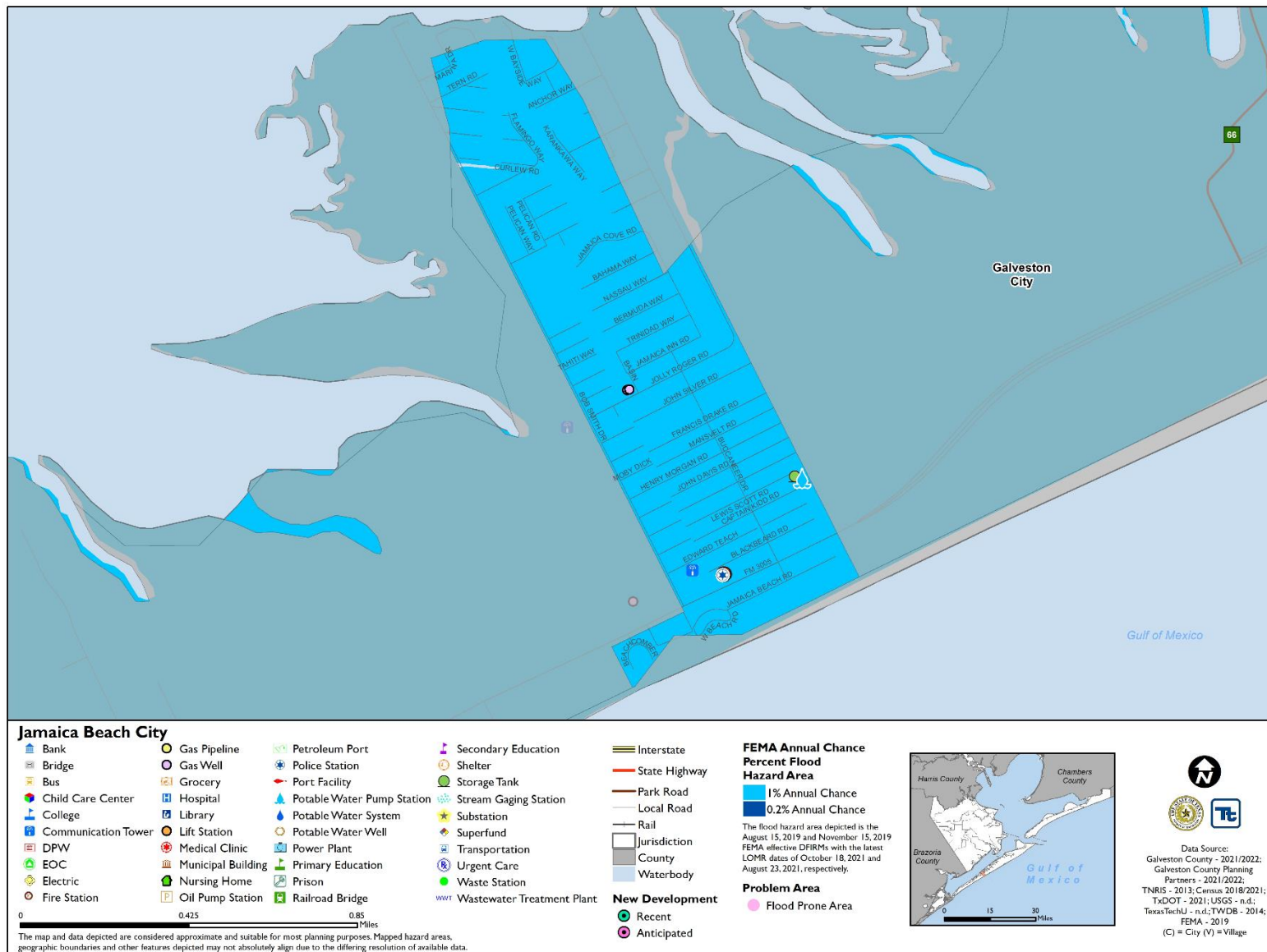




Figure 9.7-2. Jamaica Beach Area Extent and Location Map (SLOSH, Tsunami)

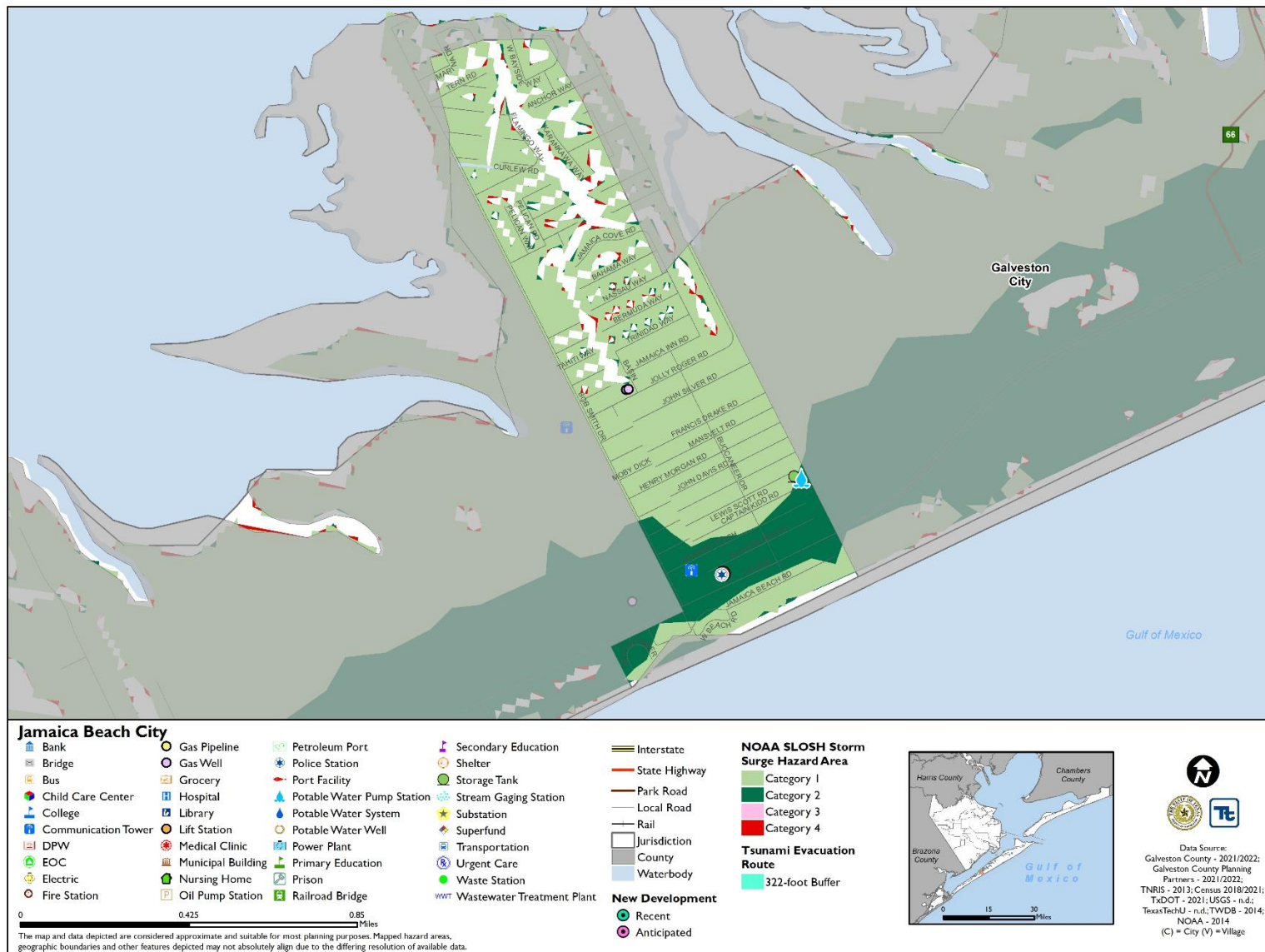




Figure 9.7-3. Jamaica Beach Area Extent and Location Map (Sea Level Rise, WUI)

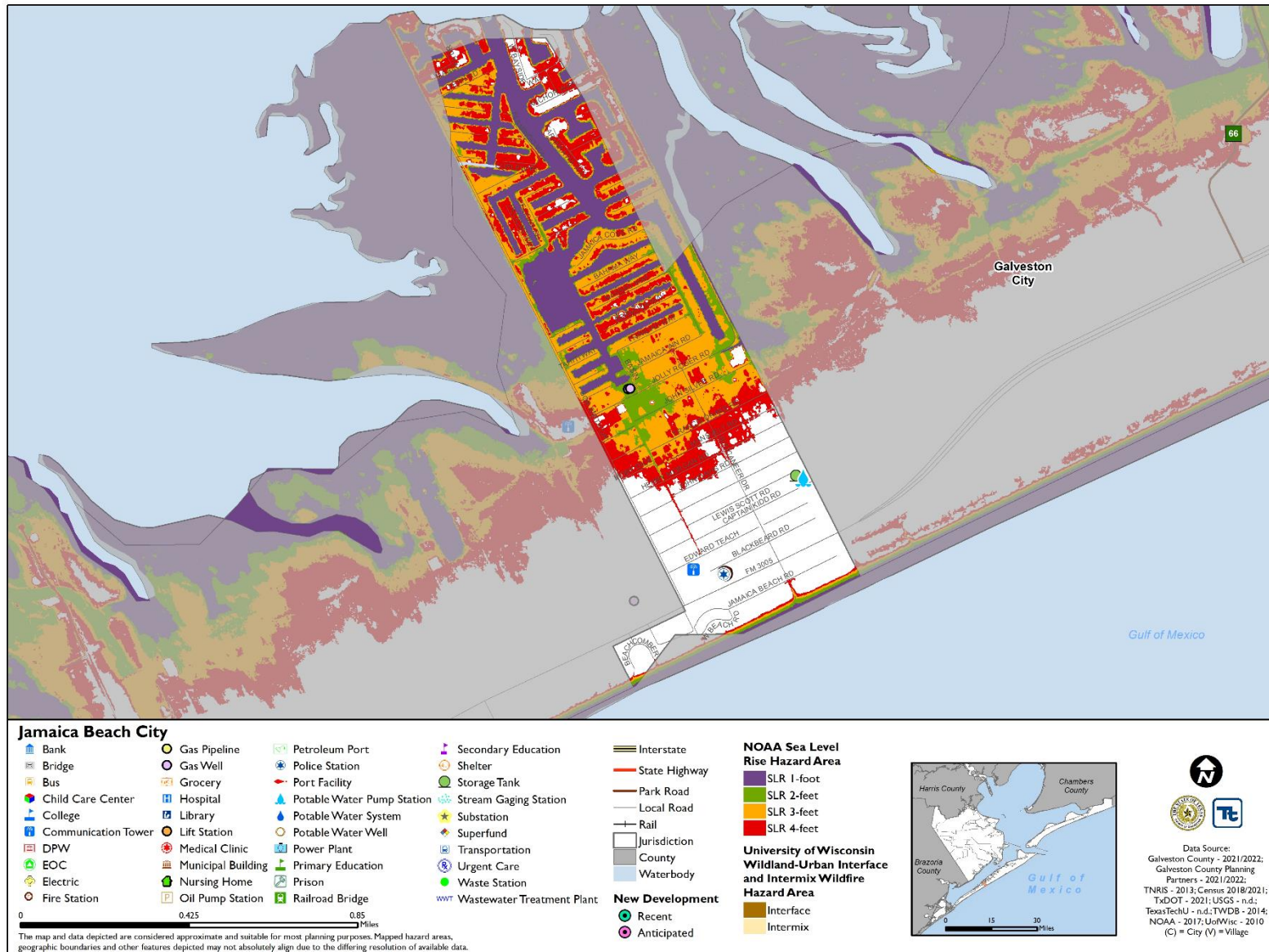
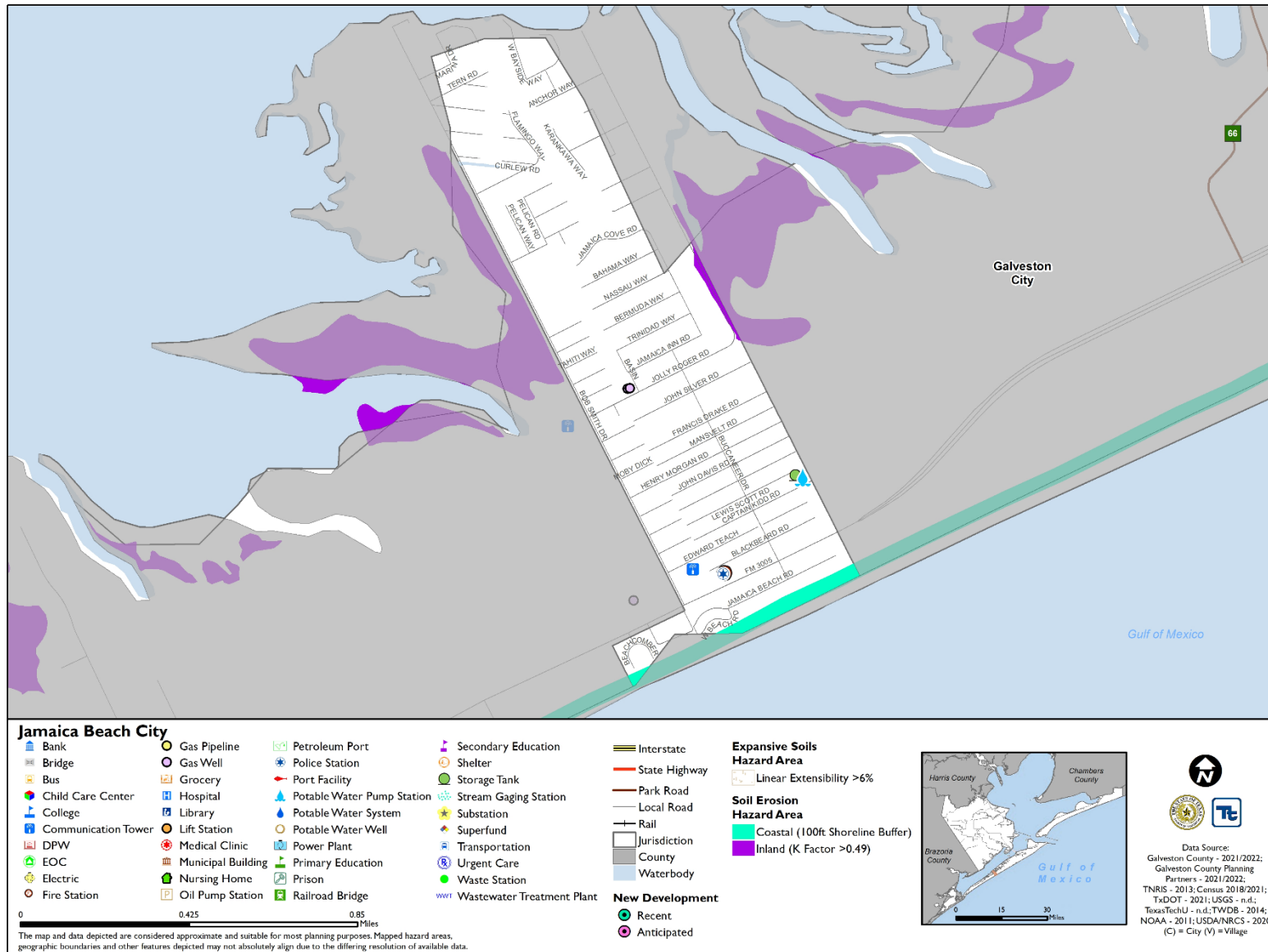




Figure 9.7-4. Jamaica Beach Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of Jamaica Beach's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages Jamaica Beach experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.7-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	Not Applicable
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	Not Applicable
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson and Santa Fe. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout	No damage was reported to the City



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	There was no damage in the City
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	There was no damage in the City
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	There were power outages in the City. There was extreme cold. Several pumps busted and had to be replaced.
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	There were power outages all thorough the City. There was damage to several structures due to the wind and there was a lot of debris that had to be cleared.

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Jamaica Beach's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.



As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of Jamaica Beach. The City of Jamaica Beach reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of Jamaica Beach agreed with the calculated rankings.

Table 9.7-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
Low	Low	Low	Low	Medium	High	Low	High	Low

Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire
Low	Low	Low	Medium	Medium	Low	Medium	Low

Note: The scale is based on the hazard rankings established in Section 4.4 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

9.7.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the 'Capability Assessment' presented previously in this annex.



Table 9.7-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
JB 2006-1:	Implement beach and dune restoration program	City staff and council	In Progress, this is funded through a TDEM grant	Yes (as 2022- Jamaica Beach- 001)	-	-
JB 2006-4:	Conduct annual hurricane town hall meetings	City staff	Completed	No	The Village of Jamaica Beach conducts a yearly Hurricane preparedness meeting	This is a joined effort between City Hall, The Fire Department and TWIA
JB 2011-5:	Prepare a Drought and Extreme Heat Contingency Plan	City Administrator	No	No	-	-
JB 2016-1:	Jamaica Cove Rd. Survey	City Administrator	No	No	-	-
JB 2016-2:	Purchase and install generators for existing and new critical facilities and infrastructure	City Administration	In Progress. The only generator that the city is waiting on is the on for the Fire Department which is back ordered at this time.	No	-	-
JB 2016-3:	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties	City Administration and applicable state and county agencies	In progress at this time	Yes (as 2022- Jamaica Beach- 011)	One home is being elevated at this time on the beach front	The Building Department and Director of Operations are overseeing the project.
JB 2016-4:	Improve regulations and permit requirements to promote hazard mitigation strategies	City Administration and applicable departments	In progress at this time	Yes (as 2022- Jamaica Beach- 012)	The city is consulting with Debbie Vascik at this time to tighten the flood ordinance and increase the CRS rating	The Building Department and Director of Operations are overseeing the project.
JB 2016-5:	Develop and provide public awareness campaigns for natural hazards	City Administration and applicable departments	IN progress	Yes (as 2022- Jamaica Beach- 013)	The Village of Jamaica Beach conducts a yearly Hurricane preparedness meeting In addition there is information on the City's website which is in the process of being updated to assist citizens in preparing for a natural hazard.	This is a joined effort between City Hall, The Fire Department and TWIA



Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.7-14, the City did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of Jamaica Beach participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.7-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X	X		X	X	X		X	X	X
Dam & Levee Failure (no hazard exposure)										
Drought	X			X	X	X				X
Expansive Soils	X	X		X	X	X			X	X
Extreme Temperatures	X	X		X	X	X	X		X	X
Flood	X	X		X	X	X	X	X	X	X
Hail	X	X		X	X	X			X	X
Hurricane & Tropical Storm	X	X		X	X	X	X	X	X	X
Land Subsidence	X	X		X	X	X		X	X	X
Lightning	X	X		X	X	X			X	X
Pandemic	X			X	X	X				X
Severe Winter Storm	X	X		X	X	X	X		X	X
Thunderstorm Wind	X	X		X	X	X			X	X
Tornadoes	X	X		X	X	X			X	X
Tsunami	X	X		X	X	X	X	X	X	X
Utility Failure	X	X		X	X	X	X		X	X
Wildfire	X	X		X	X	X			X	X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of Jamaica Beach would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.7-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Jamaica Beach-001	Dune Protection Study	Problem: With the wearing away of the shoreline residents along Beachcomber Road, Jamaica Beach Road, West Beach Road, and Buccaneer Road and Boardwalk subdivision become prone to flooding. The loss of Dune protection as well as the increased flooding issues and erosion of drainage ditches puts residents in danger of flooding hazards. In the past elderly residents (70+ years old) have had to pump water from their residences onto the shoreline to minimize flood damage to their structures. Solution: Restoration of the dunes. There needs to be an engineering study to determine the proper drainage. A beach construction certificate must be obtained from the General Land Office. Dunes need to be restored with in-kind materials. Acceptable grass must be planted on these dunes to minimize the hazards.	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Land Subsidence, Tsunami	1, 2, 3	5 years	Director of Operations	TDEM grants and grants awarded by FEMA	Protection of residential structures. Protection to elderly residents in these homes	Low	High	SIP, EAP	PR, NR, SP
2022-Jamaica Beach-002	Extreme Temperature Protection Emergency Winter storm, Water Pipe /	Problem: The City of Jamaica Beach has an aging infrastructure. During the 2021 Winter Storm, there were approximately 100 water lines/water meter that was damaged due to the	Both	Extreme Temperatures, Severe Winter Storm	1, 2, 3	1 year	Director of Operations	TDEM grants and grants awarded by FEMA	Protection of life. Allowing citizens to take refuge from extreme heat	Approximately \$80,000 for the reroof of the complex. Approximately \$14,000 for the generator	High	SIP, EAP	PP, PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
	Water meter protection	freezing temperatures. Currently, the city is operating at a 30-40 p.s.i. water pressure to minimize the damage to the water lines. This is in comparison with the City of Galveston's 100 p.s.i. working water pressure. Solution: Restoration and enlargement of water lines in the city. This also includes the replacement of faulty water meters.								including installation			
2022-Jamaica Beach-003	Flood Hazard Mitigation	Problem: The City of Jamaica Beach has an aging infrastructure. The water treatment plant operates at 50% due to damage that has been sustained throughout the years. Many of the drainage ditches are either clogged or overgrown compounding problems to the aging infrastructure that taxes the pumps in the lift stations and the workload in the water treatment facility. The Jamaica Beach Volunteer Fire Department is in dire need of a generator. The water boxes float away when the water levels get high. The City needs to replace them with boxes that will not float away. Solution: Evaluate the water treatment plant and ensure that all areas are operational.	Both	Flood, Hurricane & Tropical Storm, Tsunami, Utility Failure	1, 2, 3	Five years	Director of Operations	TDEM grants and grants awarded by FEMA	Protection of life. Elimination of loss of equipment and damage to buildings. Increase resiliency of first responders in the event of an emergency.	Water treatment Plant \$2,000,000; Generator \$5,000; Lift Stations \$700,000; Drainage Ditches \$200,000 Storage Facility \$500,000 Water Meter Boxes \$100,000	High	SIP, EAP	SP, PI, PP



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Purchase and install a generator at the Fire Department Building. Update and rehab lift stations throughout the City. Engineer drainage ditches throughout the City and ensures that proper drainage is achieved. Complete the engineering project throughout the City, including installing culverts, establishing drainage ditches, and clearing the existing drainage ditches. Building a storage facility for critical equipment that will be needed and used in the event of a storm. This is to include boats used for search and rescue, and materials and equipment used to protect the citizens from catastrophic flood damage. Replace water meter boxes throughout the City with those that will not float away. Adoption of a post disaster recovery ordinance.											
2022-Jamaica Beach-004	Critical Facility Upgrades to Withstand Hail and Wind	Problem: The City of Jamaica Beach has equipment that is not protected from the environment. There are also aging roof structures to the water treatment plant as well as to the emergency building complex. The city is in dire need of a facility that can store boats, equipment, and supplies that are needed to respond to emergencies. The	Existing	Hail, Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind, Tornadoes	1, 2, 3	Two years	Building Dept., Director of Operations	TDEM grants and grants awarded by FEMA	Protection of life by having equipment ready to respond in the event of an emergency. Elimination of loss of equipment and damage to buildings. Increase	Equipment and supplies Storage Facility \$500,000 Re-Roof \$100,000 Shutters	Medium	SIP, LPR	SP, PP, PR



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		emergency complex is in dire need of shutters that will eliminate hail and wind damage. Solution: Replace the roof at the emergency complex with a hail and wind-resistant roof. Install emergency shutters at the emergency complex, build a storage facility for equipment and supplies that are not protected from hail and wind at this time.							resiliency of first responders in the event of an emergency				
2022-Jamaica Beach-005	Implement Results of Dune Protection Study and Sea Level Rise Planning	Problem: The City of Jamaica Beach has multiple beachfront properties that are vulnerable to Sea Level raises and high tides. The city has lost much of its dune protection due to losses of these dunes from prior storms. Solution: Replacement and restoration to beach dunes will protect the beachfront community from further loss of life and property.	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2, 3	Five years	Director of Operations	TDEM grants and grants awarded by FEMA	Protection of life by the rebuilding, replacement and restoration of dunes. There will also be the protection of property by restoring dunes.	Restoration of dunes has a projected cost of \$2,000,000 including engineering	High	SIP, EAP	SP, NR, PI
2022-Jamaica Beach-006	Tree Trimming Program	Problem: Severe winds in the City present threats to lives, property, and utilities. This is due to downed power lines, trees, damage and to structures. Solution: Implement a tree trimming and removal program.	Both	Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Utility Failure, Wildfire	1, 2, 3	Five years	Director of Operations	TDEM grants and grants awarded by FEMA	Protection of life and critical infrastructure	Low	High	NSP	PP, NR, ES



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Jamaica Beach-007	Harden Infrastructure and Prepare Community for Severe Weather	Problem: The City of Jamaica Beach has multiple hazards when severe weather reaches us. The aging infrastructure and the water and sewer lines that are not designed to be below a freezing line suffer the greatest damage. This poses a threat to lives, property, and vital utilities, primarily because of flying debris downed trees and power lines. Severe winter temperatures cause damage to structures and infrastructure in the City of Jamaica Beach. Solution: Adding insulation to the emergency complex both to the attic areas and to exposed piping will protect the utilities. Adding generators to the water and sewer treatment facilities with generators that enable the city to install heaters into the lift stations will ensure that they do not have damage from liquid expansion in pipes. Building a storage building that will house equipment and supplies will ensure that the city has salt available to maintain adequate road and clearing capabilities, therefore, mitigating traffic accidents. Informing citizens about severe weather impacts and distributing family and traveling emergencies about	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Utility Failure	1, 2, 3	Five years	Building Dept., Director of Operations	TDEM grants and grants awarded by FEMA	Protection of life by building a new building to protect equipment and supplies. Creating a warming center and minimizing the damages to infrastructure as well as to facilities by improving insulation practices. Educating citizens on the dangers of Severe Winter storms and burning of fuel-burning equipment.	Building a new structure has a price of \$500,000. Replacing generators to lift stations \$35,000. Generator for the fire station area of the emergency complex \$15,000. Education programs \$3,000 Warming station maintenance and \$20,000 Water and Sewer infrastructure \$2,000,000. Winterization of affected structures \$40,000	High	SIP, EAP	SP, PP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		severe weather hazards will allow mitigation to be successful. Encouraging homeowners to install carbon monoxide monitors and providing driver education and materials will also decrease the hazards of severe winter storm weather. Educating citizens about the dangers of fuel-burning equipment and the importance of adequate ventilation. Reaching out to the vulnerable population and ensuring that they are safe. Establishing a heating center for the community.											
2022-Jamaica Beach-008	Beach Management Plan	Problem: The City of Jamaica Beach has a true hazard from storm surges. The city needs to develop a phased beach management plan. The city also needs to be able to protect its equipment and supplies in the event of a storm surge. Solution: Developing and maintaining a beach management plan. Building a critical facility in accordance with Executive Order 11988. Construct groins to capture material along the shoreline to trap and retain sand. Installing geotextile sand tubes to trap sand or protect beachfront properties. Building coastal berms to absorb waves and protect the shoreline from erosion. Building a storm berm to	Both	Coastal & Inland Erosion, Expansive Soils, Flood, Hurricane & Tropical Storm, Land Subsidence, Tsunami	1, 2, 3	Five years	Director of Operations	TDEM grants and grants awarded by FEMA	Protection of life by building a new building to protect equipment and supplies. Minimizing the damages to facilities and to residents by creating a more resilient community. Educating citizens on the dangers of storm surge. Protecting and restoring natural buffers to minimize the impacts of storm surges.	Building a new structure has a price of \$500,000. Education programs \$3,000. Development of a beach management plan and implementing safety features like geotextile tubes \$2,000,000	High	SIP, LPR	SP, PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		keep rock protection in place and provide a slow supply of sediment to the coastal system. Examining the appropriate use of beach nourishment, sand scraping dune-gap plugs, etcetera for coastal hazards. Implementing dune restoration, plantings, and use of natural materials. Planting sediment -trapping vegetation, sediment mounds, etc., for coastal hazards. Performing sand-scraping-using bulldozers to deposit the top foot of sand above the high tide line -to reinforce the beach without adding new sand. Using sediment mounds to act as artificial dunes or plugs for natural dune gaps to slow the inland progress of storm-related wind and water. Educate residents about unanticipated storm surge risks. Educating property owners in high-risk areas about mitigation options. Educating the public about risks, preparedness measures, and evacuation procedures.											
2022-Jamaica Beach-009	Subsidence Study and Implementation	Problem: The City of Jamaica Beach has a true hazard from subsidence. The city needs to develop a drainage solution throughout the beachside as well as the bayside of the city. The city currently has the destruction of streets and collapses of bulkheads in areas that the	Both	Expansive Soils, Flood, Hurricane & Tropical Storm, Land Subsidence	1, 2, 3	Five years	Director of Operations	TDEM grants and grants awarded by FEMA	Replacing water lines and sewer lines will allow the city to maintain subsidence at a minimum in the city. Sinkholes that create damage to	Bulkhead at the Water treatment plant \$150,000. Bulkheads at the Marina \$150,000. Replacement of Water Lines \$800,000. Replacement of	High	SIP, LPR	SP, PR



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Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		city is responsible for due to shifting soils. Solution: Developing a study to evaluate breakage in the infrastructure of sewer lines and water lines will allow the city to pinpoint problem areas. Once the areas that create soil shift by erosion through water and sewer leaks those lines can be replaced. Bulkheads can be repaired and filling as well as erosion protection can be installed in these areas. Educating the public about risks, preparedness measures, subsidence risk, and measures.							streets and rights of way will be mitigated. Repairing the bulkheads will prevent further damage to the marina as well as to the sewer treatment plant.	Sewer Lines \$1,500,000 Repair to damage from sinkholes due to subsidence \$100,000			
2022-Jamaica Beach-010	Increase Fire Fighting Capacity	Problem: The City of Jamaica Beach has a true hazard from wildfires due to proximity to the state park. The fire department has equipment that is outdated and there is a need for training in the fire department. There is a need for a building that stores equipment and supplies. Solution: Upgrading the fire equipment will enable the city to respond better and protect the lives and property of citizens in a more effective manner. The city needs to replace bunker gear. Update the air compressor to increase storage in the air cascade system and establish a mobile cascade to support	Both	Wildfire	1, 2, 3	Five years	City of Jamaica Beach Fire Dept.	TDEM grants and grants awarded by FEMA	Improved fire-fighting capabilities and safety for fire fighters	Bunker gear \$250,000. Air packs \$270,000. Bottler for air packs \$72,000. Air cascade system \$50,000. Mobile cascade system \$100,000. Monitor-Defibrillators \$90,000. Lucas Chest Compression devices \$54,000. Ladder Fire Truck \$1,200,000. Fire Engine \$500,000. Storage Building \$500,000.	High	SIP, EAP	SP, PP, ES



Section 9.7: Jamaica Beach

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		higher pressure air tanks. The city needs cardiac monitors – Defibrillators and chest compression devices. The ladder truck needs replacement as well as the Engine. Having a “burn” building and training tower will allow the city’s staff to train better and more effectively without having to go off Galveston Island for training. The city also need monitoring equipment for Carbon Monoxide, Hydrogen Sulfide, and Chlorine detection to minimize Haz-Mat situations when the wildfires reach the city. The fire hose is old and worn out. Citizens need to be educated about the risks of wildfires.								Training Facility \$800,000. Air monitoring equipment \$20,000. Fire Hoses \$30,000			
2022-Jamaica Beach-011	Mitigation RFC/SRL properties	Problem: Flood waters damaged facilities. Solution: Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties.	Existing	Flood, Hurricane & Tropical Storm	1, 2	1 to 5 years	Building Dept., Director of Operations	TDEM grants and grants awarded by FEMA	Protection of structures and critical infrastructure.	High	High	SIP	SP, PP
2022-Jamaica Beach-012	Integrate mitigation measures in community regulations and permits	Problem: Hazard mitigation is an ongoing need. Solution: Improve and enforce community regulations and permit requirements to promote hazard mitigation strategies. This includes restricting development or requiring enhanced building techniques in floodplains and mapped high-hazard areas.	Both	All Hazards except Dam & Levee Failure	1, 2, 3, 4	1 to 5 years	Building Dept., Director of Operations	TDEM grants and grants awarded by FEMA	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR, PP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Jamaica Beach-013	Develop and provide public information for residential mitigation and awareness for hazards	Problem: Methods and operational equipment are needed to inform the public on how residents can mitigate hazards at their properties. Additionally, outreach methods are needed informing the community of immediate danger from an impending hazard or updating the public with an ongoing controlled hazard. Solution: Public outreach program will be designed to inform residents on how they can mitigate hazards at their properties and notify the public of immediate hazard threats or updated supplemental information of ongoing hazards through numerous methods that could include text messages, automated “robo calls”, emails, media outlet press releases, internet websites and social media accounts from city departments. Equipment would include social monitoring or crowd source programs, cameras and hard-shell cases, laptop, and a dedicated vehicle.	Both	All Hazards except Dam & Levee Failure	1, 2	1-5 years	Director of Operations	TDEM grants and grants awarded by FEMA	Prevention of loss of life and protection of critical infrastructure.	Low	High	EAP	PR, ES

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV Community Assistance Visit
 CRS Community Rating System
 DPW Department of Public Works

Potential FEMA HMA Funding Sources:

FMA Flood Mitigation Assistance Grant Program
 HMGP Hazard Mitigation Grant Program

Timeline:

The time required for completion of the project upon implementation

Cost:



EHP Environmental Planning and Historic Preservation
 FEMA Federal Emergency Management Agency
 FPA Floodplain Administrator
 HMA Hazard Mitigation Assistance
 N/A Not applicable
 NFIP National Flood Insurance Program
 OEM Office of Emergency Management

BRIC Building Resilient Infrastructure and Communities
 Program

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP) - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.7-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Jamaica Beach-001	Dune Protection Program	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-002	Extreme Temperature Protection Emergency Winter storm, Water Pipe / Water meter protection	1	1	1	1	1	1	1	0	-1	-1	1	1	1	1	9	High
2022-Jamaica Beach-003	Flood Hazard Mitigation	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High



Section 9.7: Jamaica Beach

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Jamaica Beach-004	Critical Facility Upgrades to Withstand Hail	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-005	Implement Results of Dune Protection Study and Sea Level Rise Planning	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-006	Tree Trimming Program	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-007	Harden Infrastructure and Prepare Community for Severe Weather	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-008	Beach Management Plan	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-009	Subsidence Study and Implementation	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-010	Increase Fire Fighting Capacity	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-011	Mitigation RFC/SRL properties	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-012	Integrate mitigation measures in community regulations and permits	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High
2022-Jamaica Beach-013	Develop and provide public information for residential mitigation and awareness for hazards	1	1	1	1	1	1	1	1	-1	-1	1	1	1	1	10	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions. Low (0-4), Medium (5-8), High (9-14).



9.8 CITY OF KEMAH

This section presents the jurisdictional annex for the City of Kemah and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City participated in the planning process, an assessment of Kemah's risk and vulnerability, the different capabilities used in the City, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.8.1 Hazard Mitigation Planning Team

The City of Kemah followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many City of Kemah departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.8-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Walter Gant	Emergency Management Coordinator	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.8.2 Jurisdictional Profile

Kemah is on State Highway 146 and Farm Road 518 in a half-moon pocket on Galveston in northeastern Galveston County. Originally a small fishing town, the City has become a tourist destination for the area's restaurants and attractions, which are contained within the Kemah Entertainment District. In 2012, Kemah was ranked the top tourism spot in the Greater Houston area.

According to the U.S. Census, the 2010 population for the City was 1,773. The estimated 2019 population was 1,807, a 1.9-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 8.4-percent of the population is 5 years of age or younger and 19.8-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.8.3 Jurisdictional Capability Assessment and Integration

The City of Kemah performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of planning, legal and regulatory capabilities.



- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of Kemah identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of Kemah, what is present in the jurisdiction, and code citation and date.

Table 9.8-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 18 – Buildings and Building Regulations, 5/17/2010	State and Local	Building Official
<i>How does this reduce risk?</i> Any structure code compliant with city regulations when the building was eligible for a certificate of occupancy shall remain code compliant unless the structure is modified more than 50 percent in value by new improvements or by repairs constituting 50 percent cost of reconstruction of the damaged or deteriorated structure. If the renovations or repairs exceed 50 percent as measured herein, the revised or repaired structure must be compliant with the codes and regulations in effect at the time of renovation or repair. All repairs require a building permit which shall indicate whether or not the current codes or the former codes are controlling of the new construction. Any building or structure requiring repair, removal or demolition, as described and defined hereinbelow and all buildings or structures within the city which because of their condition are unsafe, unsanitary, uninhabitable or otherwise dangerous to the health, safety and general welfare of the citizens of the city are hereby declared to be a public nuisance and unlawful and subject to the provisions of this article regarding repair, removal or demolition.					
Zoning/Land Use Code	Yes	No	Chapter 114 – Zoning, 6/11/1998	Local	Board of Adjustment
<i>How does this reduce risk?</i> This Ordinance provides for the creation of a Zoning Board and establishes controls for short term rentals.					
Subdivision Ordinance	Yes	No	Chapter 86 – Subdivisions, 3/12/1992	Local	City Council
<i>How does this reduce risk?</i> This chapter is to provide for the harmonious development of the city and its environs, for the coordination of streets within subdivisions and other existing or planned streets or with other features for access to and extension of public facilities; for adequate open spaces, for flood control, traffic, recreation, light and air; and for the distribution of population and traffic which will tend to create conditions favorable to health, safety, morals, and the general welfare of the city. Regarding watercourses and easements, the plat must show distances to be provided along the side lot lines from the front lot line to the point where the side line crosses the drainage easement line or the high bank of a stream, and the traverse line to be provided along the edge of all large watercourses in a convenient location, preferably along a utility easement if paralleling the drainage easement or stream. It is also required that the subdivider shall construct a drainage system to drain the proposed subdivision and every lot therein.					
Site Plan Ordinance	No	No	-	Local and County	-
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Stormwater Management Ordinance	Yes	Yes	Chapter 38 – Environment, Article VIII – Stormwater Management, 12/11/1997	Local	Building Official
<i>How does this reduce risk?</i> It is the intent of the mayor and the city council that stormwater flooding be minimized to the extent possible for frequent storm events. It is also the intent that water quality be preserved to the extent possible for all storm events. All development shall be subject to the stormwater management and drainage requirements of this article. This Ordinance also is intended to prevent the illicit discharge of contaminated stormwater runoff from industrial, commercial, residential, and construction sites into the municipal separate stormwater system (MS4) within the City of Kemah.					
Post-Disaster Recovery/ Reconstruction Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single family dwelling by answering Yes or No to being aware of any of the following conditions: • Present flood insurance coverage • Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir • Previous water penetration into a structure on the property due to a natural flood event • Located wholly or partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) • Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) • Located wholly or partly in a floodway • Located wholly or partly in a flood pool • Located wholly or partly in a reservoir					
Growth Management	No	No	-	-	-
<i>How does this reduce risk?</i>					
Environmental Protection Ordinance	Yes	Yes	Chapter 38 – Environment, 12/11/1997	Local	City Engineer, Architect and Planner
<i>How does this reduce risk?</i> The purpose of this article is to promote, protect and preserve the public interest by addressing land alteration, particularly the clearing and grading of land in the area within the boundary of the city. This is necessary in order to:(1)Provide minimum development regulations and construction procedures which will preserve, replace or enhance to the maximum extent practicable, consistent with the subsequent development of the land, evergreens, specimen deciduous trees, understory and groundcover so as to preserve and enhance the natural qualities of lands and watercourses within the city. The Ordinance also requires that new development promote safety upon the city roads and rights-of-way; to decrease potential flood and erosion damage to public and private property.					
Flood Damage Prevention Ordinance	Yes	Yes	Chapter 46 – Floods, 8/02/1999	Federal, State, County and Local	Floodplain Administrator
<i>How does this reduce risk?</i> This Chapter addresses Critical Facilities and requires that new critical facilities be prohibited from the 500-year floodplain; or that new and substantially improved critical facilities be required to be protected from damage and loss of access as a result of the 500-year flood or the flood record, whichever is higher. The purpose of Article II – Flood Damage Prevention is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to: Regulate uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities; Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; Control alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of floodwaters; Control filling, grading, dredging and other development which may increase erosion or flood damage Regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands; and Qualify and maintain for participation in the National Flood Insurance Program.					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Chapter 26 – Civil Emergencies, 6/23/1983	Local	Emergency Management Director
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
This Chapter creates the office of emergency management director of the city, which shall be held by the mayor in accordance with state law. The director shall be responsible for conducting a program of comprehensive emergency management within the city and for carrying out the duties and responsibilities set forth in sections 26-2 and 26-4. He may delegate authority for execution of these duties to the coordinator, but ultimate responsibility for such execution shall remain with the director. The powers and duties of the emergency management director shall include an ongoing survey of actual or potential major hazards which threaten life and property within the city, and an ongoing program of identifying and requiring or recommending the implementation of measures which would tend to prevent the occurrence or reduce the impact of such hazards if a disaster did occur. As part of his responsibility in hazard mitigation, the director shall supervise the development of an emergency management plan for the city and shall recommend that plan for adoption by the city council along with any and all mutual aid plans and agreements which are deemed essential for the implementation of such emergency management plan.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-
Planning Documents					
Comprehensive Plan	Yes	No	Strategic Plan, 2009-2013	Local	Mayor and City Council
<i>How does this reduce risk?</i> From an environmental protection perspective, the Plan seeks to achieve good stewardship of existing infrastructure and future infrastructure needs; expanding park and recreation offerings, both passive and active; and the preservation of and education on Kemah's unique ecological resources, such as the coastal prairie and bayfront.					
Capital Improvement Plan	Yes	No	Capital Projects 2022	Local	Mayor and City Council
<i>How does this reduce risk?</i> The City's 2022 Capital Projects planned for 2022 include road, drainage, downtown, park and other miscellaneous facility improvements, totaling \$736,200.00.					
Disaster Debris Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	Yes	No	-	-	-
<i>How does this reduce risk?</i>					
Stormwater Management Plan	Yes	No	Stormwater Management Program (SWMP) Revised, June 2019	State and Local	City Administrator
<i>How does this reduce risk?</i> To achieve the goal of the reduction of pollutant discharge to the MEP, the City incorporated best management practices (BMPs) to implement the following minimum control measures: • Public Education and Outreach • Public Participation/ Involvement • Illicit Discharge Detection and Elimination • Construction Site Runoff Control • Post-Construction Runoff Control • Pollution Prevention/ Good Housekeeping • Industrial stormwater sources The City of Kemah's Storm Water Management Plan was developed in order to comply with the TPDES and Environmental Protection Agency's Phase II requirements. The plan will be reviewed and revised each year, as necessary to maintain the goals of reducing the discharge of pollutant to the "maximum extent practicable" (MEP), protecting the water quality, and satisfying the appropriate water quality requirements of the Clean Water Act.					
Open Space Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	Yes	No	-	-	-



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
<i>How does this reduce risk?</i>					
Shoreline Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Agriculture Plan	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	-	-	-
<i>How does this reduce risk?</i>					
Continuity of Operations Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of Kemah to oversee and track development.



Table 9.8-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Through the Building Official.
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	-
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Yes	Tracked by available vacant lots and the ETJ.

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Kemah and their current responsibilities which contribute to hazard mitigation.

Table 9.8-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	No	-
Zoning Board of Adjustments	Yes	All powers granted to a board of adjustment under V.T.C.A., Local Government Code § 211.001 et seq., including but not limited to powers related to boards of adjustment in cities that have zoning, if as and when the city adopts a comprehensive zoning ordinance.
Planning Department	No	-
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	Six available staff - The purpose of the corporation is to encourage the retention of business enterprises within the City of Kemah and the promotion and development of new and expanded business enterprises in the City in order to promote and encourage economic growth of the City and the fully employment, welfare and prosperity of its citizens as provided by the Development Corporation Act of 1979, as amended.
Public Works/Highway Department	Yes	The City of Kemah Public Works Department supports the City's infrastructure and keeps the city's parks, roadways, and streets safe, clean, and attractive.
Construction/Building/Code Enforcement Department	Yes	Kemah seeks to provide its citizens and visitors with a beautiful, safe environment by ensuring compliance with state law, municipal ordinances, and building codes. The goal of the Building Permit Process is to ensure that all developments, both residential and commercial, within the city meet applicable building and development codes.
Emergency Management/Public Safety Department	Yes	Four available staff - Emergency management is a coordinated effort, involving local, state, and federal government agencies as well as volunteer organizations and businesses. Within an integrated emergency management framework, these entities assist citizens and their



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
		communities to prepare for, respond to, recover from and eliminate or reduce the efforts of natural and human-caused emergencies and disasters.
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	Blackboard Connect
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	Five Public Works Staff
Mutual aid agreements	Yes	Two - Galveston County/Clearlake Shores
Human Resources Manual	Yes	Building/Fire Marshal
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	LJA – Engineering Firm
Engineers or professionals trained in building or infrastructure construction practices	Yes	Building Official
Planners or engineers with an understanding of natural hazards	Yes	LJA – Engineering Firm
Staff with expertise or training in benefit/cost analysis	Yes	Emergency Management Coordinator
Professionals trained in conducting damage assessments	Yes	Emergency Management Coordinator
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	Yes	Emergency Management Coordinator
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	Yes	Emergency Management Coordinator
Grant writer(s)	Yes	-
Resilience Officer	Yes	Emergency Management Coordinator
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to the City of Kemah.

Table 9.8-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	Yes; Kipp road/sidewalk project.
Capital improvements project funding	Yes; various road and flood projects
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	No
Impact fees for homebuyers or developers of new development/homes	No
Stormwater utility fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	Yes
Withhold public expenditures in hazard-prone areas	Yes
Other federal or state funding programs	Yes
Open Space Acquisition funding programs	Yes
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	N/A



Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Kemah.

Table 9.8-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	Blackboard Connect
Personnel skilled or trained in website development	Yes	Bobby Hurman
Hazard mitigation information available on your website	Yes	The City's Emergency Management webpage provides many links for citizens to be educated on flood hazards and preparedness.
Social media for hazard mitigation education and outreach	Yes	Facebook & Blackboard Connect
Citizen boards or commissions that address issues related to hazard mitigation	Yes	Economic Development Board/Kemah Community Development Corporation
Other programs already in place that could be used to communicate hazard-related information	No	-
Warning systems for hazard events	Yes	Blackboard Connect
Natural disaster/safety programs in place for schools	No	-
Other	N/A	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Kemah.

Table 9.8-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	Yes	10	10/15/2020
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	2009	6/1/2009
Public Protection (ISO Fire Protection Classes 1 to 10)	3	-	-
Storm Ready Certification	No	Galveston County is certified	-
Firewise Communities classification	NP	-	-
Other	N/A	-	-

Note:

N/A Not applicable
NP Not participating
- Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.



Table 9.8-8. Adaptive Capacity

Hazard	Preliminary Ranking
Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.8.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.8-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	West Kemah
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	No
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	Our Building Official will do damage assessments
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	None
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes
NFIP Compliance	
What local department is responsible for floodplain management?	Community Development Department
Are any certified floodplain managers on staff in your jurisdiction?	Yes
Do you have access to resources to determine possible future flooding conditions from climate change?	No



NFIP Topic	Comments
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes: flood mitigation training (CFM)
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	Inspections, Permit Review, and Engineering Capability
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	If the improvement of the development is over 50% of the value of the structure.
What are the barriers to running an effective NFIP program in the community, if any?	None
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	N/A
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Ordinance No. 1175, 2020
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	It meets requirements.
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	No
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	Yes – Class 8 as of 10/1/2021

Source:

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.8.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.8-10. Recent and Expected Future Development

Type of Development	2016		2017		2018		2019		2020		2021	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	-	-	-	-	-	-	-	-	3	-	-	-
Multi-Family	-	-	-	-	-	-	-	-	2	-	-	-
Other (commercial, mixed-use, etc.)	-	-	-	-	-	-	-	-	4	-	-	-
Total Permits Issued	-	-	-	-	-	-	-	-	-	-	-	-



Property or Development Name	Type of Development	# of Units / Structures	Location (address and/or block and lot)	Known Hazard Zone(s)*	Description / Status of Development
Recent Major Development and Infrastructure from 2016 to Present					
None identified					
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years					
None identified					

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.8.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of Kemah's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City of Kemah has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.8-1. Kemah Area Extent and Location Map (Flood)

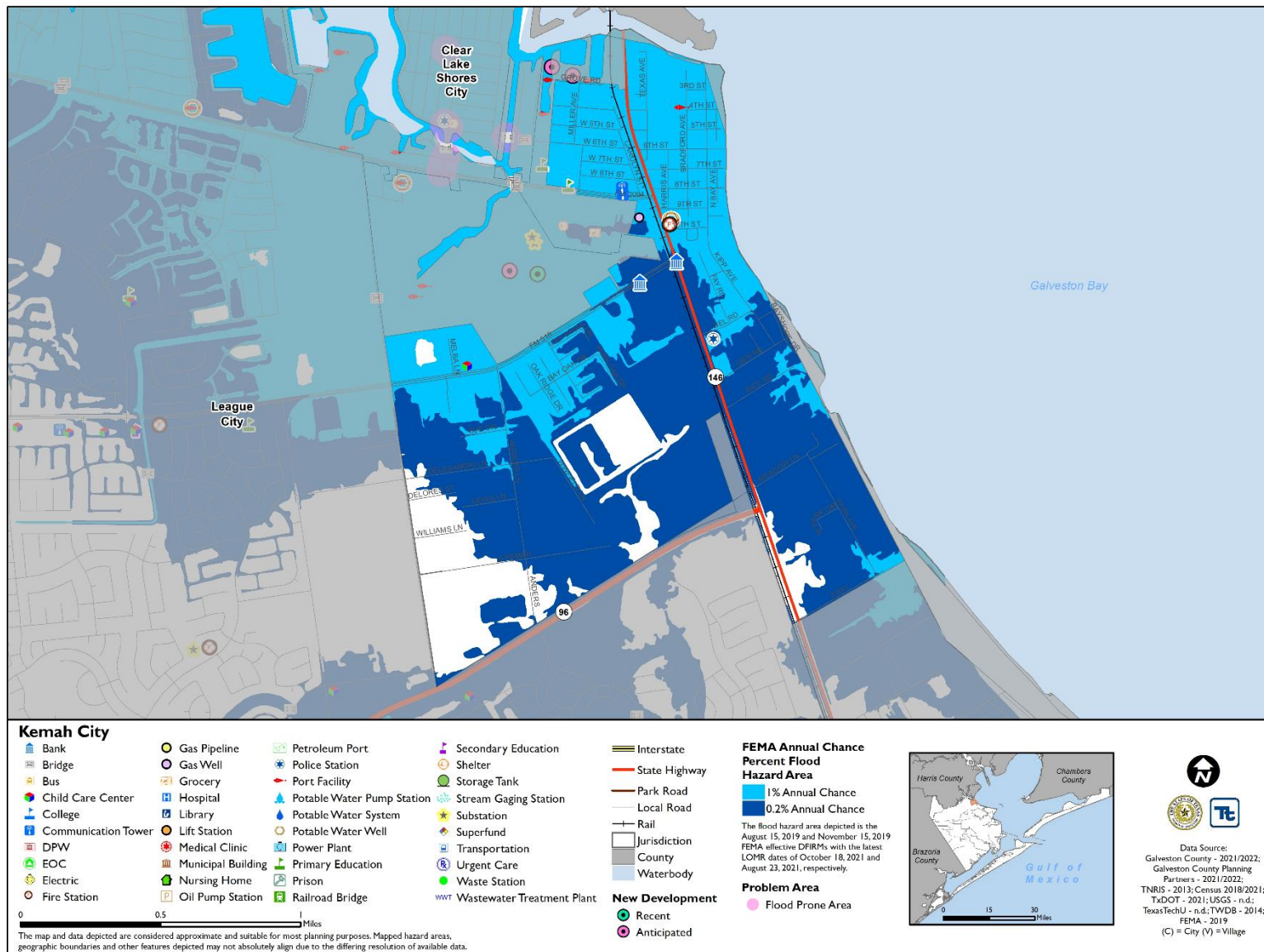




Figure 9.8-2. Kemah Area Extent and Location Map (SLOSH, Tsunami)

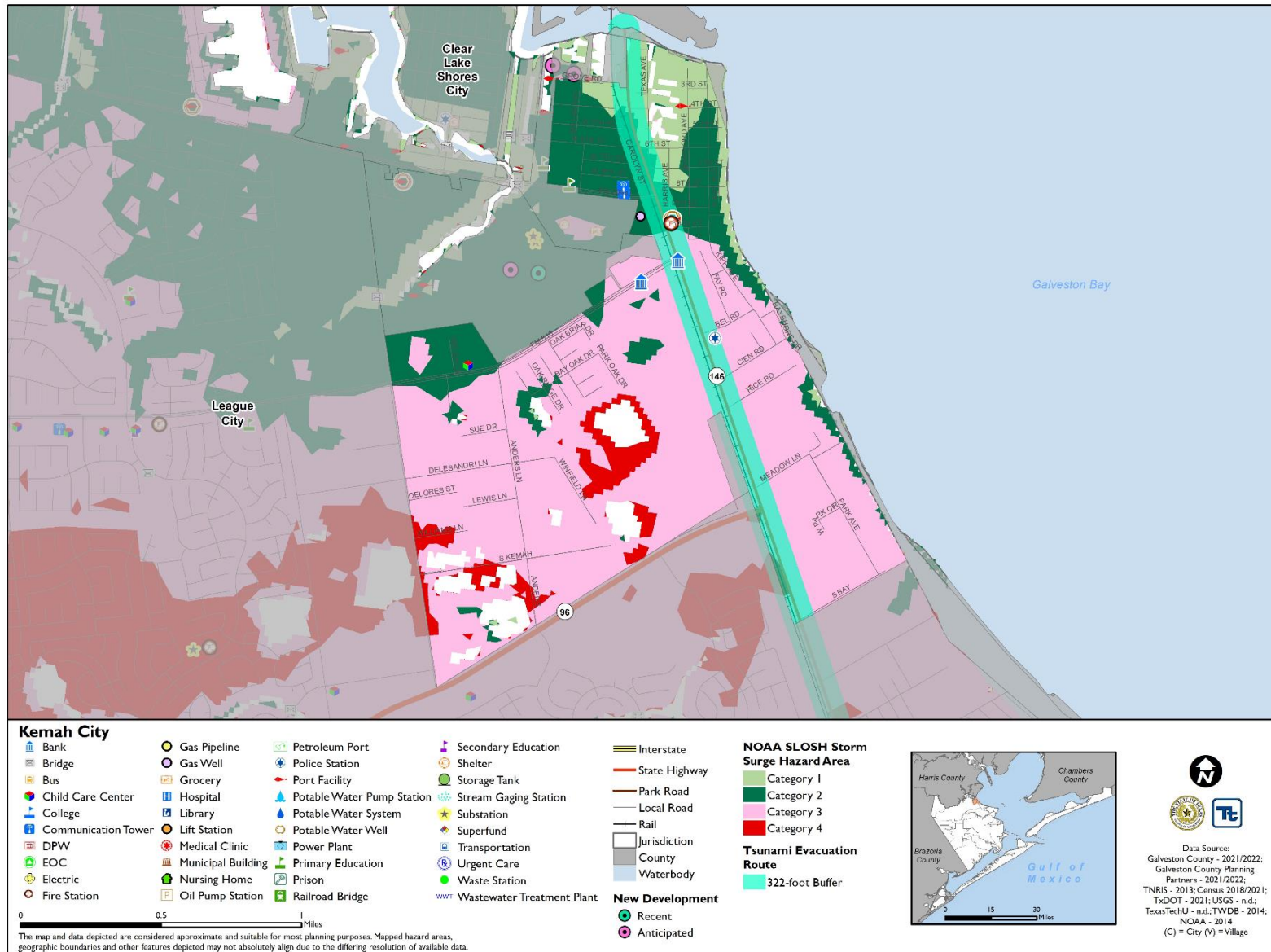




Figure 9.8-3. Kemah Area Extent and Location Map (Sea Level Rise, WUI)

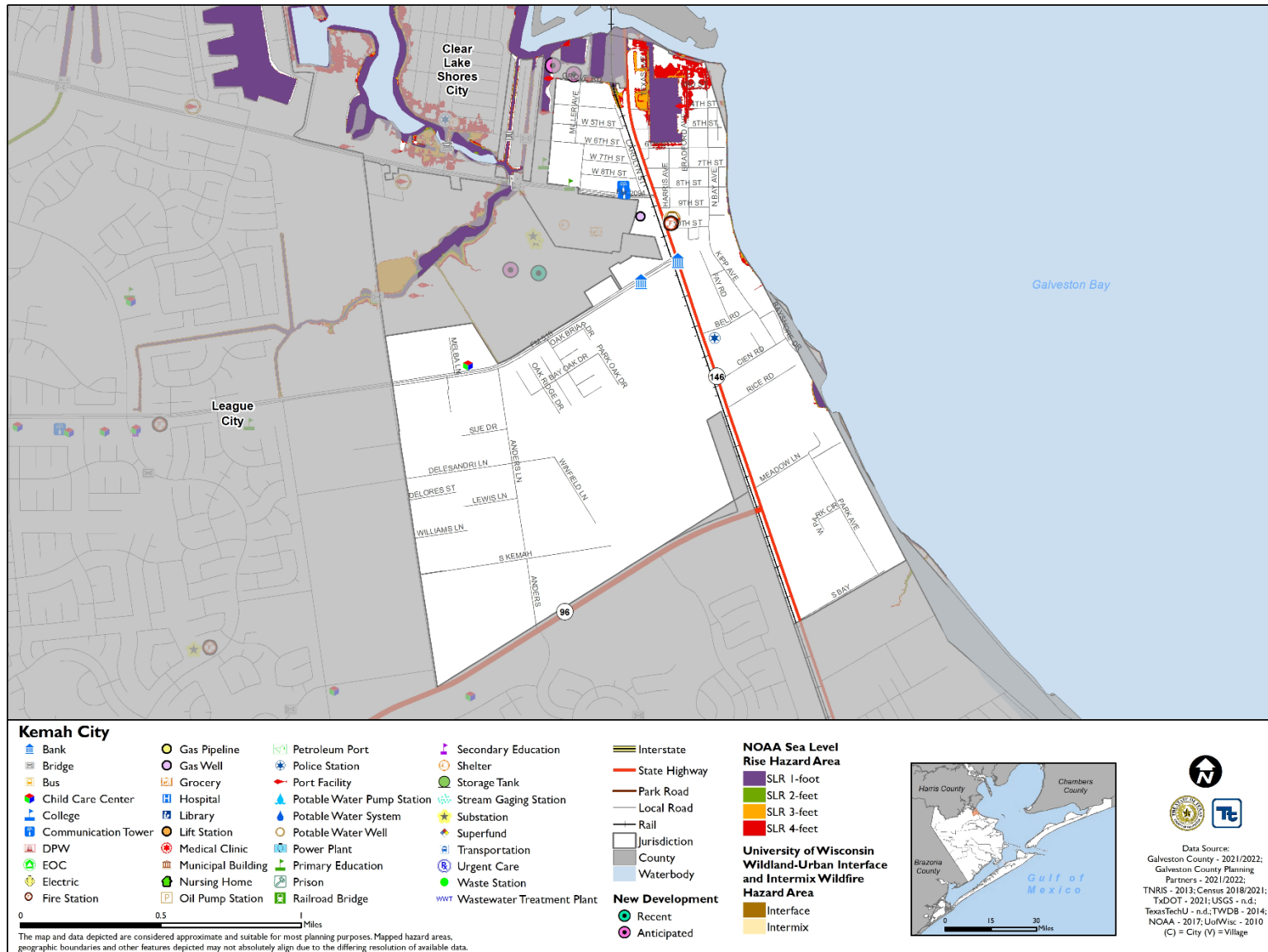
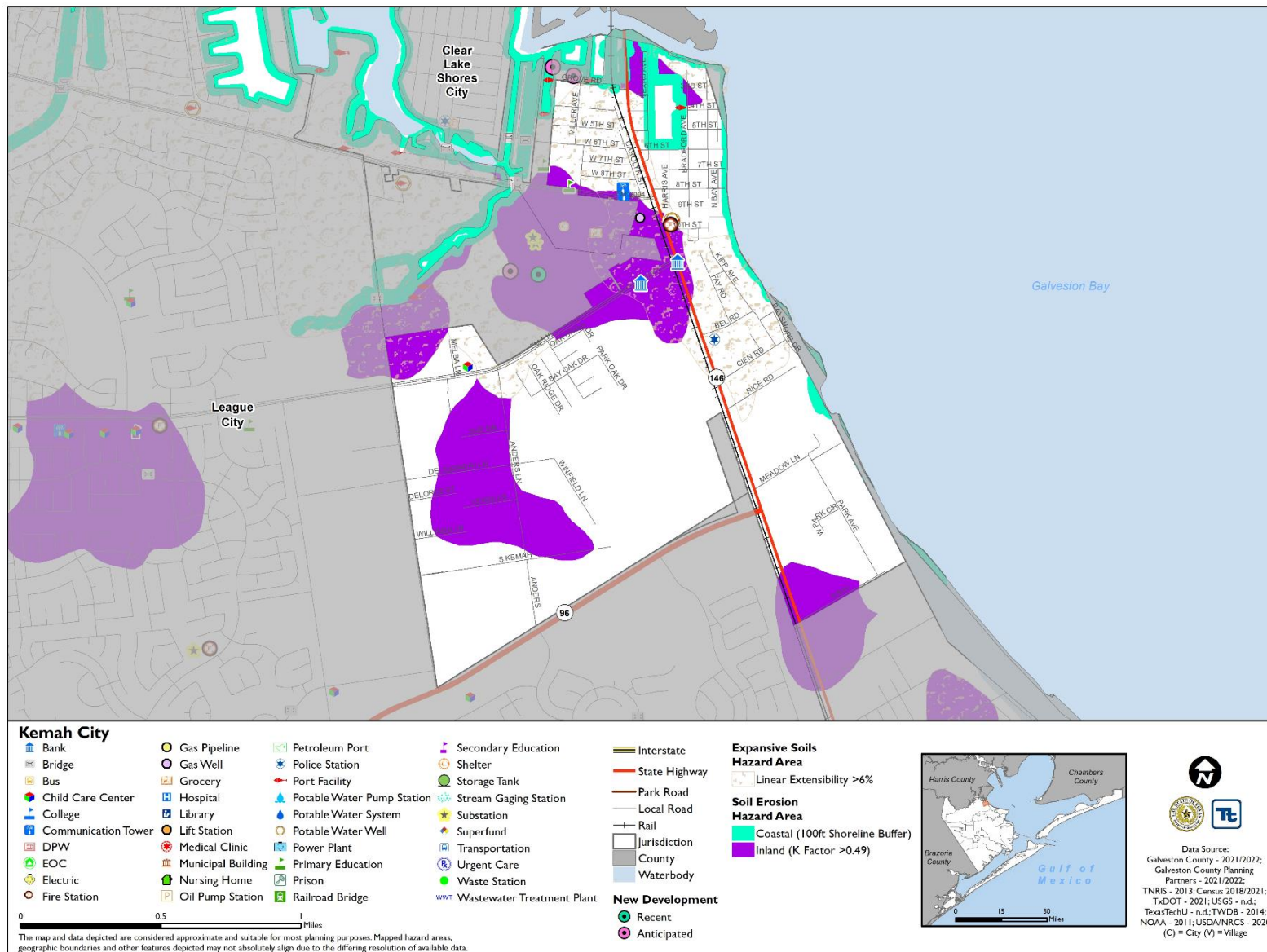




Figure 9.8-4. Kemah Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of Kemah's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages Kemah experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.8-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	The municipality did not identify specific damages or losses from this event.
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	The municipality did not identify specific damages or losses from this event.
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson and Santa Fe. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate	The municipality did not identify specific damages or losses from this event.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	The municipality did not identify specific damages or losses from this event.
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	No significant damage
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	No significant damage
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	Public Works had residential tree removal.

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Kemah's risk assessment results and data used to determine the hazard ranking.



Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of Kemah. The City of Kemah reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of Kemah agreed with the calculated rankings.

Table 9.8-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
Medium	Low	Low	Low	Medium	High	Low	High	Low
Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire	
Low	Low	Low	Medium	Medium	Low	Medium	Low	

Note: The scale is based on the hazard rankings established in Section 4.4 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

Identified Issues

Specific areas of concern based on resident response to the citizen survey include:

- Jarboe ditch cannot handle the stormwater due to the additional subdivisions and buildings that drain into it
- Kemah Oaks subdivision floods
- Street flooding
- Retention pond is full
- Exit routes flood on Lawrence Road

9.8.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own



table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the ‘Capability Assessment’ presented previously in this annex.



Table 9.8-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
K 2006-1:	Develop and provide public awareness campaigns for natural hazards	City Administration	Ongoing Capability	Yes (2022-Kemah-001)	Performed during the 2021 Ice Storm and Hurricane Nicholas	Emergency Management
K 2006-2:	Develop severe weather audio alert system	City Administration	No Progress	No	-	-
K 2006-3:	Implement storm sewer system re-engineering and follow-up construction project to mitigate flood related impacts.	City Administration	No Progress	No	-	-
K 2006-4:	Develop city ordinance requiring the incorporation of wind resistant construction provisions and enforcement measures in the city building code.	City Administration	Ongoing Capability	No	-	-
K 2011-1:	Conduct National Weather Service tornado drills along with elementary school in jurisdiction	Emergency management	No progress	No	-	-
K 2011-8:	Implement any updates for drought contingency plans as developed by the WCID# 12	Emergency Management	No progress	No	-	-
K 2011-10:	Develop program to integrate with the Harris County Flood Control District for the purpose of optimizing the operation of the flood gates at second cut outlet	Emergency Management	No progress	No	-	-
K 2011-11a:	Update flood plain ordinance to ensure compliance with minimum standards of NFIP	Emergency Management	Completed	No	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
K 2011-13:	Develop maintenance and flow testing program for fire hydrants in jurisdiction	Fire Department	Completed	Yes (as 2022-Kemah-002)	-	WCID #12
K 2011-14:	Harden existing critical facilities and infrastructure to be more resistant to hazards	Emergency Management	Ongoing Progress	No	-	-
K-2016-1:	Stormproof/retrofit critical facilities and infrastructure	City Administration	No Progress	No	-	-
K 2016-2:	Purchase and install generators for existing and new critical facilities and infrastructure	City Administration	Ongoing Progress	Yes (as 2022-Kemah-003)	Plan on buying generator for Community Center	Emergency Management
K-2016-3:	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties	City Administration and applicable state and county agencies	No Progress	No	-	-
K-2016-4	Widen drainage systems and culverts	City Administration and applicable department and water district staff	Completed	Yes (as 2022-Kemah-004)	Widened bayous	-
K-2016-5:	Improve regulations and permit requirements to promote hazard mitigation strategies	City Administration and applicable departments	Completed	Yes (as 2022-Kemah-005)	-	The City follows Galveston County Standards
K 2016-6:	Implement the Corp of Engineers study of the Galveston County Water Reservoir Dam and Levee system	City Administration and applicable departments	No Progress	No	-	-



Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.8-14, the City did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of Kemah participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.8-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X			X	X	X				X
Dam & Levee Failure	X			X	X	X				X
Drought	X			X	X	X				X
Expansive Soils	X			X	X	X				X
Extreme Temperatures	X	X		X	X	X			X	X
Flood	X	X		X	X	X			X	X
Hail	X	X		X	X	X			X	X
Hurricane & Tropical Storm	X	X		X	X	X			X	X
Land Subsidence	X			X	X	X				X
Lightning	X	X		X	X	X			X	X
Pandemic	X			X	X	X				X
Severe Winter Storm	X	X		X	X	X			X	X
Thunderstorm Wind	X	X		X	X	X			X	X
Tornadoes	X	X		X	X	X			X	X
Tsunami	X	X		X	X	X			X	X
Utility Failure	X	X		X	X	X			X	X
Wildfire	X			X	X	X				X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of Kemah would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.8-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Kemah-001	Develop and provide public information and awareness for hazards	Problem: Methods and operational equipment needed to inform the public of immediate danger from an impending hazard or updating the public with an ongoing controlled hazard. Solution: Public outreach program will be designed to notify public of immediate hazard threats or updated supplemental information of ongoing hazards through numerous methods that could include text messages, automated “robo calls”, emails, media outlet press releases, internet websites and social media accounts from city departments. Equipment would include social monitoring or crowd source programs, cameras and hard-shell cases, laptop, and a dedicated vehicle.	Both	All Hazards	1, 2	1-5 years	Emergency Management	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	EAP	PR, ES
2022-Kemah-002	Fire Hydrant Program	Problem: Degraded fire hydrants can result in lower capability to fight fires. Solution: Continue to implement the maintenance and flow testing program for fire hydrants in the jurisdiction.	Both	Wildfire	1, 2	Ongoing	Emergency Management	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	LPR	PR
2022-Kemah-003	Emergency Generators	Problem: Critical facilities lack backup power. Solution: Purchase and install emergency power generators and connection equipment to support critical facilities and infrastructure.	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure, Wildfire	1, 2	1-5 years	Emergency Management	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP, ES
2022-Kemah-004	Drainage Improvements	Problem: Flooding impacts low-lying areas and bayous.	Both	Flood, Hurricane & Tropical	1, 2	1-5 years	City Administrator, Floodplain	FEMA Grant Funding (FMA,	Protection of structures and critical infrastructure.	High	High	SIP	PP, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Solution: Widen drainage systems and culverts, and upgrade storm sewer systems to reduce standing water and runoff.		Storm, Severe Winter Storm			Administrator, Water District	HMGP, BRIC)					
2022-Kemah-005	Integrate mitigation measures in community regulations and permits	Problem: Hazard mitigation is an ongoing need. Solution: Improve and enforce community regulations and permit requirements to promote hazard mitigation strategies. This includes restricting development or requiring enhanced building techniques in floodplains and mapped high-hazard areas.	Both	All Hazards	1, 2, 3, 4	1 to 5 years	City Administrator, Building Official	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR, PP

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DPW	Department of Public Works
EHP	Environmental Planning and Historic Preservation
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation

Cost:

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)** - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- **Preventative Measures (PR)** - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- **Property Protection (PP)** - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information (PI)** - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection (NR)** - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.



- *Structural Flood Control Projects (SP)* - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)* - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.8-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Kemah-001	Develop and provide public information and awareness for hazards	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Kemah-002	Fire Hydrant Program	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Kemah-003	Emergency Generators	1	1	1	1	1	1	-1	1	1	1	1	1	1	1	12	High
2022-Kemah-004	Drainage Improvements	0	1	1	1	1	1	-1	1	1	1	1	1	1	1	11	High
2022-Kemah-005	Integrate mitigation measures in community regulations and permits	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions.
 Low (0-4), Medium (5-8), High (9-14).



9.9 CITY OF LA MARQUE

This section presents the jurisdictional annex for the City of La Marque and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City of La Marque participated in the planning process, an assessment of the City of La Marque's risk and vulnerability, the different capabilities used in the City of La Marque, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.9.1 Hazard Mitigation Planning Team

The City of La Marque followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many City of La Marque departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.9-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Kyle Hunter	Emergency Management	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.9.2 Jurisdictional Profile

The City of La Marque is located in central Galveston County. La Marque experienced considerable growth in the 1950s, during which the city provided a general administrative and trades and crafts workforce helping to support the petrochemical complex in adjoining Texas City. The City has a total area of 14.3 square miles (14.2 square miles of land and 0.04 square miles of water).

According to the U.S. Census, the 2010 population for the City was 14,509. The estimated 2019 population was 18,030, a 24.3-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 4.3-percent of the population is 5 years of age or younger and 13.2-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.9.3 Jurisdictional Capability Assessment and Integration

The City of La Marque performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:



- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of La Marque identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of La Marque, what is present in the jurisdiction, and code citation and date.

Table 9.9-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 14 – Buildings and Building Regulations, 2/09/2009, revised 12/14/2020	State and Local	Development Services Director
<i>How does this reduce risk?</i> The City has adopted the International Building Codes with amendments. All commercial and residential developments in the city adjacent to the water must install suitable bulkhead along the banks the entire length of the property shoreline. The bulkheads shall be designed and installed in such manner as to ensure proper soil and land retention and the effective reduction of storm damage and erosion.					
Zoning/Land Use Code	Yes	No	Chapter 71 – Zoning, 12/12/2005	Local	Board of Adjustments
<i>How does this reduce risk?</i> These zoning regulations are made in accordance with the spirit of the comprehensive plan and designed to lessen congestion in the streets; to secure safety from fire, panic and other dangers; to promote health and the general welfare; to provide adequate light and air; to prevent overcrowding of land; to avoid undue concentration of population; to facilitate the adequate provision of transportation, water, sewerage, schools, parks and other public requirements. The City has created an Agricultural District. The Agricultural District is intended to provide for land within the corporate limits of the city which are not subdivided and/or are relatively undeveloped. This district is designed to promote orderly, timely, economic growth and to recognize current conditions. In addition, the City has a Floodplain District. The purpose of the District is to provide for the appropriate use of land which has a history of inundation or is determined to be subject to flood hazard, and to promote the health, safety and general welfare of the community, portions of certain districts are designated with a floodplain prefix FP and shall be subject to the applicable provisions of this Chapter.					
Subdivision Ordinance	Yes	No	Chapter 41-Article IV, Subdivisions, Sec. 101, 10/14/2019	Local	P&Z
<i>How does this reduce risk?</i> A subdivision plat is required to combine lots or tracts, and to subdivide land to divide a lot or tract into two or more parcels. It is required that a plan complying with the Engineering Design Criteria Manual, as adopted and amended by the city council from time to time; and the rules and regulations of any drainage district in which a tract or lot is located be provided as part of an application for subdivision.					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Site Plan Ordinance	Yes	No	Chapter 41-Site Plan requirements, approval, appellate procedures	Local and County	Development Services
<i>How does this reduce risk?</i> At the time of application for a building permit, a landscape plan shall be filed with the building department for review and approval. The building inspector shall not issue a building permit for the construction of any building or structure if the site plan for the building or structure does not include the specifications as given in Chapter 14.					
Stormwater Management Ordinance	Yes	Yes	Chapter 68 – Water and Sewers, Article VI – Stormwater Management Utility, 11/11/2002	Local	Public Works
<i>How does this reduce risk?</i> The city shall have full authority to operate a storm water management utility pursuant to subchapter C, chapter 402, Local Government Code; article 11, section 5, of the Texas Constitution and the Charter of the city of La Marque. The City of La Marque shall not require a deposit for stormwater management fees as a precondition to accepting surface flow into the drainage system.					
Post-Disaster Recovery/ Reconstruction Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single family dwelling by answering Yes or No to being aware of any of the following conditions: • Present flood insurance coverage • Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir • Previous water penetration into a structure on the property due to a natural flood event • Located wholly or partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) • Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) • Located wholly or partly in a floodway • Located wholly or partly in a flood pool • Located wholly or partly in a reservoir					
Growth Management	No	No	-	-	-
<i>How does this reduce risk?</i>					
Environmental Protection Ordinance	No	-	-	-	-
<i>How does this reduce risk?</i>					
Flood Damage Prevention Ordinance	Yes	Yes	Chapter 32 – Flood Damage Prevention, 4/14/2014	Federal, State, County and Local	Code Enforcement Officer/ Floodplain Administrator
<i>How does this reduce risk?</i> It is the purpose of this chapter to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by implementing the following methods: (1) Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities; (2) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; (3) Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters; (4) Control filling, grading, dredging and other development which may increase flood damage; (5) Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands (5) Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands. New construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to or above one foot above the base flood elevation. New construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to or above the one foot above base flood level or together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Encroachments are prohibited, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Chapter 26 – Emergency Management, 8/13/2012	State and Local	Emergency Management Director (Mayor)
<i>How does this reduce risk?</i> There exists the office of emergency management director of the City of La Marque, which shall be held by the mayor in accordance with state law. The director shall be responsible for conducting a program of comprehensive emergency management within the city and for carrying out the duties and responsibilities set forth in section 26-4 of this Chapter. The powers and duties of the director shall include an ongoing survey of actual or potential hazards which threaten life and property within the city; and an ongoing program of identifying and requiring or recommending the implementation of measures which would tend to prevent the occurrence or reduce the impact of such hazards if a disaster did occur. As part of his responsibility in hazard mitigation, the director shall supervise the development of an emergency management plan for the City of La Marque and shall recommend that plan for adoption by the city council along with any and all mutual aid plans and agreements which are deemed essential for the implementation of such emergency management plan. In the event a housing emergency is declared to exist by the city council following a natural or man-made disaster, and subject to the conditions contained in this section and by the resolution declaring a housing emergency, temporary structures such as manufacture homes, travel trailers and recreational vehicles may be used as temporary housing by individuals who have been displaced from their primary residence located within the city due to damage from the disaster, until such time as the city council declares an end to the housing emergency.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-
Planning Documents					
Comprehensive Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Capital Improvement Plan	Yes	No	2022 Annual Budget	Local	City Manager
<i>How does this reduce risk?</i>					
The City includes infrastructure and critical facility improvements in its annual budget.					
Disaster Debris Management Plan	Yes	No	-	Local	City Manager
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	Yes	No	-	Local	Public Works
<i>How does this reduce risk?</i>					
Stormwater Management Plan	Yes	No	Chapter 5 – Stormwater Drainage Criteria	Local	City Engineer
<i>How does this reduce risk?</i> Development and drainage shall comply with all applicable City of La Marque Ordinances, including, but not limited to, the Floodplain Ordinance. The goal for these criteria is to provide protection in a 100-year storm event. This is accomplished with the application of various drainage enhancements such as storm sewers, roadside ditches, open channels, detention, and overland (sheet) runoff. The combined system is intended to prevent structural flooding from extreme events up to a 100-year storm. In order to protect existing properties, water levels, due to runoff, shall not be increased upstream or downstream of a development due to the improvement. The City of La Marque is a participant in the National Flood Insurance Program. The intent of the flood insurance program is to make insurance available at low cost by providing for measures that reduce the likelihood of structural flooding					
Open Space Plan	In Progress	No	Parks Master Plan in development	Local	-
<i>How does this reduce risk?</i>					
The City of La Marque is working on a “Parks Master Plan” study for all the parks within city limits. The City welcomes input regarding playground equipment and any other items that residents would like to see implemented in this plan.					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Shoreline Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Agriculture Plan	No	-	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	Yes	No	Imagine La Marque – Renaissance District Revitalization Plan - 2017	Local	EDC
<i>How does this reduce risk?</i> The 2017 City of La Marque Revitalization Plan, as part of a broader strategy of reinvestment in the City, provides a vision for a vibrant downtown corridor called Renaissance District (Ren District) and a dynamic framework for realizing this vision. In order to achieve this vision, the La Marque Economic Development Corporation will initiate a Revitalization Plan.					
Other	No	-	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	No	-	-	-	-
<i>How does this reduce risk?</i>					
Continuity of Operations Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of La Marque to oversee and track development.

Table 9.9-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Development Services
Are permits tracked by hazard area? (For example, floodplain development permits.)	No	Permits are tracked by Zone
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Yes	Vacant, undeveloped acreage

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of La Marque and their current responsibilities which contribute to hazard mitigation.

Table 9.9-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	-
Zoning Board of Adjustments	Yes	Board members are appointed for two year terms.
Planning Department	Yes	-
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	Members are appointed for six year terms.
Public Works/Highway Department	Yes	The goal of Public Services is to enhance the quality of life for all residents, businesses, and visitors of the City of La Marque through responsible and sound management, innovation, teamwork, and vision, and to provide dependable, high quality, responsive public services with the resources that have been allocated.
Construction/Building/Code Enforcement Department	Yes	The Development Services Department's main function is to continually ensure the quality of life in the City of La Marque through community development, administration of programs for the revitalization of the community and protecting the public from the loss of property or life through efforts related to property maintenance, fire prevention, electrical, mechanical, plumbing and environmental quality.
Emergency Management/Public Safety Department	Yes	The Office of Emergency Management is dedicated to upholding emergency management standards in the areas of preparedness, mitigation, response and recovery in order to save lives and protect property during a major emergency or disaster.



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
		The City of La Marque Office of Emergency Management (OEM) is responsible for coordinating the preparedness for any major emergency or disaster affecting the City of La Marque.
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	Ringdown system (connect CTY), Texas City Siren System, social media
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	No	-
Mutual aid agreements	Yes	TCFD, HVFD, Galveston County Firefighters
Human Resources Manual	No	-
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	No	-
Engineers or professionals trained in building or infrastructure construction practices	Yes	Code Enforcement
Planners or engineers with an understanding of natural hazards	No	-
Staff with expertise or training in benefit/cost analysis	No	-
Professionals trained in conducting damage assessments	Yes	Code Enforcement Officers and building inspectors
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	No	-
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	Yes	The Office of Emergency Management director of the City of La Marque, which shall be held by the mayor, or the Mayor's designee in accordance with state law.
Grant writer(s)	No	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to the City of La Marque.

Table 9.9-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	-
Capital improvements project funding	Yes. The City's annual budget includes capital improvement projects which enhance mitigation efforts.
Authority to levy taxes for specific purposes	-
User fees for water, sewer, gas or electric service	-
Impact fees for homebuyers or developers of new development/homes	Yes, fees are used to improve existing infrastructure and future growth
Stormwater utility fee	Yes. The City shall have full authority to operate a storm water management utility pursuant to subchapter C, chapter 402, Local Government Code; article 11, section 5, of the Texas Constitution and the Charter of the City of La Marque. The City of La Marque shall not require a deposit for stormwater management fees as a precondition to accepting surface flow into the drainage system.
Incur debt through general obligation bonds	-
Incur debt through special tax bonds	-
Incur debt through private activity bonds	-
Withhold public expenditures in hazard-prone areas	-
Other federal or state funding programs	-
Open Space Acquisition funding programs	-



Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	-

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of La Marque.

Table 9.9-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	Ringdown system (connect CTY), social media platforms, local cable channel 16
Personnel skilled or trained in website development	Yes	IT Department and City PIO
Hazard mitigation information available on your website	Yes	Yes, http://www.cityoflamarque.org/389/Hazard-Mitigation-Plan
Social media for hazard mitigation education and outreach	Yes	Emergency Management has a web page that provides for hazard mitigation outreach and preparedness.
Citizen boards or commissions that address issues related to hazard mitigation	No	CERT - The CERT Program educates people about disaster preparedness and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization and disaster medical operations. Once trained, CERT members can assist others in their neighborhoods or workplace following an event when professional responders are not immediately able to help. CERT members are also encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects in their community.
Other programs already in place that could be used to communicate hazard-related information	Yes	Water Bill print out, connect cty, social media sites.
Warning systems for hazard events	Yes	Ringdown system (connect CTY), Texas City Siren System, social media
Natural disaster/safety programs in place for schools	No	-
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of La Marque.

Table 9.9-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	2/2X	2/1/2022
Storm Ready Certification	No	Galveston County is certified	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable



NP Not participating
- Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.9-8. Adaptive Capacity

Hazard	Preliminary Ranking
Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

**Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.*

9.9.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.9-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	No, the City does not maintain a list of properties that have been damaged by flood.
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	No
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	N/A
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	Approximately 150. Hurricane Ike & Hurricane Harvey damaged structures were demolished, and a new home rebuilt that was funded by the General Land Office Grants to the property owners.



NFIP Topic	Comments
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes
NFIP Compliance	
What local department is responsible for floodplain management?	Code Compliance
Are any certified floodplain managers on staff in your jurisdiction?	No, the Code Compliance Supervisor is in the process of getting Certified.
Do you have access to resources to determine possible future flooding conditions from climate change?	Yes, GIS and Flood Plan Mapping, Chapter 32 Article III local Ordinance
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes, continued education funding
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	All new construction must submit grade elevation plans. All new construction is inspected for proper drainage practices.
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	Multi-Departmental plan reviews
What are the barriers to running an effective NFIP program in the community, if any?	Staffing costs
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	N/A
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Chapter 32-73 Flood Damage Prevention, amended in 2014
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Meets minimum requirements
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	Chapter 32 Section 4,6,7,8,9
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	The City does not participate in CRS.

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.9.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.9-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	224	-	201	-	103	-	310	-	194	-	225	-
Multi-Family	0	-	0	-	0	-	0	-	0	-	0	-
Other (commercial)	12	-	26	-	27	-	24	-	12	-	30	-



mixed-use, etc.)												
Total Permits Issued	236	-	227	-	130	-	334	-	206	-	255	-
Property or Development Name	Type of Development	# of Units / Structures	Location (address and/or block and lot)				Known Hazard Zone(s)*		Description / Status of Development			
Recent Major Development and Infrastructure from 2016 to Present												
None identified												
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years												
None identified												

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.9.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of La Marque's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City of La Marque has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.9-1. La Marque Area Extent and Location Map (Flood)

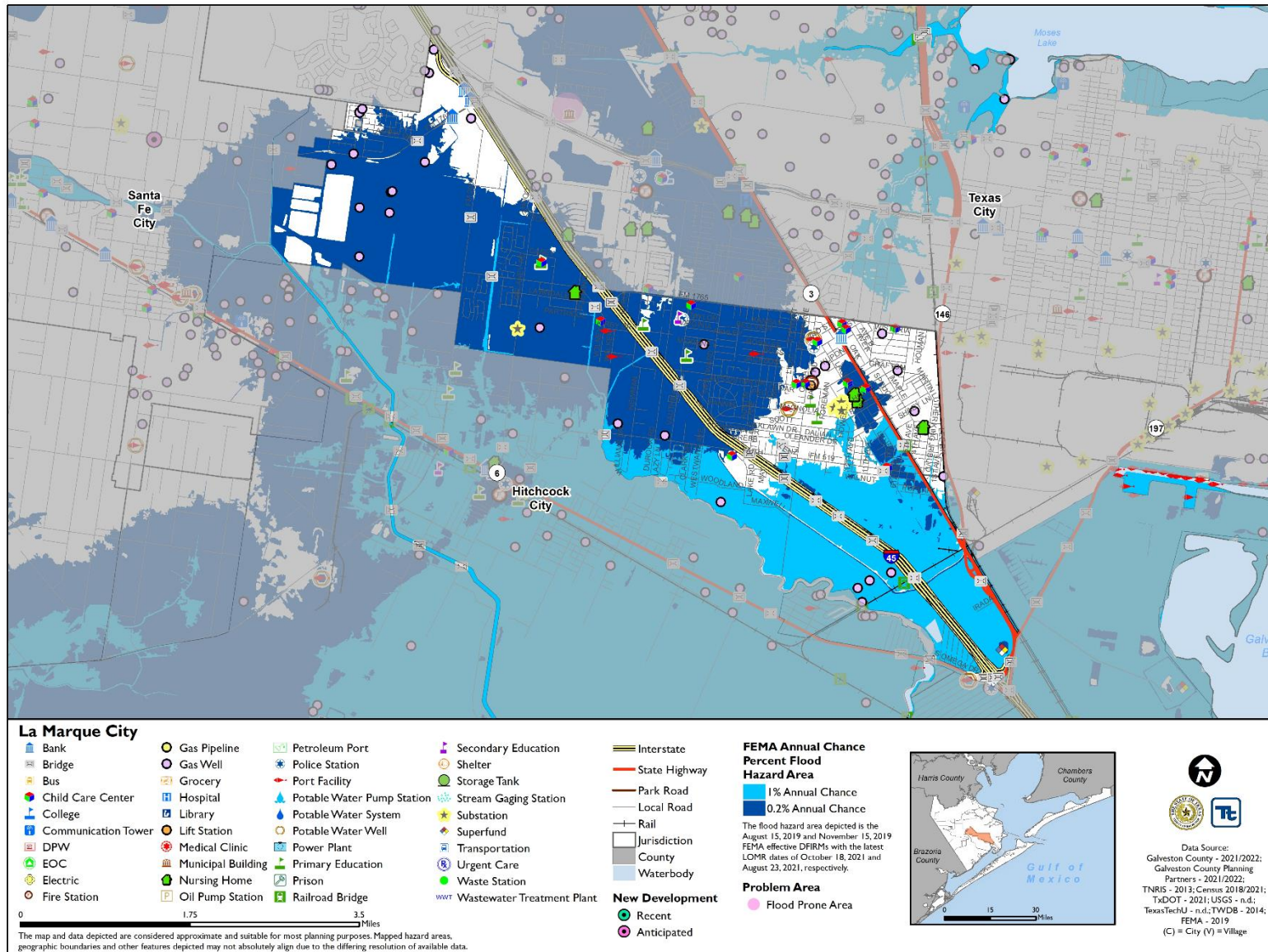




Figure 9.9-2. La Marque Area Extent and Location Map (SLOSH, Tsunami)

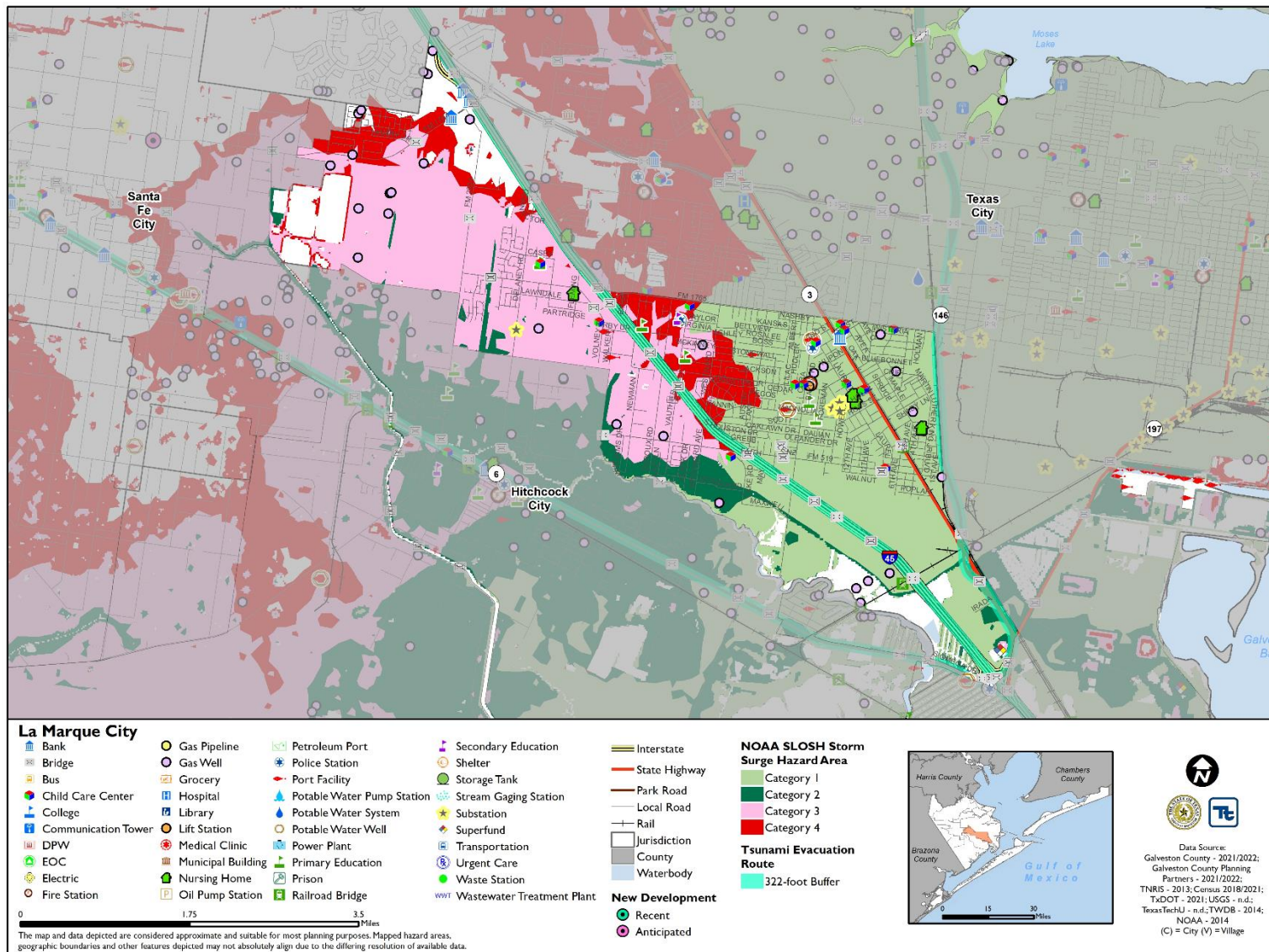




Figure 9.9-3. La Marque Area Extent and Location Map (Sea Level Rise, WUI)

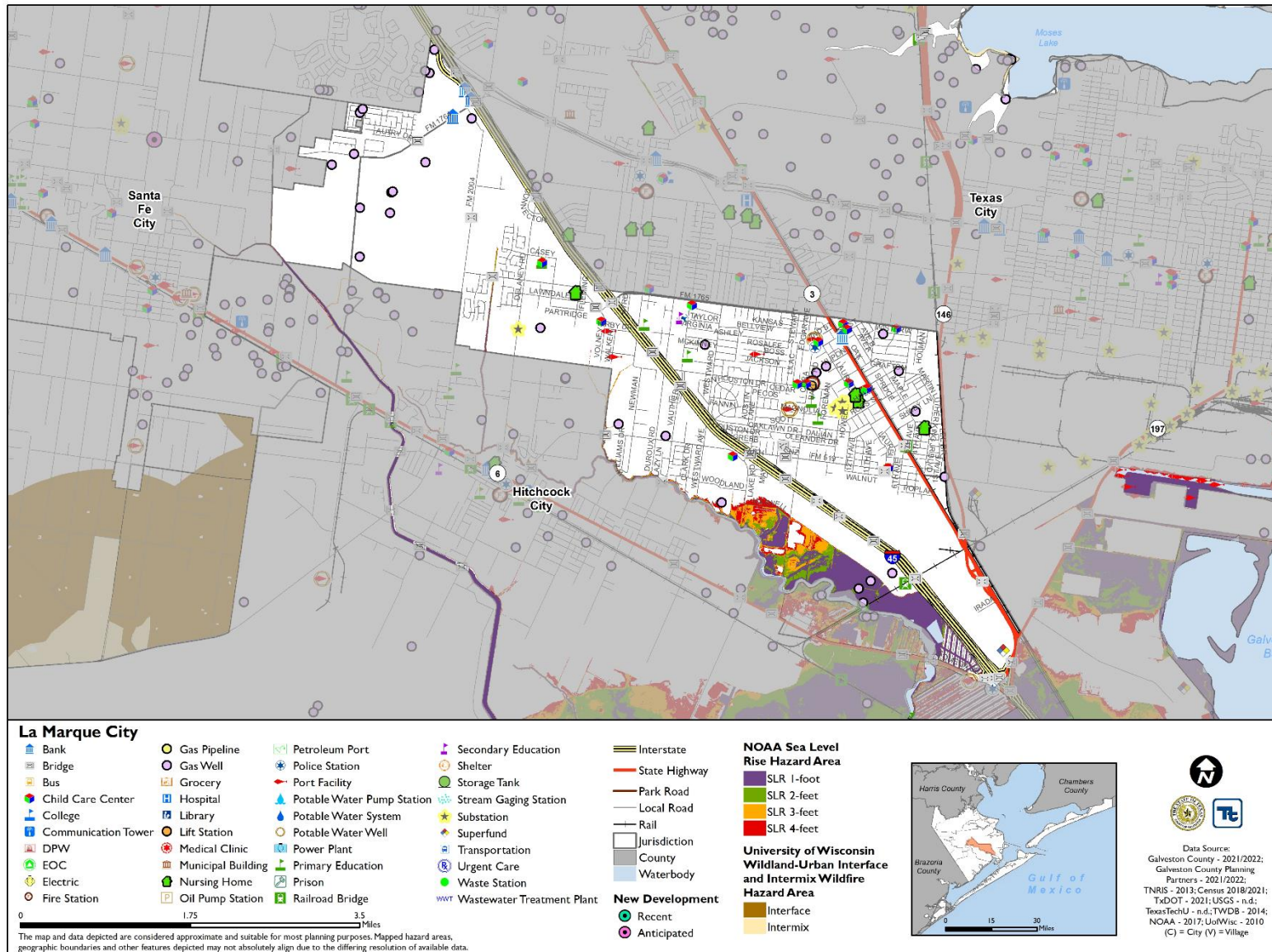
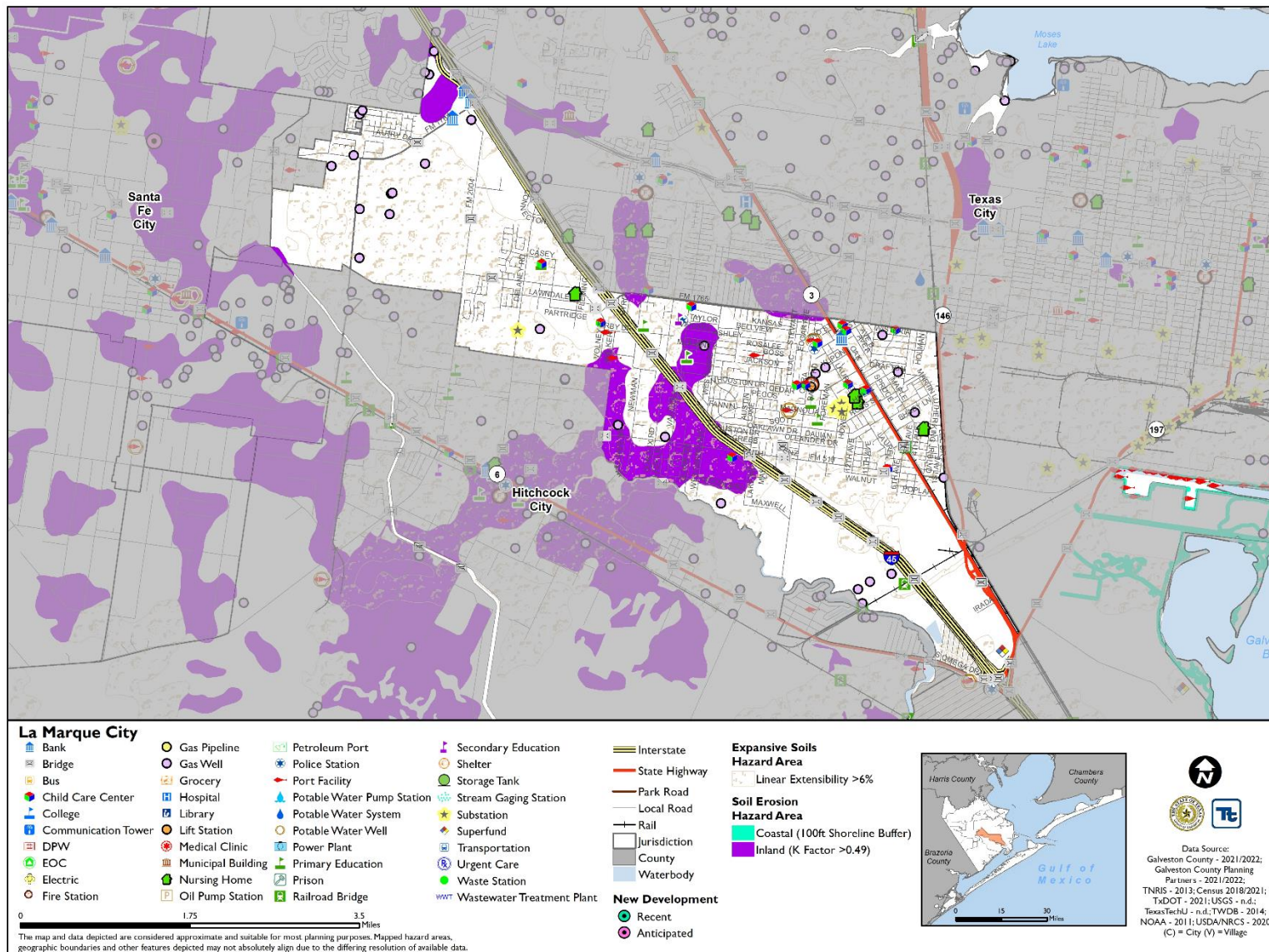




Figure 9.9-4. La Marque Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of La Marque's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages the City of La Marque experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.9-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	No damages identified
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes.
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson and Santa Fe. Approximately 7,000 homes and 125 businesses were	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	There were numerous water rescues. Flood waters completely inundated homes and businesses in La Marque.
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	No damages identified
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads.
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
				monoxide poisoning and other effects.
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	The storm brought gusty winds to most of the City of La Marque, causing power outages.

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of La Marque's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of La Marque. The City of La Marque reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of La Marque agreed with the calculated rankings.

Table 9.9-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
Low	Low	Low	High	Medium	Low	Low	High	Low

Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire
Low	Low	Low	Medium	Medium	Low	Medium	Low

Note: The scale is based on the hazard rankings established in Section 5.3 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

9.9.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.



Past Mitigation Initiative Status

The following table indicates progress on the community’s mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the ‘Capability Assessment’ presented previously in this annex.



Table 9.9-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
LM 2006-2:	Implement drainage projects that support low maintenance and cleaning of drainage ditches.	Public Works	In Progress	Yes (as 2022-La Marque-001)	Westwood Circle Project – Completed/ Merry, Melody Project (GLO) - in progress	Public Works/ Adico Engineering
LM 2011-2:	Purchase and Install Storm Shutters for Fire Station Entry way	Fire Department	No progress	No	-	-
LM 2011-3:	Purchase new Fire Station Doors for Apparatus Bays	Fire Department	No progress	No	-	-
LM 2011-6:	Purchase New Rescue Pumper for Fire Station	Fire Department	completed	No	-	-
LM 2011-7:	Build Westside Public Safety Complex	City of La Marque Fire/Police Departments	Fire Station Complete	No	-	-
LM 2011-9:	Purchase and Install Generators for existing and new critical facilities and infrastructure	Public Services / Police Department	In Progress	No	-	-
LM 2011-11:	Construct safe room community shelter	Emergency Management	No progress	No	-	-
LM 2011-12:	Build new roads to accommodate evacuations and reduce congestion at the intersections cited	TXDOT, Public Services to coordinate	In progress	No	-	-
LM 2011-13:	Purchase and Install generators for wastewater lift stations located throughout the city.	Public Services		No	-	-
LM 2011-14:	Construct a storm water detention area on the east side of the City	Public Works		No	-	-
LM 2011-15:	Increase the height of the existing Levee wall system to withstand a Category 5 storm surge	US Army Corps of Engineers, Galveston County Drainage District	No progress	No	-	-
LM 2011-16:	Purchase 100' Aluminum Aerial platform fire apparatus for residential and commercial structure fire rescues.	Fire Department	No progress	No	-	-
LM 2011-17:	Build Public Services Facility	City Administration	In progress	No	-	-
LM 2011-18:	Remove downed trees and brush that pose increased fire risk throughout the City.	Fire Department/Public Services/Code Enforcement	In Progress	No	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
LM 2011-19:	Develop and provide public awareness campaigns for natural hazards and Dam/Levee Failure	GCOEM, Emergency Management, and applicable state/federal agencies	In progress	Yes (as 2022-La Marque-002)	-	-
LM-2016-1:	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties	City Administration and applicable state and county agencies	No Progress	Yes (as 2022-La Marque-003)	-	-
LM 2016-2:	Install lightning grounding systems and protection devices on critical facilities/infrastructure	City Administration	No Progress	No	-	-
LM 2016-3	Develop Critical Infrastructure and Key Resources database (CIKR)	City Administration and applicable departments	No Progress	No	-	-
LM 2016-4:	Improve regulations and permit requirements to promote hazard mitigation strategies	City Administration and Development Services	On Going Capability/ In Progress	Yes (as 2022-La Marque-004)	-	-
LM 2016-5:	Become a Certified NWS Storm Ready Community	Emergency Manager	In Progress	No	-	-
LM 2016-6:	Implement the Corp of Engineers study of the Galveston County Water Reservoir Dam and Levee system	City Administration and applicable departments	-	No	-	-



Additional Mitigation Efforts

The City of La Marque has not identified any additional mitigation efforts from what is presented in Table 9.9-14.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of La Marque participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.9-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X			X	X		X			X
Dam & Levee Failure	X			X	X		X			X
Drought	X			X	X		X			X
Expansive Soils	X			X	X		X			X
Extreme Temperatures	X			X	X		X			X
Flood	X	X		X	X	X	X		X	X
Hail	X			X	X		X			X
Hurricane & Tropical Storm	X	X		X	X	X	X		X	X
Land Subsidence	X			X	X		X			X
Lightning	X			X	X		X			X
Pandemic	X			X	X		X			X
Severe Winter Storm	X			X	X		X			X
Thunderstorm Wind	X			X	X		X			X
Tornadoes	X			X	X		X			X
Tsunami	X			X	X		X			X
Utility Failure	X			X	X		X			X
Wildfire	X			X	X		X			X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of La Marque would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.9-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-La Marque-001	Drainage and Stormwater Improvements	Problem: Ditches require constant maintenance Solution: Implement drainage projects that support low maintenance and cleaning of drainage ditches.	Both	Flood, Hurricane & Tropical Storm, Severe Winter Storm	1, 2	1-5 years	Public Works/ Adico Engineering	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	High	High	LPR, SIP	PP, SP
2022-La Marque-002	Public Outreach	Problem: Methods and operational equipment are needed to inform the public on how residents can mitigate hazards at their properties. Additionally, outreach methods are needed informing the community of immediate danger from an impending hazard or updating the public with an ongoing controlled hazard. Solution: Public outreach program will be designed to inform residents on how they can mitigate hazards at their properties and notify the public of immediate hazard threats or updated supplemental information of ongoing hazards through numerous methods that could include text messages, automated "robo calls", emails, media outlet press releases, internet websites and social media accounts from city departments. Equipment would include social monitoring or crowd source programs, cameras and hard-shell cases, laptop, and a dedicated vehicle.	Both	All Hazards	3	1-5 Years	City Administration, Emergency Management	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	EAP	PI, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-La Marque-003	Mitigation RFC/SRL properties	Problem: Flood waters damaged facilities and homes. Solution: Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties.	Existing	Flood, Hurricane & Tropical Storm	1	1-5 years	City Administration, Development Services, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP, PP
2022-La Marque-004	Integrate mitigation measures in community regulations and permits	Problem: Hazard mitigation is an ongoing need. Solution: Improve and enforce community regulations and permit requirements to promote hazard mitigation strategies. This includes restricting development or requiring enhanced building techniques in floodplains and mapped high-hazard areas.	Both	All hazards	1, 2	Ongoing	City Administration, Development Services	FEMA Grant Funding (FMA, HMGP)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR, ES

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DPW	Department of Public Works
EHP	Environmental Planning and Historic Preservation
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program
OEM	Office of Emergency Management

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation

Cost:

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)** - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.



CRS Category:

- *Preventative Measures (PR)* - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- *Property Protection (PP)* - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- *Public Information (PI)* - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- *Natural Resource Protection (NR)* - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- *Structural Flood Control Projects (SP)* - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)* - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.9-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-La Marque-001	Drainage and Stormwater Improvements	0	1	1	1	1	1	0	1	1	1	1	1	1	1	12	High
2022-La Marque-002	Public Outreach	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-La Marque-003	Mitigation RFC/SRL properties	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-La Marque-004	Integrate mitigation measures in community regulations and permits	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions.
Low (0-4), Medium (5-8), High (9-14).



9.10 CITY OF LEAGUE CITY

This section presents the jurisdictional annex for the City of League City and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City of League City participated in the planning process, an assessment of the City of League City's risk and vulnerability, the different capabilities used in the City of League City, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.10.1 Hazard Mitigation Planning Team

The City of League City followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many City of League City departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.10-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Ryan Edghill	Emergency Management	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
Kris Carpenter	Planning Manager	Attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback
David Reagan	Building Official	Attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.10.2 Jurisdictional Profile

According to the U.S. Census, the 2010 population for the City was 83,560. The estimated 2019 population was 114,392, a 36.9-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 7.0-percent of the population is 5 years of age or younger and 9.6-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.10.3 Jurisdictional Capability Assessment and Integration

The City of League City performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:



- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of League City identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of League City, what is present in the jurisdiction, and code citation and date.

Table 9.10-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 22 – Buildings and Building Regulations, 8/14/2018	State and Local	Building Official and City Code Compliance Official
<i>How does this reduce risk?</i> The City building official and city code compliance official or their designees are hereby authorized to enforce all provisions of this chapter. The City has adopted the International Building Codes with amendments. Any person who constructs any structure within the city limits shall adhere to the requirements for windstorm and hurricane protection.					
Zoning/Land Use Code	Yes	No	Chapter 125 – Unified Development Code, Article III – Zoning Regulations, 9/29/2020	Local	Board of Adjustments
<i>How does this reduce risk?</i> The purpose of this section is to establish base and overlay zoning districts for the City of League City. These zoning districts are intended to: (1) Regulate and manage the location and use of buildings and land for residence, commerce and trade, industry, transportation, communications and utilities, and other purposes; (2) Regulate and manage the location, height and size of buildings and structures hereafter erected or structurally altered, the size of yards, setbacks, and other open spaces, and the density of population; and (3) Establish site development and design standards, subdivision standards, and requirements for adequate public facilities and services. The City has created an Open Space District. The specific purpose of the OS Open Space District is to identify existing public and private open space in the city and to provide for appropriate use and development within lands zoned as such in the future. Such lands include undeveloped open space, drainage ways, and utility easements.					
Subdivision Ordinance	Yes	No	Chapter 125 – Unified Development Code, Article V – Subdivisions, 9/29/2020	Local	Planning and Engineering
<i>How does this reduce risk?</i> It is the intent of this section for the city to state the requirements for subdividers, developers, applicants, engineers, surveyors, realtors and other persons interested and involved in the subdivision and the development of land. Any prospective subdivision of land is hereby also					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
subject to the policies of the comprehensive plan including, but not limited to, the future land use plan and corresponding provisions, as well as complementary general design and construction standards approved by ordinance by city council. Building coverages are determined by hydrologic and hydraulic studies. The developer shall install an on-site drainage system capable of conveying through and from the property the design flow of storm water runoff originating in the development during a special flood hazard area as determined in accordance with criteria specified in the City of League City Master Drainage Plan, in addition to flows from undeveloped land upstream in the natural watershed of the proposed development, flows from existing upstream developments, and designs flows from developments for which plats and plans have been approved, without resulting in erosion, sedimentation or flooding of the receiving channel and downstream properties.					
Site Plan Ordinance	Yes	No	Chapter 125 – Unified Development Code, Article IV – Site Development Standards, 9/29/2020	Local and County	Planning and Building
<i>How does this reduce risk?</i> Site Plan preparation required the incorporation of the flood damage prevention standards. Other performance standards are intended to control dangerous or objectionable environmental effects—including noise, vibration, smoke, dust or other particulate matter, toxic or noxious materials, odors, fire, explosive hazard or glare and ensure compatible land use relationships.					
Stormwater Management Ordinance	Yes	Yes	Chapter 43 of the City's Code of Ordinances, entitled Clean Water, 7/14/2009	Local, State, Federal	Public Works Dept., Building Official, Engineering Dept.
<i>How does this reduce risk?</i> The intent of the ordinance from which this chapter derives is to satisfy conditions imposed by the city's National Pollutant Discharge Elimination System (NPDES) permit. Delegation of federal authority to the State of Texas, to administer NPDES permit requirements, has been made by EPA pursuant to Section 1342(b) of Title 33 of the United States Code. All monitoring required by this article shall be performed in accordance with the methodologies and protocols established in Chapter 319 of Title 30 of the Texas Administrative Code, as amended from time to time. All new development and significant redevelopment subject to this article shall either obtain and continuously maintain a stormwater quality permit or file an industrial activity certification.					
Post-Disaster Recovery/ Reconstruction Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single-family dwelling by answering Yes or No to being aware of any of the following conditions ☐ Present flood insurance coverage ☐ Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir ☐ Previous water penetration into a structure on the property due to a natural flood event Yes (Y) if aware and check wholly or partly as applicable, write No (N) if not aware. ☐ Located wholly or partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) ☐ Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) ☐ Located wholly or partly in a floodway ☐ Located wholly or partly in a flood pool ☐ Located wholly or partly in a reservoir					
Growth Management	No	No	-	-	-
<i>How does this reduce risk?</i>					
Environmental Protection Ordinance	Yes	Yes	Chapter 42 of the City's Code of Ordinances, entitled Environment, 2/23/2020	Local and State/Federal	Public Works Dept., Engineering Dept.
<i>How does this reduce risk?</i> Chapter 42 includes controls for nuisances caused by noise, oil and gas drilling and production, pipelines and pump stations and seismic testing.					
Flood Damage Prevention Ordinance	Yes	Yes	Chapter 50 – Floods, 6/26/2018	Federal, State, County and Local	Floodplain Administrator, Building



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
					Official, Engineering Dept.
<i>How does this reduce risk?</i> It is the purpose of this article to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas, by implementing the following methods designed to: (1) Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities. (2) Require that uses vulnerable to floods including facilities which service such uses, be protected against flood damage at the time of initial construction. (3) Control the alteration of natural floodplains, stream channels and natural protective barriers which are involved in the accommodation of floodwaters. (4) Control filling, grading, dredging, and other development which may increase flood damage. (5) Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands. New construction and substantial improvement of any residential structure permitted on or after October 1, 2018, shall have the lowest floor (including basement), elevated a minimum of 24 inches above the larger of the base flood elevation (BFE), the crown of the nearest street or the highest grade adjacent to the building and be a minimum of three inches above the nearest 500-year flood. New construction and substantial improvements of any commercial, industrial or other nonresidential structures permitted on or after October 1, 2018, shall have the lowest floor (including basement, and attendant utility and sanitary facilities) elevated or floodproofed to a minimum of 24 inches above the larger of the base flood elevation (BFE), the crown of the nearest street or the highest grade adjacent to the building and be a minimum of three inches above the nearest 500-year flood.					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Chapter 34 – Civil Emergencies, Article II – Emergency Management, 4/14/1983	Local	Emergency Management Director
<i>How does this reduce risk?</i> There exists the office of emergency management director of the city, which shall be held by the mayor in accordance with state law. The powers and duties of the emergency management director shall include an ongoing survey of actual or potential major hazards which threaten life and property within the city, and an ongoing program of identifying and requiring or recommending the implementation of measures which would tend to prevent the occurrence or reduce the impact of such hazards if a disaster did occur. As part of his responsibility in hazard mitigation, the director shall supervise the development of an emergency management plan for the city, and shall recommend that plan for adoption by the city council along with any and all mutual aid plans and agreements which are deemed essential for the implementation of such emergency management plan.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-
Planning Documents					
Comprehensive Plan	Yes	Yes	Comprehensive Plan, 2035, Updated June 2013	Local	Planning Department
<i>How does this reduce risk?</i> The 2035 Comprehensive Plan serves as a blueprint for how and where the community should grow and considers issues such as land use, neighborhoods, mobility, and economic development. Floodplain preservation and flood protection is a guiding principle evident throughout the Plan. The Plan includes an entire Chapter devoted to Hazard Mitigation. Including in the Plan's guiding principles is to protect people and structures from flooding and other potential hazards through sound development and building practices. The Plan recommends that natural areas such as floodplains, native habitat areas, prairie land and wetlands should be protected and, when appropriate, utilized as amenities to achieving desired character. Natural features should be used as buffers or open space between or around developed areas and incompatible uses. Natural disasters can be mitigated by "getting out of the way", protecting and enhancing natural features, making structures more resistant to flood and wind damage, and managing the development and redevelopment of land.					
Capital Improvement Plan	Yes	No	City releases a 5-yr CIP plan that incorporates drainage improvements, 9/14/2021	Local	Citywide
<i>How does this reduce risk?</i> Capital Improvement Plan – Fiscal Years 2022-2026. The FY2022 capital program includes \$86.85 million in funding for 65 projects, including 50 tax supported and 15 utility projects. The FY2022 program includes \$15.02 million in continued reinvestment in sidewalks,					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
traffic signals, asphalt and concrete roadways, general facilities, and park facilities. Also included is \$12.41 million in the street and traffic program with improvements to traffic systems, environmental clearance, and land acquisition for the extension of North Landing. The drainage program is funded at \$34.44 million in FY2022 to mainly implement projects from the May 2019 GO Bond election. The FY2022 Fire program totals \$420,000 for the design of dormitories and a bay expansion to Fire Station #5 and temporary Boxx Modular buildings while Fire Station 5 is awaiting expansion. \$1 million in potential grant funding to replace City generators is programmed in Facilities. The Parks program totals \$6.93 million in FY2022 and includes funding for 11 projects, many of which have anticipated grant funding in the amount of \$500,000. Construction of the FM270 Boat Ramp is programmed in FY2022 along with 2 kayak launch sites, one at the end of Kansas Ave, and another near Highway 270 Boat Ramp, a pedestrian trail connection at Gilmore Elementary, and a TxDOT Bike Trail and Sidewalk. Downtown Revitalization program comprises \$2.22 million for the Main Street project in FY2022 for underground electrical and land acquisition. The Plan includes a substantial Drainage Improvement Program.					
Disaster Debris Management Plan	Yes	No	-	Local	Emergency Management
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	Yes	No	Chapter 50 – Floods	Local, State, Federal	Floodplain Administrator, Building Official, Engineering Dept.
<i>How does this reduce risk?</i>					
Floodplain management is a component of Chapter 50 as described above and is addressed in depth in the City's Comprehensive Plan.					
Stormwater Management Plan	No	No	Chapter 43 – Clean Water	Local, State, Federal	Public Works Dept., Building Official, Engineering Dept.
<i>How does this reduce risk?</i>					
Open Space Plan	Yes	No	Parks, Trails, and Open Space Master Plan, November 2017	Local	Parks Director
<i>How does this reduce risk?</i>					
In order to assess the parks, trails, and open space needs for League City over the next 20 years, a multi-level approach was taken. Existing facilities and park acreage were compared to national, regional, and local standards using level-of-service which compares the quantity of parks per population. During development of the previous parks master plan in 2006, League City established a goal to provide 10 acres of park space per 1,000 residents. This quantity was updated to 15 acres per 1,000 residents to include a goal for regional parks. Currently, there are 14.9 acres of park space per 1,000 residents within League City.					
Much of the land surrounding Clear Creek and Dickinson Bayou are considered within the 100 year floodplain which is generally unsuitable for development. The preservation and protection of these lands is critical to existing ecosystems. Providing access to these areas, such as the Dr. Ned and Fay Dudney Clear Creek Nature Center, allows League City residents a more intimate view of natural surroundings.					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Shoreline Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Transportation Plan	Yes	No	Master Mobility Plan Update, 2018	Local	City Council
<i>How does this reduce risk?</i> The purpose of the League City Master Mobility Plan Update is to retrofit the 2011 Master Mobility Plan with up-to-date travel demand model analyses and improve long-term transportation connectivity and access and create a more efficient framework for economic development. The Master Mobility Plan Document includes transportation policy, goals and objectives, and implementation strategies to guide the growth and development of the thoroughfare network. The Mobility Plan Map is the long-term illustration of the thoroughfare network with identified general alignments and rights-of-way for future preservation.					
Agriculture Plan	No	Yes	-	-	-
<i>How does this reduce risk?</i>					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	Yes	No	Revitalizing Historic League City – Downtown Redevelopment, 2016	Local	Economic Development
<i>How does this reduce risk?</i> Downtown redevelopment recommendations include an: Entryway with gateway sign • Pedestrian crossings • New development framing the roadway • Improved parking in public right-of-way • Enhanced streetscaping • Buried/relocated overhead utilities • Use of historic roadway markers					
Other	No	-	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	-	Local	Emergency Management
<i>How does this reduce risk?</i>					
Continuity of Operations Plan	Yes??	No	-	Local	Emergency Management
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	Yes	Yes	-	Local	Emergency Management
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	Yes	No	-	Local	Emergency Management
<i>How does this reduce risk?</i>					
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of League City to oversee and track development.

Table 9.10-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible?	Yes	Permits are approved construction plans for new development and CIP projects.



Indicate if your jurisdiction implements the following	Yes/No	Comment
-If no, what is your process for development?		
Are permits tracked by hazard area? (For example, floodplain development permits.)	No	-
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	No	-

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to League City and their current responsibilities which contribute to hazard mitigation.

Table 9.10-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	The Planning and Zoning Commission (P&Z) is an eight-member board of volunteers that is responsible for the review of subdivision plans and other development issues brought forth by the Planning Department. The commission also makes recommendations to City Council on rezoning, text amendments, and planned-unit developments (PUD), comprehensive plan, and transportation planning issues.
Zoning Board of Adjustments	Yes	The primary function of the ZBA is to hear and decide upon variance requests from the Zoning Ordinance, Sign Ordinance, and appeals from a decision by staff. The ZBA also convenes as the Buildings and Standards Commission (BASC).
Planning Department	Yes	The League City Planning Department provides general guidance on zoning and land use in League City. The department reviews and provides information on requests for rezoning, special use permits, and variances. The department provides staff support to the Planning and Zoning Commission, the Zoning Board of Adjustments, and the Historic Commission.
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	-
Public Works/Highway Department	Yes	-
Construction/Building/Code Enforcement Department	Yes	Code Compliance - Responsible for enforcing City codes and ordinances throughout the City with the goal of maintaining a safe and beautiful city for residents, businesses, and visitors to enjoy. Planning and Development - Work with the Planning Department to enforce zoning ordinances which includes land usage and sign enforcement. Building Department - Relies on City assistance in enforcing unapproved construction throughout the City, as well as bringing into compliance any dilapidated structures. Engineering - Assist with floodplain management, illicit discharges and drainage concerns.



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Emergency Management/Public Safety Department	Yes	The mission of the City of League City's Office of Emergency Management is to promote emergency preparedness and resiliency for city staff, residents, businesses, and community organizations through a comprehensive program that strives to mitigate, prepare for, respond to, and recover from any emergency that may impact League City. This is accomplished through a robust training, planning, and exercise program that allows the city to maintain the State of Texas' "Advanced Level of Preparedness."
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	SwiftReach
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	-
Mutual aid agreements	Yes	-
Human Resources Manual	Yes	-
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	Yes	-
Engineers or professionals trained in building or infrastructure construction practices	Yes	-
Planners or engineers with an understanding of natural hazards	Yes	-
Staff with expertise or training in benefit/cost analysis	Yes	-
Professionals trained in conducting damage assessments	Yes	Floodplain/Stormwater Administrator and Coordinator
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	Yes	Engineering Tech
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	Yes	-
Grant writer(s)	Yes	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	Yes	-

Fiscal Capability

The table below summarizes financial resources available to League City.

Table 9.10-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	-
User fees for water, sewer, gas or electric service	Yes
Impact fees for homebuyers or developers of new development/homes	Yes
Stormwater utility fee	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activity bonds	-



Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Withhold public expenditures in hazard-prone areas	-
Other federal or state funding programs	Yes
Open Space Acquisition funding programs	-
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	-

Education and Outreach Capability

The table below summarizes the education and outreach resources available to League City.

Table 9.10-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	Multi public events throughout the year
Personnel skilled or trained in website development	Yes	-
Hazard mitigation information available on your website	Yes	-
Social media for hazard mitigation education and outreach	Yes	Facebook, Twitter
Citizen boards or commissions that address issues related to hazard mitigation	No	-
Other programs already in place that could be used to communicate hazard-related information	No	-
Warning systems for hazard events	Yes	Facebook, Twitter, SwiftReach
Natural disaster/safety programs in place for schools	No	-
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to League City.

Table 9.10-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	Yes	5	10/21/2020
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	4	10/28/2021
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	1	-
Storm Ready Certification	No	Galveston County is certified	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable
NP Not participating
- Unavailable



Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.10-8. Adaptive Capacity

Hazard	Preliminary Ranking
Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

**Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.*

9.10.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.10-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	Yes
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	Not at this time
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	N/A
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	A structure shall be deemed to be substantially improved or substantially damaged when the cumulative costs of the improvements or damage repairs, when combined incrementally over a five-year period of time, equal or exceed 50 percent of the market value of the structure.



NFIP Topic	Comments
	Structures located within the 0.2 percent flood zone will be excluded from this requirement. City ordinance, Chapter 50. Sec 50-81 (10). No structure was declared substantial damaged.
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	None
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	No, there are FEMA Zone A where the flood hazard map does not have BFE.
NFIP Compliance	
What local department is responsible for floodplain management?	Engineering
Are any certified floodplain managers on staff in your jurisdiction?	6
Do you have access to resources to determine possible future flooding conditions from climate change?	League City flood gages
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes, Substantial Damage
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	Permit review, GIS, outreach education by sending handout or flyers about flooding issues, public events.
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	A structure shall be deemed to be substantially improved or substantially damaged when the cumulative costs of the improvements or damage repairs, when combined incrementally over a five-year period of time, equal or exceed 50 percent of the market value of the structure. Structures located within the 0.2 percent flood zone will be excluded from this requirement. Chapter 50 Sec 50-81 (10).
What are the barriers to running an effective NFIP program in the community, if any?	Updates to NFIP is causing concern – inability to see how proposed changes impact residents rates.
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	None
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	October 2020
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Ordinance Chapter 50, 07/23/2019
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Higher freeboard 2'
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	Not directly. P&Z reviews variance requests for habitable structures within the A Zones. City has an active Repetitive Loss Area Analysis Program.
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	Yes, League City is interested in improving CRS classification to a Class 4.

Source:

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable



9.10.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.10-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	1073	-	881	-	776	-	673	-	802	-	484	-
Multi-Family	0	-	9	-	0	-	0	-	1	-	1	-
Other (commercial, mixed-use, etc.)	4665	-	4650	-	4765	-	4663	-	5118	-	5245	-
Total Permits Issued	5738	-	5540	-	5541	-	5336	-	5921	-	5732	-
Property or Development Name	Type of Development		# of Units / Structures		Location (address and/or block and lot)			Known Hazard Zone(s)*		Description / Status of Development		
Recent Major Development and Infrastructure from 2016 to Present												
None identified												
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years												
None identified												

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

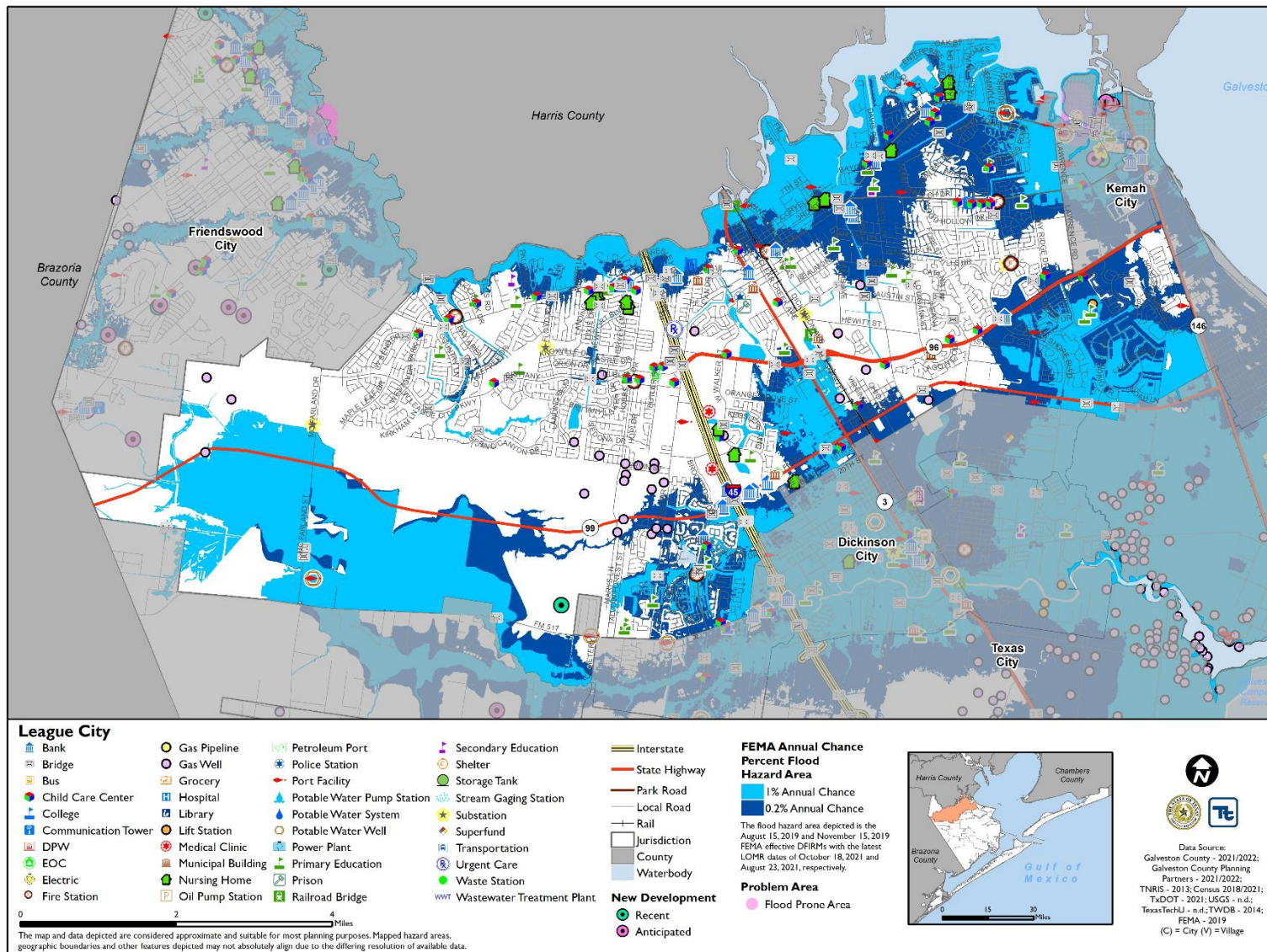
9.10.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of League City's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City of League City has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.10-1. League City Area Extent and Location Map (Flood)





League City

Legend:

- Bank
- Bridge
- Bus
- Child Care Center
- College
- Communication Tower
- DPW
- EOC
- Electric
- Fire Station
- Gas Pipeline
- Gas Well
- Grocery
- Hospital
- Library
- Life Station
- Medical Clinic
- Municipal Building
- Nursing Home
- Oil Pump Station
- Petroleum Port
- Police Station
- Port Facility
- Potable Water Pump Station
- Potable Water System
- Substation
- Potable Water Well
- Power Plant
- Primary Education
- Prison
- Railroad Bridge
- Secondary Education
- Shelter
- Storage Tank
- Stream Gaging Station
- Superfund
- Superfund
- Transportation
- Urgent Care
- Waste Station
- Wastewater Treatment Plant
- Interstate
- State Highway
- Park Road
- Local Road
- Rail
- Jurisdiction
- County
- Waterbody

NOAA SLOSH Storm Surge Hazard Area

- Category 1
- Category 2
- Category 3
- Category 4

Tsunami Evacuation Route

- 322-foot Buffer

New Development

- Recent
- Anticipated

Map Scale: 0 to 4 Miles

Inset Map: Harris County, Brazoria County, Chambers County, Gulf of Mexico

Data Source: Galveston County - 2021/2022; Galveston County Planning Partners - 2021/2022; TNIRIS - 2013; Census 2018/2021; TxDOT - 2021; USGS - n.d.; Texas TechU - n.d.; TWDB - 2014; NOAA - 2014

Legend:

- (C) = City (V) = Village



Figure 9.10-3. League City Area Extent and Location Map (Sea Level Rise, WUI)

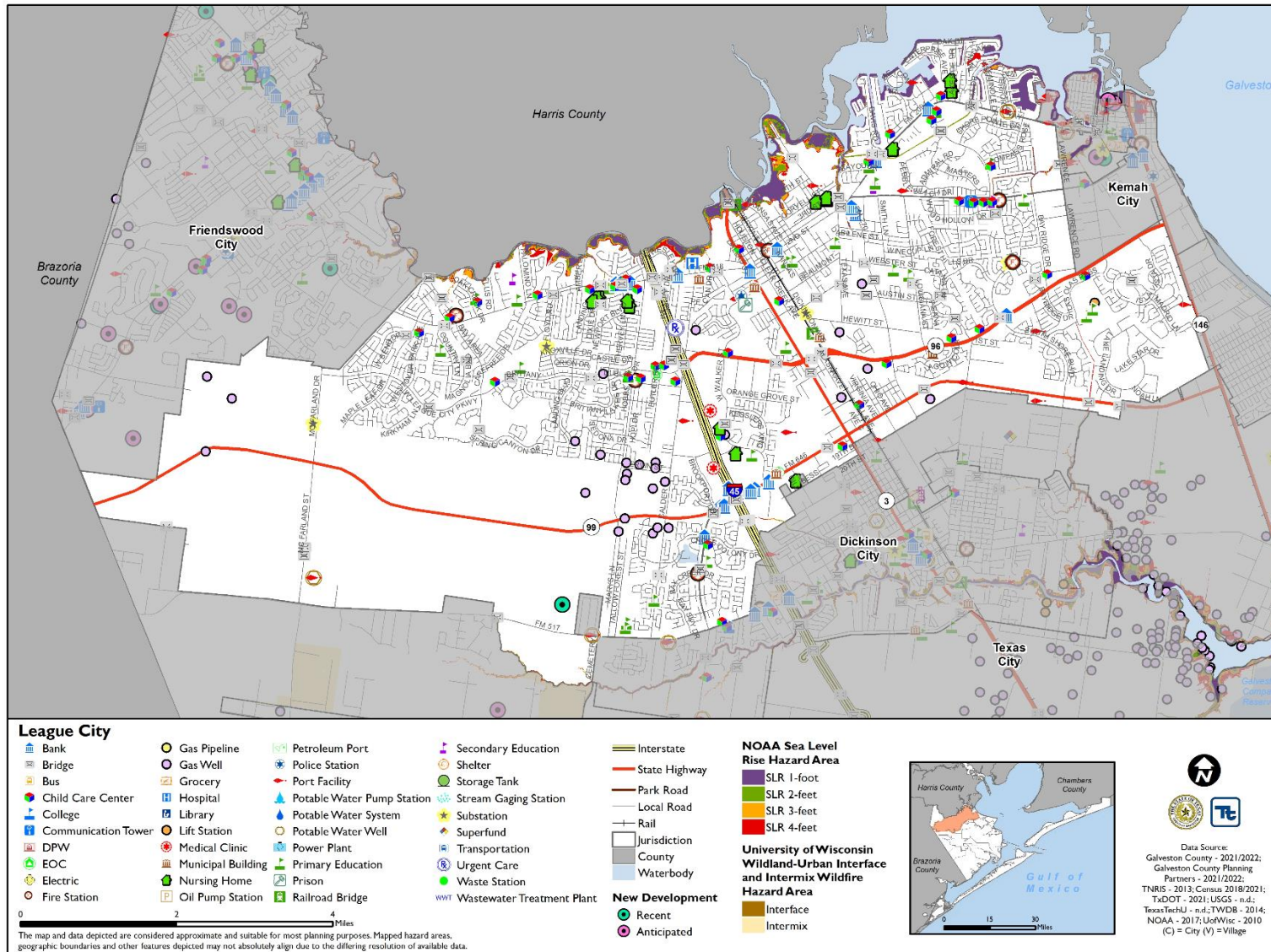
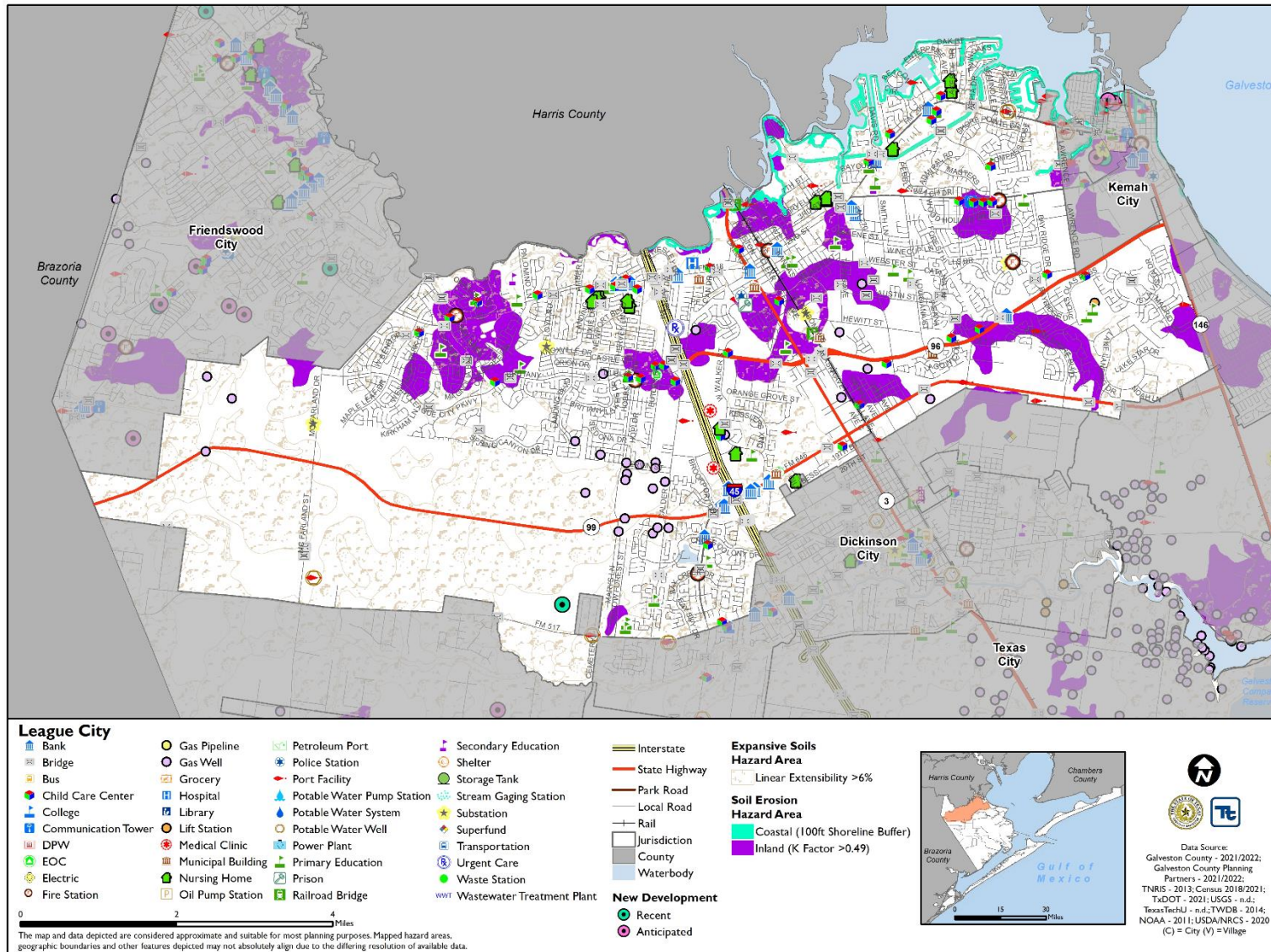




Figure 9.10-4. League City Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of League City's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages the City of League City experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.10-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
Ongoing	COVID-19 Pandemic	Yes		\$4,000,000 in force account payroll and equipment to respond to the pandemic, purchase supplies, provide additional leave for staff, reduced scheduling, telework equipment, and assistance at the vaccination hub.
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	N/A
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	N/A
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force	\$9,722,978.53 in damages. Force account equipment and labor for emergency protective actions, debris removal, flooding damage to 25% of homes and city facilities, damage to water/utilities systems including lift stations and water plants, damage to public parks, extensive soil erosion and damage to drainage/flood control systems.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson and Santa Fe. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	N/A
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	\$445,790.30 in force account labor and equipment for emergency protective measures.



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	\$442,826.90 in force account equipment and labor for emergency protective measures, public supply distribution, damage to facilities, and debris removal.
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	Approximately \$50,000 in force account labor – damage assessment is ongoing.

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of League City's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of League City. The City of League City reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of League City agreed with the calculated rankings.

Table 9.10-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
Medium	Low	Low	High	Medium	Low	Low	High	Low
Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire	
Low	Low	Low	Medium	Medium	Low	Medium	Low	



Note: The scale is based on the hazard rankings established in Section 5.3 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

Identified Issues

Specific areas of concern based on resident response to the citizen survey include:

- Flooding due to new construction
- Intersection of W. Main and I-45 flood
- Flooding along creeks
- Oaks of Clear Creek Subdivision in League City is flood prone
- Street flooding – Cedar Landing
- Bolton Dr drains very slow when large downpours occur
- North end of Pecan Orchard Rd in LC due to the elevation of the road being marginally or higher than land to the west. With extreme rain events, this section of road acts as a dam.
- Power grid
- Erosion on the beach

9.10.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community’s mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the ‘Capability Assessment’ presented previously in this annex.



Table 9.10-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/pers on to implement the project.
LC 2005-1	Stormwater Drainage Improvement	Public Works and Engineering	No Real Progress due to changes with USACE policies. Restructured Nottingham and Interurban Work but received no bids. Projects have been removed from City's CIP. Bradshaw Ditch work is being incorporated into LC 2018-4.	No	-	-
LC 2005-2:	Highland Terrace Drainage	Public Works and Engineering	No progress. Portions of project will be included in LC 2018-5.	No	-	-
LC 2005-3:	Kansas Street Drainage	Public Works and Engineering	Completed. Funded by City. \$3,770,591.00	No	-	-
LC 2005-4:	Shellside Detention	Public Works and Engineering	Completed. Funded by City and CDBG, Disaster Recover, Round 2.2 Program (2008 Hurricanes), \$3,507,604.32.	No	-	-
LC 2005-6:	Develop a Tornado Public Education Campaign	Office of Emergency Management in coordination with CCISD and local private schools	-	No	-	-
LC 2005-7:	Install Lightning/Surge Protection Equipment at City Buildings	Office of Emergency Management, Facilities Maintenance	-	No	-	-
LC 2005-8:	Homeowner Mitigation Incentive Campaign	Office of Emergency Management, Buildings	-	No	-	-
LC 2016-1:	Clear Creek Federal Project - South Belt Detention aka MUD Gully Detention	Engineering	On-going, but City is not running this project.	No, not managed by City	-	-
LC 2016-2:	Elevate Homes in RL and SRL Properties	Building Department	-	No	-	-
LC 2016-3:	Increased Freeboard - Update City ordinance to require 24" of freeboard in the floodplain.	Building Department	-	No	-	-
LC 2016-4:	Acquisition and Relocation	Building Department	-	No	-	-
LC 2016-5:	Lightning Monitoring	Fire Department, Emergency Management	-	No	-	-



SECTION 9.10: City of League City

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
LC 2016-6:	Develop and Provide Public Outreach and Education	Emergency Management	-	No	-	-
LC 2016-7:	Planting of Trees	Planning and Zoning	-	No	-	-
LC 2016-8:	Safe Rooms/Community Shelters	Emergency Management, Planning and Zoning and Building	-	No	-	-
LC 2018-1	Bay Ridge Subdivision Improvements Project	Engineering	On-going. Projects will be City funded. Currently Phase 3 in construction, Phase 2 getting ready to bid, Phases 1 and 4 are in preliminary engineering phase. Total Cost is expected to be \$24 Million	Yes (as 2022-League City-001)	Identified in the post-Harvey Drainage Study for the Bay Ridge Subdivision. Subdivision experiences flooding of streets that can reach 2' in depth and the majority of homeowners can experience flooding in their garages and/or homes. Improvements would include the design and construction of a flood gate across Bay Ridge Drive and/or full reconstruction of the entrance, the addition of a Stormwater pump station, and the widening of Gum Bayou.	Engineering / Project Management
LC 2018-2	Hidden Oaks Drive and Calder Road Drainage Improvements Project	Engineering	On-going. Project has been designed to 90%, but current estimates exceed construction budget. Current construction estimate is \$75,000	Yes (as 2022-League City-002)	During rain events that exceed the 1% event, Hidden Oaks Drive and portions of Shadow Circle and Sunset Circle experience flooding that can reach 2' in depth. These events can cause flood waters to back up into Calder Drive causing concerns for safety. The project will provide an unobstructed drainage channel for rainfall runoff events that exceeds the 1% rainfall event. This will reduce the amount of rainfall runoff crossing Calder Road from the Pecan Forest Subdivision and entering Hidden Oaks.	Engineering / Project Management
LC 2018-3	League City Parkway Drainage Channel Project	Engineering	No Progress, Project is not funded at this time and City is exploring other options to provide relief to area.	No	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/pers on to implement the project.
LC 2018-4	Oaks of Clear Creek Area Detention Pond Project	Engineering	In Progress. Project is funded with City funds and CDBG-DR Harvey Funds. Current Estimate is \$5.3 Million	Yes (as 2022-League City-003)	Areas flood at the 1% event. To mitigate, improvements would include the purchase of land, design and construction of detention pond(s) for the subdivision to contain the 1% event. Up to 2 ponds are proposed. Internal re-routing and up-sizing of the subdivision's storm sewer system will be required.	Engineering / Project Management
LC 2018-5	FM 518 & Wesley Street Infrastructure Hardening Project	Engineering	In progress. Project is funded with a mix of City Funds, HMGP and CDBG-DR Hurricane Harvey Funds. Current Estimate is \$3.9 Million	Yes (as 2022-League City-004)	During moderate to severe rainfall events, FM 518 and Wesley Street experiences significant flooding in the vicinity of the Highland Terrace Subdivision. The flooding is primarily an overland flow issue, and this project would create an overland flow "patch" that reduces the flooding depth in FM 518 and make it passable during extreme rainfall events. The proposed projects to help with this issue would be (1) raise the vertical profile of FM 518, (2) create alternate overland flow paths, and (3) improve sub-surface drainage.	Engineering / Project Management
LC 2018-6	Magnolia Creek and Cedar Gully Drainage Improvement Project	Engineering	In progress. City funded project with a budget of \$7.5 Million	Yes (as 2022-League City-005)	The rapid urbanization of League City has increased the magnitude and duration of flows and when coupled with the highly erosive soils, channel erosion has been a constant maintenance issue. Improvements would include (1) the modification of outlets for 3 existing detention basins in the Magnolia Creek sub-watershed so that Stormwater inflows for most events are stored in the basin and the channel forming discharge is allowed to pass through to the	Engineering/ Project Management



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/pers on to implement the project.
					downstream channel and (2) the modification of the Summer Place culvert crossing into a staged culvert opening by placing multiple barrels at different elevations. These projects would (1) correct the erosion of the channel bed and low flow sections, (2) stabilize failed side-slopes of earthen channel sections, (3) increase long-term channel stability, (4) reduce long-term maintenance costs, and (5) maintain flood control function of the channel.	
LC 2018-7	City-Wide Drainage Performance Analysis Project	Engineering	Completed, Final Cost was \$772,588 and was funded by City and HMGP Hurricane Harvey Funds	No	-	-
LC 2018-8	Brittany Bay Subdivision Drainage Improvements Project	Engineering	In progress. Current estimated cost is \$500,000. Funds are coming from City, HMGP and CDBG-DR Hurricane Harvey Grants	Yes (as 2022-League City-006)	This project would purchase ROW. Swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. At 2 locations, concrete swales will be constructed and at the remaining locations, pavers will be used to construct the swales. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.	Engineering / Project Management
LC 2018-9	Countryside Subdivision Drainage Improvements Project	Engineering	In progress. Current estimated cost is \$400,000 all City funded	Yes (as 2022-League City-007)	This project would purchase ROW. At all locations, swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. At 2 locations, concrete swales will be constructed, and the remaining locations grass or pavers will be	Engineering / Project Management



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
					used to construct the swales. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.	
LC 2018-10	Rustic Oakes Subdivision Drainage Improvements Project	Engineering	In progress. Current estimate is \$400,000, all City funded.	Yes (as 2022-League City-008)	At all locations, swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. At 5 locations, concrete swales will be constructed, and the remaining locations grass or pavers will be used to construct the swales. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.	Engineering / Project Management
LC 2018-11	Newport Subdivision Drainage Improvements Project	Engineering	In progress. Project funded by City, HMGP & CDBG-DR Hurricane Harvey Grants Current Estimate is \$530,000.	Yes (as 2022-League City-009)	This project would purchase up to 9 of the existing easements as ROW. At all locations, swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. All sites would have grass or pavers used to construct the swales. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.	Engineering / Project Management
LC 2018-12	The Landing Subdivision Drainage Improvements Project	Engineering	In Progress. Project is funded by City and CDBG-DR Hurricane Harvey Grants. Current Estimate is \$450,000.	Yes (as 2022-League City-010)	The Landing Subdivision drains directly to the Landing Ditch through 8 storm sewer outfalls. The outfall easements do not have defined swales and coupled with existing fences and heavy vegetation the sheet flow is being at a minimum partially blocked	Engineering / Project Management



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/pers on to implement the project.
					through the easements. As currently graded, the existing drainage easements do not have sufficient capacity to carry the extreme event's sheet flow from the streets to Landing Ditch. This factor, combined with blockage of the drainage easements by fences and/or vegetation, causes excessive ponding in the street during an extreme event rainfall. This project would purchase up to 6 of the existing easements as ROW. At all locations, swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. Up to 6 swales would be constructed as concrete swales and the remaining swales be grass or pavers. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.	
LC 2018-13	The Meadows Subdivision Drainage Improvements Project	Engineering	In Progress. City Funded with current estimate at \$1.5 Million.	Yes (as 2022-League City-011)	The Meadows Subdivision drains into a tributary of Robinson's Gully (Channel RB103-00-00) through 13 storm sewer outfalls. Six of the outfall easements need to have defined swales added. The lack of swales coupled with existing fences and heavy vegetation means the sheet flow is being at minimum partially blocked through the easements. As currently graded, the existing drainage easements do not have sufficient capacity to carry the extreme event's sheet flow from	Engineering / Project Management



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/pers on to implement the project.
					the streets to the tributary. This factor, combined with blockage of the drainage easements by fences and/or vegetation, causes excessive ponding in the street during an extreme event exceedance rainfall. The Tributary was not constructed to ultimate design capacity when the Meadows were being constructed. This has led to a lack of capacity of the tributary itself which in turn limits the existing Meadows drainage from getting to Robinson's Gully. This project would purchase up to 3 of the existing easements as ROW and purchase 3 new drainage ROWs. At all locations, swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. Up to 6 swales could be constructed as concrete swales and the remaining swales being grass or pavers. Drainage obstructions will be permanently removed. The tributary will need to be lowered approximately 2' from Robinson's Gully to Smith lane, the weir at the FM 270 crossing will need to be removed and the existing box culverts at the Smith Lane crossing will need to be replaced. Project will lower the 100 year water surface elevation within the tributary by 2' from Robinson's Gully to Smith Lane and 0.9'	



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
					upstream of Smith Lane. When coupled with the overflow swales, this in turn will provide ultimate design capacity to the tributary and allow water to exit the Meadows Drainage system limiting street and structural flooding.	
LC 2018-14	Benson Bayou Regional Mitigation Conveyance & Pond Project	Yes	In progress. Project will be funded by City and likely split into multiple phases. Current estimate is \$50 Million	Yes (as 2022-League City-012)	The flooding problems seen in the existing conditions are generally concentrated east of the HL&P easement that runs northwest to southeast across the Benson Bayou area. The areas of deepest flooding immediately upstream of the HL&P easement are in undeveloped areas. Although not as deep, the flooded areas in the vicinity of State Highway 3 and League City Parkway are a concern due to the Oaks of Clear Creek and Leisure Lakes Subdivisions. Homes in this area routinely experience street flooding and structural inundation. The primary issue in the Benson Bayou area is that League City has no control over the down-stream capacity of the bayou within the City of Dickinson. For this reason, any drainage improvements achieved for owners within this watershed by increased conveyance must be mitigated before flows leave League City. Alternatively, drainage may be improved using a detention solution. Many of the flooding problems within Benson Bayou area will not be solved directly by improvements implemented by the City. However, the flooding	Engineering / Project Management



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/pers on to implement the project.
					cannot be removed unless there is sufficient underlying infrastructure to receive it. Part of this necessary infrastructure is adequately sized channels. Detention sites have been identified that can be used to attenuate the flows in Bensons Bayou and its tributaries. Routing flows to these basins and constructing outflow control structures will help to reduce the frequency of flooding. Re-grading tributaries from the HL&P culverts all the way to League City Parkway and beyond will provide the conveyance and depth necessary for new developments. Leaving the HL&P culverts in place and constructing a mitigation pond will prevent downstream impacts. The City is proposing to re-grade approximately 2,000 LF of tributaries and land acquisition for and construction of a 300 - 400 acre-foot mitigation pond along with reconstructing road crossings on League City Parkway and Hwy 3 and existing pond outfall structures as needed within this watershed.	
LC 2018-15	Trailer Mounted Generator and By-Pass Pump Units	Engineering	No Progress at this time. Project is funded with City funds and is currently estimated at \$660,000.	Yes (as 2022-League City-013)	The project is to purchase at a minimum the following items: 2 Trailer Mounted Diesel Driven 200 kW Gensets with electrical pigtail connection	Public Works / Project Management



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/pers on to implement the project.
					1 Trailer Mounted 6" and 8" DriPrime Diesel Driven Pump with suction & discharge piping 1 4X4 1-ton Flatbed with bed rack	

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Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.10-14, the City did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of League City participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.10-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X	X		X	X		X		X	
Dam & Levee Failure (no hazard exposure)										
Drought	X	X		X	X		X		X	
Expansive Soils	X	X		X	X		X		X	
Extreme Temperatures	X	X		X	X		X		X	X
Flood	X	X		X	X		X		X	X
Hail	X	X		X	X		X		X	X
Hurricane & Tropical Storm	X	X		X	X		X		X	X
Land Subsidence	X	X		X	X		X		X	
Lightning	X	X		X	X		X		X	X
Pandemic	X	X		X	X		X		X	
Severe Winter Storm	X	X		X	X		X		X	X
Thunderstorm Wind	X	X		X	X		X		X	X
Tornadoes	X	X		X	X		X		X	X
Tsunami	X	X		X	X		X		X	X
Utility Failure	X	X		X	X		X		X	X
Wildfire	X	X		X	X		X		X	X

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of League City would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.10-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-League City-001	Bay Ridge Subdivision Improvements Project	Problem: Identified in the post-Harvey Drainage Study for the Bay Ridge Subdivision. Subdivision experiences flooding of streets that can reach 2' in depth and the majority of homeowners can experience flooding in their garages and/or homes. Solution: Improvements would include the design and construction of a flood gate across Bay Ridge Drive and/or full reconstruction of the entrance, the addition of a Stormwater pump station, and the widening of Gum Bayou. Projects will be City funded. Currently Phase 3 in construction, Phase 2 getting ready to bid, Phases 1 and 4 are in preliminary engineering phase.	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	Ongoing	Engineering / Project Management	City Funding, FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	\$24 million	High	SIP	SP
2022-League City-002	Hidden Oaks Drive and Calder Road Drainage Improvements Project	Problem: During rain events that exceed the 1% event, Hidden Oaks Drive and portions of Shadow Circle and Sunset Circle experience	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	Ongoing	Engineering / Project Management	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	\$75,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		flooding that can reach 2' in depth. These events can cause flood waters to back up into Calder Drive causing concerns for safety. Solution: The project will provide an unobstructed drainage channel for rainfall runoff events that exceeds the 1% rainfall event. This will reduce the amount of rainfall runoff crossing Calder Road from the Pecan Forest Subdivision and entering Hidden Oaks.											
2022-League City-003	Oaks of Clear Creek Area Detention Pond Project	Problem: Areas flood at the 1% event. Solution: To mitigate, improvements would include the purchase of land, design and construction of detention pond(s) for the subdivision to contain the 1% event. Up to 2 ponds are proposed. Internal re-routing and up-sizing of the subdivision's storm sewer system will be required.	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress	Engineering / Project Management	Project is funded with City funds and CDBG-DR Harvey Funds	Protection of structures and critical infrastructure.	\$5.3 million	High	SIP	SP
2022-League City-004	FM 518 & Wesley Street Infrastructure Hardening Project	Problem: During moderate to severe rainfall events, FM 518 and Wesley Street experiences significant flooding in the vicinity of the Highland	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress	Engineering / Project Management	Project is funded with a mix of City Funds, HMGP and	Protection of structures and critical infrastructure.	\$3.9 million	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Terrace Subdivision. The flooding is primarily an overland flow issue, and this project would create an overland flow “patch” that reduces the flooding depth in FM 518 and make it passable during extreme rainfall events. Solution: The proposed projects to help with this issue would be (1) raise the vertical profile of FM 518, (2) create alternate overland flow paths, and (3) improve sub-surface drainage.						CDBG-DR Hurricane Harvey Funds.					
2022-League City-005	Magnolia Creek and Cedar Gully Drainage Improvement Project	Problem: The rapid urbanization of League City has increased the magnitude and duration of flows and when coupled with the highly erosive soils, channel erosion has been a constant maintenance issue. Solution: Improvements would include (1) the modification of outlets for 3 existing detention basins in the Magnolia Creek sub-watershed so that Stormwater inflows for most events are stored in the	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress	Engineering / Project Management	City Funds, FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	\$7.5 million	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		basin and the channel forming discharge is allowed to pass through to the downstream channel and (2) the modification of the Summer Place culvert crossing into a staged culvert opening by placing multiple barrels at different elevations. These projects would (1) correct the erosion of the channel bed and low flow sections, (2) stabilize failed side-slopes of earthen channel sections, (3) increase long-term channel stability, (4) reduce long-term maintenance costs, and (5) maintain flood control function of the channel.											
2022-League City-006	Brittany Bay Subdivision Drainage Improvements Project	Problem: Brittany Bay Subdivision has insufficient drainage. Solution: This project would purchase ROW. Swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. At 2 locations, concrete swales will be constructed and at the	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress	Engineering / Project Management	City Funds, HMGP and CDBG-DR Hurricane Harvey Grants	Protection of structures and critical infrastructure.	\$500,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		remaining locations, pavers will be used to construct the swales. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.											
2022-League City-007	Countryside Subdivision Drainage Improvements Project	Problem: Countryside Subdivision has insufficient drainage. Solution: This project would purchase ROW. At all locations, swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. At 2 locations, concrete swales will be constructed, and the remaining locations grass or pavers will be used to construct the swales. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress	Engineering / Project Management	City Funds	Protection of structures and critical infrastructure.	\$400,000	High	SIP	SP
2022-League City-008	Rustic Oaks Subdivision Drainage Improvements Project	Problem: Rustic Oaks Subdivision has insufficient drainage. Solution: At all locations, swales will	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical	1, 2	In progress	Engineering / Project Management	City Funds	Protection of structures and critical infrastructure.	\$400,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. At 5 locations, concrete swales will be constructed, and the remaining locations grass or pavers will be used to construct the swales. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.		Storm, Tsunami									
2022-League City-009	Newport Subdivision Drainage Improvements Project	Problem: Newport Subdivision has insufficient drainage. Solution: This project would purchase up to 9 of the existing easements as ROW. At all locations, swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. All sites would have grass or pavers used to construct the swales. Drainage obstructions will be permanently removed, and the existing storm sewer	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress	Engineering / Project Management	City Funds, HMGP & CDBG-DR Hurricane Harvey Grants	Protection of structures and critical infrastructure.	\$530,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		manhole cover elevation will be adjusted as needed.											
2022-League City-010	The Landing Subdivision Drainage Improvements Project	Problem: The Landing Subdivision drains directly to the Landing Ditch through 8 storm sewer outfalls. The outfall easements do not have defined swales and coupled with existing fences and heavy vegetation the sheet flow is being at a minimum partially blocked through the easements. As currently graded, the existing drainage easements do not have sufficient capacity to carry the extreme event's sheet flow from the streets to Landing Ditch. This factor, combined with blockage of the drainage easements by fences and/or vegetation, causes excessive ponding in the street during an extreme event rainfall. Solution: This project would purchase up to 6 of the existing easements as ROW. At all locations, swales will be constructed which will require the removal and	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress	Engineering / Project Management	City Funds and CDBG-DR Hurricane Harvey Grants	Protection of structures and critical infrastructure.	\$450,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		replacement of the existing fence between 2 lots inside the easement/ROW. Up to 6 swales would be constructed as concrete swales and the remaining swales be grass or pavers. Drainage obstructions will be permanently removed, and the existing storm sewer manhole cover elevation will be adjusted as needed.											
2022-League City-011	The Meadows Subdivision Drainage Improvements Project	Problem: The Meadows Subdivision drains into a tributary of Robinson's Gully (Channel RB103-00-00) through 13 storm sewer outfalls. Six of the outfall easements need to have defined swales added. The lack of swales coupled with existing fences and heavy vegetation means the sheet flow is being at minimum partially blocked through the easements. As currently graded, the existing drainage easements do not have sufficient capacity to carry the extreme event's sheet flow from the streets to the tributary. This factor, combined with blockage of the	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress	Engineering / Project Management	City Funds	Protection of structures and critical infrastructure.	\$1.5 million	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		drainage easements by fences and/or vegetation, causes excessive ponding in the street during an extreme event exceedance rainfall. The Tributary was not constructed to ultimate design capacity when the Meadows were being constructed. This has led to a lack of capacity of the tributary itself which in turn limits the existing Meadows drainage from getting to Robinson's Gully. Solution: This project would purchase up to 3 of the existing easements as ROW and purchase 3 new drainage ROWs. At all locations, swales will be constructed which will require the removal and replacement of the existing fence between 2 lots inside the easement/ROW. Up to 6 swales could be constructed as concrete swales and the remaining swales being grass or pavers. Drainage obstructions will be permanently removed. The tributary will need to be lowered											



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		approximately 2' from Robinson's Gully to Smith lane, the weir at the FM 270 crossing will need to be removed and the existing box culverts at the Smith Lane crossing will need to be replaced. Project will lower the 100-year water surface elevation within the tributary by 2' from Robinson's Gully to Smith Lane and 0.9' upstream of Smith Lane. When coupled with the overflow swales, this in turn will provide ultimate design capacity to the tributary and allow water to exit the Meadows Drainage system limiting street and structural flooding.											
2022-League City-012	Benson Bayou Regional Mitigation Conveyance & Pond Project	Problem: The flooding problems seen in the existing conditions are generally concentrated east of the HL&P easement that runs northwest to southeast across the Benson Bayou area. The areas of deepest flooding immediately upstream of the HL&P easement are in undeveloped areas. Although not as deep, the flooded areas	Both	Coastal & Inland Erosion, Flood, Hurricane & Tropical Storm, Tsunami	1, 2	In progress (multi-phased)	Engineering / Project Management	City Funding, FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	\$50 million	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		in the vicinity of State Highway 3 and League City Parkway are a concern due to the Oaks of Clear Creek and Leisure Lakes Subdivisions. Homes in this area routinely experience street flooding and structural inundation. The primary issue in the Benson Bayou area is that League City has no control over the down-stream capacity of the bayou within the City of Dickinson. For this reason, any drainage improvements achieved for owners within this watershed by increased conveyance must be mitigated before flows leave League City. Alternatively, drainage may be improved using a detention solution. Many of the flooding problems within Benson Bayou area will not be solved directly by improvements implemented by the City. However, the flooding cannot be removed unless there is sufficient underlying infrastructure to											



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		receive it. Part of this necessary infrastructure is adequately sized channels. Detention sites have been identified that can be used to attenuate the flows in Bensons Bayou and its tributaries. Routing flows to these basins and constructing outflow control structures will help to reduce the frequency of flooding. Re-grading tributaries from the HL&P culverts all the way to League City Parkway and beyond will provide the conveyance and depth necessary for new developments. Leaving the HL&P culverts in place and constructing a mitigation pond will prevent downstream impacts. Solution: The City is proposing to re-grade approximately 2,000 LF of tributaries and land acquisition for and construction of a 300 - 400 acre-foot mitigation pond along with reconstructing road crossings on											



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		League City Parkway and Hwy 3 and existing pond outfall structures as needed within this watershed.											
2022-League City-013	Trailer Mounted Generator and By-Pass Pump Units	Problem: The City lacks emergency portable energy. Solution: The project is to purchase at a minimum the following items: 2 Trailer Mounted Diesel Driven 200 kW Gensets with electrical pigtail connection 1 Trailer Mounted 6" and 8" DriPrime Diesel Driven Pump with suction & discharge piping 1 4X4 1-ton Flatbed with bed rack	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure, Wildfire	1, 2	1-5 years	Public Works / Project Management	City Funds, FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	\$660,000	High	SIP	SP
2022-League City-014	Public Works Operations Center (PWOC) - Bathrooms, Locker Rooms, Showers	Problem: PWOC serves as the central operations hub for the City's critical infrastructure departments. The facility was built in 1988 and has inadequate access to personal sanitation or sufficient space needed to effectively reduce exposure during a pandemic. The potential for exposure is high due to a crew-	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Pandemic, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure, Wildfire	1	6 months	League City Public Works	HMGP, General Fund	Significant reduction in potential exposure to a contagious illness that allows employees the ability to perform critical functions during an emergency.	\$275,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		oriented work environment. Currently, employees do not have access to individual lockers or showers at the location. This hinders the ability of critical infrastructure personnel to safely distance, promote sufficient disinfection practices, or remain at work for long periods of time during an emergency or disaster. Solution: The proposed project would provide ADA compliant male and female restrooms, showers, and locker rooms (dressing areas) that are conducive to emergency operations where social distancing and close quarter staff staging is critical in the prevention of mass exposure to contagious illness.											
2022-League City-015	Dallas Salmon Wastewater Treatment Plant (DSWWTP) Influent Lift Station Electrical Improvements	Problem: The Dallas Salmon WWTP is situated approximately 1500 feet south of the main channel of Clear Creek and the subject Influent Lift Station is located 200 feet from the water's edge of a Clear Creek backwater slough. A previous severe flood event	Both	Flood, Hurricane, Tsunami	1	18 months	League City Public Works	HMGP, PDM, CIP, General Fund	Elevating crucial electrical equipment will mitigate potential loss of the City's most critical wastewater lift station during a severe flood	\$288,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		caused flooding on Clear Creek to overtop the Influent Lift Station. Flood water reached into pump electrical lead junction boxes for six submersible pumps. Flooding of this system could cause a major electrical failure of the City's most vital lift station. Solution: Elevate applicable electrical junction boxes, disconnect enclosures, local HOA controls, and two Odor Control units to an elevation considered safe from future flood and storm surge events. This project will require an elevated walkway/platform for safe access by personnel during flood events. The addition of six watertight wet well hatches will ensure functionality and survivability. Construction will be limited to the general surface area of the influent wet well and primarily all above grade construction. No major excavation will be required.							or storm surge event.				



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-League City-016	Fire Station Renovation/Expansion	Problem: The COVID-19 pandemic demonstrated that existing fire stations do not have sufficient space to house first responders during a pandemic response and maintain adequate distance between employees to successfully reduce exposure. This impacts the Fire Department's ability to maintain adequate staffing levels at each station. It is critical to ensure the health and safety of first responders and other critical essential personnel during a pandemic or other disaster to ensure adequate staffing and continuity of operations. Solution: Existing fire station buildings can be renovated or expanded to add additional space and mitigation efforts to reduce potential exposure between employees during a pandemic. This would also allow the City to house additional responders during other emergencies or	Both	All hazards except Dam & Levee Failure	1, 2	1 year	League City Fire Department	HMGP, CIP, General Fund	Prevent the spread of a pandemic illness among critical essential employees and first responders.	\$750,000	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		disasters, such as a hurricane or severe weather event, especially one that occurs during an ongoing pandemic.											
2022-League City-017	Integration of Mitigation Plan	Problem: The City of League City has various plans, ordinances, and programs related to land use where the potential exists to better incorporate mitigation opportunities that could prevent future loss of life, injury, damage to property, the economy, and natural systems. Solution: Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community, including the Comprehensive Plan, Building and Zoning Codes, Capital Improvement Plan, Citywide Drainage Plan, etc.	N/A	All hazards except Dam & Levee Failure	1, 2	2 years	Emergency Management, Planning Manager, Building Official	Staff Time, HMGP, General Fund	Avoid missed opportunities to implement mitigation actions by ensuring mitigation is incorporated into all plans.	\$10,000	Medium	LPR	PR
2022-League City-018	Generators for Critical Infrastructure	Problem: The City of League City has been affected by multiple hazards in the past, such as hurricanes, winter storms, and severe weather, that		Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning,	1, 2	1 year	Facilities Department/ Public Works	HMGP, CDBG, General Fund	Prevent loss of power to critical facilities, equipment and infrastructure during an	\$200,000	High	SIP	SP, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		resulted in the loss of power to City-owned and operated critical facilities and equipment. To ensure critical infrastructure continues to function effectively during a disaster, the City needs to add generators at new locations and equipment and replace/upgrade existing generators that no longer work properly. Solution: Purchase generators for critical facilities and equipment that lack adequate back-up power.		Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure, Wildfire					emergency or disaster.				
2022-League City-019	Safety/Disaster Outreach Programs for Schools	Problem: The City of League City has a growing population with many new residents who are unfamiliar with the hazards that exist in the area. Outreach programs are needed to educate the public on the hazards in the area and how to mitigate, prepare for, and appropriately respond to each hazard. Solution: The League City Office of Emergency will coordinate with other	Both	All hazards except Dam & Levee Failure	1, 2	1 year	LC Emergency Management	HMGP, CDBG, General Fund	Increase emergency preparedness education in the community	\$40,000	Medium	EAP	PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		City departments and local agencies to develop and implement safety and disaster outreach programs in local schools.											
2022-League City-020	Compliance with NFIP	Problem: Flooding will continue to be a primary hazard of concern for the League City community. To benefit the residents of League City, the City needs to remain in good standing and compliance under the NFIP. Solution: Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements: • Enforce the flood damage prevention ordinance. • Participate in floodplain identification and mapping updates. • Provide public assistance/information on floodplain requirements and impacts.	Both	Flood, Hurricane & Tropical Storm, Tsunami	1, 2, 3	Multi-year	LC Engineering/ Planning and Development	Staff Time, PDM, General Fund	Ensure the City remains in compliance with NFIP to maximize the benefit for residents.	\$50,000	Medium	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-League City-021	Flood Alert Gauges	Problem: League City has experienced flooding and flash flooding events numerous times in the past. Flooding will continue to be a primary hazard of concern in the future. It is difficult to monitor the amount of rainfall impacting the community without having enough flood alert gauges strategically placed at locations throughout the city. Lack of real-time data during an event makes it difficult to properly warn residents of potential or actual flooding in their area. Solution: Install flood alert gauges at strategic locations throughout the city to monitor real-time rainfall data at various locations.	Both	Flood, Hurricane & Tropical Storm, Tsunami	1, 2, 3	1 year	LC Engineering	PDM, FMA, HMGP, CDBG, General Fund	Ensure adequate warning for residents in areas experiencing flooding or flash flooding to prevent loss of life and property damage.	\$50,000	Medium	SIP, LPR	SP, PI, PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV	Community Assistance Visit
CRS	Community Rating System
DPW	Department of Public Works
EHP	Environmental Planning and Historic Preservation
FEMA	Federal Emergency Management Agency
FPA	Floodplain Administrator

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation

Cost:

The estimated cost for implementation.

Benefits:



HMA Hazard Mitigation Assistance
 N/A Not applicable
 NFIP National Flood Insurance Program
 OEM Office of Emergency Management

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- **Local Plans and Regulations (LPR)** – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- **Structure and Infrastructure Project (SIP)** - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural Systems Protection (NSP)** – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs (EAP)** – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- **Preventative Measures (PR)** - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- **Property Protection (PP)** - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Information (PI)** - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- **Natural Resource Protection (NR)** - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Structural Flood Control Projects (SP)** - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- **Emergency Services (ES)** - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.10-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-League City-001	Bay Ridge Subdivision Improvements Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-002	Hidden Oaks Drive and Calder Road Drainage Improvements Project	0	1	1	1	1	1	-1	1	0	1	1	1	1	1	11	High
2022-League City-003	Oaks of Clear Creek Area Detention Pond Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-004	FM 518 & Wesley Street Infrastructure Hardening Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High



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Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-League City-005	Magnolia Creek and Cedar Gully Drainage Improvement Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-006	Brittany Bay Subdivision Drainage Improvements Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-007	Countryside Subdivision Drainage Improvements Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-008	Rustic Oakes Subdivision Drainage Improvements Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-009	Newport Subdivision Drainage Improvements Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-010	The Landing Subdivision Drainage Improvements Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-011	The Meadows Subdivision Drainage Improvements Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-012	Benson Bayou Regional Mitigation Conveyance & Pond Project	0	1	1	1	1	1	1	1	0	1	1	1	1	1	12	High
2022-League City-013	Trailer Mounted Generator and By-Pass Pump Units	1	1	1	1	1	1	1	1	0	1	1	1	1	1	13	High
2022-League City-014	Public Works Operations Center (PWOC) - Bathrooms, Locker Rooms, Showers	1	0	1	1	1	1	0	1	0	0	1	1	1	1	10	High
2022-League City-015	Dallas Salmon Wastewater Treatment Plant (DSWWTP) Influent Lift Station Electrical Improvements	1	1	1	1	0	1	1	0	0	1	1	1	1	1	11	High
2022-League City-016	Fire Station Renovation/Expansion	1	0	1	1	1	1	0	1	0	1	1	1	1	0	10	High
2022-League City-017	Integration of Mitigation Plan	0	1	1	1	1	1	0	1	0	0	1	1	0	0	8	Medium



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-League City-018	Generators for Critical Infrastructure	1	1	1	1	1	1	0	1	0	1	1	1	1	0	11	High
2022-League City-019	Safety/Disaster Outreach Programs for Schools	0	0	1	1	1	1	0	1	0	0	1	1	1	0	8	Medium
2022-League City-020	Compliance with NFIP	1	1	1	1	1	1	0	1	0	0	1	1	1	0	10	High
2022-League City-021	Flood Alert Gauges	1	1	1	1	1	1	0	1	1	1	1	1	1	0	12	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions.
Low (0-4), Medium (5-8), High (9-14).



9.11 CITY OF SANTA FE

This section presents the jurisdictional annex for the City of Santa Fe and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City of Santa Fe participated in the planning process, an assessment of the City of Santa Fe's risk and vulnerability, the different capabilities used in the City of Santa Fe, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.11.1 Hazard Mitigation Planning Team

The City of Santa Fe followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many City of Santa Fe departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.11-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Robert Shores	Police Captain	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.11.2 Jurisdictional Profile

Santa Fe is a city in Galveston County, Texas. It is named for the Santa Fe Railroad which runs through the town alongside State Highway 6. It is located in southern Galveston County. According to the U.S. Census, the 2010 population for the City was 12,222. The estimated 2019 population was 12,735, a 4.2-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 6.2-percent of the population is 5 years of age or younger and 19.6-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.11.3 Jurisdictional Capability Assessment and Integration

The City of Santa Fe performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities



- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the City of Santa Fe identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the City of Santa Fe, what is present in the jurisdiction, and code citation and date.

Table 9.11-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Chapter 3 – Construction Regulations, 5/13/2004	State and Local	Building Inspector
<i>How does this reduce risk?</i> The City has adopted the International Building Codes with amendments, including the International Property Maintenance Code. Under Supplementary Building Codes the City requires that all new structures or modifications to structures which require a building permit shall conform to wind resistant construction standards as promulgated by the State Board of Insurance under the Windstorm Inspection Program. In addition, this Chapter contains the Section of Flood Hazard Regulations.					
Zoning/Land Use Code	Yes	No	Article 1 – Zoning, 11/09/2006	Local	Zoning/Development Officer
<i>How does this reduce risk?</i> The Santa Fe Zoning Ordinance is specifically aimed at protecting the public health, safety, morals, and the general welfare of the citizens of the City. The regulations are necessary to encourage the most appropriate use of land; to reduce fire hazards and to improve public safety; to decrease traffic congestion and its accompanying hazards; to prevent the undue concentration of population; to lay a proper foundation for the reasonable termination of land use activities which are not in conformance with the City's long-range land use plans; to create a comprehensive and stable pattern of land uses; to maintain and stabilize property values; to develop an efficient and effective basis upon which to provide services for water supply, sanitary and storm sewer systems, pedestrian and automobile circulation, schools, parks, and other public facilities. This Ordinance has been designed to incorporate and implement the goals, objectives, and policies found in the document entitled: The Santa Fe Comprehensive Plan, which is the officially adopted long-range plan for the City of Santa Fe. The Zoning Ordinance divides the City into Districts, including an Agricultural District, and a Public Service District.					
Subdivision Ordinance	Yes	No	Chapter 8 – Subdivisions, 11/13/1997	Local	Zoning Officer
<i>How does this reduce risk?</i> The subdivision of land is the first step in the process of urban development. The arrangement of land parcels in the community for residential, commercial, and industrial uses, and for streets, alleys, schools, parks and other public purposes will determine to a large degree the conditions of health, safety, economy, and amenity that prevail in the urban area. The quality of these conditions is of public interest. This Ordinance and the standards for the subdivision and improvement of land for urban use makes provisions for adequate light, air, open spaces, drainage, transportation, public utilities, and other needs, to insure the development and maintenance of a healthy, attractive and efficient community that provides for the conservation and protection of its human and natural resources. It is the purpose of this Ordinance to implement the goals, objectives and policies of the City's comprehensive planning process to promote orderly growth and development. Subdivision Plats require the identification of any watercourses, water bodies, flood hazard areas, significant tree masses, slopes, or other natural features within the area to be subdivided. The Planning Commission shall not approve any plat of subdivision that does not make adequate provision for storm and flood water runoff channels or basins					
Site Plan Ordinance	Yes	No	Chapter 3 - Construction	Local and County	Zoning Officer



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
<i>How does this reduce risk?</i> The City does not have a specific Site Plan Ordinance, but site plans may be required by the Planning and Zoning Commissioner as a part of the Conditional Use Permit review process. Conditional Use site plans considered by the Planning and Zoning Commissioner shall be approved only after the Planning and Zoning Commissioner finds that the proposed development, if completed as proposed, will comply with all applicable provisions of this Ordinance and all conditions deemed necessary.					
Stormwater Management Ordinance	Yes	Yes	Article 8 – Performance Standards, Section 8.10 Stormwater Management, 5/27/2004	Local	Zoning Officer
<i>How does this reduce risk?</i> Each development shall provide for the on-site or off-site detention of excess storm water runoff resulting from that development. For the purpose of this Article, "excess storm water runoff" shall include all increases in storm water resulting from: an increase in the impervious surface of the site, including all additions of buildings, roads, and parking lots; changes in soil absorption caused by compaction during development; modifications in contours, including the filling or draining of small depressed areas, alteration of drainage ways, or re-grading of slopes; destruction of forest; alteration of drainage ways or installation of collection systems to intercept street flows or to replace swales or other drainage ways; or the alteration of subsurface flows, including any groundwater dewatering or diversion practices compared with the site in its natural state. No development shall cause downstream property owners, water courses, channels, or conduits to receive storm water runoff from proposed development than would have resulted from the same storm event occurring over the site of the proposed land use with the land in its natural, undeveloped condition.					
Post-Disaster Recovery/ Reconstruction Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i> The law requires disclosures of the seller of a single-family dwelling by answering Yes or No to being aware of any of the following conditions ☐ Present flood insurance coverage ☐ Previous flooding due to a failure or breach of a reservoir or a controlled or emergency release of water from a reservoir ☐ Previous water penetration into a structure on the property due to a natural flood event Yes (Y) if aware and check wholly or partly as applicable, write No (N) if not aware. ☐ Located wholly or partly in a 100-year floodplain (Special Flood Hazard Area-Zone A, V, A99, AE, AO, AH, VE, or AR) ☐ Located wholly or partly in a 500-year floodplain (Moderate Flood Hazard Area-Zone X (shaded)) ☐ Located wholly or partly in a floodway ☐ Located wholly or partly in a flood pool ☐ Located wholly or partly in a reservoir					
Growth Management	Yes	No	Zoning Code	Local	Zoning Officer
<i>How does this reduce risk?</i> The City has a Zoning Code and Zoning Districts that manage and control growth but does not have a separate Growth Management Ordinance.					
Environmental Protection Ordinance	Yes	Yes	Subdivision Development Ordinance	Local	Zoning Officer
<i>How does this reduce risk?</i>					
Flood Damage Prevention Ordinance	Yes	Yes	Chapter 3 – Construction Regulations – Section 19 – Flood Hazard Area Regulations, 5/10/2012	Federal, State, County and Local	Zoning Officer
<i>How does this reduce risk?</i> It is the purpose of this section to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by implementing the following methods: (a) Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities; (b) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; (c) Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters; (d) Control filling, grading, dredging and other development which may increase flood damage;					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
(e) Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands.					
New construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to twelve inches (12") above the base flood elevation. New construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to twelve inches (12") above the base flood level or together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.					
Wellhead Protection	No	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	Yes	No	Code of Ordinance Chapter 7 –Personnel - Section 5 – Emergency Management Program, 5/12/1994	Local	Emergency Management Coordinator
<i>How does this reduce risk?</i> There exists the office of emergency management director of the City of Santa Fe which shall be held by the city mayor. The director shall be responsible for a program of comprehensive emergency management within the city and for carrying out the duties and responsibilities set forth in this section. The duties and responsibilities of the emergency management director shall include; conducting an on-going survey of actual or potential hazards which threaten life and property within the city and an on-going program of identifying and requiring or recommending the implementation of measures which would tend to prevent the occurrence or reduce the impact of such hazards if a disaster did occur; and supervising of the development and approval of an emergency management plan for the City of Santa Fe and shall recommend for adoption by the city council all mutual aid arrangements deemed necessary for the implementation of such plan. A comprehensive emergency management plan shall be developed and maintained in a current state.					
Climate Change Ordinance	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	-	-	-	-	-
Planning Documents					
Comprehensive Plan	No	No	-	-	-
<i>How does this reduce risk?</i> The City had advertised a RFQ for the development of a Comprehensive Plan.					
Capital Improvement Plan	Yes	No	2021 -2022	Local	Mayor and Council
<i>How does this reduce risk?</i> The city operates with a five-year plan where projects are added based on priority as determined by staff. As the fund balance in each of the capital project funds is reviewed for excessive revenue, this revenue is considered for additional projects. Additional projects are prioritized and then placed on next year's schedule when funding will be available. The City Council will adopt the budget by fund and the Capital Improvements Plan before the start of the fiscal year on October 1 st . Debt financing is used to pay for large capital improvements to and or/ construction of the City's street, water, and sewer systems; parks and recreational facilities; police and fire protection facilities; and the flood protection and storm drainage.					
Disaster Debris Management Plan	Yes	No	Emergency Management Program	Local	City Manager
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	Yes	No	Atlas 14	Local/ County	Drainage District 1
<i>How does this reduce risk?</i>					
Stormwater Management Plan	Yes	No	Engineering Design Specifications – Chapter 4 Drainage Design Requirements, 3/26/2020	Local/ County	City Engineer and Public Works
<i>How does this reduce risk?</i> The structural design of flood control facilities encompasses all aspects of the design of modifications to existing channels and streams or new channels, from the selection of side slopes for earthen channels to major structures, such as bridges, culverts, drop structures, and retaining walls. Hydraulic structures should convey stormwater safely, control erosion, be cost effective, require minimal maintenance, and add safety and esthetics to the drainage system. The intent of this section is to present recommended standard structural details and to outline the criteria and calculations required for approval of non-standard structures. Discussed in the sections to follow is the structural design of drainage					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
channels (both lined and unlined), culverts, bridges, drop structures, closed conduits, backslope drains, sheet flow interceptors, and storm sewer outlets					
Open Space Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Urban Water Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	Yes	No	General Provisions - Chapter 1	Local	Economic Develop Committee
<i>How does this reduce risk?</i>					
Shoreline Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Transportation Plan	Yes	No	TX Traffic Code Chapter 9	State/ Local	Police Dept.
<i>How does this reduce risk?</i> The Santa Fe City Council hereby adopts the Texas Uniform Act Regulating Traffic on Highways, known as Article 6701d of Vernon's Texas Civil Statutes, as heretofore and hereafter amended, and ordains that such act shall be in full force and effect upon all streets, roads, alleys, and thoroughfares within the city.					
Agriculture Plan	Yes	Yes	Article 4 -Zoning Districts 4/25/2013	State/ Local	Zoning Officer
<i>How does this reduce risk?</i> Within the City's Zoning Code there is an Agricultural/Residential District intended to retain the open character of the land. This district is primarily designed for those areas on the periphery and within Santa Fe which have soils most suitable for agricultural production. Agricultural activities are frequently associated with noise, odors, dust, aerial chemical spraying, and other activities generally incompatible with urban life. However, agriculture forms a vital segment of both the Texas and local economy. Therefore, it is the purpose of the AR - District to provide areas of low-density development to accommodate land uses within a district which will have the least negative impacts on agriculture. Developmental standards within the AR - District are designed to provide for a high quality of life while effectively reducing the need for extensive urban infrastructure and associated public facilities. The regulatory provisions of this district are aimed at achieving the goals, objectives and policies identified in the Santa Fe Comprehensive Plan.					
Climate Action/ Resiliency/Sustainability Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Tourism Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Business/ Downtown Development Plan	Yes	No	Zoning Code	Local	Zoning Officer
<i>How does this reduce risk?</i>					
Other	No	No	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	Yes	Yes	Code of Ordinance Chapter 7	Local	Police Dept. / EMC
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Continuity of Operations Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Strategic Recovery Planning Report	No	No	-	-	-
<i>How does this reduce risk?</i>					
Threat & Hazard Identification & Risk Assessment (THIRA)	Yes	Yes	-	Local	Auditor
<i>How does this reduce risk?</i>					
Post-Disaster Recovery Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Public Health Plan	No	No	-	-	-
<i>How does this reduce risk?</i>					
Other	No	No	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of Santa Fe to oversee and track development.

Table 9.11-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Building and Permitting Dept
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	FEMA Flood Maps
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Yes	Zoning Maps

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Santa Fe and their current responsibilities which contribute to hazard mitigation.

Table 9.11-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	Volunteer - The Planning and Zoning Commission shall have the responsibility for the preparation and maintenance of the City's comprehensive plan; shall serve in an advisory capacity on matters concerning amendments to the Santa Fe Zoning Ordinance text or map, on matters concerning the granting or denial of conditional use permits, and on matters pertaining to Planned Unit Designation under the terms of the zoning ordinance; and shall be exclusively responsible for the City's review, and approval or rejection of subdivision plats.
Zoning Board of Adjustments	Yes	Volunteer - The Board of Adjustment shall act in a quasi-judicial capacity and activities shall be in accordance with



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
		Chapter 711, of the Texas Local Government Code, as amended. The Board may hear an appeal that alleges error in an order or decision of the Santa Fe Zoning Officer pertaining to the City's Zoning Ordinance text or map; and shall be authorized to grant variances from the terms of the City's Zoning Ordinance if the variance is not contrary to the public interest and, due to special conditions which are not self-imposed, a literal enforcement of the ordinance would result in unnecessary hardship, and so that the spirit of the ordinance is observed and substantial justice is done. The Board may reverse or affirm in whole or in part or modify the Zoning Officer's decision pertaining to the Zoning Ordinance.
Planning Department	Yes	Available City Staff/ Community Services Director - The Community Services Department provides excellent customer service and policy recommendations that guide the physical, economic, and social growth of Santa Fe to achieve a better quality of life as established by citizens' vision of the community. The Department helps with general guidance on zoning and land use in Santa Fe. The department reviews and provides information on requests for rezoning, special use permits, variances, and subdividing property. The department provides staff support to the Planning and Zoning Commission, the Zoning Board of Adjustments, and the Building Standards Commission.
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	Volunteer
Public Works/Highway Department	Yes	Street Department - The City of Santa Fe Street Department serves the community of Santa Fe by providing the highest quality street and drainage maintenance possible. It is the Department's responsibility to enhance and maintain street safety and improve drainage within the city limits of Santa Fe. The Street Department also operates and maintains city equipment and vehicles.
Construction/Building/Code Enforcement Department	Yes	Available City Staff -The Building and Permitting Department ensures the health, safety, and well-being of all people who live, work, or visit the city by ensuring compliance with adopted codes and city ordinances. The Building Official will review permit package and applicants will be notified when the permit is ready for payment. Applicants for permits will also receive a notice of any comments that need to be addressed via email.
Emergency Management/Public Safety Department	Yes	Chief of Police/ City Manager - Emergency management is a coordinated effort, involving local, state, and federal government agencies as well as volunteer organizations and businesses. Within an integrated emergency management framework, these entities assist citizens and their communities to prepare for, respond to, recover from and eliminate or reduce the efforts of natural and human-caused emergencies and disasters.
Warning Systems / Services (mass notification system, outdoor warning signals)	No	-
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	Street Department
Mutual aid agreements	Yes	All Departments
Human Resources Manual	Yes	Street Department
Other	Yes	Building Standards Commission, Board of Adjustments, both volunteer
Technical/Staffing Capability		



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Planners or engineers with knowledge of land development and land management practices	Yes	City Staff
Engineers or professionals trained in building or infrastructure construction practices	Yes	Building Department
Planners or engineers with an understanding of natural hazards	Yes	City Staff
Staff with expertise or training in benefit/cost analysis	Yes	City Staff
Professionals trained in conducting damage assessments	Yes	Building Officials
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	Yes	GIS Staff
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	Yes	City Staff/ Mayor/ Police Chief
Grant writer(s)	Yes (Grant Applicants)	City Staff
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to the City of Santa Fe.

Table 9.11-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	Yes, through application
Capital improvements project funding	Yes – There is a 5-Year Capital Program funded on an annual basis as part of the City’s Budget that often include projects that aid in mitigation.
Authority to levy taxes for specific purposes	Yes, improvements, additions
User fees for water, sewer, gas or electric service	Yes
Impact fees for homebuyers or developers of new development/homes	No
Stormwater utility fee	No
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	Yes, Police Dept.
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other federal or state funding programs	Yes, FEMA, CDBG
Open Space Acquisition funding programs	No
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	No

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Santa Fe.

Table 9.11-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	City Secretary
Personnel skilled or trained in website development	Yes	Community Service Director



Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Hazard mitigation information available on your website	Yes	Community Service Director – The Department of Emergency Management had a Hazard Mitigation webpage on it they have posted a Hurricane and Severe Weather Guide. In this guide are numerous checklists on what to do before, during and after the storm. The guide contains contact information for local emergency managers and numerous resources/links where additional information can be found.
Social media for hazard mitigation education and outreach	Yes	Community Service Director
Citizen boards or commissions that address issues related to hazard mitigation	No	-
Other programs already in place that could be used to communicate hazard-related information	No	-
Warning systems for hazard events	Yes	Social Media, City Hall Marquet
Natural disaster/safety programs in place for schools	Yes	Santa Fe ISD
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Santa Fe.

Table 9.11-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	3 – Commercial 4 – Residential	10/14/2021
Public Protection (ISO Fire Protection Classes 1 to 10)	No	-	-
Storm Ready Certification	Yes	Galveston County is certified	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable
NP Not participating
- Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.11-8. Adaptive Capacity

Hazard	Preliminary Ranking
Erosion	Moderate
Dam and Levee Failure	Moderate



Hazard	Preliminary Ranking
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

*Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.

9.11.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.11-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	No, but on file with the county tax office
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	No
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	Through assessments and permit requests
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	10-15 through the GLO
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes
NFIP Compliance	
What local department is responsible for floodplain management?	Planning and Community Ser
Are any certified floodplain managers on staff in your jurisdiction?	No
Do you have access to resources to determine possible future flooding conditions from climate change?	Yes, Atlas 14
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes, updated information / training



NFIP Topic	Comments
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	All buildings inspected, review permit plans, properly identify properties using mapping system, outsource engineers, conduct own inspections
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	Over 50% of the value of the structure
What are the barriers to running an effective NFIP program in the community, if any?	Community not knowledgeable of program
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Unknown
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Construction regulation, section 19, August, 2019
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Yes, meets
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	Yes, on occasion, Planning and Zoning reviews for height restrictions Site plans are received by Building and Planning
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	Participation yes

Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.11.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.11-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	-	-	-	-	39	2	39	3	60	0	61	3
Multi-Family	-	-	-	-	0	0	0	0	0	0	0	0
Other (commercial, mixed-use, etc.)	-	-	-	-	0	0	0	0	0	0	0	0
Total Permits Issued	-	-	-	-	39	2	39	3	60	0	61	3
Property or Development Name	Type of Development		# of Units / Structures		Location (address and/or block and lot)		Known Hazard Zone(s)*		Description / Status of Development			



Recent Major Development and Infrastructure from 2016 to Present
None identified
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years
None identified

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.11.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the City of Santa Fe's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the City of Santa Fe has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.11-1. Santa Fe Area Extent and Location Map (Flood)

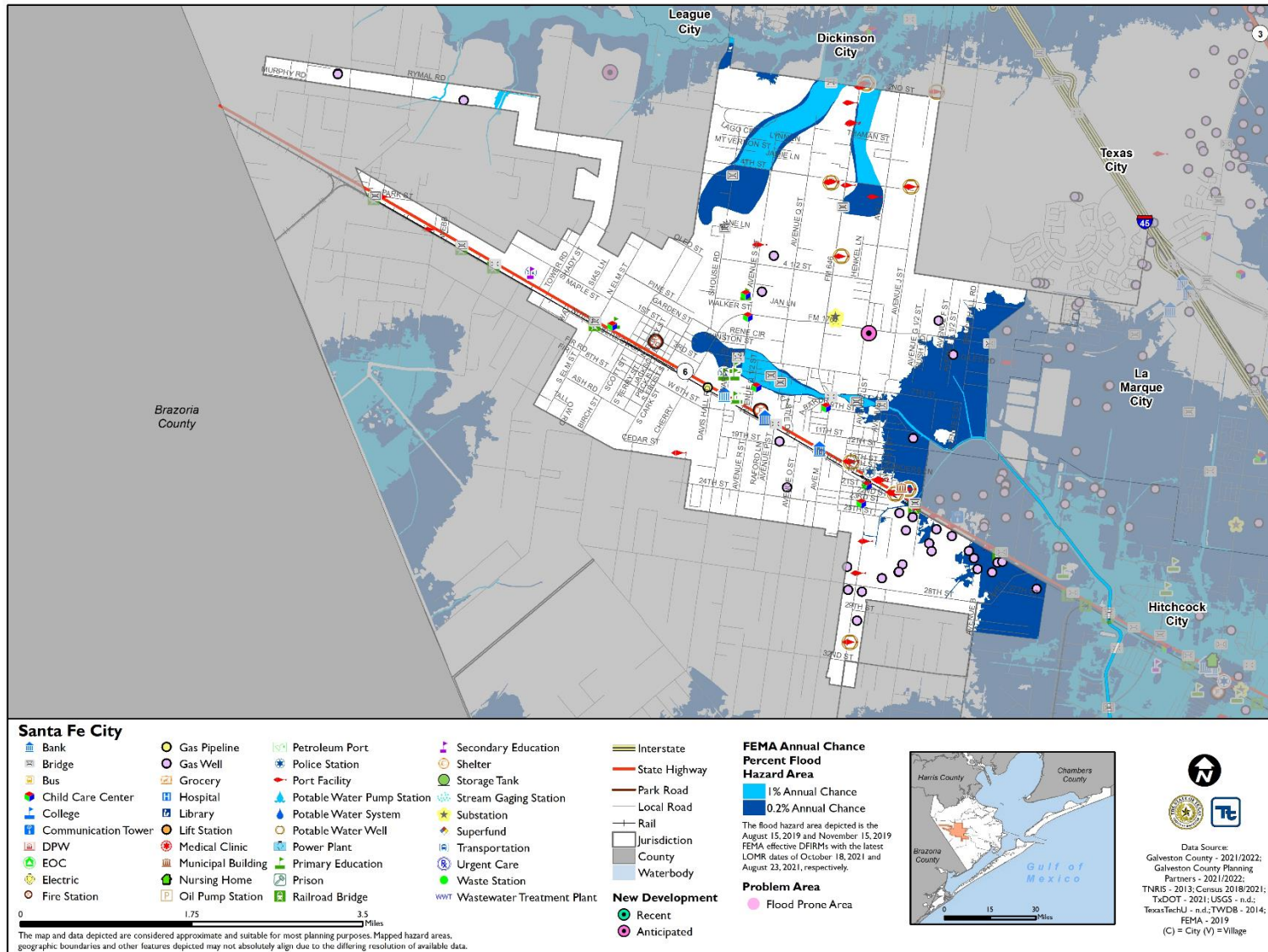




Figure 9.11-2. Santa Fe Area Extent and Location Map (SLOSH, Tsunami)

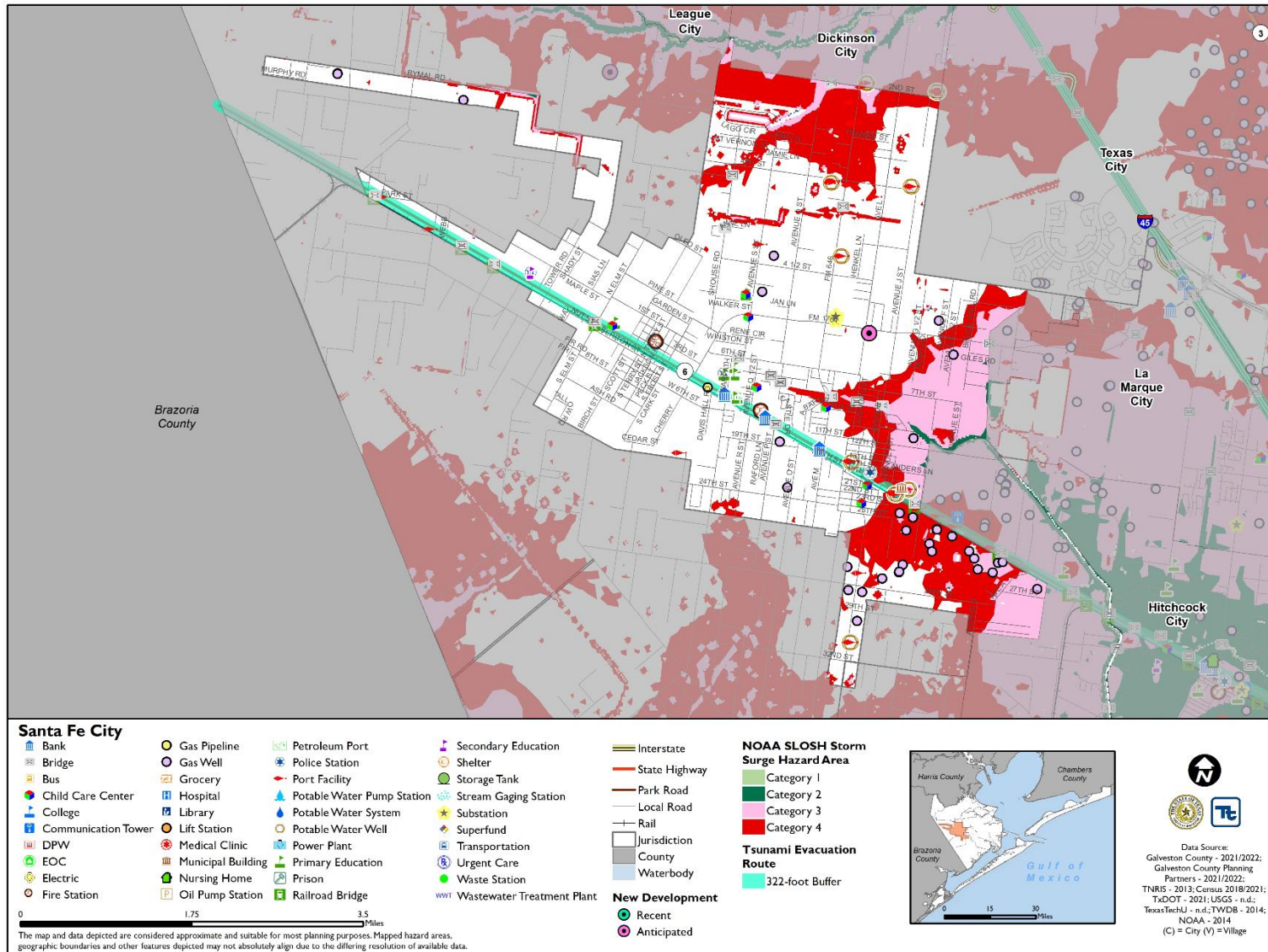




Figure 9.11-3. Santa Fe Area Extent and Location Map (Sea Level Rise, WUI)

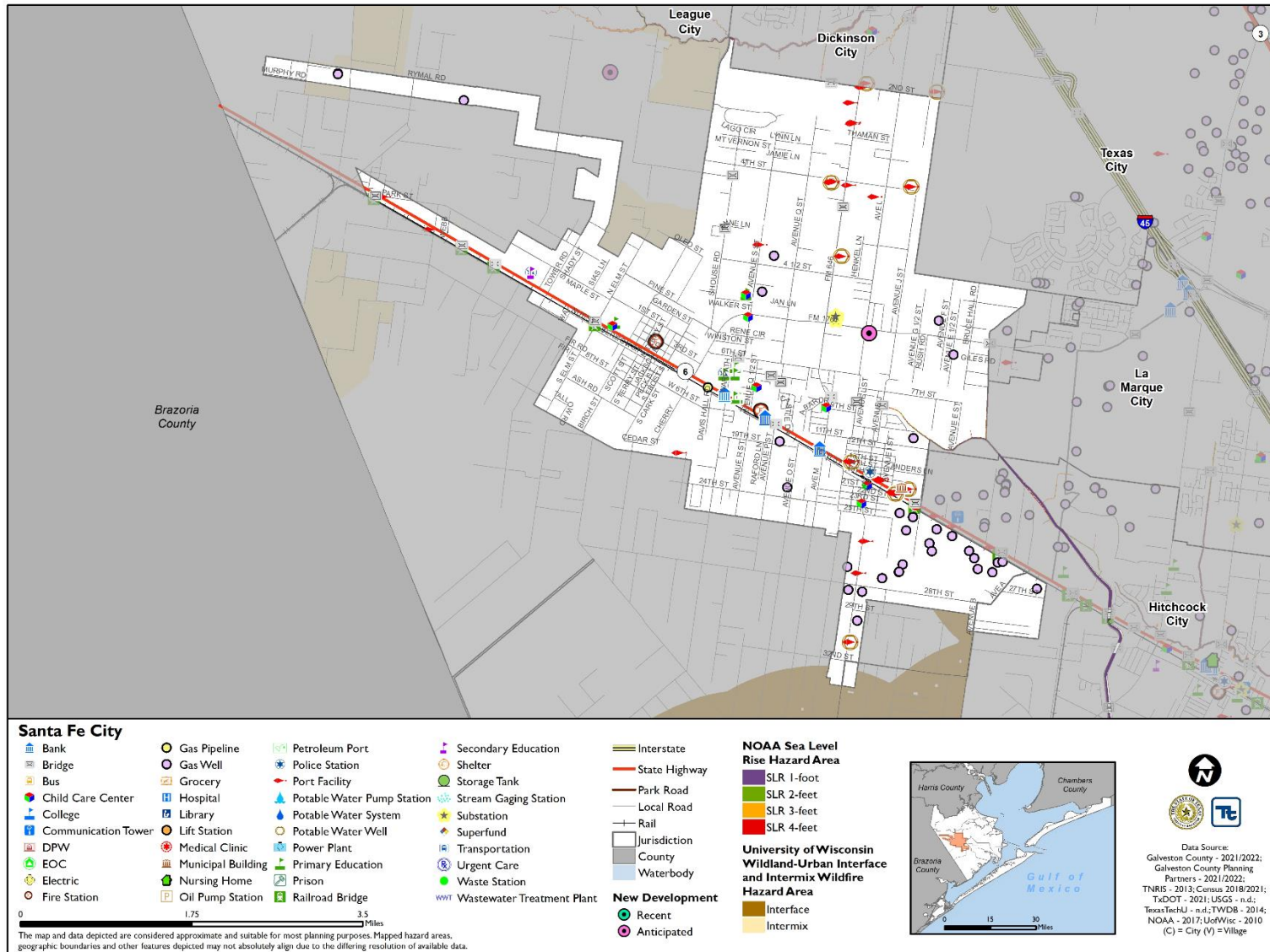
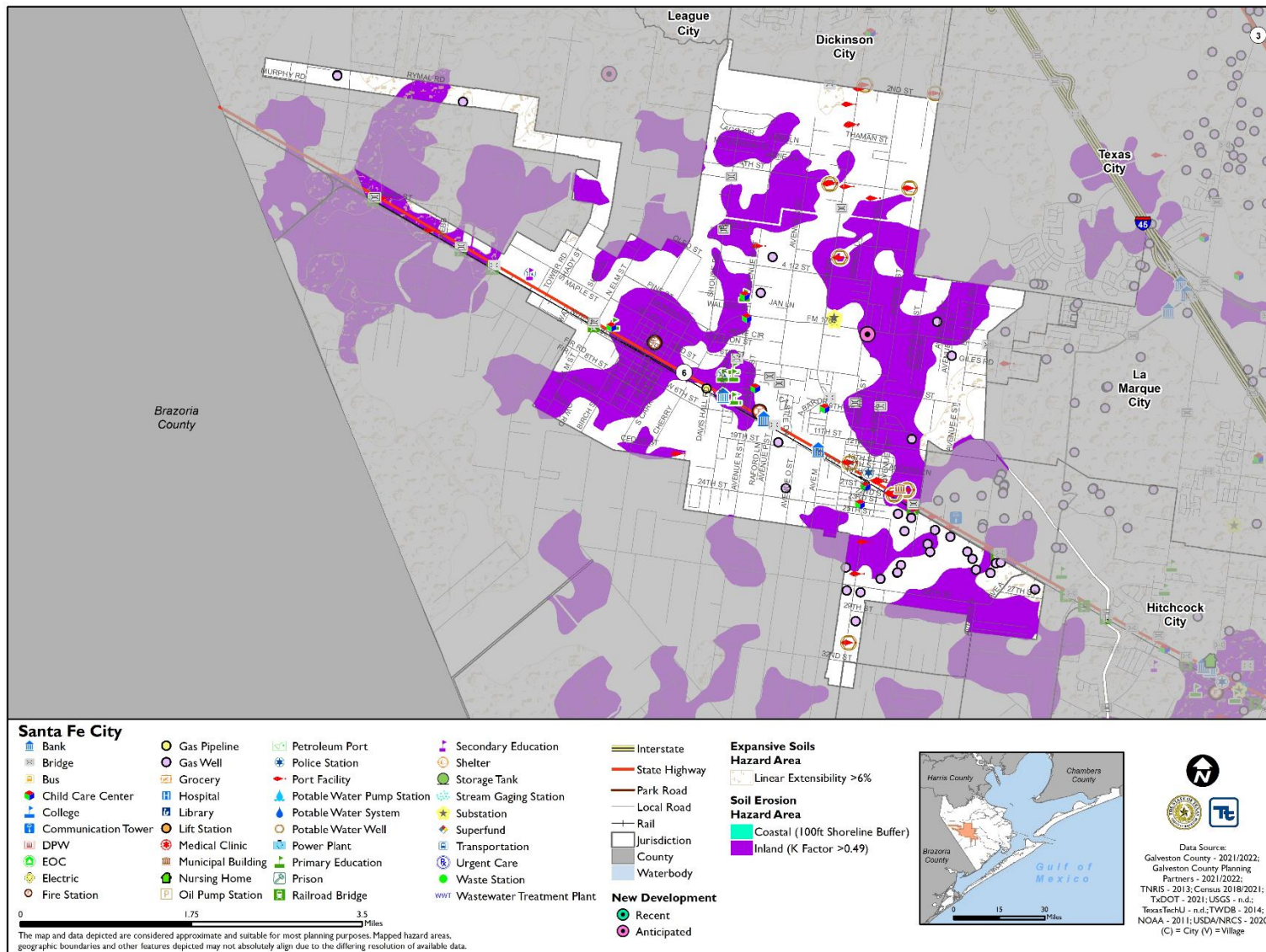




Figure 9.11-4. Santa Fe Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of Santa Fe's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages the City of Santa Fe experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.11-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	N/A
December 3, 2016	Flash Flood / Heavy Rain	No	Efficient low level convergence along a near coastal warm frontal boundary within a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 - Emmett Lowry Parkway and Highway 146 intersection.	N/A
August 26 – 30, 2017	Flash Flood / Heavy Rain / Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that 5 day period over Southeast Texas TS Harvey produced catastrophic flooding with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League	-Sustained damage city wide -Removed 22,602 CY of C&D debris from public ROW - Removed 3 CY of HHW debris from public ROW



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			City, Dickinson and Santa Fe. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, FM 518 and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	N/A
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	N/A
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and	Provided force account overtime labor for winterizing facilities, physically marking roadways, install manual stop signs, assisted water department with disconnection of leaking water meters, distributing water and MREs, emergency



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	communications and providing support to senior living complex and staffing warming centers. B. Provided back up emergency generator for powered the police department emergency communications center during periods of power outages. C. Provided rental of Santa Fe High School Cafeteria for warming center.
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	N/A

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Santa Fe's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of Santa Fe. The City of Santa Fe reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the City of Santa Fe agreed with the calculated rankings.

Table 9.11-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
High	Low	Low	Low	Medium	Low	Low	Medium	Low



Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire
Low	Low	Low	Medium	Medium	Low	Medium	Low

Note: The scale is based on the hazard rankings established in Section 5.3 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

Identified Issues

Specific areas of concern based on resident response to the citizen survey include:

- Occasional street flooding.

9.11.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the 'Capability Assessment' presented previously in this annex.



Table 9.11-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
SF 2016-1	Stormproof / retrofit new critical facilities and infrastructure	City Administration	-	Yes (as 2022-Santa Fe-001)	-	-
SF 2016-2	Harden existing critical facilities and infrastructure to be more resistant to hazards	City Administration	The City of Santa Fe is currently applying for multiple grants with the help of Grantworks and with the assistance of WCID#8 and Galveston County Drainage District #1. These grants may assist in street repairs, drainage, sewer/water upgrades and repairs at the treatment plant. At this time, the city is still in the application process and beginning stages of the grants. The city will update this information as it is received.	Yes (as 2022-Santa Fe-001, 005)	-	-
SF 2016-3	Build storm water detention ponds when appropriate	City Administration	-	Yes (as 2022-Santa Fe-011)	-	-
SF 2016-4	Purchase and install generators for existing and new critical facilities and infrastructure	City Administration	-	Yes (as 2022-Santa Fe-008)	-	-
SF 2016-5	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties	City Administration	-	Yes (as 2022-Santa Fe-012)	-	-
SF 2016-6	Widen drainage systems and culverts	City Administration and applicable department and water district staff	The City of Santa Fe, WCID#8, and Drainage District will be working together to rehab or reconstruct water, sewer, drainage and streets for a block containing 21st Street through 25th Street including Ave H and Ave I with grant money awarded in the amount of \$350,000.00 from the Texas Department of Agriculture and	Yes (as 2022-Santa Fe-013)	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
			\$1,389,501.00 awarded from the General Land Office.			
SF 2016-7	Purchase and install lightning grounding systems and protection devices on sewer and water systems and municipal buildings	City Administration	-	Yes (as 2022-Santa Fe-014)	-	-
SF 2016-8	Implement / maintain tree /vegetation trimming /removal near, infrastructure, drainage systems and roadside areas	City Administration	-	Yes (as 2022-Santa Fe-002)	-	-
SF 2016-9	Develop Critical Infrastructure and Key Resources database (CIKR)	City Administration	-	Yes (as 2022-Santa Fe-015)	-	-
SF 2016-10	Improve regulations and permit requirements to promote hazard mitigation strategies	City Administration	-	Yes (as 2022-Santa Fe-016)	-	-
SF 2016-11	Develop and provide public information and awareness for natural hazards	City Administration in coordination with county and state officials	-	Yes (as 2022-Santa Fe-009)	-	-



Additional Mitigation Efforts

The City of Santa Fe has identified the following mitigation projects/activities that have also been completed but not identified in the table above:

- Ave P St Drainage Project (Proposed 2021-2022) - City of Santa Fe, Economic Development Commission (EDC), and Drainage District 1, funded by EDC, to improve drainage affecting 32 businesses and over 100 residences.
- Drainage block project (In-progress, completion by end of 2021) – City of Santa Fe, funded by GLO and TDA through grant, to improve drainage and placement of water / sewer lines.
- Culvert upgrade project (Completed 2021) – City of Santa Fe and Drainage District 1, to improve drainage by culvert pipe upgrades of outfall ditches and ditch ways.

Proposed Hazard Mitigation Initiatives for the HMP Update

The City of Santa Fe participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.11-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X	X		X	X	X	X		X	X
Dam & Levee Failure (no hazard exposure)										
Drought	X	X		X	X	X	X		X	X
Expansive Soils	X	X		X	X	X	X		X	X
Extreme Temperatures	X	X	X	X	X	X	X	X	X	X
Flood	X	X	X	X	X	X	X	X	X	X
Hail	X	X		X	X	X	X		X	X
Hurricane & Tropical Storm	X	X	X	X	X	X	X	X	X	X
Land Subsidence	X	X		X	X	X	X		X	X
Lightning	X	X		X	X	X	X		X	X
Pandemic	X	X		X	X	X	X		X	X
Severe Winter Storm	X	X	X	X	X	X	X	X	X	X
Thunderstorm Wind	X	X	X	X	X	X	X	X	X	X
Tornadoes	X	X	X	X	X	X	X	X	X	X
Tsunami	X	X	X	X	X	X	X	X	X	X
Utility Failure	X	X	X	X	X	X	X	X	X	X
Wildfire (no hazard exposure)										

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the City of Santa Fe would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.



As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as 'High', 'Medium', or 'Low.' The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.

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Table 9.11-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Santa Fe-001	Building Retrofits	Problem: Structural weaknesses that cannot withstand hazard events. Solution: Retrofit buildings that are shown to be in high or medium risk areas of the city to reduce flood and wind damage. This can include new roofing, siding, or windows that improve the structural integrity.	Existing	All hazards except Dam & Levee Failure, Wildfire	1, 2	1 to 5 years	City Administration, City Engineer, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	PP, SP
2022-Santa Fe-002	Tree Trimming and Drainage Cleaning Plan	Problem: Overgrown or dead trees and other debris can increase the adverse effects of storm events. Solution: Continue with maintenance plans such as tree trimming and drainage system cleaning to ensure proper flood drainage and reduce risk of flooding or high winds causing trees to destroy power lines.	Both	Extreme Temperatures, Flood, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure	1, 2	Ongoing	City Administration, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of utility services, loss of life and damage to critical infrastructure.	Low	High	NSP	NR, PP
2022-Santa Fe-003	Mutual Aid Agreements	Problem: The City may need outside assistance during and after hazard events. Solution: Continue and develop mutual aid contracts with surrounding agencies including Emergency	Both	All Hazards except Dam & Levee Failure, Wildfire	1, 2	Ongoing	City Administration, Emergency Management Coordinator	Staff Time	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Medical Services and Fire and Rescue to get help to those needing high water rescue, medical attention, etc.											
2022-Santa Fe-004	High Water Rescue Plan	Problem: High water rescues needed during severe storm events. Solution: Maintain the 5-ton high water rescue vehicle purchased by the city and have an emergency preparedness plan in place to coordinate high water rescues.	Both	Flood, Hurricane & Tropical Storm, Tsunami	1, 2	1-5 years	City Administration, Emergency Management Coordinator	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR
2022-Santa Fe-005	Utility Hardening	Problem: Utilities are vulnerable to hazard events. Solution: Make sure underground utilities are clearly marked and able to withstand potential risks (such as freezing water lines or busted gas pipes).	Both	All Hazards except Dam & Levee Failure, Wildfire	1, 2	1 to 5 years	City Administration, City Engineer, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of critical infrastructure.	High	High	SIP	SP, ES
2022-Santa Fe-006	Evacuation Plan	Problem: Residents need to know how to quickly and safely leave a hazard area in advance of a hazard event. Solution: Develop and disseminate evacuation plan, both on small and large scale. This should include populations from other cities who may use the City's	Both	Extreme Temperatures, Flood, Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure	1, 2, 3	1-5 years	City Administration, Emergency Management Coordinator	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life.	High	High	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		major roadways to evacuate.											
2022-Santa Fe-007	Emergency Response Plan	Problem: Organized disaster response efforts are needed. Solution: Prepare emergency response plan and coordinate with other City entities (such as Street Department and Fire and Rescue personnel) to ensure clear communication as to what each entity's job function will be pre and post natural event.	Both	All hazards except Dam & Levee Failure, Wildfire	1, 2	1-5 years	City Administration, Emergency Management Coordinator	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	LPR	PR, ES
2022-Santa Fe-008	Emergency Generators	Problem: Critical facilities lack backup power. Solution: Install generators at critical facilities throughout the city so the public, should they not evacuate, have access to basic needs. Generator locations can include school buildings, where mass quantities of people can gather to have access to food, water and shelter. Grocery stores such as Arlan's Market (12460 Highway 6) and HEB (4206 Warpath Avenue) so people who choose not to gather at mass	Both	Expansive Soils, Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure	1	1-5 years	City Administration, Emergency Management Coordinator, Public Works	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP, ES



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		shelter places still have access to food and water. Frontier Communications (13546 Highway 6) to have technicians on standby in case of phone outages. Major gas stations at heavily traffic intersections (Highway 6 and FM 1764, Highway 6 and FM 646 N, Highway 6 and FM 646 S, FM 1764 and FM 646 N) so people who chose to evacuate have access to gasoline and diesel.											
2022-Santa Fe-009	Ongoing Natural Hazards Public Awareness, Mitigation Strategy and Alert Campaign	Problem: As seen during the COVID-19 pandemic, misinformation, fear, and lack of clear communication about hazards leaves citizens with more questions than answers. Solution: Continue to use social media and the City website (ci.santa-fe.tx.us) to inform residents on how they can mitigate hazards at their properties and notify the public of immediate hazard threats or updated supplemental information of ongoing hazards. Additional outreach methods could include text messages,	Both	All Hazards except Dam & Levee Failure, Wildfire	3	1-5 Years	City Administration, Emergency Management Coordinator	City Funds, FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	EAP	PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		automated “robo calls”, emails and media outlet press releases as needed.											
2022-Santa Fe-010	Ongoing Pandemic Preparedness	Problem: The surge of COVID-19 cases drew attention to the need to be prepared with PPE and social distancing standards in anticipation of an outbreak event. Solution: Large quantities of extra gloves, hand sanitizer, hand soap, face shields, face masks, gown covers, and COVID tests were bought and stored at the Police Department. Inventory is taken at least once every 3 months to check supply levels, and new goods are ordered when needed. Hand sanitizing stations were placed at businesses and government buildings around the city. Mask mandates were enforced by individual businesses. Social distancing practices were utilized where applicable, including placing stickers on the ground for people to stand 6 feet apart, chairs and large gathering spaces were spread out and sanitized frequently	Both	Pandemic	1, 2	Ongoing	City Administration, Emergency Management Coordinator, Mayor’s Office	City Funds	Prevention of loss of life.	\$8,000	Medium	LPR	



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		between visitors, and businesses were able to close off lobbies or make delivery methods curbside to reduce the spread of the virus.											
2022-Santa Fe-011	Storm water detention ponds	Problem: Storm water flooding. Solution: Build storm water detention ponds when appropriate.	Both	Flood, Hurricane & Tropical Storm	1	1-5 years	City Administration, City Engineer, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP
2022-Santa Fe-012	Mitigation RFC/SRL properties	Problem: Flood waters damaged facilities. Solution: Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties.	Existing	Flood, Hurricane & Tropical Storm	1	1-5 years	City Administration, City Engineer, Public Works	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP
2022-Santa Fe-013	Widen drainage systems and culverts	Problem: Insufficient flood water control. Solution: The City of Santa Fe, WCID#8, and Drainage District will be working together to rehab or reconstruct water, sewer, drainage and streets for a block containing 21st Street through 25th Street including Ave H and Ave I.	Both	Flood, Hurricane & Tropical Storm, Thunderstorm, Severe Winter Storm	1	1-5 years	City Administration, City Engineer, Public Works	Texas Department of Agriculture, General Land Office	Prevention of loss of life and protection of critical infrastructure.	\$1.8 million	High	SIP	SP
2022-Santa Fe-014	Lightning Grounding	Problem: Lightning causes damages to critical facilities. Solution: Install lightning grounding systems and protection	Both	Lightning	1, 2	1 to 5 years	City Administration, City Engineer, Public Works	FEMA Grant Funding (HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	High	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		devices on critical facilities/infrastructure											
2022-Santa Fe-015	Develop Critical Infrastructure and Key Resources database (CIKR)	Problem: Need to quickly locate critical infrastructure. Solution: Develop database with geolocations.	Both	Coastal & Inland Erosion, Expansive Soils, Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Land Subsidence, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure	1, 2	1 to 5 years	City Administration, Emergency Management Coordinator, Public Works	FEMA Grant Funding (HMGP, BRIC)	Protection of critical infrastructure.	High	High	SIP	SP
2022-Santa Fe-016	Integrate mitigation measures in community regulations and permits	Problem: Hazard mitigation is an ongoing need. Solution: Improve and enforce community regulations and permit requirements to promote hazard mitigation strategies. This includes restricting development or requiring enhanced building techniques in floodplains and mapped high-hazard areas.	Both	All hazards except Dam & Levee Failure, Wildfire	1, 2, 3, 4	1 to 5 years	City Administration, Building Inspector, Zoning/Development Officer	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	LPR	PR

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

Potential FEMA HMA Funding Sources:

Timeline:





CAV Community Assistance Visit
 CRS Community Rating System
 DPW Department of Public Works
 EHP Environmental Planning and Historic Preservation
 FEMA Federal Emergency Management Agency
 FPA Floodplain Administrator
 HMA Hazard Mitigation Assistance
 N/A Not applicable
 NFIP National Flood Insurance Program
 OEM Office of Emergency Management

FMA Flood Mitigation Assistance Grant Program
 HMGP Hazard Mitigation Grant Program
 BRIC Building Resilient Infrastructure and Communities Program

The time required for completion of the project upon implementation

Cost:
 The estimated cost for implementation.

Benefits:
 A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP) - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.11-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Santa Fe-001	Building Retrofits	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-002	Tree Trimming and Drainage Cleaning Plan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-003	Mutual Aid Agreements	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Santa Fe-004	High Water Rescue Plan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-005	Utility Hardening	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-006	Evacuation Plan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-007	Emergency Response Plan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-008	Emergency Generators	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-009	Ongoing Natural Hazards Public Awareness, Mitigation Strategy and Alert Campaign	1	1	1	1	1	1	0	0	0	1	1	1	1	0	10	High
2022-Santa Fe-010	Ongoing Pandemic Preparedness	1	0	1	1	1	1	0	0	0	1	0	1	1	0	8	Medium
2022-Santa Fe-011	Storm water detention ponds	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-012	Mitigation RFC/SRL properties	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-013	Widen drainage systems and culverts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-014	Lightning Grounding	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High
2022-Santa Fe-015	Develop Critical Infrastructure and Key Resources database (CIKR)	0	1	1	1	1	1	1	1	1	1	1	1	1	1	13	High
2022-Santa Fe-016	Integrate mitigation measures in community regulations and permits	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions.
Low (0-4), Medium (5-8), High (9-14).



9.12 VILLAGE OF TIKI ISLAND

This section presents the jurisdictional annex for the Village of Tiki Island and includes resources and information to assist public and private sectors with reducing losses from future hazard events. This annex is not intended as guidance for actions to take during a disaster. Rather, this annex provides actions that can be implemented prior to a disaster to reduce or eliminate damage to property and people. The annex includes a general overview of the municipality and who in the City of Tiki Island participated in the planning process, an assessment of Tiki Island's risk and vulnerability, the different capabilities used in the City of Tiki Island, and an action plan that will be implemented to achieve a more resilient jurisdiction.

9.12.1 Hazard Mitigation Planning Team

The Village of Tiki Island followed the planning process described in Section 2 (Planning Process) in Volume I of this plan update and developed the annex over the course of several months with input from many Village of Tiki Island departments as summarized in the table below. The primary and alternate points of contact represented the community on the Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the jurisdiction's planning process through Planning Partnership meetings is included in Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.12-1. Hazard Mitigation Planning Team

Name	Title	Method of Participation
Graham George	Emergency Management Coordinator	Designated point of contact for planning process; attended meetings; provided information on capabilities, past event history, past action statuses; identified mitigation actions; reviewed annex and provided feedback

9.12.2 Jurisdictional Profile

The Village of Tiki Island, Texas, is primarily a waterfront canal residential community with limited commercial and marina businesses. The Village of Tiki Island was incorporated on August 30, 1982. The Village of Tiki Island is a Type A General Law Municipality with the Alderman form of government. The governing body is known as "The Board of Aldermen" and includes six members (a mayor and five alderman), all of whom are elected at-large. According to the U.S. Census, the 2010 population for the Village was 968. The estimated 2019 population was 1,106, a 14.3-percent increase from the 2010 Census. Data from the 2019 U.S. Census American Community Survey indicate that 0.5-percent of the population is 5 years of age or younger and 32.6-percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.12.3 Jurisdictional Capability Assessment and Integration

The City of Tiki Island performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:



- An assessment of planning, legal and regulatory capabilities.
- Development and permitting capabilities.
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities.
- An assessment of education and outreach capabilities.
- Classification under various community mitigation programs.
- The community's adaptive capacity to withstand hazard events.

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. Annex development included reviewing planning and policy documents and surveying each jurisdiction to obtain a better understanding of their progress in plan integration and how risk reduction is supported. Areas with current mitigation integration are summarized in this jurisdictional Capability Assessment. The updated mitigation strategy includes opportunities the Village of Tiki Island identified for integration of mitigation concepts to be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability

Section 5 (Capability Assessment) provides an overview of the planning, legal, and regulatory capabilities. The table below summarizes the regulatory tools that are available to the Village of Tiki Island, what is present in the jurisdiction, and code citation and date.

Table 9.12-2. Planning, Legal, and Regulatory Capability

	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Codes, Ordinances, & Regulations					
Building Code	Yes	Yes	Article 3, Division 1, Section 6-134	State and Local	Building Official
<i>How does this reduce risk?</i>					
Zoning/Land Use Code	-	No	-	-	-
<i>How does this reduce risk?</i>					
Subdivision Ordinance	Yes	No	-	Local	-
<i>How does this reduce risk?</i> Must be elevated with 2' freeboard.					
Site Plan Ordinance	-	No	-	-	-
<i>How does this reduce risk?</i>					
Stormwater Management Ordinance	-	No	-	-	-
<i>How does this reduce risk?</i>					
Post-Disaster Recovery/ Reconstruction Ordinance	-	No	-	-	-
<i>How does this reduce risk?</i>					
Real Estate Disclosure	Yes	Yes	Texas Property Code Section § 5.008	State	Texas Real Estate Commission
<i>How does this reduce risk?</i>					
Growth Management	-	No	-	-	-
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Environmental Protection Ordinance	Yes	No	-	-	-
<i>How does this reduce risk?</i> No development in this area allowed.					
Flood Damage Prevention Ordinance	-	Yes	-	-	-
<i>How does this reduce risk?</i> Guidelines for development.					
Wellhead Protection	-	No	-	-	-
<i>How does this reduce risk?</i>					
Emergency Management Ordinance	-	No	-	-	-
<i>How does this reduce risk?</i>					
Climate Change Ordinance	-	No	-	-	-
<i>How does this reduce risk?</i>					
Other	-	-	-	-	-
Planning Documents					
Comprehensive Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Capital Improvement Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Disaster Debris Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Floodplain Management or Watershed Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Stormwater Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Open Space Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Urban Water Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Habitat Conservation Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Economic Development Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Shoreline Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Community Wildfire Protection Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					
Community Forest Management Plan	-	No	-	-	-
<i>How does this reduce risk?</i>					



	Jurisdiction has this? (Yes/No)	Required by State? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual / Department / Agency Responsible
Transportation Plan	-	No	-	-	-
How does this reduce risk?					
Agriculture Plan	-	No	-	-	-
How does this reduce risk?					
Climate Action/ Resiliency/Sustainability Plan	-	No	-	-	-
How does this reduce risk?					
Tourism Plan	-	No	-	-	-
How does this reduce risk?					
Business/ Downtown Development Plan	-	No	-	-	-
How does this reduce risk?					
Other	-	-	-	-	-
Response/Recovery Planning					
Comprehensive Emergency Management Plan	-	Yes	-	-	-
How does this reduce risk?					
Continuity of Operations Plan	-	No	-	-	-
How does this reduce risk?					
Strategic Recovery Planning Report	-	No	-	-	-
How does this reduce risk?					
Threat & Hazard Identification & Risk Assessment (THIRA)	-	Yes	-	-	-
How does this reduce risk?					
Outreach to educate citizens.					
Post-Disaster Recovery Plan	-	No	-	-	-
How does this reduce risk?					
Public Health Plan	-	No	-	-	-
How does this reduce risk?					
Other	-	-	-	-	-

Development and Permitting Capability

The table below summarizes the capabilities of the City of Tiki Island to oversee and track development.

Table 9.12-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment
Do you issue development permits? -If yes, what department is responsible? -If no, what is your process for development?	Yes	Building Department
Are permits tracked by hazard area? (For example, floodplain development permits.)	Yes	-
Do you have a buildable land inventory? -If yes, describe. -If no, quantitatively describe the level of buildout in the jurisdiction.	Yes	Lots are identified on flood map



Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Tiki Island and their current responsibilities which contribute to hazard mitigation.

Table 9.12-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	-
Zoning Board of Adjustments	Yes	-
Planning Department	Yes	-
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	No	-
Public Works/Highway Department	No	-
Construction/Building/Code Enforcement Department	Yes	-
Emergency Management/Public Safety Department	Yes	-
Warning Systems / Services (mass notification system, outdoor warning signals)	Yes	-
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	Yes	-
Mutual aid agreements	Yes	Galveston
Human Resources Manual	No	-
Other	-	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	No	-
Engineers or professionals trained in building or infrastructure construction practices	No	-
Planners or engineers with an understanding of natural hazards	No	-
Staff with expertise or training in benefit/cost analysis	No	-
Professionals trained in conducting damage assessments	No	-
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	No	-
Scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	Yes	-
Grant writer(s)	No	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to the City of Tiki Island.



Table 9.12-5. Fiscal Capabilities

Financial Resources	Are these accessible or eligible to use for mitigation? (Yes/No) If yes, please describe. If no, can this be used to support in the future?
Community development Block Grants (CDBG, CDBG-DR)	No
Capital improvements project funding	No
Authority to levy taxes for specific purposes	No
User fees for water, sewer, gas or electric service	No
Impact fees for homebuyers or developers of new development/homes	No
Stormwater utility fee	No
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other federal or state funding programs	No
Open Space Acquisition funding programs	No
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	No

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Tiki Island.

Table 9.12-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Does the jurisdiction have any public outreach mechanisms / programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? If yes, please describe.
Public information officer or communications office	Yes	Building official and clerk
Personnel skilled or trained in website development	No	-
Hazard mitigation information available on your website	Yes	-
Social media for hazard mitigation education and outreach	No	-
Citizen boards or commissions that address issues related to hazard mitigation	No	-
Other programs already in place that could be used to communicate hazard-related information	Yes	Mailouts and website
Warning systems for hazard events	Yes	Emergency Notification System
Natural disaster/safety programs in place for schools	N/A	No school in jurisdiction
Other	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Tiki Island.

Table 9.12-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	Yes	7	2017



Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Building Code Effectiveness Grading Schedule (BCEGS)	Yes	5	10/13/21
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	5	-
Storm Ready Certification	No	Galveston County is certified	-
Firewise Communities classification	No	-	-
Other	No	-	-

Note:

N/A Not applicable
 NP Not participating
 - Unavailable

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). In other words, it describes a jurisdiction’s current capabilities to adjust to, protect from, or withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each hazard of concern and the jurisdiction’s rating.

Table 9.12-8. Adaptive Capacity

Hazard	Preliminary Ranking
Erosion	Moderate
Dam and Levee Failure	Moderate
Drought	Moderate
Expansive Soils	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Hail	Moderate
Hurricane	Moderate
Land Subsidence	Moderate
Lightning	Moderate
Pandemic	Moderate
Severe Winter Storm	Moderate
Tornado	Moderate
Tsunami	Moderate
Utility Failure	Moderate
Wildfire	Moderate
Windstorm	Moderate

**Strong = Capacity exists and is in use, Moderate = Capacity may exist; but is not used or could use some improvement, Weak = Capacity does not exist or could use substantial improvement.*

9.12.4 National Flood Insurance Program (NFIP) Compliance

The table below provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP.

Table 9.12-9. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	



NFIP Topic	Comments
Describe areas prone to flooding in your jurisdiction. Do you maintain a list of properties that have been damaged by flooding?	Yes – all jurisdiction is in flood zone
Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)?	Yes/ None
Are any RiskMAP projects currently underway in your jurisdiction? If so, state what projects are underway.	No
How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction?	Yes – 3
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? If there are mitigation properties, how were the projects funded?	3 – funded by insurance
Do your flood hazard maps adequately address the flood risk within your jurisdiction? If not, state why.	Yes
NFIP Compliance	
What local department is responsible for floodplain management?	Building Department
Are any certified floodplain managers on staff in your jurisdiction?	Yes
Do you have access to resources to determine possible future flooding conditions from climate change?	Yes
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes, onsite or class training
Provide an explanation of NFIP administration services you provide (e.g. permit review, GIS, education/outreach, inspections, engineering capability)	Phone reviews, walk-in reviews, elevation reviews, map reviews, onsite reviews
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	Use CAD and compare appraised value to cost of improvements
What are the barriers to running an effective NFIP program in the community, if any?	Manpower
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, state the violations.	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	2017
What is the local law number or municipal code of your flood damage prevention ordinance? What is the date that your flood damage prevention ordinance was last amended?	Article 1, Division 1, Section 14-112, 2017
Does your floodplain management program meet or exceed minimum requirements? If exceeds, in what ways?	Yes – CRS Community Class 7
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	Yes
Does your jurisdiction participate in CRS? If yes, is your jurisdiction interested in improving its CRS Classification? If no, is your jurisdiction interested in joining the CRS program?	Yes – CRS Community Class 7

Source:



Notes:

RL—Repetitive Loss; SRL—Severe Repetitive Loss; NA—Not applicable

9.12.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to understanding a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.12-10. Recent and Expected Future Development

Type of Development	2015		2016		2017		2018		2019		2020	
Number of Building Permits for New Construction Issued Since the Previous HMP* (within regulatory floodplain/ outside regulatory floodplain)												
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	11	11	12	12	10	10	2	2	14	14	6	6
Multi-Family	-	-	-	-	-	-	-	-	-	-	-	-
Other (commercial, mixed-use, etc.)	-	-	-	-	-	-	-	-	-	-	-	-
Total Permits Issued	11	11	12	12	10	10	2	2	14	14	6	6
Property or Development Name	Type of Development		# of Units / Structures		Location (address and/or block and lot)			Known Hazard Zone(s)*		Description / Status of Development		
Recent Major Development and Infrastructure from 2016 to Present												
None identified												
Known or Anticipated Major Development and Infrastructure in the Next Five (5) Years												
None identified												

SFHA Special Flood Hazard Area (1% annual chance flood event)

Number of building permits based on best available data during the drafting of this HMP

* Only location-specific hazard zones or vulnerabilities identified.

9.12.6 Jurisdictional Risk Assessment

The hazard profiles in Section 4 (Risk Assessment) provide detailed information regarding each plan participant's vulnerability to the identified hazards. Section 4.1 (Hazards of Concern), Section 4.2 (Methodology and Tools), and Section 4.4 (Hazard Ranking) provide a detailed summary for the Village of Tiki Island's risk assessment results, and data used to determine the hazard ranking are discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction. These maps are based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were only generated for those hazards that can be clearly identified using mapping techniques and technologies and for which the Village of Tiki Island has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.12-1. Tiki Island Area Extent and Location Map (Flood)

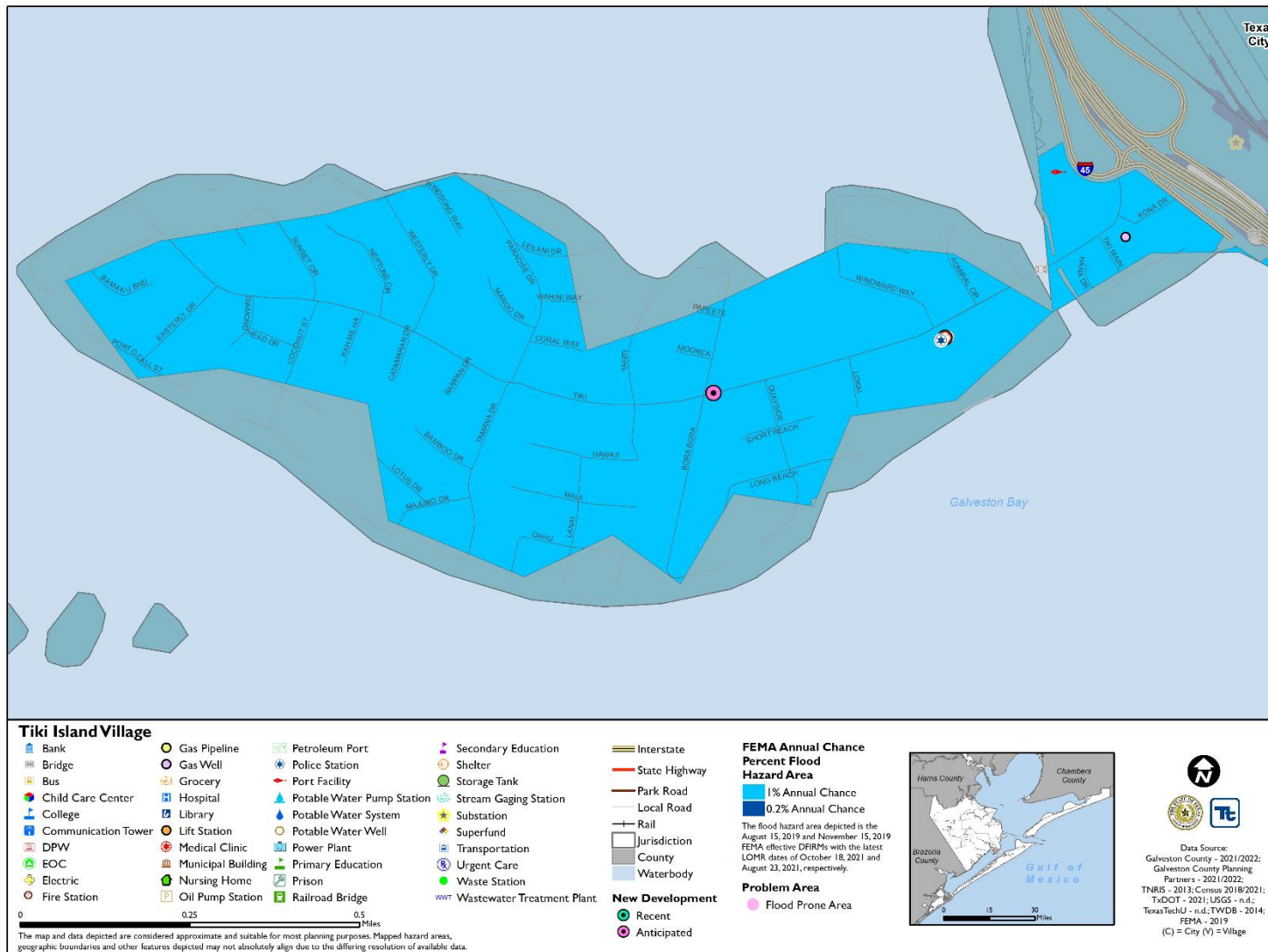




Figure 9.12-2. Tiki Island Area Extent and Location Map (SLOSH, Tsunami)

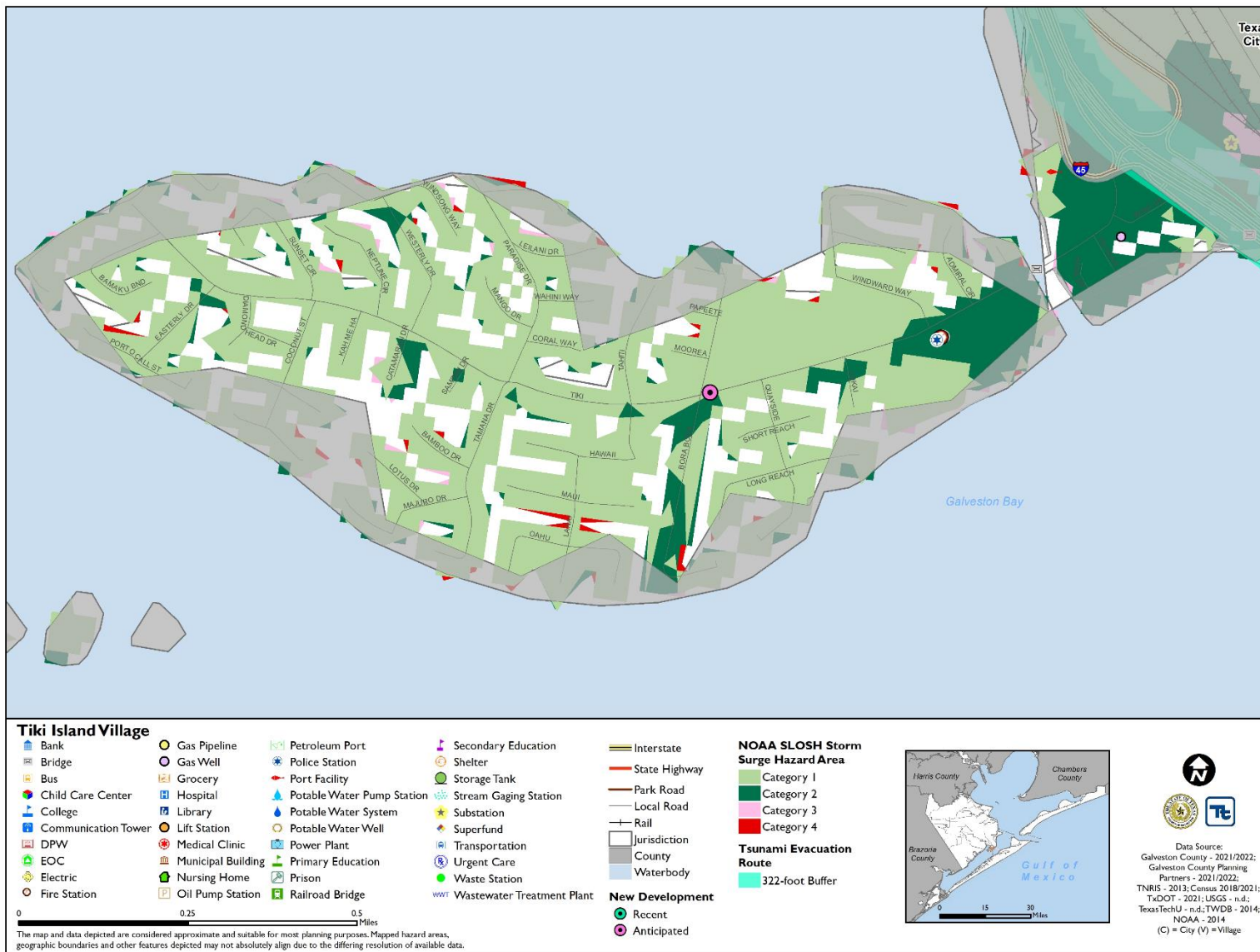




Figure 9.12-3. Tiki Island Area Extent and Location Map (Sea Level Rise, WUI)

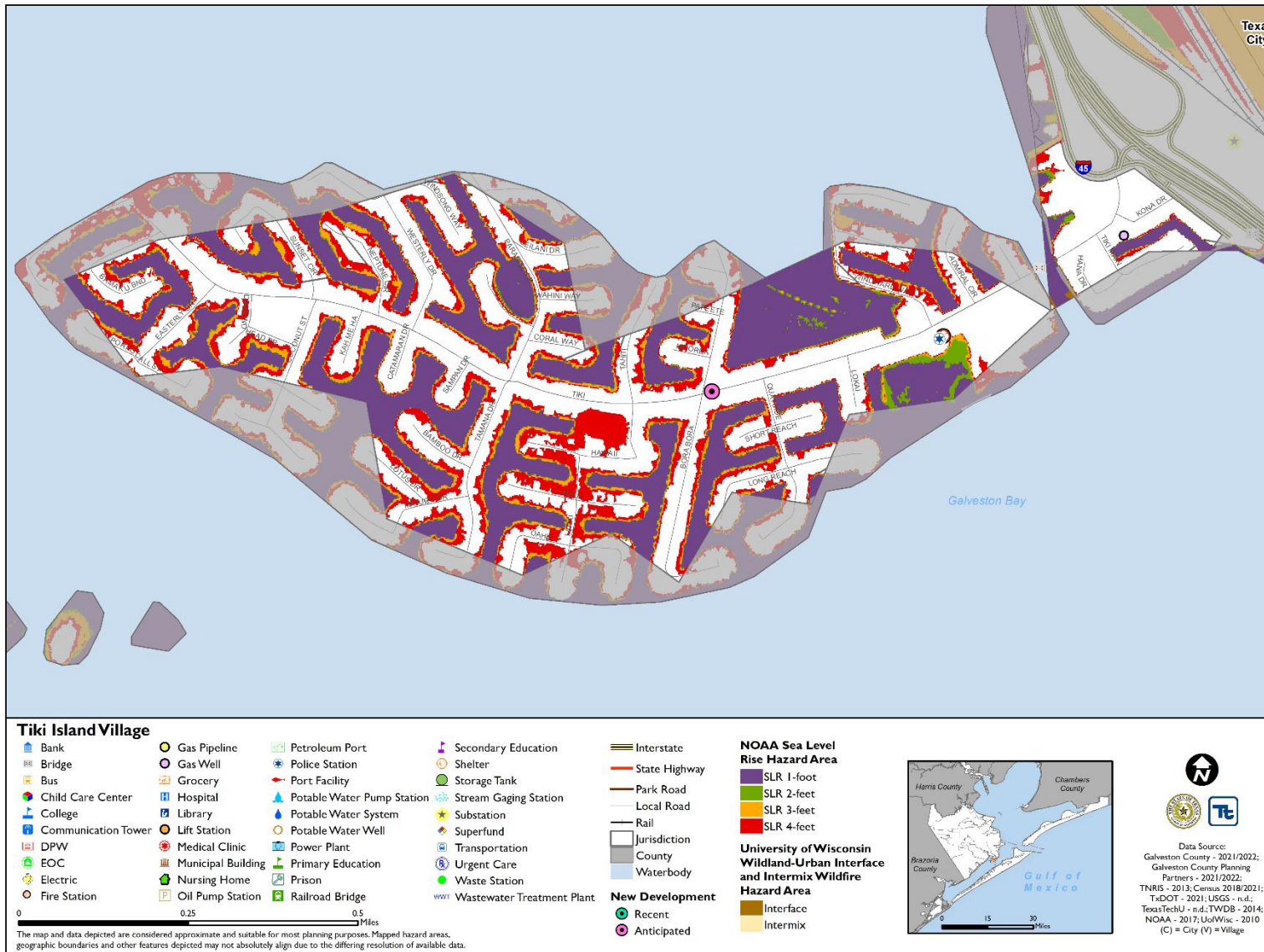
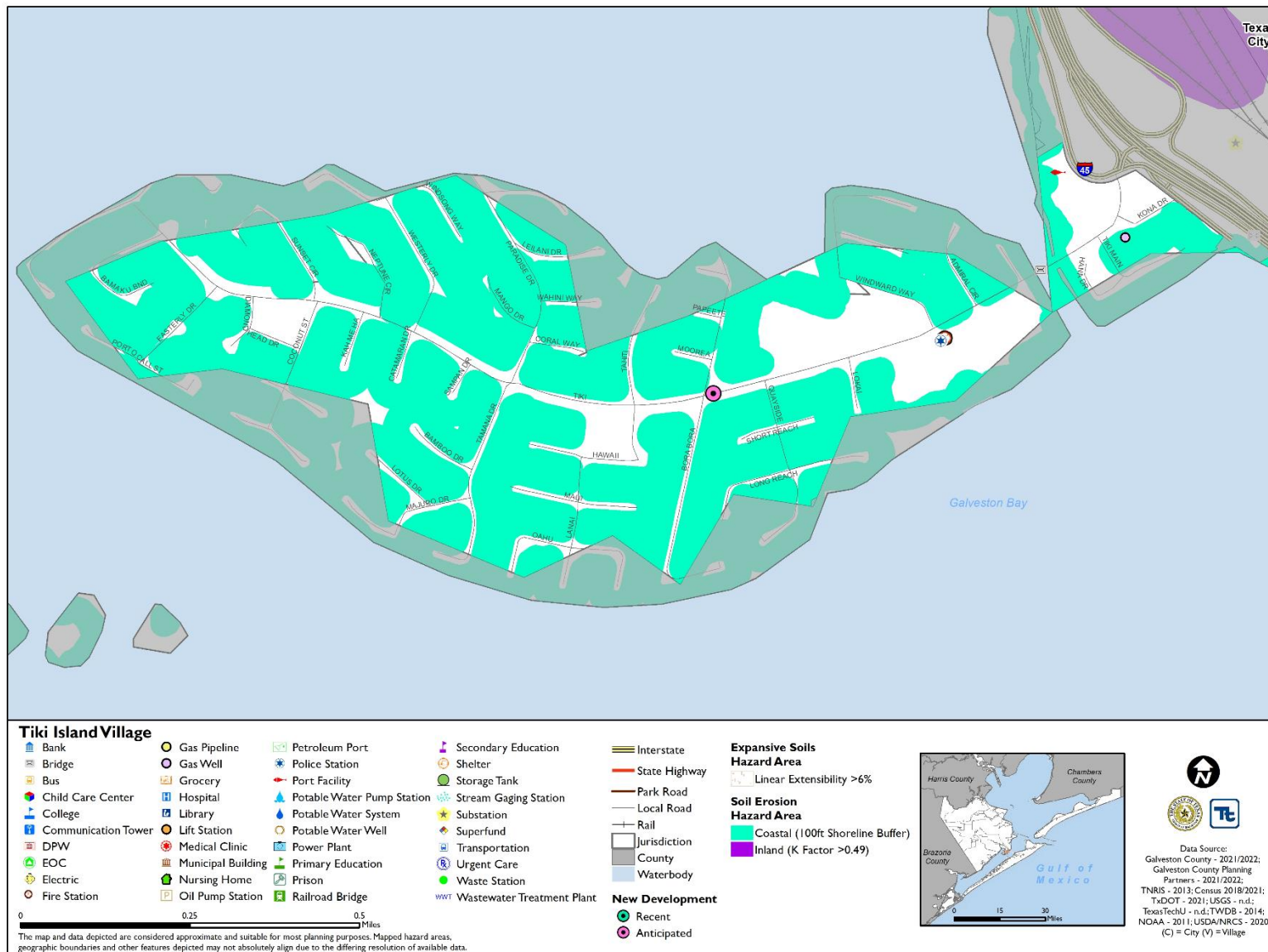




Figure 9.12-4. Tiki Island Area Extent and Location Map (Erosion, Soils)





Hazard Event History

Galveston County has a history of natural hazard events as detailed in Section 4 (Risk Assessment) of this plan. A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the county and its municipalities.

The City of Tiki Island's history of federal declarations (as presented by FEMA) and significant hazard events (as presented in NOAA-NCEI) is consistent with that of Galveston County. The table below provides details regarding municipal-specific loss and damages the City of Tiki Island experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.12-11. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
October 22-31, 2015	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding (DR-4245)	Yes	The EF-2 tornado touched down just east of Clover Field Airport (Brazoria County) and continued on a narrow northeast track into Galveston County. This tornado expanded in size and weakened in intensity as it approached FM 518 over the last half of its track. There was extensive tree damage along the entire track. Homes sustained partial roof loss and tree damage consistent with an EF-1 rating from east of the airport through Sunset Drive in Friendswood (Galveston County). Low-end EF-2 damage occurred on Chester Drive in Friendswood where there was complete loss of a residential home's roof. Estimated peak wind was 115 mph. Property damages were estimated at \$1 million.	No significant damages or losses identified
December 3, 2016	Flash Flood/Heavy Rain	No	Efficient low-level convergence along a near coastal warm frontal boundary with a moist environment generated thunderstorms that produced extreme early day rainfall rates. This intense morning rainfall produced flash flooding. Numerous streets were inundated with flood waters nearing homes in Texas City. Impassable roads due to high water included the FM 1764 – Emmett Lowry Parkway and Highway 146 intersection.	No significant damages or losses identified
August 26-30, 2017	Flash Flood/Heavy Rain/Tropical System Hurricane Harvey (DR-4332)	Yes	Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25 th . The storm then weakened to a tropical storm and slowed, looping back and tracking over SE Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30 th . Over that 5-day period over Southeast Texas TS Harvey produced catastrophic flooding	1 home damaged by tornado



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			with a large area of 30 to 60 inches of rain, 23 tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. There were numerous water rescues across western and central Galveston County. Flood waters completely inundated hundreds to thousands of homes and businesses in League City, Dickinson, and Santa Fe. Approximately 7,000 homes and 125 businesses were impacted by flood waters across the county. Clear Creek measured record levels that lead to the widespread flooding throughout Friendswood and League City. Major flooding occurred along the Dickinson Bayou; from Cemetery Road to east of Highway 3 along FM 517. Flood waters inundated sections of Interstate 45, Bay Area Boulevard, FM 528, and numerous primary and secondary county roads. There were numerous water rescues and flooded homes within the Friendswood, Pearland, and Dickinson areas. Three fatalities and 3 injuries in Galveston County were recorded as a result of the storm. An estimated \$10 Billion in property damages and \$10,000 in crop damages were recorded in the County.	
July 25 – 31, 2020	Hurricane Hanna (EM-3530)	Yes	Hurricane Hanna, the 2020 Atlantic season's first Hurricane, made landfall along the unpopulated Padre Island National Seashore on the mid-Kennedy County coastline as a Category 1 storm at around 5 PM Central Time Saturday, July 25th, carrying sustained 90 mph winds with gusts over 100 mph in a small portion of the inner eye wall. At the storm's peak, an estimated 50 thousand electric customers were without power.	No significant damages or losses identified
August 23 – 27, 2020	Tropical Storms Marco and Laura (EM-3540; DR-4572)	Yes (EM); No (DR)	Hurricane Laura made landfall along the southwest Louisiana coast. The hurricane brought high surf, elevated tides and some winds and wind gusts to tropical storm force along the SE Texas coast. Period of storm surge flooding and high surf from 8/26 to 8/27 leading to flooding of low lying areas and roads. Beach erosion on Gulf side. Tide gauges measured tides 3 to 4 feet above MHHW. Bolivar Peninsula and Galveston Island, including Jamaica Beach, with multiple roads closed.	Some street flooding
February 15, 2021	Severe Winter Storms (DR-4586)	Yes	Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to	Power outage, frozen & broken water lines



Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
			widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects. Ten deaths and were reported in Galveston County, along with over \$12 million in property damages.	
September 14-17, 2021	Hurricane Nicholas	N/A	The storm brought gusty winds to most of coastal southeast Texas, causing power outages to nearly 500,000 people. Several inches of rain fell, resulting in flash flooding. Between six and nine inches of rain fell in the Galveston area.	No significant damages or losses identified

Hazard Ranking and Vulnerabilities

The hazard profiles in Section 4.1 (Hazards of Concern) of this plan have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the Village of Tiki Island's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Section 4 (Risk Assessment) of the plan. The ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property, and the economy as well as community capability and changing future climate conditions. This input supports the mitigation action development to target those hazards with highest level of concern.

As discussed in Section 4.4 (Hazard Ranking), each participating jurisdiction can have differing degrees of risk exposure and vulnerability compared with Galveston County as a whole. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the Village of Tiki Island. The Village of Tiki Island reviewed the county hazard risk/vulnerability risk ranking table, including municipal-specific results, to reflect the relative risk of the hazards of concern to the community.

During the review of the hazard/vulnerability risk ranking, the Village of Tiki Island agreed with the calculated rankings.

Table 9.12-12. Hazard Ranking Input

Coastal & Inland Erosion	Dam & Levee Failure	Drought	Expansive Soils	Extreme Temperatures	Flood	Hail	Hurricane & Tropical Storm	Land Subsidence
High	Low	Medium	Low	Medium	High	Low	High	Low
Lightning	Pandemic	Severe Winter Storm	Thunderstorm Wind	Tornadoes	Tsunami	Utility Failure	Wildfire	
Low	Low	Low	Medium	Medium	Low	Medium	Low	



Note: The scale is based on the hazard rankings established in Section 4.4 (Hazard Ranking) and modified as appropriate during review by the jurisdiction.

9.12.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and their prioritization.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2017 HMP. Actions that are carried forward as part of this plan update are included in the following subsection in its own table with prioritization. Previous actions that are now on-going programs and capabilities are indicated as such in the following table and are discussed in the 'Capability Assessment' presented previously in this annex.



Table 9.12-13. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
TI 2011-2	Implement water conservation awareness campaign (at Citywide Fourth of July picnic and other local activities)	Water District	-	Yes (as 2022-Tiki Island-001)	-	-
TI 2011-5	Elevate 11 wastewater lift stations and provide backup power	Water District	-	Yes (as 2022-Tiki Island-002)	-	-
TI 2011-8	Purchase new Emergency Notification System (ENS)	Emergency Management	-	Yes (as 2022-Tiki Island-003)	-	-
TI 2011-9	Replace the Tiki Drive Bridge with an improved, hardened bridge to withstand storm surge and debris	TXDOT, Mayor	-	Yes (as 2022-Tiki Island-004)	-	-
TI 2011-10	Become a NOAA “Storm Ready” community	Emergency Management	-	Yes (as 2022-Tiki Island-005)	-	-
TI 2011-13	Implement a tree trimming program that clears tree limbs from public right of ways	City Department	Yes, ongoing	Yes (as 2022-Tiki Island-006)	-	-
TI 2011-14	Develop and conduct a fire safety and prevention program	Public Safety/Fire Marshal	-	Yes (as 2022-Tiki Island-007)	-	-
TI 2016-1	Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim/Severe Repetitive Loss (RFC/SRL) properties	City Administration and applicable state/county agencies	-	Yes (as 2022-Tiki Island-008)	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2022 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
TI 2016-2	Improve regulations and permit requirements to promote hazard mitigation strategies	City Administration	2' freeboard	Yes (as 2022-Tiki Island-009)	-	-
TI 2016-3	Develop and provide public information and awareness for natural hazards	City Administration	Ongoing	Yes (as 2022-Tiki Island-010)	-	-



Additional Mitigation Efforts

Other than routine maintenance activities and progress noted in Table 9.12-14, the Village did not undertake any additional mitigation efforts in the last five years.

Proposed Hazard Mitigation Initiatives for the HMP Update

The Village of Tiki Island participated in a mitigation action workshop in December 2021 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA 551 ‘Selecting Appropriate Mitigation Measures for Floodprone Structures’ (March 2007) and FEMA ‘Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards’ (January 2013).

The table below indicates the range of proposed mitigation action categories.

Table 9.12-14. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Coastal & Inland Erosion	X			X	X		X			
Dam & Levee Failure (no hazard exposure)										
Drought	X			X	X		X			
Expansive Soils	X			X	X		X			
Extreme Temperatures	X			X	X		X			
Flood	X	X		X	X		X		X	
Hail	X			X	X		X			
Hurricane & Tropical Storm	X	X	X	X	X		X	X	X	
Land Subsidence	X			X	X		X			
Lightning	X			X	X		X			
Pandemic	X			X	X		X			
Severe Winter Storm	X		X	X	X		X	X		
Thunderstorm Wind	X	X	X	X	X		X	X	X	
Tornadoes	X		X	X	X		X	X		
Tsunami	X			X	X		X			
Utility Failure	X		X	X	X		X	X		
Wildfire	X		X	X	X		X	X		

Note: Section 6 (Mitigation Strategy) provides for an explanation of the mitigation categories.

The table below (Table 9.1-13) summarizes the comprehensive range of specific mitigation initiatives the Village of Tiki Island would like to pursue in the future to reduce the effects of hazards. Some of these initiatives may be previous actions carried forward for this plan update. These initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table below to further demonstrate the wide-range of activities and mitigation measures selected.

As discussed in Section 6 (Mitigation Strategy), 14 evaluation/prioritization criteria are used to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing your actions as ‘High’, ‘Medium’, or ‘Low.’ The table below summarizes the evaluation of each mitigation initiative, listed by Action Number.

Table 9.1-14 provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.



Table 9.12-15. Proposed Hazard Mitigation Initiatives and Associated Priority

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Tiki Island-001	Water Conservation Campaign	Problem: Water shortages occur during periods of drought. Solution: Implement water conservation awareness campaign (at Citywide Fourth of July picnic and other local activities).	Both	Drought	1, 2, 3	Ongoing	Water District	City Funds	Prevention of economic impacts due to lack of water.	Low	High	EAP	PI
2022-Tiki Island-002	Lift Station Hardening	Problem: Lift stations are prone to flooding. Solution: Elevate 11 wastewater lift stations and provide backup power.	Existing	Flood, Hurricane & Tropical Storm	1, 2	1-5 years	Water District	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of utility services and damage to critical infrastructure.	High	High	SIP	SP
2022-Tiki Island-003	Emergency Awareness	Problem: Need upgraded emergency notification. Solution: Purchase new Emergency Notification System (ENS).	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Pandemic, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Tsunami, Utility Failure, Wildfire	1, 2	1-5 years	Emergency Management	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and damage to critical infrastructure.	High	High	EAP	PI
2022-Tiki Island-004	Tiki Drive Bridge Replacement	Problem: Tiki Drive Bridge is not rated to withstand severe weather events. Solution: Replace the Tiki Drive Bridge with an improved, hardened bridge to withstand storm surge and debris.	Existing	Flood, Hurricane & Tropical Storm, Thunderstorm Winds	1, 2	1-5 years	TXDOT, Mayor	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and damage to critical infrastructure.	High	High	SIP	SP



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2022-Tiki Island-005	Join "Storm Ready"	Problem: Need better storm preparedness. Solution: Become a NOAA "Storm Ready" community.	Both	Extreme Temperatures, Flood, Hail, Hurricane & Tropical Storm, Lightning, Severe Winter Storm, Thunderstorm Wind, Tornadoes	1, 2, 3	1-5 years	Emergency Management	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and damage to critical infrastructure.	Low	High	LPR	PR
2022-Tiki Island-006	Tree Trimming Program	Problem: Continual trimming of vegetation is required to mitigation the impact of severe weather. Solution: Implement a tree trimming program that clears tree limbs from public right of ways.	Both	Hurricane & Tropical Storm, Severe Winter Storm, Thunderstorm Wind, Tornadoes, Utility Failure, Wildfire	1, 2	Ongoing	Maintenance Department	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of utility services, loss of life and damage to critical infrastructure.	Low	High	NSP	NR
2022-Tiki Island-007	Fire Safety and Prevention Program	Problem: Lack of fire danger awareness. Solution: Develop and conduct a fire safety and prevention program.	Both	Wildfire	1, 2, 3	1-5 years	Public Safety/Fire Marshal	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and damage to critical infrastructure.	Low	High	EAP	PI
2022-Tiki Island-008	Mitigation RFC/SRL properties	Problem: Flood waters damaged facilities and homes. Solution: Mitigate (elevate, reconstruct, acquisition, demolition) Repetitive Flood Claim / Severe Repetitive Loss (RFC/SRL) properties.	Existing	Flood, Hurricane & Tropical Storm	1, 2	1 to 5 years	City Administration, Building Inspector/ Maintenance, and applicable state/county agencies	FEMA Grant Funding (FMA, HMGP, BRIC)	Protection of structures and critical infrastructure.	High	High	SIP	SP
2022-Tiki Island-009	Integrate mitigation measures in community regulations and permits	Problem: Hazard mitigation is an ongoing need. Solution: Improve and enforce community regulations and permit requirements to promote hazard mitigation strategies. This includes restricting development	Both	All Hazards except Dam & Levee Failure	1, 2, 3, 4	1 to 5 years	City Administration, Building Inspector/ Maintenance	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and damage to critical infrastructure.	Low	High	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		or requiring enhanced building techniques in floodplains and mapped high-hazard areas.											
2022-Tiki Island-010	Public Outreach	Problem: Methods and operational equipment are needed to inform the public on how residents can mitigate hazards at their properties. Additionally, outreach methods are needed informing the community of immediate danger from an impending hazard or updating the public with an ongoing controlled hazard. Solution: Public outreach program will be designed to inform residents on how they can mitigate hazards at their properties and notify the public of immediate hazard threats or updated supplemental information of ongoing hazards through numerous methods that could include text messages, automated “robo calls”, emails, media outlet press releases, internet websites and social media accounts from village departments. Equipment would include social monitoring or crowd source programs, cameras and hard-shell cases, laptop, and a dedicated vehicle.	Both	All Hazards except Dam & Levee Failure	3	1-5 Years	City Administration, Mayor's Office, Public Safety, Fire Marshal	FEMA Grant Funding (FMA, HMGP, BRIC)	Prevention of loss of life and protection of critical infrastructure.	Low	High	EAP	PI

Notes:

Not all acronyms and abbreviations defined below are included in the table.

Acronyms and Abbreviations:

CAV Community Assistance Visit
 CRS Community Rating System
 DPW Department of Public Works

Potential FEMA HMA Funding Sources:

FMA Flood Mitigation Assistance Grant Program
 HMGP Hazard Mitigation Grant Program

Timeline:

The time required for completion of the project upon implementation

Cost:



EHP Environmental Planning and Historic Preservation
 FEMA Federal Emergency Management Agency
 FPA Floodplain Administrator
 HMA Hazard Mitigation Assistance
 N/A Not applicable
 NFIP National Flood Insurance Program
 OEM Office of Emergency Management

BRIC Building Resilient Infrastructure and Communities Program

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Project (SIP) - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- Preventative Measures (PR) - Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- Property Protection (PP) - These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Information (PI) - Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- Natural Resource Protection (NR) - Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Flood Control Projects (SP) - Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- Emergency Services (ES) - Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

Table 9.12-16. Summary Evaluation and Action Priority

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Tiki Island-001	Water Conservation Campaign	0	0	1	1	1	1	0	1	1	1	-1	1	1	1	9	High
2022-Tiki Island-002	Lift Station Hardening	0	1	1	1	1	1	0	1	1	1	1	1	1	1	12	High
2022-Tiki Island-003	Emergency Awareness	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High / Medium / Low
2022-Tiki Island-004	Tiki Drive Bridge Replacement	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Tiki Island-005	Join "Storm Ready"	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Tiki Island-006	Tree Trimming Program	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Tiki Island-007	Fire Safety and Prevention Program	1	1	1	1	1	1	0	1	1	1	-1	1	1	1	11	High
2022-Tiki Island-008	Mitigation RFC/SRL properties	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Tiki Island-009	Integrate mitigation measures in community regulations and permits	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High
2022-Tiki Island-010	Public Outreach	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13	High

Note: Section 6 (Mitigation Strategy), which conveys guidance on prioritizing mitigation actions. Low (0-4), Medium (5-8), High (9-14).



CITY COUNCIL AGENDA FORM

Meeting Date: June 27, 2022
Prepared by: Giovanna Bonsignore
Department: Development Services

Agenda item: _____
Reviewed by: Kathleen Van Stavern

AGENDA ITEM DESCRIPTION: Discussion/possible action regarding Final Plat for Sunset Grove, Section 4

☒ **ATTACHMENTS FOR REFERENCE**

1. Planning and Zoning Commission Staff Report
2. Submitted Plat
3. Final Plat Application

STAFF BRIEFING

- The Sunset Grove General Plan contains the detail and project phasing for the Sunset Grove development and was approved by Council at a previous meeting

HISTORY: N/A

TARGET IMPLEMENTATION: Final Plat Approved

SIGNIFICANT ACTION DATES:

06/21/21 - Planning and Zoning recommended approval with conditions of the Sunset Grove Sect 4 preliminary plat

06/25/21 - Applicant submitted a corrected preliminary plat to address the conditions

07/12/21 - Preliminary Plat Approved at City Council with conditions

05/24/22 - Planning and Zoning recommended approval of Final Plat of the Sunset Grove Sect 4

ACTION:

- | | |
|--|---|
| ☐ Ordinance | ☐ Resolution |
| ☐ Special Presentation | ☐ Proclamation |
| ☐ Finance Report | ☐ Public Hearing |
| ☒ Other - Final Plat | |
| ☒ Mark if this item does not conflict with any Resolution, Ordinance or City Charter, policies, procedures | |

Cost Details:

Budgeted	
Actual Bid	
Estimated Expenditure	
Acct. Name(s)	
Line Items #	
Other Funding	

STAFF'S RECOMMENDATION: Motion to approve Final Plat of Sunset Grove, Section 4, all conditions requested have been made and approved by Adico and supporting documentation compliant with the City Code Chapter 41

FISCAL IMPACT: N/A

RESOLUTION NO. R-2022-0035

A RESOLUTION OF THE CITY OF LA MARQUE, TEXAS ACCEPTING THE FINAL PLAT OF SUNSET GROVE SECTION FOUR

WHEREAS, KB Home Lone Star Inc., is the owner of certain property in the City of La Marque Texas known as Sunset Grove Section 4 and more accurately described in Exhibit 1 and

WHEREAS, KB Home Lone Star Inc., submitted the Final Plat attached as Exhibit 1 for approval to the City of La Marque, Texas.

NOW THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF LA MARQUE, TEXAS:

Section 1. The findings and recitals set out in the preamble to this Resolution are found to be true and correct and they are hereby adopted by the City Council and made a part hereof for all purposes.

Section 2. The Final Plat attached as Exhibit 1 is approved by City Council.

Section 3. Severability. In the event any clause, phrase, provision sentence, or part of this Resolution or the application of the same to any person or circumstance for any reason be adjudged invalid or held unconstitutional by a court of competent jurisdiction, it is the intention of the City Council that the invalidity or unconstitutionality of the one or more parts shall not affect, impair, or invalidate this Resolution as a whole or any part or provision other than the part declared to be invalid or unconstitutional; and the City Council of the City of La Marque, Texas, declares that it would have passed each and every part of the same notwithstanding the omission of any such part thus declared to be invalid or unconstitutional, whether there be one or more parts.

CITY OF LA MARQUE, TEXAS

Keith Bell, Mayor

ATTEST:

Kierra Nance, TRMC, City Clerk

APPROVED AS TO FORM:

Gus Knebel
City Attorney

City of La Marque Planning & Zoning Commission

STAFF REPORT

Meeting Date: May 24, 2022

Agenda Item: Discussion / possible action regarding a Final Plat of Sunset Grove, Section 4, a subdivision of 12.43 acres located in S.F Austin League No. 4 Survey, A-2 City of La Marque, Galveston County Texas

Item Type: Plat - Final plat

Standard for Approval:

Plats that comply with the requirements of City Code Chapter 41 and Chapter 212 of the Texas Local Government Code must be approved. Preliminary plats will always be approved with conditions because they will not comply with all of the requirements by nature of being a preliminary plat. Plats that do not comply with the requirements and need major changes will be denied and the reasons stated.

References:

City Code Chapter 41;
Chapter 212, Texas Local Government Code

Council approval: Required

Public comments: None



Friday, December 17, 2021

Renissa M. Garza Montalvo
Costello, Inc.
2107 Citywest Blvd., 3rd Floor
Houston, TX 77042

Re: Sunset Grove Section 4 Final Plat
Letter of Recommendation to Approve
COLM Project No. PZ2021-021
Adico, LLC Project No. 18100-2-083

Dear Ms. Montalvo;

On behalf of the City of La Marque, Adico, LLC has reviewed the second submittal for Sunset Grove Section 4 Final Plat received on or about November 22, 2021.

Based on our review, we have no objections to the final plat as resubmitted on December 9, 2021. Please provide one (1) mylar and two (2) prints of the plat to Margaret Corfield, Development Services, 1130 1st St. La Marque, TX 77568.

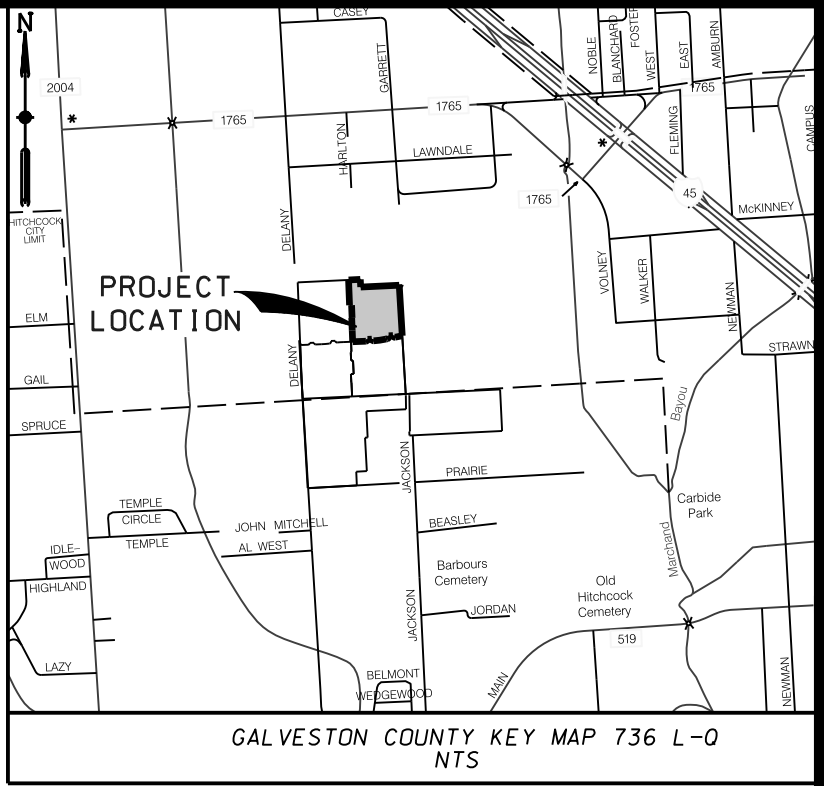
Should you have any questions, please do not hesitate to call our office.

Sincerely,
Adico, LLC

A handwritten signature in blue ink, appearing to read "Dinh V. Ho, P.E.".

Dinh V. Ho, P.E.
TBPE Firm No. 16423

Cc: Margaret Corfield
File: 18100-2-083



STATE OF TEXAS
COUNTY OF GALVESTON

WE, KB HOME LONE STAR INC., A TEXAS CORPORATION, OWNERS OF THE PROPERTY IN THE ABOVE AND FOREGOING MAP OF SUNSET GROVE SECTION FOUR, DO HEREBY MAKE SUBDIVISION ON SAID PROPERTY ACCORDING TO THE LINES, STREETS, ALLEYS, PARKS, BUILDING LINES, AND EASEMENTS THEREIN SHOWN, AND DESIGNATE SAID SUBDIVISION AS SUNSET GROVE SECTION FOUR IN THE STEPHEN F. AUSTIN LEAGUE NO. 4, A-2 IN GALVESTON COUNTY, TEXAS; AND DEDICATE THE STREETS, AND EASEMENTS SHOWN THEREON FOREVER.

FURTHER, OWNERS HAVE DEDICATED AND BY THESE PRESENTS DO DEDICATE TO THE USE OF THE PUBLIC FOR PUBLIC UTILITY PURPOSE FOREVER UNOBSTRUCTED AERIAL EASEMENTS. THE AERIAL EASEMENTS SHALL EXTEND HORIZONTALLY AN ADDITIONAL ELEVEN FEET, SIX INCHES (11' 6") FOR TEN FEET (10' 0") PERIMETER GROUND EASEMENTS OR SEVEN FEET, SIX INCHES (7' 6") FOR FOURTEEN FEET (14' 0") PERIMETER GROUND EASEMENTS OR FIVE FEET, SIX INCHES (5' 6") FOR SIXTEEN FEET (16' 0") PERIMETER GROUND EASEMENTS, FROM A PLANE SIXTEEN FEET (16' 0") ABOVE THE GROUND LEVEL UPWARD, LOCATED ADJACENT TO AND ADJOINING SAID PUBLIC UTILITY EASEMENTS THAT ARE DESIGNATED WITH AERIAL EASEMENTS (U.E. AND A.E.) AS INDICATED AND DEPICTED HEREON, WHEREBY THE AERIAL EASEMENT TOTALS TWENTY ONE FEET, SIX INCHES (21' 6") IN WIDTH.

FURTHER, OWNERS HAVE DEDICATED AND BY THESE PRESENTS DO DEDICATE TO THE USE OF THE PUBLIC FOR PUBLIC UTILITY PURPOSE FOREVER UNOBSTRUCTED AERIAL EASEMENT. THE AERIAL EASEMENTS SHALL EXTEND HORIZONTALLY AN ADDITIONAL TEN FEET (10' 0") FOR TEN FEET (10' 0") BACK-TO-BACK GROUND EASEMENTS, OR EIGHT FEET (8' 0") FOR FOURTEEN FEET (14' 0") BACK-TO-BACK GROUND EASEMENTS OR SEVEN FEET (7' 0") FOR SIXTEEN FEET (16' 0") BACK-TO-BACK GROUND EASEMENTS, FROM A PLANE SIXTEEN FEET (16' 0") ABOVE THE GROUND LEVEL UPWARD, LOCATED ADJACENT TO BOTH SIDES AND ADJOINING SAID PUBLIC UTILITY EASEMENTS THAT ARE DESIGNATED WITH AERIAL EASEMENTS (U.E. AND A.E.) AS INDICATED AND DEPICTED HEREON, WHEREBY THE AERIAL EASEMENT TOTALS THIRTY FEET (30' 0") IN WIDTH.

FURTHER, OWNERS DO HEREBY CERTIFY THAT WE ARE THE OWNERS OF THE PROPERTY IMMEDIATELY ADJACENT TO THE BOUNDARIES OF THE ABOVE AND FOREGOING PLAT OF SUNSET GROVE SECTION FOUR WHERE BUILDING SETBACK LINES OR PUBLIC EASEMENTS ARE TO BE ESTABLISHED OUTSIDE THE BOUNDARIES OF THE ABOVE AND FOREGOING PLAT AND DO HEREBY MAKE AND ESTABLISH ALL BUILDING SETBACK LINES AND DEDICATE TO THE USE OF THE PUBLIC FOREVER ALL PUBLIC EASEMENTS SHOWN IN SAID ADJACENT ACREAGE.

THIS IS TO CERTIFY THAT WE, KB HOME LOAN STAR INC., A TEXAS CORPORATION, HAVE COMPLIED WITH OR WILL COMPLY WITH THE EXISTING REGULATIONS HERETOFORE ON FILE AND ADOPTED BY THE CITY OF LA MARQUE IN GALVESTON COUNTY, TEXAS.

IN TESTIMONY WHEREOF, KB HOME LOAN STAR INC., A TEXAS CORPORATION, HAS CAUSED THESE PRESENTS TO BE SIGNED BY DAVID WILLIAMSON, DIRECTOR OF LAND DEVELOPMENT AND BY MICHAEL KASKA, SENIOR MANAGER-LAND DEVELOPMENT, THIS ____ DAY OF ____ 2021.

KB HOME LONE STAR INC.,
A TEXAS CORPORATION

BY: DAVID WILLIAMSON
DIRECTOR OF LAND DEVELOPMENT

BY: MICHAEL KASKA
SENIOR MANAGER-LAND DEVELOPMENT

BEFORE ME, THE UNDERSIGNED AUTHORITY, ON THIS DAY PERSONALLY APPEARED DAVID WILLIAMSON, DIRECTOR OF LAND DEVELOPMENT AND MICHAEL KASKA, SENIOR MANAGER-LAND DEVELOPMENT OF KB HOME LONE STAR INC., KNOWN TO ME TO BE THE PERSONS WHOSE NAMES ARE SUBSCRIBED TO THE FOREGOING INSTRUMENT, AND ACKNOWLEDGED TO ME THAT THEY EXECUTED THEIR NAME FOR THE PURPOSES AND CONSIDERATION THEREIN SET FORTH.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, THIS ____ DAY OF ____ 2021.

NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

PRINT NAME

MY COMMISSION EXPIRES: _____

I, MARK D. ARMSTRONG, AM AUTHORIZED UNDER THE LAWS OF THE STATE OF TEXAS TO PRACTICE THE PROFESSION OF SURVEYING AND HEREBY CERTIFY THAT THE ABOVE SUBDIVISION IS TRUE AND ACCURATE; WAS PREPARED FROM AN ACTUAL SURVEY OF THE PROPERTY MADE UNDER MY SUPERVISION ON THE GROUND; THAT, EXCEPT AS SHOWN ALL BOUNDARY CORNERS, ANGLE POINTS, POINTS OF CURVATURE AND OTHER POINTS OF REFERENCE HAVE BEEN MARKED WITH IRON PIPES OR RODS HAVING AN OUTSIDE DIAMETER OF NOT LESS THAN FIVE EIGHTHS (5/8) INCH AND A LENGTH OF NOT LESS THAN THREE (3) FEET; AND THAT THE PLAT BOUNDARY CORNERS HAVE BEEN TIED TO THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE.

MARK D. ARMSTRONG
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 5363

WE HEREBY CERTIFY THAT THE ABOVE AND FOREGOING PLAT OF SUNSET GROVE SECTION FOUR, WAS APPROVED BY THE PLANNING COMMISSION OF THE CITY OF LA MARQUE, TEXAS, ON THE ____ DAY OF _____, A. D., 2021, AND BY THE CITY COUNCIL OF THE CITY OF LA MARQUE, TEXAS, ON THE ____ DAY OF _____, A. D., 2021.

CHAIRMAN, PLANNING COMMISSION

KEITH BELL
MAYOR OF THE CITY OF LA MARQUE, TEXAS

I, DWIGHT D. SULLIVAN, COUNTY CLERK, GALVESTON COUNTY, TEXAS, DO HEREBY CERTIFY THAT THE WRITTEN INSTRUMENT WAS FILED FOR RECORD IN MY OFFICE ON _____, 2021, AT _____ O'CLOCK, ____ M., AND DULY RECORDED ON _____, 2021, AT _____ O'CLOCK, ____ M. IN INSTRUMENT NUMBER _____, GALVESTON COUNTY RECORDS.

WITNESS MY HAND AND SEAL OF OFFICE, AT GALVESTON, TEXAS, THE DAY AND DATE LAST ABOVE WRITTEN.

DWIGHT D. SULLIVAN, COUNTY CLERK,
GALVESTON COUNTY, TEXAS

BY: _____
DEPUTY

METES AND BOUNDS DESCRIPTION 12.43 ACRES

Being a 12.43 acre tract of land located in the Stephen F. Austin League No. 4, Abstract No. 2 in Galveston County, Texas; said 12.43 acre tract being a portion of a called 80.00 acre tract of land recorded in the name of KB HOME LONE STAR INC. in Clerk's File (C.F.) No. 2017076084 of the Official Public Records of Real Property of Galveston County (O.P.R.R.P.G.C.); said 12.43 acre tract being more particularly described by metes and bounds as follows (all bearings are referenced to the Texas Coordinate System, North American Datum 1983 (NAD 83), South Central Zone);

Beginning at a 5/8-inch iron rod with cap stamped "COSTELLO INC" found for the northeast corner of Sunset Grove Section Two, a subdivision recorded under Instrument Number 2021003251 of the Galveston County Records, same being on the common line of said 80.00 acre tract and a called 5.0 acre tract of land recorded in C.F. No. 8600357 of the O.P.R.R.P.G.C.;

- Thence, with said common line, North 87 degrees 15 minutes 03 seconds East, a distance of 165.32 feet to the southeast corner of said 5.0 acre tract, same being on the westerly line of a called 5 acre tract of land recorded in C.F. No. 2000004069 of the O.P.R.R.P.G.C.;
- Thence, with the common line of said 80.00 acre tract and said 5 acre tract, South 02 degrees 44 minutes 57 seconds East, a distance of 108.25 feet to the southwest corner of said 5 acre tract;
- Thence, continuing with said common line, North 87 degrees 14 minutes 10 seconds East, a distance of 586.62 feet to the southeast corner of a said 5 acre tract, same being on the common line of said 80.00 acre tract and a called 87.05 acre tract of land recorded in Clerk's File Number 2020049570 of the O.P.R.R.P.G.C.;
- Thence, with said common line, South 22 degrees 03 minutes 57 seconds East, a distance of 21.51 feet to the northeast corner of a called 2.090 acre tract of land recorded in Clerk's File Number 8647700 of the O.P.R.R.P.G.C.;
- Thence, with the common line of said 80.00 acre tract and said 2.090 acre tract, South 86 degrees 35 minutes 21 seconds West, a distance of 50.00 feet to the northwest corner of said 2.090 acre tract;
- Thence, continuing with said common line, South 03 degrees 24 minutes 39 seconds East, a distance of 692.17 feet;

Thence, through said 80.00 acre tract, the following twelve (12) courses:

- South 78 degrees 32 minutes 02 seconds West, a distance of 102.94 feet;
 - 43.09 feet along the arc of a curve to the right, said curve having a central angle of 98 degrees 44 minutes 54 seconds, a radius of 25.00 feet and a chord that bears North 52 degrees 05 minutes 31 seconds West, a distance of 37.95 feet;
 - South 87 degrees 16 minutes 56 seconds West, a distance of 60.00 feet;
 - South 02 degrees 43 minutes 04 seconds East, a distance of 16.93 feet;
 - 35.45 feet along the arc of a curve to the right, said curve having a central angle of 81 degrees 15 minutes 06 seconds, a radius of 25.00 feet and a chord that bears South 37 degrees 54 minutes 29 seconds West, a distance of 32.56 feet;
 - South 78 degrees 32 minutes 02 seconds West, a distance of 21.05 feet;
 - 172.98 feet along the arc of a curve to the right, said curve having a central angle of 06 degrees 44 minutes 32 seconds, a radius of 1,470.00 feet and a chord that bears South 81 degrees 54 minutes 18 seconds West, a distance of 172.88 feet;
 - 40.15 feet along the arc of a curve to the right, said curve having a central angle of 92 degrees 00 minutes 22 seconds, a radius of 25.00 feet and a chord that bears North 48 degrees 43 minutes 15 seconds West, a distance of 35.97 feet;
 - South 87 degrees 16 minutes 56 seconds West, a distance of 60.00 feet;
 - South 02 degrees 43 minutes 04 seconds East, a distance of 0.40 feet;
 - 39.50 feet along the arc of a curve to the right, said curve having a central angle of 90 degrees 31 minutes 54 seconds, a radius of 25.00 feet and a chord that bears South 42 degrees 32 minutes 53 seconds West, a distance of 35.52 feet;
 - South 87 degrees 48 minutes 51 seconds West, a distance of 185.63 feet to the southeast corner of aforesaid Sunset Grove Section Two;
- Thence, with the east line of said Sunset Grove Section Two, the following seven (7) courses:
- North 02 degrees 11 minutes 09 seconds West, a distance of 155.00 feet;
 - South 87 degrees 48 minutes 51 seconds West, a distance of 0.55 feet;
 - North 02 degrees 11 minutes 09 seconds West, a distance of 180.00 feet;
 - North 87 degrees 48 minutes 51 seconds East, a distance of 5.19 feet;
 - North 02 degrees 11 minutes 09 seconds West, a distance of 180.00 feet;
 - South 87 degrees 48 minutes 51 seconds West, a distance of 28.83 feet;
 - North 02 degrees 11 minutes 09 seconds West, a distance of 356.19 feet to the **Point of Beginning** and containing 12.43 acres of land.

FINAL PLAT SUNSET GROVE SECTION FOUR

BEING A SUBDIVISION OF 12.43 ACRES
LOCATED IN THE
STEPHEN F. AUSTIN LEAGUE NO. 4, ABSTRACT-2
CITY OF LA MARQUE
GALVESTON COUNTY, TEXAS
ALSO BEING A PARTIAL REPLAT OF
LOTS 13 AND 14 OF DELANY ROAD ACRES
VOLUME 18, PAGE 760, G.C.M.R.

42 LOTS 3 BLOCKS 5 RESERVES

DATE: DECEMBER, 2021

ENGINEER/SURVEYOR:



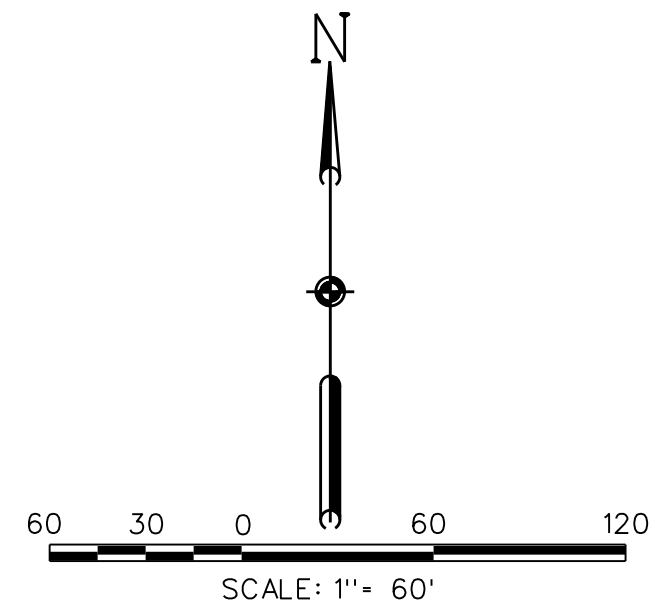
PLANNER:

7GEN PLANNING
Planning and Landscape Architecture
2107 CITYWEST BOULEVARD, 4TH FLOOR
Houston, Texas 77042
(713) 343-0394 (713) 783-3580, Fax

DEVELOPER:

KB HOME LONE STAR INC.,
A TEXAS CORPORATON
11314 RICHMOND AVE.
HOUSTON, TX 77082

COSTELLO, INC.
Engineering and Surveying
2107 CITYWEST BOULEVARD
3RD FLOOR
HOUSTON, TEXAS 77042
(713) 783-7788 FAX: 783-3580
TBPE FIRM REGISTRATION NO. 280
TBPLS FIRM REGISTRATION NO. 100466

**LEGEND**

- SET 5/8 - INCH IRON ROD WITH PLASTIC CAP STAMPED "COSTELLO INC" UNLESS OTHERWISE NOTED

- FOUND 5/8 - INCH IRON ROD UNLESS OTHERWISE NOTED

- ① INDICATES BLOCK NUMBER

- A INDICATES RESERVE

- INDICATES STREET NAME BREAK

- 0000 INDICATES STREET ADDRESS

LINE DATA TABLE

NUMBER	DIRECTION	DISTANCE (FEET)
L1	S87°16'56"W	60.00
L2	S02°43'04"E	16.93
L3	S78°32'02"W	21.05
L4	S87°16'56"W	60.00
L5	S02°43'04"E	0.40
L6	S87°48'51"W	0.55
L7	N87°48'51"E	5.19
L8	S87°48'51"W	28.83
L9	S22°03'57"W	21.51
L10	S86°35'21"W	50.00
L11	N41°40'51"E	14.29
L12	S47°11'09"E	14.14
L13	S02°43'04"E	104.61
L14	S42°11'53"W	15.00
L15	S42°32'53"W	5.00

CURVE DATA TABLE

NUMBER	ARC LENGTH (FEET)	RADIUS (FEET)	DELTA ANGLE	CHORD DIRECTION	CHORD LENGTH (FEET)
C1	43.09	25.00	98° 44' 54"	N52°05'31"W	37.95
C2	35.45	25.00	81° 15' 6"	S37°54'29"W	32.56
C3	172.98	1470.00	6° 44' 32"	S81°54'16"W	172.88
C4	40.15	25.00	92° 0' 22"	N48°43'55"W	35.97
C5	39.50	25.00	90° 31' 54"	S42°32'53"W	35.52
C6	85.88	55.00	89° 28' 6"	S47°27'07"E	77.42
C7	85.88	55.00	89° 28' 6"	S47°27'07"E	77.42
C8	39.04	25.00	89° 28' 6"	S47°27'07"E	35.19
C9	39.04	25.00	89° 28' 6"	S47°27'07"E	35.19
C10	123.55	50.00	141° 34' 22"	N47°27'07"W	94.43
C11	141.81	50.00	162° 30' 11"	N47°50'16"W	98.84
C12	16.10	25.00	36° 54' 15"	S69°21'43"W	15.83
C13	15.77	25.00	36° 7' 51"	S15°20'52"W	15.51
C14	11.37	25.00	26° 3' 8"	S10°18'30"W	11.27
C15	11.37	25.00	26° 3' 8"	S74°47'16"W	11.27

NOTES:

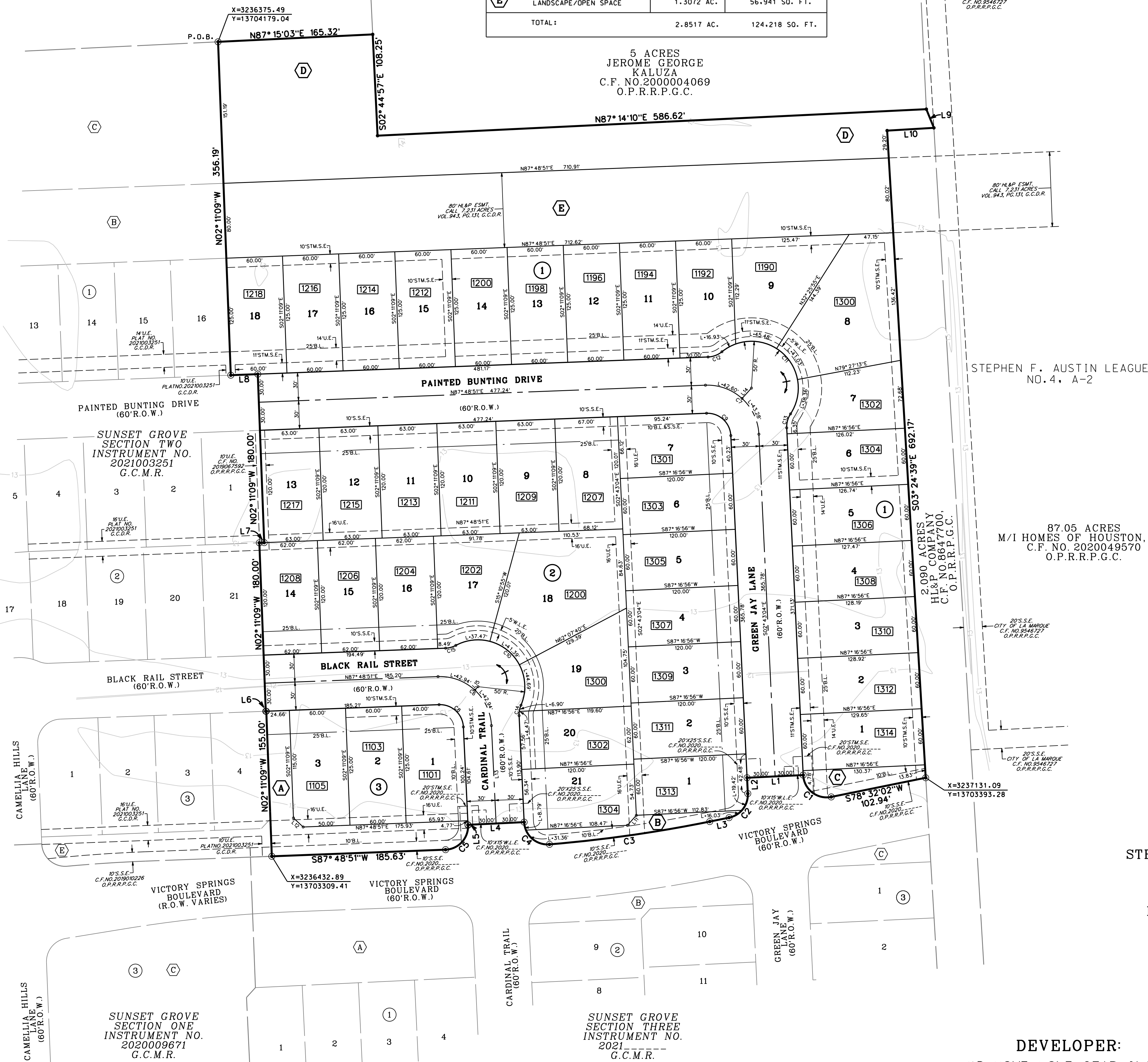
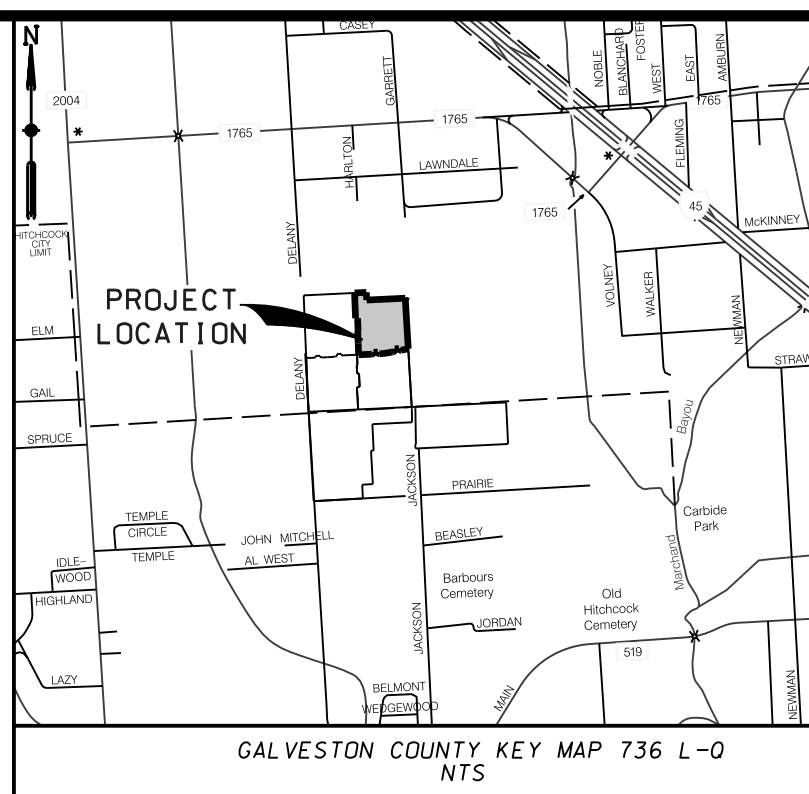
- B.L. INDICATES BUILDING LINE
U.E. INDICATES UTILITY EASEMENT
W.L.E. INDICATES WATER LINE EASEMENT
S.S.E. INDICATES SANITARY SEWER EASEMENT
STM.S.E. INDICATES STORM SEWER EASEMENT
D.E. INDICATES DRAINAGE EASEMENT
ESMT. INDICATES EASEMENT
VOL., PG. INDICATES VOLUME PAGE
G.C.M.R. INDICATES GALVESTON COUNTY MAP RECORD
O.R.R.P. INDICATES OFFICIAL PUBLIC RECORDS OF REAL PROPERTY
F.M.E. INDICATES FORCE MAIN EASEMENT
G.C.D.R. INDICATES GALVESTON COUNTY DEED RECORDS
G.C.D.D. INDICATES GALVESTON COUNTY DRAINAGE DISTRICT
HL&P INDICATES HOUSTON LIGHTING AND POWER
F.H.E. INDICATES A FIRE HYDRANT EASEMENT
RB INDICATES RADIAL BEARING
I.R. INDICATES A IRON ROD
FND. INDICATES FOUND
U.V.E. INDICATES UNOBSTRUCTED VISIBILITY EASEMENT
W.M.E. INDICATES WATER METER EASEMENT
R.O.W. INDICATES RIGHT OF WAY
P.O.B. INDICATES POINT OF BEGINNING
- ALL NON-PERIMETER EASEMENTS ON PROPERTY LINES ARE CENTERED UNLESS OTHERWISE NOTED.
- ALL BEARINGS ARE BASED ON THE TEXAS COORDINATES SYSTEM OF 1983, SOUTH CENTRAL ZONE.
- UNLESS OTHERWISE INDICATED, THE BUILDING LINES (B.L.), WEATHER ONE OR MORE, SHOWN ON THIS SUBDIVISION PLAT ARE ESTABLISHED TO EVIDENCE COMPLIANCE WITH THE APPLICABLE PROVISIONS OF SUBDIVISION ORDINANCE NO. 139, CITY OF LA MARQUE, TEXAS, IN EFFECT AT THE TIME THIS PLAT WAS APPROVED, WHICH MAY BE AMENDED FROM TIME TO TIME.
- ALL OF THE PROPERTY SUBDIVIDED IN THE FOREGOING PLAT IS WITH THE INCORPORATED BOUNDARIES OF THE CITY OF LA MARQUE, TEXAS
- SUNSET GROVE SECTION FOUR IS LOCATED WITHIN SHADED ZONE X PER FEMA FLOOD INSURANCE RATE MAP PANEL 0385G WHICH BEARS AN EFFECT DATE OF AUGUST 15, 2019 AND MAP NUMBER 448167C0385G; MAP REVISED AUGUST 15, 2019. BASE FLOOD ELEVATION = 14.7.
- SIDEWALKS WILL BE CONSTRUCTED ALONG ALL STREET FRONTAGES BY THE BUILDER AT THE TIME OF HOME CONSTRUCTION.
- A ONE-FOOT RESERVE DEDICATED TO THE PUBLIC IN FEE AS A BUFFER SEPARATION BETWEEN THE SIDE OR END OF STREETS IN SUBDIVISION PLATS WHERE SUCH STREETS ABUT ADJACENT ACREAGE TRACTS, THE CONDITIONS OF SUCH DEDICATION BEING THAT WHEN THE ADJACENT PROPERTY IS SUBDIVIDED BY A RECORDED PLAT, THE ONE-FOOT RESERVE SHALL THEREUPON BECOME VESTED IN THE PUBLIC FOR STREET RIGHT-OF-WAY PURPOSES AND THE FEE TITLE THERETO SHALL REVERT AND REVEST IN THE DEDICATOR, HIS HEIRS, ASSIGNS, OR SUCCESSORS.
- DEVELOPER SHALL BE RESPONSIBLE FOR CONSTRUCTION OF SIDEWALKS ALONG ALL VICTORY SPRINGS BOULEVARD STREET FRONTAGE (NOT INCLUDING LOTS) AND RESERVES.
- ALL RESERVES, INCLUDING LANDSCAPING SHALL BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION.
- THIS BOUNDARY OF THIS PLAT IS LOCATED WITHIN GALVESTON COUNTY MUD NO. 68.
- APPROVAL OF THE FINAL PLAT SHALL EXPIRE AT THE EXPIRATION OF A PERIOD OF SIX MONTHS FROM THE DATE OF SUCH APPROVAL UNLESS THE FINAL PLAT SHALL HAVE BEEN SUBMITTED FOR APPROVAL PRIOR TO THE EXPIRATION OF SUCH SIX MONTH PERIOD.
- THIS PLAT IS SUBJECT TO A WATER LINE EASEMENT AS SET FORTH AND RECORDED UNDER GALVESTON COUNTY CLERK'S FILE NO. 2019010225.

CALL 5.0 ACRES
C.F. NO. 8600357
O.P.R.R.P.G.C.

RESERVE TABLE		
A	RESTRICTED RESERVE "A" LANDSCAPE/OPEN SPACE	0.2139 AC. 9,317 SQ. FT.
B	RESTRICTED RESERVE "B" LANDSCAPE/OPEN SPACE	0.0713 AC. 3,106 SQ. FT.
C	RESTRICTED RESERVE "C" LANDSCAPE/OPEN SPACE	0.0672 AC. 2,925 SQ. FT.
D	RESTRICTED RESERVE "D" LANDSCAPE/OPEN SPACE	1.1921 AC. 51,929 SQ. FT.
E	RESTRICTED RESERVE "E" LANDSCAPE/OPEN SPACE	1.3072 AC. 56,941 SQ. FT.
TOTAL:		2.8517 AC. 124,218 SQ. FT.

5 ACRES
JEROME GEORGE
KALUZA
C.F. NO. 2020004069
O.P.R.R.P.G.C.

87.05 ACRES
M/I HOMES OF HOUSTON, LLC
C.F. NO. 2020049570
O.P.R.R.P.G.C.



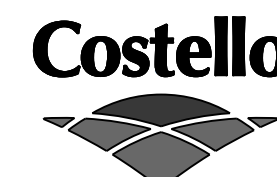
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VOLUME 18, PAGE 760, G.C.M.R.

42 LOTS 3 BLOCKS 5 RESERVES

SCALE: 1"=60' DATE: DECEMBER, 2021

ENGINEER/SURVEYOR:



DEVELOPER:

KB HOME LONE STAR INC.,
A TEXAS CORPORATON

11314 RICHMOND AVE.
HOUSTON, TX 77082

PLANNER:

7GEN PLANNING
Planning and Landscape Architecture
2107 CITYWEST BOULEVARD, 4TH FLOOR
Houston, Texas 77042
(713) 343-0394 (713) 783-3580, Fax

COSTELLO, INC.
Engineering and Surveying
2107 CITYWEST BOULEVARD
3RD FLOOR
HOUSTON, TEXAS 77042
(713) 783-7788 FAX: 783-3580
TBPE FIRM REGISTRATION NO. 280
TBPLS FIRM REGISTRATION NO. 100486



CITY COUNCIL AGENDA FORM

Meeting Date: 06-27-2022
Prepared by: Kyle Hunter
Department: OEM

Agenda item: _____
Reviewed by: _____

AGENDA ITEM DESCRIPTION: Informational item to make the Council aware of a Request for Proposals - Disaster Debris Monitoring and Consulting Services

X

ATTACHMENTS FOR REFERENCE

1. RFP

STAFF BRIEFING:

HISTORY: As we are in Hurricane season already we are reviewing all of our contracts and are in need of a Disaster Debris Monitoring and Consulting Service to handle debris pickup and paperwork for FEMA reimbursement if a disaster were to hit the City of La Marque

TARGET IMPLEMENTATION: June 23, 2022

SIGNIFICANT ACTION DATES:

ISSUANCE OF RFP: June 23, 2022

PRE-PROPOSAL CONFERENCE: 10 AM June 28, 2022

DEADLINE FOR QUESTIONS: 2 PM June 30, 2022

SUBMITTAL DEADLINE: 10 AM July 7, 2022

ACTION:

- | | |
|--|---|
| ☐ Ordinance | ☐ Resolution |
| ☐ Special Presentation | ☐ Proclamation |
| ☐ Finance Report | ☐ Public Hearing |
| ☐ Municode Codification | |
| ☒ Mark if this item does not conflict with any Resolution, Ordinance or City Charter, policies, procedures | |

Cost Details:

Budgeted	
Actual Bid	
Estimated Expenditure	
Acct. Name(s)	
Line Items #	
Other Funding	

STAFF'S RECOMMENDATION:

FISCAL IMPACT:



City of La Marque

REQUEST FOR PROPOSAL

Proposal Reference Number: RFP# 22-01

Project Title: Debris Management, Monitoring, and Consulting Services

Proposal Closing Date: 10:00 A.M.(CST), Thursday, July 7, 2022

No Proposals submitted after the above deadline will be accepted.

KEY EVENTS SCHEDULE

PROJECT NAME:	Debris Management, Monitoring, and Consulting Services
ISSUANCE OF RFP	June 24, 2022
PRE-PROPOSAL CONFERENCE:	10:00 A.M (CST), Tuesday, June 28, 2022 Via zoom: https://us06web.zoom.us/j/83044324912?pwd=NUNJYzVaQVFwdlNNbHAYMXczZ1Q1QT09 There will be registration at the pre-proposal meeting. The pre-proposal conference will allow all Proposers an opportunity to ask representatives relevant questions and clarify provisions of this RFP.
DEADLINE FOR QUESTIONS:	2:00 P.M (CST), Thursday, June 30, 2022 All questions will be answered in the form of an addendum, after the question deadline. All questions related to this RFP are to be directed to the following link: Upload Questions Here
SUBMITTAL DEADLINE:	10:00 A.M (CST), Thursday, July 7, 2022
SUBMITAL REQUIREMENT:	Electronic submittals required Upload Submittal Here
CITY OF LA MARQUE COUNCIL AWARD:	A final determination will be made at a future City of La Marque Council meeting. City of La Marque reserves the right to reject any and all request for proposals and waive any and all formalities and conditions.
TERM OF SERVICE/PROJECT:	A one (1) year Agreement with an option to automatically renew for two (2) additional years in one (1) year increments.

REQUEST FOR PROPOSAL

TABLE OF CONTENTS

SECTION 1: INTRODUCTION

SECTION 2: NOTICE TO PROPOSER

SECTION 3: SCOPE OF WORK

SECTION 4: PRICING PROPOSAL

SECTION 5: APPENDICES

SECTION 6: PROPOSER'S QUESTIONNAIRE

SECTION 7: REFERENCES

SECTION 8: SUBMISSION OF PROPOSER

SECTION 9: PROPOSED SAMPLE AGREEMENT

SECTION 1

INTRODUCTION

1.1 Description of City of La Marque

The City of La Marque is strategically situated in Galveston County, approximately 15 miles south of Houston and four miles north of Galveston Island. La Marque is the second-fastest-growing city in Galveston County with an estimated population of 18,000, an area of 14.25 square miles and boasting 14.3 miles of I-45 frontage more than any other city in Galveston County. Citizens enjoy easy, breezy coastal living, abundant housing options and the security of a hurricane protection levee system. The City of La Marque is a coastal community and is vulnerable to natural and manmade disasters including but not limited to hurricanes, tornadoes, floods, oil spills, and hazardous material releases. Disasters such as hurricanes often produce large volumes of debris. Debris and damaged trees create hazardous conditions including blocked roadways/drives and obstacles to emergency vehicles. These hazards and obstacles often block routine, essential, and emergency traffic, both vehicular and pedestrian. One of the first essential steps in securing the community is the removal of hazardous debris to allow for security, emergency, and other service traffic. It is in the best interest of the Owner to enter into an agreement for a term of one year with a firm to provide debris management and monitoring services because of a disaster.

The City of La Marque located in Texas is a home rule city and is governed through a council-manager form of government.

City of La Marque's web page is located at <http://www.cityoflamarque.org>

1.2 Objective of this Request for Proposal

The City of La Marque is soliciting proposals in response to this Request for Proposal, RFP# 22-01, from qualified vendors to provide Debris Management, Monitoring, and Consulting Services (the “**Services**”). The Services are more specifically described in **Section 4** (Scope of Work) of this RFP.

City of La Marque reserves the right to award multiple Agreements as a result of this RFP if deemed to be in the best interest of City of La Marque. City of La Marque makes no representations of any kind that an award will be made as a result of this RFP.

City of La Marque is soliciting competitive sealed submissions from vendors having suitable qualifications and experience providing services in accordance with the terms, conditions and requirements set forth in this RFP. This RFP provides sufficient information for interested parties to prepare and provide submissions for consideration by City of La Marque.

1.3 Public Information

Proposer is hereby notified that City of La Marque strictly adheres to all statutes, court decisions and the opinions of the Texas Attorney General with respect to disclosure of public information.

City of La Marque strictly adheres to the Texas Public Information Act (Texas

Government Code Chapter 552.001, et seq.) and all other governing statutes, regulations, and laws regarding the disclosure of RFP information. Proposal Documents are not available for public inspection until after the Agreement is awarded. If the Proposer has notified City of La Marque, in writing, that the Proposal Document contains trade secrets or confidential information, City of La Marque will generally take reasonable steps to prevent disclosure of such information, in accordance with the Public Information Act. This is a statement of general policy only, and in no event shall City of La Marque be liable for disclosure of such information by City of La Marque in response to a request, regardless of City of La Marque's failure to take any such reasonable steps, even if City of La Marque is negligent in failing to do so.

The requirements of Subchapter J, Chapter 552, Government Code, may apply to this solicitation and the company or vendor agrees that the agreement can be terminated if the company or vendor knowingly or intentionally fails to comply with a requirement of that chapter. Vendor or company acknowledges that the solicitation is part of any resulting agreement of the solicitation.

1.4 Type of Agreement

All Proposers are hereby put on notice that if the Proposer is awarded an agreement for procurement of goods or services, City of La Marque is entering into that agreement in its governmental capacity, and not a proprietary capacity.

An award of an agreement to a vendor(s) does not guarantee the vendor(s) that City of La Marque shall issue any Purchase Order(s) for the Proposer's goods or services, or guarantee any particular volume use, number, or sales.

Vendor will be required to enter into an agreement with City of La Marque in a form substantially similar to the Proposed Sample Agreement between City of La Marque and Vendor (the "**Agreement**") attached to this RFP in Section 9 and incorporated for all purposes.

Proposers should be aware that the contents of the successful proposal will become a part of the subsequent contractual documents. Failure of the Proposer to accept this obligation may result in the cancellation of any award.

By submitting a proposal, Proposer further warrants and represents that he/she has become fully acquainted with the conditions, facts, and circumstances relating to providing the services/products required under this RFP. The failure or omission of Proposer to acquaint himself/herself with existing conditions, facts, and circumstances, shall in no way relieve him/her of any obligation with respect to his/her proposal and any ensuing agreement.

Each Proposer acknowledges that City of La Marque has made a reasonable attempt to provide the Proposer with relevant data. The Proposer, therefore, waives any right of avoidance of the agreement based upon any expressed or implied warranty or representation that the pricing or activity data provided discloses all requirements, risks or exposures known to exist in the provision of the services being requested.

An agreement shall be effective for one (1) year upon execution by the City of La Marque. This Agreement shall automatically renew for successive one-year periods under the existing terms and conditions, unless either party gives the other party written notice of non-renewal at least 30 days prior to such renewal date. The total term of this

contract cannot exceed three (3) years. The Option to Extend will not be considered if funding is unavailable or if the contractor's past performance is not within the industry standard or acceptable to the City.

1.5 Clarifications and Interpretations

Proposers shall promptly notify the City of La Marque of any omissions, ambiguity, inconsistency, or error that they may discover upon examination of this RFP. City of La Marque shall not be responsible or liable for any errors and/or misrepresentation that result from the solicitations which are inadvertently incomplete, ambiguous, inconsistent, or obviously erroneous.

City of La Marque may, in its sole discretion, respond in writing to written inquiries concerning this RFP. Only City of La Marque's responses that are made by formal written Addenda will be binding on City of La Marque. Any verbal responses, written interpretations, or clarifications other than Addenda to this RFP will be without legal effect. All Addenda issued by City of La Marque prior to the Submittal Deadline will be and are hereby incorporated as a part of this RFP for all purposes.

Proposers are required to acknowledge receipt of each Addendum as specified in this Section. The Proposer must acknowledge all Addenda by completing, signing, and returning the Addenda Checklist. The Addenda Checklist must accompany the Proposer's proposal. Addenda, if any, will be posted on City of La Marque's website.

1.6 Proposal Evaluation Process

The evaluation of the Proposals shall be based on the requirements and percentages described in **Section 2.2** of this RFP. All properly submitted Proposals will be reviewed, evaluated, and ranked by City of La Marque.

An award of an agreement to provide the goods or services specified herein will be made using competitive sealed proposals, in accordance with Chapter 252 of the Texas Local Government Code and with the City of La Marque's purchasing policy. All proposals submitted by the Submittal Deadline, accompanied by the number of completed and signed originals that are required by this RFP, will be opened publicly to identify the name of each Proposer submitting a proposal. Any proposals that are not submitted by the Submittal Date, or that are not accompanied by the number of completed and signed originals by this RFP, will be rejected by City of La Marque as non-responsive due to material failure to comply with advertised specifications.

If the Proposal Document is incomplete or otherwise fails to conform to the requirements of the RFP, City of La Marque alone will determine whether the variance is so significant as to render the Proposal non-responsive. After the opening of the proposals and upon completion of the initial review and evaluation of the proposals, City of La Marque may invite one or more selected Proposers to participate in oral presentations. City of La Marque will use commercially reasonable efforts to avoid public disclosure of the contents of a proposal prior to selection of Vendor.

Discussions may not be initiated by proposers. These discussions will be limited to issues and topics brought forth by the City of La Marque. Any attempt by proposer or vendor at deviating from the issues and topics to discuss other issues and topics concerning the Proposal brought forth by the City of La Marque shall be grounds for disqualification. Vendors shall not contact any City of La Marque personnel during the proposal process without the express permission

from the City of La Marque's City Clerk.

City of La Marque may make the selection of Vendor on the basis of the proposals initially submitted, without discussion, clarification or modification. In the alternative, City of La Marque may make the selection of Vendor on the basis of negotiation with any of the Proposers. In conducting such negotiations, City of La Marque will use commercially reasonable efforts to avoid disclosing the contents of competing proposals.

At City of La Marque's sole option and discretion, City of La Marque may discuss and negotiate all elements of the proposals submitted by selected Proposers within a specified competitive range. For purposes of negotiation, City of La Marque may establish, after an initial review of the proposals, a competitive range of acceptable, or potentially acceptable, proposals composed of the highest rated proposal(s). In that event, City of La Marque will defer further action on proposals not included within the competitive range pending the selection of Vendor; provided, however, City of La Marque reserves the right to include additional proposals in the competitive range, if deemed to be in the best interests of City of La Marque.

After submission of a proposal, but before final selection of Vendor is made, City of La Marque may permit a Proposer to revise its proposal in order to obtain the Proposer's **best and final offer (BAFO)**. In that event, representations made by Proposer in its revised proposal, including price and fee quotes, will be binding on Proposer.

If only one bid or proposal is received in response to the Request for Proposal/Bid, a detailed cost proposal may be requested of the single vendor. A cost/price analysis and evaluation and/or audit may be performed of the cost proposal in order to determine if the price is fair and reasonable.

All correspondence relating to this proposal, from advertisement to award, shall be sent to the City of La Marque's City Clerk's Office. All presentations and/or meetings between City of La Marque and the vendor relating to this proposal shall be coordinated by City of La Marque City Clerk's Office. City of La Marque reserves the right to determine which proposal provides City of La Marque with the best value and which will be in the City of La Marque's best interest.

City of La Marque reserves the right to (a) enter into an agreement for all or any portion of the requirements and specifications set forth in this RFP with one or more Proposers, (b) reject any and all proposals and re-solicit proposals, or (c) reject any and all proposals and temporarily or permanently abandon this selection process, if deemed to be in the best interests of City of La Marque. Proposer is hereby notified that City of La Marque will maintain in its files concerning this RFP a written record of the basis upon which a selection, if any, is made by City of La Marque.

1.7 City of La Marque's Reservation of Rights

City of La Marque may evaluate the Proposals based on the anticipated completion of all or any portion of the Project. City of La Marque reserves the right to divide the Project into multiple parts, to reject any and all Proposals and re-solicit for new Proposals, or to reject any and all Proposals and temporarily or permanently abandon the Project. City of La Marque makes no representations, written or oral, that it will enter into any form of agreement with any respondent to this RFP for any project and no such representation is intended or should be construed by the issuance of this RFP. Acceptance of a Proposal for consideration does not waive this reservation of rights, nor does it imply any obligation by City of La Marque.

City of La Marque reserves the right to award one agreement for some or all the requirements proposed or award multiple agreements for various portions of the requirements to different Proposers.

If the best proposer's Proposal is significantly unbalanced either in excess of or below reasonable cost analysis values normally associated with the work, the Proposal will be considered as non-responsive and will not be considered for award. City of La Marque reserves the right to evaluate and determine the next qualified Proposal for consideration of Award.

1.8 System for Award Management (SAM.GOV)

All vendors contracting with City of La Marque may be required to register or have an active registration with the System for Award Management (SAM.gov). Registration is free. The System for Award Management (SAM) is the official registration required prior to bidding on a contract with any federal government agency, including local governments who receive federal funds. Registration must be completed prior to contract award by City of La Marque Council. Registering online is accomplished on the SAM website here: <https://sam.gov/content/home>

1.9 No Reimbursement for Costs

Proposer acknowledges and accepts that any costs incurred from the Proposer's participation in this RFP shall be at the sole risk and responsibility of the Proposer. Proposer understands and agrees that (1) this RFP is a solicitation for proposals and City of La Marque has made no representation written or oral that one or more agreements with City of La Marque will be awarded under this RFP; (2) City of La Marque issues this RFP predicated on City of La Marque's anticipated requirements for the Services, and City of La Marque has made no representation, written or oral, that any particular scope of services will actually be required by City of La Marque; and (3) Proposer will bear, as its sole risk and responsibility, any cost that arises from Proposer's preparation of a proposal in response to this RFP.

1.10 RFP Withdrawals and/or Amendments

City of La Marque reserves the right to withdraw this RFP for any reason. City of La Marque reserves the right to amend any aspect of this RFP by formal written Addendum prior to the Proposal submittal deadline.

1.11 Tax Exempt Status

City of La Marque purchases are exempt from State Sales Tax and Federal Excise Tax. Do not include tax in the proposal. City of La Marque will furnish Excise Tax Exemption Certificate upon request.

1.12 Compliance with House Bills 13, 19, 89 and Texas Government Code Chapter 2252, Section 2252.152 and Section 2252.152.

City of La Marque Requires Proposer to verify that they are in-compliance with House Bills and Texas Government Codes. Refer to **Section 5** for these documents

1.13 Proposal Validity Period

Once the submittal deadline has passed, any proposal Document shall constitute an irrevocable proposal to provide the commodities and/or services set forth in the Scope of

Services at the price(s) shown in the Proposal Document. Such proposal shall be irrevocable until the earlier of the expiration of ninety (90) days from the submittal deadline, or until an agreement has been awarded by the City of La Marque.

1.14 Equal Opportunity Employer

City of La Marque is an equal opportunity employer and does not discriminate in awarding agreements or employment of persons because of their race, sex, age, religion, national origin, veteran, disabled or handicap status or any other characteristic protected by law. City of La Marque requires companies with which it conducts business to be equal opportunity employers and comply with all applicable federal, state, and municipal laws and regulations regarding contracting and employment practices.

1.15 Conflict of Interest Questionnaire (Form CIQ)

A person or business, and their agents, who seek to contract or enter into an agreement with City of La Marque, are required by Texas Local Government Code, Chapter 176, to file a conflict-of-interest questionnaire (FORM CIQ) which is found in **Section 5**. The form must be filed with the City of La Marque City Clerk no later than seven (7) days after the date the person or business begins agreement discussions or negotiations with City of La Marque, or submits an application, response to a request for proposals or proposals, correspondence, or other writing related to any potential agreement with City of La Marque. If no conflict exists, the proposer must mark the form Not Applicable or NA and return with the proposal packet.

1.16 Disclosure of Interested Parties Form 1295

A person or business, who enters into an agreement with City of La Marque, meeting the conditions according to Texas Local Government Code Sec. 2252.908, is required to file Form 1295 with Texas Ethics Commission. **This form is not required unless there is an agreement between the vendor and the City of La Marque. Do not submit this form unless you receive an award letter from City of La Marque.**

https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

1.17 Protest Procedure

Any actual or prospective proposer who is allegedly connected with the solicitation or award of an offer may protest. The protest will be submitted in writing to the City of La Marque's City Clerk's Office within three working days after such aggrieved person knows of or should have known of the facts giving rise thereto. If the protest is not resolved by mutual agreement, the City Clerk's Office will promptly issue a decision in writing, via electronic mail, to the protesting person.

- i. All protest lodged by potential or actual bidders, contractors or proposers must be made in writing, via electronic mail, and contain the following information:
 - a) Name, address, and telephone number of the protestor.
 - b) Identification of the solicitation or agreement number and time.
 - c) A detailed statement of the protest's legal and factual grounds, including copies of relevant documents.
 - d) Identification of the issue(s) to be resolved and statement of what relief is requested.
 - e) Arguments and authorities in support of the protest.
 - f) A statement that copies of the protest have been delivered, via electronic mail, to all interested parties in the invitation to bid or request for proposals process.

- ii. In the case of request for proposals, the City of La Marque City Clerk shall ask the protester deliver, via electronic mail, the protest to relevant parties.
- iii. The City of La Marque's City Manager has the authority to render the final determination regarding the protest. Any determination rendered by the City of La Marque's City Manager will be final.

1.18 Pursuant to Sec. 2-341 of the City of La Marque Code – Declaration of Policy

- A. It is the policy of City of La Marque to stimulate growth of local minority and women-owned business enterprise (M/WBE) by encouraging their participation in all phases of its contract and procurement activity and by affording them the opportunity to compete for all City of La Marque contracts. The purpose and objectives of this article are to:
 - i. Increase the capacity of local M/WBE's to provide products and services.
 - ii. Increase the opportunities for local M/WBE's to expand their business with City of La Marque and other public and private sector business entities.
- B. Provided, however, nothing herein shall require City of La Marque to award contracts for services or procurements to a M/WBE which is not also the lowest responsive and responsible Proposer and otherwise qualified unless City of La Marque may otherwise lawfully award the contract to someone other than the lowest responsive, responsible Proposer.
- C. Additionally, City of La Marque has a Disadvantaged Business Enterprise, (DBE) program mandated by the US Department of Transportation, which is part of its M/WBE program.

SECTION 2

NOTICE TO PROPOSER

2.1 Submittal Deadline

City of La Marque will accept proposals submitted in response to this RFP until **10:00 A.M (CST), Thursday, July 7, 2022.**

2.2 Criteria for Selection

Proposer is encouraged to propose terms and conditions offering the maximum benefit to City of La Marque in terms of:

Scoring Criteria:

2.2.1.1 Cost of Work.....	(40%)
2.2.1.2 Experience.....	(30%)
Safety	(20%)
Methodology	(10%)

An evaluation team from City of La Marque will evaluate proposals. The evaluation of proposals and the selection of Vendor will be based on the information provided by Proposer in its proposal. City of La Marque may give consideration to additional information, if City of La Marque deems such information relevant.

SECTION 3

Scope of Work

3.1 Project Title: Debris Management, Monitoring, and Consulting Services

3.2 Questions:

Questions about the technical nature of the Scope of Services will be directed to the following: [Upload Questions Here](#)

3.3 Special Conditions

This solicitation contains federally mandated clauses, which require acknowledgement of the offeror and are considered part of the contract between the City of La Marque and the awarded vendor.

3.4 Brand Manufacture Reference

City of La Marque has determined that any manufacturer's brand defined in the Scope of Services meets the City of La Marque's product and support need. The manufacturer's reference is not intended to be restrictive and is only descriptive of the type and quality City of La Marque desires to purchase. Quotes for similar manufactured products of like quality will be considered if the Proposal is fully noted with the manufacturer's brand name and model. City of La Marque reserves the right to determine products and support of equal value, and whether other brands or models meet the City of La Marque's product and support needs.

3.5 Scope of Work – Requirements

Section I Project Summary

This Request for Proposals (RFP) invites submittals from experienced firms for the provision of Debris Management, Monitoring, and Consulting Services ("Disaster Debris Monitoring Contract") services in City of La Marque, Texas, immediately after a hurricane, tornado, flooding event, or other natural, technological, or human-caused disaster. The objective of the RFP and subsequent contracting activity is to secure the services of a capable and experienced firm ("contractor") who is (1) capable of efficiently monitoring the removal of large volumes of disaster-generated waste from a large area in a timely and cost-effective manner. The City intends to enter into a pre-positioned contract with one (1) Primary Contractor and (1) Secondary contractor who may utilize both local and non-local resources to provide services in the event of activation by the City following a hurricane, tornado, flooding event, or other natural, technological, or human-caused disaster. The Contractor will be expected to have an initial management team mobilized to City of La Marque within 24 hours of receipt of the Notice to Proceed and to have mobilized all appropriate equipment and personnel to the City of La Marque area within 48 hours of receipt of the Notice to Proceed. The City reserves the right to enter into contracts with more than one Primary Contractor in the event that no one firm can provide all of the necessary services.

A. Introduction

The City of La Marque is strategically situated in Galveston County, 15 miles south of Houston and four miles north of Galveston Island. La Marque is the second-fastest-growing

city in Galveston County with an estimated population of 18,000, an area of 14.25 square miles and boasting 14.3 miles of I-45 frontage—more than any other city in Galveston County. Citizens enjoy easy, breezy coastal living, abundant housing options and the security of a hurricane protection levee system. The City of La Marque is a coastal community and is vulnerable to natural and manmade disasters including but not limited to hurricanes, tornadoes, floods, oil spills, and hazardous material releases. Disasters such as hurricanes often produce large volumes of debris. Debris and damaged trees create hazardous conditions including blocked roadways/drives and obstacles to emergency vehicles. These hazards and obstacles often block routine, essential, and emergency traffic, both vehicular and pedestrian. One of the first essential steps in securing the community is the removal of hazardous debris to allow for security, emergency, and other service traffic. It is in the best interest of the Owner to enter into an agreement for a term of one year with a firm to provide debris management and monitoring services because of a disaster.

The Disaster Debris Monitoring Contract will encompass the entire City of La Marque. The City of La Marque's disaster recovery planning includes considerations for removing and processing the volumes and types of debris and wastes expected to be generated by a major disaster such as a following a hurricane, tornado, flooding event, or other natural, technological, or human-caused disaster that encompasses the procedures for disposing of that material. The planning approach is formulated in part on the concept of strategic pre-positioning of the agreements and resources necessary for timely, coordinated recovery operations, including removal of debris and wastes from public property and rights-of-way throughout the City using city-owned and Contractor forces.

The Contract(s) to be awarded for this project will be a unit price contract with all associated costs included in the unit price. The City of La Marque anticipates a certain level of initial work to establish the procedures for integrating the work into the City's continuing disaster recovery program planning, along with potential costs for maintaining the program over a period of time. The City of La Marque anticipates that the bulk of the services to be provided, especially monitoring of debris/waste removal operations, will be provided on an incident specific basis with anticipated costs identified by a joint City/Contractor team as part of the initial program planning. In addition, the Primary Contractor(s) selected for the project will be required to participate in certain City directed disaster recovery training and/or exercises at no additional cost to the City.

B. Planning Standard for Debris Management, Monitoring, and Consulting Services

The City has selected a catastrophic hurricane that impacts the entire City causing large amounts of vegetative and construction and demolition debris as its planning standard. The estimated debris volume is 1.00 million cubic yards. This is strictly a planning figure for estimating potential removal and disposal needs; it is not a fixed quantity for the purpose of contractual obligations. The actual volume of debris may be greater than or less than the planning volume, and probably will be considerably less. The City's goal is to complete the debris/waste removal and disposal process in 180 days. This assumes that the entire area of the City will be accessible within that period. Due to the potential for flooding, some areas might not be accessible for some time after a major natural disaster. The Contractor must be aware that it might not be possible to initiate operations in all parts of the City simultaneously immediately after a storm.

C. Disaster Debris Monitoring Requirements

Planning for post-disaster cleanup operations is a function of the City of La Marque Public Works Department in conjunction with other City Departments. The debris management operations will be carried out under the cognizance of the City of La Marque Office of Emergency Management in conjunction with other City

Departments. The City will select one primary contractor from the three pre-authorized Contractors for debris removal operations Citywide. This selected debris contractor will also be responsible, under certain conditions, for removal of hazardous and toxic/hazardous waste associated debris such as construction and demolition debris, vegetative debris and other disaster associated debris caused by the disaster. That contractor is responsible for: (1) clearing roadways, (2) removing debris and certain waste from roadways, public right-of- ways, and public property, (3) operating Temporary Debris Management Sites, (4) volumetric reduction of debris, and ultimate disposal of the debris and waste. The general concept of disaster debris/waste removal operations includes multiple, scheduled passes of each populated area and each right-of-way directed. This will allow citizens to return to their properties and bring materials to the right-of- ways as recovery progresses. The City will prescribe the specific procedures to be followed after ascertaining the scope and nature of the disaster's impacts. Curbside segregation of debris and disaster- generated or related wastes will be an element of the City's disaster recovery program. The debris management Contractor will be required to aid in the segregation and waste stream management processes. Any hazardous materials and/or industrial wastes encountered by the debris removal Contractor will be set aside for collection and disposal by the Contractor's properly trained and equipped removal team. The City will pre-designate three Temporary Debris Management Sites (TDMS) for the sole purpose of the temporary staging and reduction of clean woody debris and construction and demolition materials. The City will also help to identify the public and private landfills that will be used for disposal of storm generated debris. The Monitoring Contractor will be expected to provide debris monitoring services at each TDMS and landfill as well as in the field during clearing, loading and hauling operations. The Monitoring Contractor will be responsible for monitoring all of the Debris Management operations during the course of the recovery/cleanup period.

D. Contract Activation

The Monitoring Contractor holding the Disaster Debris Monitoring Contract will serve as a general Contractor for the purpose of the specified services, and will be able to use his/her own and Subcontractor resources to meet the obligations of the contract. The Contractor will be expected to use fully qualified and properly equipped local firms and personnel to the maximum extent practicable. Subcontracting will be limited to one tier below the Primary Contractor's Subcontractor. When a major disaster occurs or is imminent, City of La Marque will contact the firm(s) holding the Disaster Debris Monitoring Contract(s) to advise them of the City's intent to activate the contract.

Personnel and equipment must be in place, fully prepared for the specified services and able to begin operations within 48 hours of the Contractor's receipt of the Notice to Proceed.

Section II Scope of Work

The following is envisioned as the scope of work for the project and should be considered when preparing your proposal. Nothing in this description shall be construed to limiting the potential scope or types of work that a potential Contractor may address in your proposal. Respondents should address all services which, on the basis of their experience, are deemed necessary to achieving the City's debris management goals.

A. Monitoring

The Contractor shall provide all expertise, effort, personnel, materials, and equipment necessary for monitoring and documenting the removal and lawful disposal of debris and other wastes generated by natural, technological, or human-caused disasters that impact City of La Marque, Texas. Specifically, the Contractor will be responsible for

monitoring debris and waste removal and disposal operations performed by the City's Debris Management operations relative to:

- 1) City streets, roads and right-of-ways;
- 2) Streets, roads and right-of-ways of all municipalities and communities, incorporated and unincorporated, and rural areas within the City, unless otherwise directed by the City of La Marque Office of Emergency Management or City Designee;
- 3) Canals, navigable body of water, and rights-of-way of all municipalities and communities, incorporated and unincorporated, and rural areas within the City, unless otherwise directed by the City of La Marque Office of Emergency Management or City Designee;
- 4) Public property and facilities;
- 5) Any other public site as may be directed by the City; and
- 6) Private property when necessary to protect the public (life safety) or to facilitate completion of required work, provided that entry onto private property is specifically authorized by the Office of Emergency Management in conjunction with City personnel.

Services shall be performed on an "as needed basis" when directed by the City of La Marque Office of Emergency Management. The Office of Emergency Management will provide guidance and direction on priorities and specific needs for the monitoring operations. The Contractor, in concert with Emergency Management, shall determine the method and manner of monitoring the removal and disposal of debris that provide the greatest economy of operations and cost to the City. The Contractor shall then provide for the cost-effective and efficient monitoring of materials accumulated or deposited on public property, as described above and the removal and final disposal of those materials. The Contractor will be expected to provide all personnel, equipment, forms, record keeping materials, supplies and other resources necessary to carry out the specified services and to provide ongoing and periodic reports to the City for its use in providing documentation to State and Federal officials pursuant to Federal reimbursement of eligible recovery costs. The Contractor must be fully cognizant of all pertinent Federal (FEMA, U.S. Army Corps of Engineers, etc.) and State of Texas documentation requirements and procedures and be prepared to assist the City staff in compiling and managing information and data necessary for those purposes. Prior to initiating work under this project, the Contractor shall present to the City of La Marque Office of Emergency Management or designee for review and discussion a General Operations Plan and sufficient supporting documentation to adequately describe all planned actions for monitoring the removal, handling, and eventual disposal of disaster-generated debris and wastes. The Contractor shall agree to execute this plan, with all manners of contingencies recognized, upon being authorized by the City to begin work.

When identifying resources to be made available under this contract, the Contractor must use a planning standard approach. Specifically, the Contractor shall identify the expected sources and quantities of debris and other wastes that are expected to be encountered and the anticipated level of operational resources (personnel, equipment, TDMS operations, etc.) that will be deployed by the Debris Management contractor. The Contractor must then identify sufficient monitoring resources (personnel, equipment, materials, etc.) to ensure the availability of personnel and equipment to initiate all required activities within 48 hours of being so directed. For this purpose,

identification of contractor/sub-contractor(s) and a general equipment/personnel inventory will suffice. The Contractor will be responsible for coordinating operations in such a manner as to least interfere with the work of the Debris Management Contractor, damage assessment teams, local utility company crews and other recovery operations forces. Such coordination shall be effected through communications with the City of La Marque Office of Emergency Management, his/her authorized representatives, or other City of La Marque designated personnel when so authorized by the City. To the extent authorized by the City of La Marque Office of Emergency Management or designee, the Contractor shall coordinate monitoring operations directly with the City's Debris Management Contractor when necessary to achieve effective and efficient integration of forces. The Contractor shall provide reports, summaries, and analyses of daily activities associated with the debris and waste removal and disposal operations in the form and frequency specified by the City of La Marque Office of Emergency Management, upon issuance of the authorization to proceed. The Contractor shall be prepared to advise the City of La Marque Office of Emergency Management and other local officials of the types, scopes, forms, and formats of data and information required by Federal and State agencies and shall provide all pertinent documentation in a manner that satisfies those agencies' requirements.

Section III Response Requirements

A. Qualification Requirements

- 1) Contractor must have specific experience providing the specified services following a natural disaster.

Provide statement detailing your experience.

B. Contracting Requirements

- 1) Successful Contractor must, upon award of a contract, secure a Performance and Payment Bond valid for one year and automatically renewed annually for the full term of the contract.
- 2) Bonds will be required. See the Section titled "BONDS" herein.
- 3) Successful Contractor must perform as an independent contractor and, as such, must have and maintain complete control over all of its employees and operations. Provide a statement of intent.
- 4) Successful Contractor must not assign, sublet, or transfer its interest or obligations of this project.

C. Use of Subcontractors

- 1) Contractor may use Subcontractors for this project. Please list Subcontractors proposed for this project and their respective duties.
- 2) No Subcontractor may provide services unless the City consents. The Contractor shall be responsible for completing all contract work even if a Subcontractor has assumed responsibility to complete certain work. Also, the Contractor shall be responsible for the actions and performance of all Subcontractors. Furthermore, the Contractor agrees that any subcontract for this project will include the same mandatory insurance requirements in favor of the City as are specified in the City's contract with the Contractor, unless Contractor provides such coverage for his/her Subcontractors. However, all subcontractors must provide their own Workers' Compensation Insurance per State law. Subcontractor certificates of insurance and endorsements must be collected by the Contractor and made available for City Contract Administrator review upon request. Provide statement of compliance.

D. Experience

Answer the following either as part of the Questionnaire Section or with in your proposal:

- 1) Describe Contractor's overall experience performing large-scale debris removal monitoring and work similar to this project.
- 2) Describe Contractor's experience during the last 5 years performing large-scale projects or other work similar to this project. The Contractor must identify similar projects that he/she successfully completed, including date and location, nature of work, value of the contract, and the name and telephone
- 3) Provide number of the customer's point of contact for reference purposes.
- 4) Describe Contractor's most recent experience in mobilizing large workforces under routine and emergency conditions.
- 5) If the Contractor intends to use Subcontractors to assist in the work, the Contractor shall also identify similar work successfully completed by the Subcontractors.
- 6) Document Contractor's ability to provide appropriate training for personnel that will be employed for work under this project.

E. General Project Requirements

Submittals must acknowledge these basic requirements and include responses in the proposal:

- 1) City of La Marque intends to engage a Contractor to assist the City with monitoring the work of the Debris Management Contractor in the field, at Temporary Debris Management Sites (TDMS), and at disposal sites. Contract monitors are necessary to assure that the terms of the debris and waste management contracts are satisfied by the Debris Management Contractor and his subcontractors during the removal and hauling of debris/waste from public access roads, rights-of-way and public property; during handling and processing at TDMS; and, at disposal sites. Monitors

will be assigned to debris loading areas, TDMS, and disposal sites. In addition, roving monitors will be assigned to help verify that the City's debris management plan and contracts are effectively and efficiently executed.

2) The City of La Marque will assign a Debris Manager (DM) and will establish a Debris Management Center or other operational group setting to provide overall coordination of recovery operations. The Debris Manager will be the primary point of contact for the Contractor and will resolve contract administration issues and disputes. The Monitoring Services Contractor is to provide expertise for and assistance to the City's Debris Manager and also assists City staff at the Debris Management Center in overseeing and documenting the debris management operations. Services are to be provided in these general task areas, but are not necessarily limited to these task areas:

- a. Development of a Monitoring Plan;
- b. Truck and trailer measurement, certification, marking and tracking;
- c. Equipment registry and tracking;
- d. Debris/waste management workforce registry and tracking;
- e. Field monitoring;
- f. Debris management tracking;
- g. Trip ticket management;
- h. Data administration;
- i. Invoice reconciliation;
- j. QA/QC program management;
- k. Complaint resolution;
- l. Detailed daily reports on the status, effectiveness, volumes handled, and other pertinent data for all debris operations;
- m. All monitoring workforce requirements, including but not limited to staffing, training, equipment, Safety training and enforcement, mobilization, transportation and logistic support;
- n. Site Safety Plan preparation and maintenance;
- o. Compliance with all applicable Federal, State and local rules relative to the monitoring operations;
- p. Preparation of documentation to support Federal cost reimbursement processes;
- q. Related activities for effective and efficient debris management operations deemed necessary or desirable on the basis of the Contractor's experience when authorized by the City Debris Manager.

F. Project Approach

- 1) Provide a synopsis of the Contractor's depth of knowledge of the project's scope and special requirements as the Contractor perceives them.
- 2) Provide a general description of the Contractor's intended approach to the work. That description must include a statement of the requirements as Contractor perceives them, resource mobilization strategy, and general field operations strategy. Exceptions to the project work as described by the City must fully be explained.

- 3) Provide a brief summary of the Project Work Plans (Field Operations, Communications, Work Site Safety, etc.) that will be developed for the project.
- 4) Describe frequency and nature of meetings anticipated or deemed necessary to address project requirements.

G. Workforce Information

- 1) Respondents are encouraged to review City of La Marque's pre-positioned Debris Management RFP to ascertain the anticipated scope of work in order to estimate the nature and size of the project workforce that will be required.
- 2) Submittals must acknowledge these workforce planning standards and must demonstrate the respondent's ability to satisfy these requirements:
 - i. Within 24 hours of notification, the Contractor shall provide a sufficient number of professionals and qualified personnel to meet all contract requirements and monitoring needs associated with this project, including, as a minimum forces necessary to:
 - a. Establish and staff a monitoring workforce management center in the vicinity of a City of La Marque government office designated by the City at the time of notification.
 - ii. Implement a debris/waste contractor equipment and workforce registration and tracking program.
- 3) All personnel shall be a minimum of 18 years of age, be fluent in the English language and have a valid driver's license issued in the United States. The Contractor will be required to increase its staffing from this point depending on the scope of the debris/waste removal operations, to be consistent with the number of field operations teams deployed by the Debris Removal Contractors. At the discretion of the Debris Manager, the Contractor may be required to replace any debris monitor for cause. As part of this proposal, the Contractor must indicate and explain how he/she will ensure the availability of a sufficient number of personnel to support this scope of work and also how additional personnel will be engaged should the scope of operations require additional monitors to meet City needs.
- 4) The Contractor shall provide all debris monitors with appropriate personal protective equipment to include, but not be limited to, eye protection, hearing protection, safety shoes, safety vests, hard hats, and wet weather clothing, to comply with all applicable Federal, state and local occupational health and safety requirements.
- 5) The Contractor shall provide debris monitors with necessary transportation, all communications equipment (cell phone, satellite phones, radio, etc.) necessary to remain in contact with their supervisors or other

key personnel who in turn are in direct contact with the Debris Management Center. The Contractor shall also provide all required logistical support for the personnel he/she engages, including lodging, meals and other necessary support services. The Contractor's supervisory personnel will be wholly responsible for support the Contractor's operations and resolving conflicts within the scope of or in any way associated with those operations.

- 6) The Contractor shall provide temporary office space and other facilities as necessary to carry out the scope of the work and to support the Contractor's workforce.
- 7) Upon activation of the contract, the Contractor shall immediately contact the City's Debris Manager to coordinate workforce assignments. It is anticipated that the City's debris management Contractor will establish debris management zones within the City and the Contract will be expected to assign monitors in a manner consistent with the debris removal operations.
- 8) In the proposal, respondents must provide a detailed description of the resources (workforce and equipment) available to be employed on the project, including:
 - a. Summary of the Respondent's personnel that will be dedicated to the project, including:
 - i. The number of management employees that will be assigned to the contract, their job titles, and responsibilities;
 - ii. The names of and resumes for all members of the Project Management Team;
 - iii. The name of the Respondent's claims representative;
 - iv. List of the Subcontractors with whom the Respondent has agreements for post-disaster support.
- 9) Within 48 hours of notification, the Contractor shall provide a sufficient number of professionals and qualified personnel to meet all contract requirements and monitoring needs associated with this project, including, as a minimum forces necessary to:
 - a. Monitor a minimum of 30 debris loading sites;
 - b. Monitor operations at Temporary Debris Management Sites (TDMS);
 - c. Monitor dumping operations at disposal sites;
 - d. Provide roving debris monitors to evaluate the effectiveness of debris, hazardous material and other disaster-related waste removal.

H. Capability, Capacity, and Availability

- 1) Describe how Contractor intends to maintain its capability, capacity, and availability of forces to respond if activated by the City following a natural, technological, or human-caused disaster. Knowing that the Contractor may

have similar contracts in other geographic areas, describe how Contractor will satisfy all contractual obligations for City of La Marque simultaneously with other obligations.

- a. Provide detailed resumes for key managers with a reference number for each. Identify all participants as local or non-local and provide percentage of participation in each previous project listed above.
 - b. Identify the engineering and technical staffs who will be working on each project and include responsibility (project engineer, contractor, etc.) and designation of primary contact for City staff.
- 2) Describe how Contractor intends to complete the project in the timeframe desired by the City. Comment on how Contractor's ability to perform will be affected by a smaller and/or larger disaster event generating significantly smaller or larger volumes of hazardous wastes for removal and disposal.

I. Description of Monitoring Services

Respondent must provide a detailed description of the services that Respondent will perform upon issuance of each Notice to Proceed. The description of services shall address all elements of the work described in these specifications. In addition, the Respondent may include other services which, in the Respondent's experience, are necessary or desirable in carrying out the intent of the proposed Contract and/or achieving the City's stated goals with respect to debris management operations following a disaster.

The description of services must, at a minimum, include the following:

- 1) A detailed description of the method and manner of monitoring the removal and lawful disposal of disaster-generated debris to ensure that the Debris Management Contractors are performing in accordance with the provisions of the contracts, satisfying applicable local, State and Federal statutory and regulatory requirements and adhering to FEMA guidelines that govern the eligibility of those recovery services for Federal reimbursement of the City's costs. The information provided should demonstrate how the Respondent will satisfy the requirements of the project, including:
 - a. Scope and sequence of monitoring operations to be performed.
 - b. Manner in which volumes of debris/waste will be estimated in the field, at TDMS locations, and at landfills or disposal sites.
 - c. Methodology for monitoring the collection, tracking, and disposal of disaster related materials.
 - d. Description of the documentation, accounting, and financial processes, procedures and controls that will be utilized in managing, monitoring and accounting for the resources to be employed.

- e. Organization Chart that identifies the assignment of specific responsibilities to key personnel to ensure that all management functions are identified and an organization developed to insure that all project requirements are satisfied.
 - f. Furnishing and operating an automated/electronic (paperless) debris tracking system.
- 2) A summary of the Respondent's project approach and proposed operating procedures relative to these key elements of the project, including at a minimum:
- a. Debris Management Contractor workforce and equipment registration and tracking;
 - b. Equipment identification in the field;
 - c. Truck certification, registration, and marking;
 - d. Debris Management Contractor workforce tracking;
 - e. Document management and controls, including Load Tickets and reports;
 - f. Data collection;
 - g. Data assimilation/integration;
 - h. Employment of GIS mapping, use of GPS, and other means of documenting;
 - i. Communications with Debris Management Contractor workforce;
 - j. Assembling the data necessary to prepare the Status Reports described below:
 - Database management
 - Quality Assurance (QA) for Loading Site Monitors
 - Quality Assurance for TDMS Operations Monitors
 - Quality Assurance for Landfill Operations Monitors
 - Complaint tracking and resolution
 - Monitoring workforce health and safety training and compliance monitoring
- 3) A summary of Respondent's capability to manage data collection and provide status reports and documentation required for the project, including morning summaries from the Debris Management Contractor addressing. Reporting should include real time/near time access to the automated tracking system with geographical display:
- a. Number of crews and types and quantities equipment to be deployed that day;
 - b. Areas where crews and equipment will be assigned;
 - c. Status of TDMS operations, including volumetric reduction methods to be employed;
 - d. Changes in operational status or problems encountered since the previous report;

- e. Numbers of monitoring crews to be dispatched and locations where crews will be assigned.
- 4) And evening summaries addressing:
- a. Overall status of Debris removal operations;
 - b. Number of crews and types and quantities of equipment employed that day;
 - c. Issues or problems affecting field operations;
 - d. Complaint referrals;
 - e. Damage referrals or updates;
 - f. Monitoring issues;
 - g. TDMS issues;
 - h. Overall status of geographic area;
 - i. Numbers of monitoring crews deployed and locations where crews were assigned.
- 5) Daily reports that address the types and volumes of debris/waste collected, transported, processed, delivered to disposal sites, etc., on the previous day, broken down by:
- a. Contractor;
 - b. Other forces;
 - c. TDMS;
 - d. Community drop off site;
 - e. Disposal site;
 - f. Locations where debris/waste was collected (or 100% cleared);
 - g. GIS based maps that indicate the overall status of debris/waste removal operations.
- 6) Daily reconciliation of Debris Management Contractor's time and materials summaries, Load Ticket submittals, and invoices, including:
- a. Review invoice and backup with Debris Management Contractor;
 - b. Reconcile invoice with database records;
 - c. Provide reviewed and approved invoice to City for payment.

J. Automated Debris Tracking and Reporting Systems

Per FEMA policy document 327 Public Assistance Debris Monitoring Guide, *Recent advances in automated debris management tracking systems have provided real – time and automated tracking and reporting...FEMA embraces technological advancements and recognizes the potential benefits of these automated systems.*

Respondent must demonstrate ownership or licensing of a proprietary automated debris tracking and reporting system. Respondent must demonstrate in its proposal that it maintains on hand sufficient automated debris tracking equipment dedicated to meet the needs of the City. If Respondent is licensing such technology, Respondent must provide a written letter from licensor acknowledging licensor has a minimum of 100 devices on hand for Respondent's use in the event of a disaster and such devices will be made

available for the City's recovery efforts. Respondent shall include graphic illustration and explanation of system capability and be prepared to demonstrate system functionality if requested at the time of proposal evaluation and/or interview. Respondent shall be required to submit hourly rates (in fee schedule) for operations with and without use of the automated system. Respondent's inability to provide automated system in a timely manner shall be grounds for default.

Section V Preliminary Specifications

A. General

The following preliminary specifications have been developed by City of La Marque for monitoring of disaster related debris and waste management operations carried out by the City's designated Debris Management Contractor. These Preliminary Specifications will be used in negotiating final specifications for the project once a Contractor has been selected.

B. Loading Site Monitoring Services

Monitors will be assigned in accordance with the Contractor's Monitoring Plan and shall be responsible

for carrying all provisions of this contract without specific additional direction from

City of La Marque.

The following minimum conditions apply:

1. Contractor shall, within 48 hours, be prepared to provide qualified on site personnel to monitor debris removal operations at debris loading sites located throughout the City. Additional sites may be added as debris removal efforts increase. Each loading site will operate, at a minimum, approximately 12 -14 hours per day, 7 days per week. Exact number and location of loading sites will be determined by Debris Manager in coordination with the debris removal Contractor. These hours will normally not exceed dawn to dusk; unless authorized (in writing) by the Debris Manager. In the event that 24-hour operations are authorized, Contractor shall provide monitors for 24-hour operations, with no person being assigned to monitoring duties for more than 12 hours in any 24-hour period.

The Contractor will have Loading Site Monitors stationed at each loading site operated by the debris removal Contractor and coordinated with the Debris Management Center the day before beginning the work. The Contractor must be prepared to provide a minimum of two Loading Site Monitors to be stationed at each loading site. Each truck driver will be given a load ticket that validates where the material originated and that it is eligible for pickup. Load tickets will be issued in accordance with established procedures and as a minimum must contain either a street address or the nearest intersection or Global Position Satellite (GPS) location to be valid. The volume of debris hauled will be estimated at the TDMS by the Disposal Site Monitor. Load Tickets will be provided by the Contractor. Each monitor will be fully accountable for all Load Tickets issued to him/her.

2. Contractor shall provide all management, supervision, labor, transportation, mobile communications equipment, all safety equipment, digital cameras,

video cameras, and other equipment necessary to initiate debris load tickets to document the removal of eligible debris from public access roadways, public rights-of-way, and public property within City of La Marque.

3. Contractor must be prepared to provide Loading Site Monitors per site per day at a minimum of a 12-14 hours shift. Contractor must provide personnel with transportation to and from the loading site(s), mobile communications equipment necessary to remain in contact with dispatch and supervisor(s) at all times, and all logistic support.
4. All Loading Site Monitors must speak English, be a minimum of 18 years of age, and have a valid driver's license issued in the United States.
5. All Loading Site Monitors must have experience in at least one of the following:
 - Entry level engineer
 - Solid waste site operations
 - Construction inspector
 - Land clearing operations
 - Entry level surveyor
 - Solid waste collections
 - Previous similar monitoring or inspection experience
6. Supervisors and all identified Loading Site Monitors must attend a ½-day debris monitor training session to be conducted at a location specified by the Debris Manager before the start of the first shift. Training will be the responsibility of the Contractor and must be approved by the City.
7. Monitors must be capable of working in an outside environment and be able to climb a staircase ladder of 10 feet high.

C. TDMS / Disposal Site Monitoring Services

Monitors will be assigned in accordance with the Contractor's Monitoring Plan and shall be responsible

for carrying all provisions of this contract without specific additional direction from City of La Marque. The following conditions apply.

1. The Disposal Site Monitors is to complete the load ticket and estimate volumes that have been transported to TDMS or to landfills or other disposal sites for processing, temporary staging/storage, volumetric reduction, recycling, or disposal.
2. Contractor shall provide a minimum of two Disposal Site Monitors per TDMS or disposal site per day for a minimum of a 12-14 hour shift. In the event that 24-hour operations are authorized, Contractor shall provide monitors for 24-hour operations, with no person being assigned to monitoring duties for more than 12 hours in any 24-hour period.
3. Contractor shall provide Disposal Site Monitors with transportation to and from the TDMS and/or landfill sites and mobile communications equipment necessary to remain in contact with dispatch and supervisor(s) at all times,

logistic support, and all safety equipment, digital cameras, video cameras, and other equipment necessary to safely perform the site monitoring functions.

4. Monitors must speak English, be capable of working in an outside environment, and be able to climb a staircase ladder 10 feet high.
5. Monitors must be a minimum of 18 years of age, and have a valid driver's license issued in the United States
6. Monitors must have experience in at least one of the following job categories.
 - Entry-level engineer
 - Construction inspector
 - Entry level surveyor
 - Solid waste site operations
 - Land clearing operations
 - Solid waste collections
 - Previous similar monitoring or inspection experience

Supervisors and all identified Disposal Site Monitors must attend a ½-day debris monitor training session to be conducted at a location specified by the Debris Manager before the start of the first shift. Training will be the responsibility of the Contractor and must be approved by the City.

D. Roving Debris Monitor Services

Monitors will be assigned in accordance with the Contractor's Monitoring Plan and shall be responsible for carrying all provisions of this contract without specific additional direction from City of La Marque. The function of the Roving Debris Monitors is to verify that:

- a. All eligible debris is being removed from designated public rights-of-way and public property within designated debris zones in City of La Marque.
 - b. Ineligible debris is not being picked up.
 - c. Debris Management Contractors are performing their assigned work in a manner consistent with the terms of their Agreement with the City.
1. Contractor shall provide at least one Roving Debris Monitor for each debris pickup zone to monitor and verify eligible debris removal from designated public access roads within the debris pickup zone. The Roving Debris Monitor(s) must be prepared to operate minimum of 12 to 14 hours per day, 7 days per week, consistent with the City's established work schedule for the debris management contractors.
 2. Contractor must provide Roving Debris Monitors with transportation, mobile communication equipment, all safety equipment, digital cameras, video cameras, and other equipment necessary to perform the roving debris monitoring functions.

3. All Roving Debris Monitors must speak English, be a minimum of 18 years of age, and have a valid driver's license issued in the United States.
4. All monitors must have experience in at least one of the following:
 - Entry level engineer
 - Construction inspector
 - Entry level surveyor
 - Solid waste site operations
 - Land clearing operations
 - Solid waste collections
 - Previous similar monitoring or inspection experience
5. Supervisors and all identified Roving Debris Monitors must attend a ½-day debris monitor training session to be conducted at a location specified by the Debris Manager before the start of the first shift. Training will be the responsibility of the Contractor and approved by the city.
6. Contractor shall provide all management, supervision, labor, transportation, and equipment necessary to monitor the operations of the debris removal and disposal Contractor.
7. Roving Debris Monitors must be capable of working in an outside environment and be able to climb a staircase ladder of 10 feet high.

E. Debris Management Consulting Services

1. The Contractor shall provide an experienced professional (Contractor) to assist the City in overseeing the debris management operations, including but not limited to clearing, loading, hauling, reduction, TDMS/landfill operations, and other related activities. The Contractor must have broad debris removal operations management experience, including experience with debris removal operations, oversight of temporary debris management sites, debris recycling and disposal. Required experience includes in-depth working knowledge of recovery operations, U.S. Army Corps of Engineers and similar debris management guidelines, and FEMA eligibility and reimbursement guidelines.
2. The Contractor will work directly with the City's Debris Manager or as otherwise directed by that official. The Contractor shall perform work as assigned which may include but not be limited to review of debris management plans and procedures, drafting task orders, work plans and reports, audit of debris management Contractor activities, operations, develop information for public dissemination on debris removal, reduction and disposal, and other duties as assigned.
3. The Contractor shall be available on site at the Debris Management Center for a minimum of two weeks following notice to proceed. The Debris Manager will establish the service requirements and length of time those services are needed based on needs of the City.

F. Operational Requirements

1. The Contractor will oversee documentation of the equipment and other resources provided by the City's debris management Contractor prior to the clearing, removal or hauling of any debris. At a minimum, the Contractor shall provide all necessary personnel and equipment to:
 - a. Assign a unique number to each truck, trailer or other piece of equipment;
 - b. Photograph each piece of equipment;
 - c. Accurately measure the inside of each truck/trailer load bed and calculate its full load capacity;
 - d. Identify the owner/operator of the equipment;
 - e. Ensure that each piece of equipment is clearly labeled on both sides with: the name of the primary Contractor and, if appropriate, the subcontractor; the owner or /operator, as appropriate;
 - g. The equipment number assigned; and, for trucks and trailers, the full load capacity as calculated;
 - h. Document all results in a searchable digital data base;
 - i. Provide for continuous monitoring and updating as equipment is placed into or removed from service;
 - j. Provide daily reports to the City Debris Manager on the types and numbers of equipment in use.
2. The Contractor will assist the City in managing a Load Ticket Program to document the volume of debris loaded and transported to a TDMS or landfill site. Each load of eligible debris shall be tracked using a 6-part load ticket to be provided by the Debris Monitoring Contractor (industry standard)
3. Operational Requirements of Roving Debris Monitor(s):
 - The Roving Debris Monitors will provide general oversight of debris management removal and disposal operations by the City's debris management Contractor.
 - The Roving Debris Monitors will be the "eyes and ears" in the field for the Debris Manager.
 - Therefore, their observations and reports must be backed up with photographs and video wherever necessary to demonstrate the Contractor's performance.
 - The Roving Debris Monitors are expected to make multiple visits to all loading sites and
 - TDMS/landfill sites on a continuing although random basis.

G. Reporting

The Loading Site Monitors shall also maintain a log that contains the following information:

- a. Debris loading site location;
- b. Loading Site Monitors' Name;
- c. Supervisor's Name;

- d. Number of Load Tickets issued during the shift;
- e. Starting load ticket number;
- f. Ending load ticket number;
- g. Any problems encountered or anticipated.

Each Loading Site Monitor shall submit his/her copies of the load tickets and the load ticket log to the designated supervisor at the end of each shift. The Contractor's supervisor shall ensure that the load tickets and log are submitted to the Debris Management Center not later than 9 a.m. the following day along with a summary report that describes the nature of the work completed on the previous day and the status of debris management operations. The format and content of the daily report shall be as specified by the City's Debris Manager.

Each Disposal Site Monitor will maintain a log that contains the following information:

- a. TDMS or landfill site location;
- b. Debris Management Site Monitors' Name;
- c. Supervisor's Name;
- d. Truck/trailer number and volume of debris hauled into the site;
- e. Cumulative total of debris delivered at the site during the shift;
- f. Any problems encountered or anticipated;

Each Disposal Site Monitor will turn in his/her copies of the load tickets and the load ticket log to the designated supervisor at the end of each shift. The Contractor's supervisor will ensure that the load tickets and log are submitted to the Debris Management Center not later than 9 a.m. the following day along with a summary report that describes the nature of the work completed on the previous day and the status of debris management operations. The format and content of the daily report shall be as specified by the City's Debris Manager.

Each Roving Debris Monitor(s) will be responsible for providing a detailed report to the designated supervisor at the end of each shift. The Roving Debris Monitor(s) will report any serious or safety related discrepancies observed to their supervisor. The supervisor shall keep Debris Manager informed of situations that impact the execution of the debris removal contract.

The supervisor will collect all written reports and submit them to the Debris Manager by 9 a.m. the following day along with a detailed summary report of the previous day's operations. The format and content of the report will be as specified by the City's Debris Manager

H. Safety

1. The Contractor shall follow and adhere to all appropriate Federal, state, and local occupational health and safe requirements and guidelines.
2. The Contractor shall prepare the appropriate Site/Workplace Safety Plans required by current OSHA, Texas, or other applicable agency rules, hold appropriate safety training sessions for assigned monitor workforces, and ensure that all personnel engaged in work under the agreement observe the specified safety procedures.

3. All Contractor personnel shall properly wear and maintain all appropriate safety equipment whenever engaged in work under the monitoring agreement. The following are mandatory: hardhat, reflective vest, safety shoes, long pants, appropriate cold and rainy weather clothing, eye, and hearing protection.

I. Other Considerations

1. The Contractor shall supervise and direct the work, using qualified labor and proper equipment for all tasks. Safety of the Contractor's personnel and equipment is the responsibility of the Contractor. Additionally, the Contractor shall pay for all materials, personnel, taxes, and fees necessary to perform under the terms of this contract.
2. The Contractor must be duly licensed in accordance with Federal and state statutory and regulatory requirements to perform the work. The Contractor shall be responsible for determining what permits are necessary to perform under the contract. The Contractor shall obtain all permits necessary to complete the work. Copies of all permits shall be submitted to the Debris Management Center before commencing work.
3. The Contractor shall be responsible for promptly responding to any notices of violations issued as a result of the Contractor's or any subcontractors' actions or operations during the performance of this contract. Corrections for any such violations shall be at no additional cost. The City's Debris Manager shall be immediately advised of any such violation or notice of violation and the corrective actions being taken.
4. The Contractor shall be responsible for paying any and all costs associated with violations of law or regulation relative to Contractor's activities. Such costs might include but are not limited to site cleanup and remediation; fines, administrative and civil penalties; and third-party claims imposed on City of La Marque by any regulatory agency or by any third party as a result of noncompliance with federal, state, or local environmental laws and regulations or nuisance statutes by Contractor, its subcontractors, or any other persons, corporations or legal entities retained by the Contractor under this contract.
5. The Contractor must attend all meetings required by Debris Manager to evaluate the performance of all monitors or to discuss any open contract issues.
6. The Contractor must provide sufficient personnel and management to assure the policies and procedures of work meets the requirements and intent of this contract.

CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE

The Contractor shall not commence work under this contract until he has obtained, at his expense, all insurance required under this section such insurance has been approved by the City, nor shall the Contractor allow any subcontractor to commence work on any subcontract until all similar insurance required of the subcontractor has been so obtained and approved. Such insurance shall remain in full force and effect on all phases of the work, whether or not the work is occupied or utilized by the City, until all work under the contract is completed and has been accepted by the City. **Acord Certificate of Insurance indicating the City of La Marque as an additional insured and meeting**

all minimum coverages herein shall be provided to the City within 10 days of request.

Nothing contained in the insurance requirements shall be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operations under the contract.

The Contractor shall obtain and maintain for the full period of the contract the following types of insurance in the form, minimum limits and amount herein specified or as may be otherwise required in the contract documents. The Contractor shall automatically renew any policy that expires during the performance of this contract and notify the City of such a renewal prior to expiration date. The City of La Marque shall be named as an "Additional Insured" on all of the below named insurance policies.

Workers' Compensation Insurance

Definitions

Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

Duration of the project - includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the governmental entity.

Persons providing services on the project ("subcontractor" in §406.096) - includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor code, Section 401.011(44) for all employees of the contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

D. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended

The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

(1) a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

(2) no later than seven days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

G. The contractor shall notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

H. The contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

I. The contractor shall contractually require each person with whom it contracts to provide services on a project, to:

(1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor code, Section 401.011 (44) for all of its employees' providing services on the project, for the duration of the project;

(2) provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

(3) provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(4) obtain from each other person with whom it contracts, and provide to the contractor:

(a) a certificate of coverage, prior to the other person beginning work on the project; and

(b) a new certificate of coverage showing extension of coverage, prior to the end of the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(5) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(6) notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

(7) contractually require each person with whom it contracts, to perform as required by paragraphs (1) - (7), with the certificates of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

K. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor which entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity. In the event vendor breaches this Agreement by failing to adhere to the standards outlined herein, the City reserves the right to pursue all available legal and equitable remedies.

2. Public Liability and Property Damage Insurance (Note "Indemnity" clause hereinafter)

Before commencement of the work, the Contractor shall submit written evidence that he and all his subcontractors have obtained for the period of the contract full Comprehensive General Liability and Property Damage Insurance Coverage with a company licensed to do business in the State of Texas. This coverage shall protect the Contractor, the City, and each of the officers, agents and employees from claims for damages for bodily or personal injury, sickness or disease, including death, and from claims for damages to property, which may arise directly or indirectly out of, or in connection with the performance of work under this contract by the contractor, by any of his subcontractors, or by anyone directly or indirectly employed by either of them, or under the control of either of them, and the minimum amount of such insurance shall be as follows unless higher minimum amounts are otherwise required in the contract documents :

Public Liability Insurance in an amount not less the Five Hundred Thousand Dollars (\$500,000) for damages arising out of bodily injury or personal injury, sickness or disease, or death of one person and subject to the same limit for each person and in an amount not less than One Million Dollars (\$1,000,000) in any one occurrence and Property Damage Insurance in an amount not less than Five Hundred Thousand (\$500,000) for all damages of others in any occurrence with an aggregate limit in the same amount.

The Property Damage portion of this coverage shall include, where applicable, explosion, collapse and underground exposure coverage. In addition, where Completed Operations

Insurance Coverage is applicable, such coverage will be maintained after completion and acceptance of the project for the full guarantee period.

3. Automobile Liability and Property Damage Insurance

Before commencement of the work, the Contractor shall submit written evidence that he and all his subcontractor(s) have obtained Automobile Liability and Property Damage Insurance Coverage on all self-propelled vehicles used in connection with the contract, whether owned, non-owned, or hired. The liability limits shall be not less than Five Hundred Thousand Dollars (\$500,000) for injury or death of one person and in an amount not less than One Million Dollars (\$1,000,000) in any one occurrence; and Property Damage limits of not less than Five Hundred Thousand Dollars (\$500,000) in any one occurrence.

4. Contractual Liability Coverage

Each and every policy for Liability Insurance carried by each Contractor and Subcontractor will include a "Contractual Liability Coverage" endorsement sufficiently broad to insure the provision titled "Indemnity" hereinafter set forth.

5. Indemnity

The Contractor shall defend, indemnify and hold harmless the City, and each of the officers, agents, servants and employees, from any and all suits, actions, claims, losses, or damages of any character and from all expenses incidental to the defense of such suits, actions or claims based upon, alleged to be based upon, or arising out of (1) any injury, disease, sickness, or death of any person or persons, (2) any damages to any property including loss of use thereof, caused by any act or omission of the Contractor, or any subcontractor of the Contractor, or by their officers, agents, servants, employees or anyone else under the Contractor's direction and control, and arising out of, occurring in connection with, resulting from, or caused by the performance of any work or services called for by the contract or from conditions created by the performance of non-performance of said work or services, but not including the sole negligence of any party herein indemnified.

6. Evidence of Insurance Coverage

Before commencement of any work, the Contractor shall submit written evidence that he and all his subcontractors have obtained the minimum insurance required by the contract documents. Such written evidence shall be in the form of a Certificate of Insurance executed by the Contractor's insurance carrier showing such policies in force for the specified period or by furnishing a copy of the actual policy or policies. Each policy or certificate shall bear an endorsement or statement waiving right of cancellation or reduction in coverage without ten (10) days' notice in writing to be delivered by registered mail to the City.

The Property Damage portion of this coverage shall include where applicable, explosion, collapse, and underground exposure coverage. In addition, where completed Operations Insurance Coverage is applicable; such coverage will be maintained after completion and acceptance of the project for the full guarantee period.

BONDS

The City will require the contractor, before beginning the work, to execute bonds with the City. Upon notice of award, the successful bidder shall provide:

- **PERFORMANCE BOND:** If the “Estimated Contract Total” amount shown on your proposal Bid Sheet is \$100,000 or greater, the performance bond shall be 100% of that amount. If the “Estimated Contract Total” amount is less than \$100,000 a performance bond is not required. The performance bond shall be for a one year term. A new bond shall then be submitted each year if the contract is renewed. The performance bond is solely for the protection of the City; in the amount of the contract; and conditioned on the faithful performance of the work in accordance with the plans, specifications, and contract documents.
- **PAYMENT BOND:** If the “Estimated Contract Total” amount shown on your proposal Bid Sheet is \$50,000 or greater, the payment bond shall be 100% of that amount. If the “Estimated Contract Total” amount is less than \$50,000 a payment bond is not required. The payment bond shall be for a one-year term. A new bond shall then be submitted each year if the contract is renewed. The payment bond is solely for the protection and use of payment bond beneficiaries who have a direct contractual relationship with the prime contractor or a subcontractor to supply public work labor or material, and in the amount of the contract.

A bond required must be executed by a corporate surety in accordance with Section 1, Chapter 87, Acts of the 56th Legislature, Regular Session, 1959 (Article 7.19-1, Vernon's Texas Insurance Code).

A bond executed for a public work contract with the City must be payable to the City of La Marque and using the form provided herein.

The bond must clearly and prominently display on the bond or on an attachment to the bond:

- the name, mailing address, physical address, and telephone number, including the area code, of the surety company to which any notice of claim should be sent; or
- the toll-free telephone number maintained by the Texas Department of Insurance under Subchapter B, Chapter 521, Insurance Code, and a statement that the address of the surety company to which any notice of claim should be sent may be obtained from the Texas Department of Insurance by calling the toll-free telephone number.

The City does not require a contractor for any construction contract to obtain a surety bond from any specific insurance or surety company, agent, or broker.

SECTION 4
PRICING PROPOSAL

Proposal of: _____
(Proposer Company Name)

To: City of La Marque

Ref.: Debris Management, Monitoring, and Consulting Services

RFP No#: 22-01

Ladies and Gentlemen:

Having carefully examined all the specifications and requirements of this RFP and any attachments thereto, the undersigned proposes to furnish the "Services" required pursuant to the above-referenced Request for Proposal upon the terms quoted below.

4.1 Pricing Proposal for Services Offered

4.1.1 Please provide a comprehensive, detailed list of all labor, equipment, and services that your firm can provide for Disaster Debris Monitoring Services contract as part of your proposal.

Pricing shall be submitted in a format such that all invoices may be easily tied back to your pricing sheet.

The hourly labor rates shall apply to all hours worked, including overtime, and shall include all applicable overhead and profit. Non-labor project related costs will be billed to the City at cost without mark up, e.g., lodging, transportation and per diem.

4.1.2 Using the attached Pricing Proposal (Ref. 4.5):

4. Please provide an estimated total cost for a debris volume estimate at 1.00 million cubic yards.
5. One (1) Debris Management Sites (DSM) and One (1) Landfill.

4.2 Added Value

4.2.1 Describe any proposed benefits to City of La Marque from Proposer, not otherwise set forth herein, which would be an added value to City of La Marque.

4.3 City of La Marque's Payment Terms

City of La Marque's standard payment terms for services are "Net 30 days." Indicate below the prompt payment discount that Proposer will provide to City of La Marque:

Prompt Payment Discount: _____% _____days/net 30 days

4.4 Cooperative Governmental Purchasing Notice

specifications. Prior to other governmental entities placing orders, City of La Marque will notify the successful Proposer of their intent.

Please indicate below if you will permit other governmental entities to purchase from your agreement with City of La Marque.

☐ **Yes, Others can purchase** ☐ **No, Only the City of La Marque can purchase.**

4.5 Pricing Proposal

The hourly labor rates shall apply to all hours worked, including overtime, and shall include all applicable overhead and profit. Non-labor project related costs will be billed to the City at cost without mark up, e.g., lodging, transportation and per diem.

1. Please provide an estimated total cost for a debris volume estimate at 1.00 million cubic yards.
2. One (1) Debris Management Sites (DSM) and One (1) Landfill.

Position	Personnel	Estimated	Hourly	Extended Costs
	(Number)	Hours	Rate	
Project Manager				
Operations Managers				
Scheduler/Expeditors				
GIS Analyst/Specialist				
Field Supervisors				
Debris Site / Tower Monitors				
Environmental Specialist				
Project Inspectors (Citizen Drop-Off Site)				
Field Coordinators (Crew Monitors)				
Load Ticket Data Entry Clerks (QA/QC)				
Billing Invoice Analysts				
Project Coordinators				
Residential Monitors				
Data Manager / ADMS Specialist				
Aerial Photographer				
Electronic Ticketing				
Grand Total				

Respectfully submitted,

Proposer: _____
(Authorized Signature for Proposer)

Name: _____

Title: _____

Date: _____

SECTION 5

Appendices

- Appendix A – Proposal Document**
- Appendix B – Conflict of Interest**
- Appendix C – House Bills 13, 19, 89**
- Appendix D – Property Tax Statement**
- Appendix E – Nepotism Statement**
- Appendix F – Non-Collusion Statement**
- Appendix G – Certification Regarding Debarment**
- Appendix H – ACH Form**

Appendix A – Proposal Document

Submittal Checklist: (To determine validity of Proposal)

Appendix A must be included in the submittal.

Appendix B – G all forms must be complete and included in the submittal.

By checking the below box(es), you are acknowledging the contents of the document(s) relating to the listed appendices, and agreeing to their terms:

☐ Appendix B – Conflict of Interest

☐ Appendix E – Nepotism Statement

☐ Appendix C – House Bill 13, 19, 89
Verification

☐ Appendix F – Non-Collusion Statement

☐ Appendix D – Property Tax Statement

☐ Appendix G – Certification Regarding
Debarment

All Proposals delivered to the City of La Marque shall include this page with the submittal.

RFP Number:	RFP# 22-01
Project Title:	Disaster Debris Monitoring and Consulting
Submittal Deadline:	10:00 A.M.(CST), Thursday July 7, 2022

Submit Electronically:

[Upload Submittal Here](#)

Proposer Information:

Proposer's Legal Name:			
Address:			
City, State & Zip			
Federal Employers Identification Number #			
Phone Number:		Fax Number:	
E-Mail Address:			

Proposer Authorization

I, the undersigned, have the authority to execute this Proposal in its entirety as submitted and enter into an agreement on behalf of the Proposer.

Printed Name and Position of Authorized Representative: _____

Signature of Authorized Representative: _____

Signed this _____ (day) of _____ (month), _____ (year)

Appendix B – Form CIQ

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor doing business with local governmental entity

FORM CIQ

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 Name of vendor who has a business relationship with local governmental entity.

2 ☐ Check this box if you are filing an update to a previously filed questionnaire. (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 Name of local government officer about whom the information is being disclosed.

Name of Officer

4 Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes

☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes

☐ No

5 Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

Signature of vendor doing business with the governmental entity

Date

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at <http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm>. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties

based on commercial activity of one of the parties. The term does not include a connection based on:

- (A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;
- (B) a transaction conducted at a price and subject to terms available to the public; or
- (C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds \$2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than \$100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a).

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

Appendix C - House Bills 13, 19 & 89 Verification

Pursuant to Senate Bill 13 of the 87th regular Texas Legislature session:

Verification Regarding Boycotting Energy Companies – Pursuant to Chapter 2274, Texas Government Code, Contractor verifies (1) it does not boycott energy companies, and (2) it will not boycott energy companies during the term of this Agreement. Contractor acknowledges this Agreement may be terminated and payment withheld if this verification is inaccurate. (Note: This provision only applies in a contract that (1) has a value of \$100,000 or more that is to be paid wholly or partly from public funds and (2) is with a for-profit entity, not including a sole proprietorship, that has ten (10) or more full-time employees.)

Pursuant to Senate Bill 19 of the 87th regular Texas Legislature session:

Discrimination Against Firearm Entities – In accordance with Texas Government Code Chapter 2274, Contractor verifies that it does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and will not discriminate during the term of the contract against a firearm entity or firearm trade association. This section only applies if: (i) Contractor has ten (10) or more full-time employees and (ii) this Agreement has a value of \$100,000 or more to be paid under the terms of this Agreement; and does not apply: (i) if Contractor is a sole proprietor, a non-profit entity, or a governmental entity; (ii) to a contract with a sole-source provider; or (iii) to a contract for which none of the bids from a company were able to provide the required certification.

Pursuant to Sections 2270.001, 2270.002, 808.001, Texas Government Code:

1. *“Boycott Israel” means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes; and*
2. *“Company” has the meaning assigned by Section 808.001, except that the term does not include a sole proprietorship.*
3. *Section only applies to a contract that is between a governmental entity and a company with 10 or more full-time employees; and has a value of \$100,000 or more that is to be paid wholly or partly from public funds of the governmental entity.*

I, _____ (Person name), the undersigned representative of
(Company or Business Name) _____ (hereinafter
referred to as Company)

being an adult over the age of eighteen (18) years of age, do hereby depose and verify under oath that the company named-above, under the provisions of Subtitle F, Title 10, Government Code Chapter 2270; depose and verify under oath that the Company, under the provisions of Subtitle A, Title 8, Government Code, is amended by adding Chapter 809; do hereby depose and verify under oath that the Company, under the provisions of Subtitle F, Title 10, Government Code, is amended by adding Chapter 2274 will not discriminate and/or boycott any of these provisions outlined and defined in House Bills 13, 19 and 89.

DATE

SIGNATURE OF COMPANY REPRESENTATIVE

THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED AS IT IS A PART OF THE SOLICITATION PACKAGE AS MENTIONED IN SECTION 8 OF THE PROPOSAL.

Appendix D – Property Tax Statement

**FAILURE TO COMPLETE THIS ATTACHMENT SHALL RESULT IN THE PURCHASING
SUPERVISOR DEEMING YOUR BID OR PROPOSAL
“NON-RESPONSIVE.”**

The City of La Marque, Texas has adopted the following policy:

The City of La Marque will not do business with any person or business that owes delinquent property taxes to the City.

Please indicate whether you or your company, owe delinquent property taxes to the City whether an assumed name, partnership, corporation, or any other legal form.

_____ I do not owe the City property taxes that are delinquent.

_____ I owe City property taxes that are delinquent on property located at

Proposer's Printed or Typed Name

Proposer's Signature

Date

**THIS DOCUMENT MUST BE COMPLETED, SIGNED, AND SUBMITTED AS IT IS A
PART OF THE SOLICITATION PACKAGE AS MENTIONED IN SECTION 8 OF THE
PROPOSAL.**

Appendix E – Nepotism Statement

**FAILURE TO COMPLETE THIS ATTACHMENT SHALL RESULT IN THE PURCHASING
SUPERVISOR DEEMING YOUR BID OR PROPOSAL
“NON-RESPONSIVE.”**

The Bidder or Proposer or any officer, if the Bidder or Proposer is other than an individual, shall state whether Bidder or Proposer has a relationship, either by blood or marriage, with any official or employee of the City of La Marque by completing the following:

If the Proposer or Bidder is an individual:

_____ I am not related by blood or marriage to any official or employee of the
City of La Marque

_____ I am related by blood or marriage to the following official(s) or employee(s)
of the City of La Marque

Name and title of City Official

Or employee: _____

Relationship: _____

If the Bidder or Proposer is **NOT** an individual:

_____ The officers of the company submitting this bid or proposal are not related by
blood or marriage to any official or employee of the City of La Marque.

_____ The officers of the company submitting this Proposal are related by blood or marriage to
the following official(s) or employee(s) of the City of La Marque.

Name and title of officer: _____

Employee and title of City Official or Employee: _____

Relationship: _____

**THIS DOCUMENT MUST BE COMPLETED AND SUBMITTED AS IT IS A PART OF
THE SOLICITATION PACKAGE AS MENTIONED IN SECTION 8 OF THE
PROPOSAL.**

Appendix F – Non-Collusion Statement

THE UNDERSIGNED AFFIRM THAT THEY ARE DULY AUTHORIZED TO EXECUTE THIS CONTRACT, THAT THIS COMPANY, FIRM, PARTNERSHIP, OR INDIVIDUAL HAS NOT PREPARED THIS PROPOSAL IN COLLUSION WITH ANY OTHER PROPOSER, AND THAT THE CONTENTS OF THIS PROPOSAL AS TO PRICES, TERMS OR CONDITIONS OF SAID PROPOSAL HAVE NOT BEEN COMMUNICATED BY THE UNDERSIGNED NOR BY ANY EMPLOYEE OR AGENT TO ANY OTHER PERSON ENGAGED IN THIS TYPE OF BUSINESS PRIOR TO THE OFFICIAL OPENING OF THIS PROPOSAL.

PROPOSER _____

ADDRESS _____

PHONE _____

FAX _____

PROPOSER (SIGNATURE)

PROPOSER (PRINTED NAME)

POSITION WITH COMPANY

SIGNATURE OF COMPANY OFFICIAL
AUTHORIZING THIS PROPOSAL

COMPANY OFFICIAL
(PRINTED NAME)

OFFICIAL POSITION _____

THIS DOCUMENT MUST BE COMPLETED, SIGNED, AND SUBMITTED AS IT IS A PART OF THE SOLICITATION PACKAGE AS MENTIONED IN SECTION 8 OF THE PROPOSAL.

Appendix G – Document 00435

The City of La Marque, Texas

PROPOSER'S CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION (49 CFR PART 29)

The undersigned certifies, by submission of this proposal or acceptance of this contract, that neither Contractor nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. Proposer agrees that by submitting this proposal that Proposer will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the Proposer or any lower tier participant is unable to certify to this statement, that participant shall attach an explanation to this document.

Certification-the above information is true and complete to the best of my knowledge and belief.

(Printed or typed Name of Signatory)

(Signature)

(Date)

NOTE: The penalty for making false statements in offers is prescribed in **18 U.S.C. 1001**

END OF DOCUMENT 00435-FAA

**THIS DOCUMENT MUST BE COMPLETED, SIGNED, AND SUBMITTED AS IT IS A PART
OF THE SOLICITATION PACKAGE AS MENTIONED IN SECTION 8 OF THE PROPOSAL.**

Appendix H – ACH Form



City of La Marque Accounts Payable
1111 Bayou Road La Marque, TX 77568
Maria Barnett
PHONE (409) 938-9214 FAX (409) 877-5020
Email: m.barnett@cityoflamarque.org

Vendor Information ACH AUTHORIZATION FORM

Vendor Name		Vendor No.	
Address	City	ST	Zip
Accounting/ACH Contact Name	Phone	Fax	
Email Address for Remittance Advice (**required**)			

Above named Vendor hereby authorizes the City of La Marque to originate Automated Clearing House electronic funds transfer (EFT) credit entries to Vendor's account, as indicated below, for payment/reimbursement of goods and/or services.

Banking Information

☐ Checking
☐ Savings

☐ New Setup
☐ Change

Name on Bank Account	
Bank Routing Number*	Bank Account #

*Please provide the 9 digit bank routing number from a check. The routing number from a deposit slip is invalid.

If you change banks or accounts please provide at least thirty (30) days written notice.

Vendor Authorization:

Authorized Name/Title		Authorized Signature		Date
COR Accounts Payable Use:	Date Received:	Date Entered:	Entered by:	

APPENDIX I – FEDERAL CLAUSES

The following, federally mandated, clauses require acknowledgement of the offeror and are considered part of the contract between the City of La Marque and the awarded vendor. Any offeror that does not acknowledge the clauses below shall be considered non-responsive and will not be considered for award.

1. **NO GOVERNMENTAL OBLIGATION TO THIRD PARTIES:** The Owner and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Owner, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.
2. **PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACTS:** Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq., "Administrative Remedies for False Claims and Statements," apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.
3. **ACCESS TO RECORDS AND REPORTS:** The contractor agrees to provide (insert name of state agency or local or Indian tribal government), (insert name of recipient), the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions. The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed. The contractor agrees to provide the FEMA Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract."
4. **EQUAL EMPLOYMENT OPPORTUNITY:** The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and

of the rules, regulations, and relevant orders of the Secretary of Labor. The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law. The vendor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States."

5. GOVERNMENT-WIDE SUSPENSION AND DEBARMENT: This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such the contractor is required to verify that none of the contractor, its principals (defined at 2 C.F.R. § 180.995), or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935). The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into. This certification is a material representation of fact relied upon by (insert name of subrecipient). If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to (name of state agency serving as recipient and name of subrecipient), the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment. The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

6. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT:

- 1. Overtime requirements** - No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
- 2. Violation; liability for unpaid wages; liquidated damages** - In the event of any violation of the clause set forth in paragraph (1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty

hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

3. **Withholding for unpaid wages and liquidated damages** – The Owner shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.
4. **Subcontracts** - Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.

7. **LOBBYING:**

Byrd Anti-Lobbying Amendment, 31 U.S.C. § 1352 (as amended)

Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient.

APPENDIX A, 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding \$100,000)

The undersigned [Contractor] certifies, to the best of his or her knowledge, that:

- 1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- 2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- 3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Contractor certifies or affirms by signing this contract the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, Contractor understands and agrees that the provisions of 31 U.S.C. § 3801 *et seq* apply to this certification and disclosure, if any.

8. **CLEAN AIR 42 U.S.C. § 7401 et seq.:** Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 *et seq*. The Contractor agrees to report each violation to the Owner and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to the State of Texas, Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

Contractor also agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by FEMA.

9. **CLEAN WATER REQUIREMENTS 33 U.S.C. 1251 et seq.:** Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 *et seq*. Contractor agrees to report each violation to the Owner and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to the State of Texas, Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office. Contractor also agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by FEMA.

10. PROCUREMENT OF RECOVERED MATERIALS 42 U.S.C 6962:

(1) In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA- designated items unless the product cannot be acquired—

(i) Competitively within a timeframe providing for compliance with the contract performance schedule;

(ii) Meeting contract performance requirements; or

(iii) At a reasonable price.

(2) Information about this requirement, along with the list of EPA-designate items, is available at EPA's Comprehensive Procurement Guidelines web site,

<https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>.

11. **DEPARTMENT OF HOMELAND SECURITY SEAL, LOGO, AND FLAGS:** By signing this contract, the contractor agrees it shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific FEMA pre- approval.

12. **COMPLIANCE WITH FEDERAL LAW, REGULATIONS, AND EXECUTIVE ORDERS:** This is an acknowledgement that FEMA financial assistance will be used to fund the contract only. The contractor will comply will all applicable federal law, regulations, executive orders, FEMA policies, procedures, and directives.

13. COMPLIANCE WITH DAVIS-BACON ACT AND COPELAND “ANTI-KICKBACK” ACT:

Minimum wages - (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination, and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) Except with respect to helpers as defined as 29 CFR 5.2(n)(4), the work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) With respect to helpers as defined in 29 CFR 5.2(n)(4), such a classification prevails in the area in which the work is performed.

action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers, or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(v)(A) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination, and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers, or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(v) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(2) Withholding - The [*City of La Marque*] shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the [*City of La Marque*] may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall

maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the [City of La Marque] for transmission to the Federal Transit Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5 and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives

of the Federal Transit Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees – (i) Apprentices – Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division of the U.S. Department of Labor determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees – Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not

less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity – The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements – The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts – The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal Transit Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination: debarment – A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements – All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards – Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility – (i) By entering into this contract, the contractor certifies that

neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

I, _____ (printed name), the undersigned, do hereby acknowledge, and agree to comply, with the above statements for the entire length of any agreement with the City of La Marque, Texas.

Signature of Authorized Company Representative

Date

THIS DOCUMENT MUST BE SIGNED AND SUBMITTED AS IT IS A PART OF THE BID PACKAGE AS MENTIONED IN SECTION 6B OF THE ITB.

SECTION 6

PROPOSER'S QUESTIONNAIRE

Proposals must include responses to the questions contained in this Proposer's General Questionnaire. Proposer should reference the item number and repeat the question in its response. In cases where a question does not apply, or if unable to respond, Proposer should refer to the item number, repeat the question, and indicate N/A (Not Applicable) or N/R (No Response), as appropriate. Proposer will explain the reason when responding N/A or N/R.

6.1 Proposer Profile

6.1.1 Legal name of Proposer Company: _____

Centralized Master Bidders List registration number: _____

Prime contractor HUB / MWBE registration number: _____

An individual Proposer acting as a sole proprietor must also enter the Proposer's Social Security Number: # _____-_____-_____.

Dun and Bradstreet Number - Data Universal Numbering System (DUNS):
_____.

Number of years in Business: _____

State of incorporation: _____

Number of Employees: _____

Annual Revenues Volume: _____

Name of Parent Corporation if any _____

NOTE: If Proposer is a subsidiary, City of La Marque prefers to enter into an agreement or agreement with the Parent Corporation or to receive assurances of performance from the Parent Corporation.

6.1.2 Proposer will provide a copy of its financial statements for the past two (2) years.

6.1.3 Proposer will provide a financial rating of the Proposer's entity and any related documentation (such as a Dunn and Bradstreet analysis) that indicates the financial stability of Proposer.

3.1.4 Proposer will state whether or not Proposer is currently for sale or involved in any transaction to expand or to become acquired by another business entity. If yes, Proposer will explain the expected impact, both in organizational and directional terms.

6.1.5 Proposer will provide any details of all past or pending litigation or claims filed against Proposer that would affect its performance under an Agreement with City of La Marque.

- 6.1.6 Proposer will state whether or not Proposer is currently in default on any loan agreement or financing agreement with any bank, financial institution, or other entity. If yes, Proposer will specify the pertinent date(s), details, circumstances, and describe the current prospects for resolution.
- 6.1.7 Proposer will state whether or not any relationship exists (whether by family kinship, business association, capital funding agreement, or any other such relationship) between Proposer and any employee of City of La Marque. If yes, Proposer will explain.

6.2 Approach to Project Services

- 3.2.1 Proposer will provide a statement of the Proposer's service approach and will describe any unique benefits to City of La Marque from doing business with Proposer. Proposer will briefly describe its approach for the required services identified in **Section 3** Scope of Work of this RFP.
- 3.2.2 Proposer will provide an estimate of the earliest starting date for services following execution of an Agreement.
- 3.2.3 Proposer will describe the types of reports or other written documents Proposer will provide (if any) and the frequency of reporting, if more frequent than required in the RFP. Proposer will include samples of reports and documents, if appropriate.

6.3 General Requirements

- 3.3.1 Proposer will provide summary resumes for its proposed key personnel who will be providing services under the Agreement with City of La Marque, including their specific experiences with similar service projects, and number of years of employment with Proposer.
- 3.3.2 Proposer will describe any difficulties it anticipates in performing its duties under the Agreement with City of La Marque and how Proposer plans to manage these difficulties. Proposer will describe the assistance it will require from City of La Marque.
- 3.3.3 Proposer will describe its approach in providing staffing continuity to customer.
- 3.3.4 Proposer will describe its ability to communicate its vision and capacity for establishing a relationship that addresses current and future needs and trends in the industry.
- 3.4.5 Proposer will describe any additional costs that may be associated with service work and the invoicing of such.

6.4 Quality Assurance

Professional will describe its quality assurance program, its quality requirements, and how they are measured.

6.5 Service Support

Proposer will describe its service support philosophy, how the philosophy is implemented, and how Proposer measures its success in maintaining this philosophy.

6.6 Additional Services

- 3.6.1 Proposer will provide a list of any additional services or benefits not otherwise identified in this RFP that Proposer would propose to provide to City of La Marque. Additional services or benefits must be directly related to the goods and services solicited under this RFP.
- 3.6.2 Proposer will provide details describing any unique or special services or benefits offered or advantages to be gained by City of La Marque from doing business with Proposer. Additional services or benefits must be directly related to the goods and services solicited under this RFP.

SECTION 7

REFERENCES

References – This section is required.

Proposer shall provide four (4) references where Proposer has performed similar to or the same types of services as described herein. Proposer shall provide references not affiliated with the City of La Marque, or any of its employees.

Reference #1:

Client / Company Name:	
Contact Name:	Contact Title:
Phone:	Email:
Date and Scope of Services Provided:	

Reference #2:

Client / Company Name:	
Contact Name:	Contact Title:
Phone:	Email:
Date and Scope of Services Provided:	

Reference #3:

Client / Company Name:	
Contact Name:	Contact Title:
Phone:	Email:
Date and Scope of Services Provided:	

Reference #4:

Client / Company Name:	
Contact Name:	Contact Title:
Phone:	Email:
Date and Scope of Services Provided:	

SECTION 8

SUBMISSION OF PROPOSAL

- A. Submittal Packet – How to submit: All Proposals must be submitted electronically. No Proposal will be accepted by mail or hand delivery. Proposals submitted by mail or hand delivery will be marked non-responsive.
- B. Submittal Packet – Required Contents: All items in this Proposal are considered part of the Proposal package. Submittals must include the package in its entirety; signed in the appropriate places by an authorized representative of the company with an original signature. Proposals not including all of the above will be considered non-responsive. Proposers must submit their Proposals on the forms provided herein, otherwise, it will be marked non-responsive.
- C. Submittal Deadline: The deadline for submittal of Proposals shall be as identified on the page of the Proposal and on page of **Appendix A-Proposal**. It is the Proposer's responsibility to have the Proposal Documents, including Addenda, correctly submitted by the submittal deadline. No extensions will be granted, and no late Proposals will be accepted.
- D. Proposals Received Late: Proposers are encouraged to submit their Proposals as soon as possible. The time and date of receipt as recorded in the City Clerk's Office, by City of La Marque online submittal portal, shall be the official time of receipt. City of La Marque is not responsible for late submission regardless of the reason. Late Proposals will not be considered under any circumstances.
- E. Alterations or Withdrawals of Proposal Document: Any submitted Proposal may be withdrawn, or a revised Proposal substituted prior to the submittal deadline. Proposal Documents cannot be altered, amended, or withdrawn by the Proposer after the submittal deadline.
- F. Proposal Document Format: All proposal documents must be prepared in single-space type, on standard 8-1/2" x 11" vertically oriented pages, numbered at the bottom, with the exception of plans or drawings, those may be submitted landscape on 8-1/2" x 11" pages. **The package must be in the order required in the Scope of Services.** The submittal must be written in pen or typed, signatures must be signed in pen, or a digital signature via the electronic submittal process, and anything written in pencil will not be accepted. Mistakes can be crossed out and corrections inserted and initialed by the individual signing the proposal. City of La Marque only accepts proposals that are submitted through the online portal. The link is provided on the title page of this document and in **Section 3. Scope of Work – Special Conditions**. No hand delivered or mailed submittals will be considered and will be marked "Non-responsive".
- G. Questions and Responses: The question deadline will be addressed in the **Key Dates Schedule**. Responses will be answered after the question deadline in the form of an Addendum. No responses will be given to questions submitted after the deadline. Questions submitted outside of the City Clerks Office will not be answered and any

communication with a User Department prior to award by City of La Marque Council will disqualify a vendor from being considered for award.

- H. Pre-Proposal Conferences: The date and time of a pre-proposal conference, if necessary, will be found in the **Key Dates Schedule**.

8.1 Proposal Submittal Order

Proposer is instructed to complete, sign, and return the following documents in the following order as a part of its proposal. If Proposer fails to return each of the following items with its proposal, then City of La Marque may consider this as Non-Responsive and reject the proposal:

- 8.1.1 Signed and Completed Appendix A – Proposal Document (**Section 5**)
- 8.1.2 Signed and Completed Appendix B – Form CIQ (**Section 5**)
- 8.1.3 Signed and Completed Appendix C – House Bills 13, 19, 89 Verifications (**Section 5**)
- 8.1.4 Signed and Completed Appendix D – Property Tax Statement (**Section 5**)
- 8.1.5 Signed and Completed Appendix E – Nepotism Statement (**Section 5**)
- 8.1.6 Signed and Completed Appendix F – Non-Collusion Statement (**Section 5**)
- 8.1.7 Signed and Completed Appendix G – Certification Regarding Debarment (**Section 5**)
- 8.1.8 Signed and Completed Appendix I– Federal Clauses (**Section 5**)
- 8.1.9 Signed and Completed Pricing Proposal (**Section 4**)
- 8.1.10 Signed and Completed Addenda Checklist (if applicable)

Note: It is the Proposer's responsibility to make sure they have obtained all addenda.

- 8.1.11 Completed References (**Section 7**)
- 8.1.12 Responses to Proposer's Questionnaire (**Section 6**)

SECTION 9

PROPOSED SAMPLE AGREEMENT

City of La Marque has attached a sample proposed Agreement, which includes all Attachments, in conjunction with the award of an agreement with the selected vendor. **AS PART OF YOUR RESPONSE TO THIS RFP, YOU MUST IDENTIFY, IN WRITING, ANY EXCEPTIONS OR ADDITIONS YOU MAY HAVE TO THE PROVISIONS OF THE AGREEMENT.** Any desired changes are to be specific and cite the applicable section. If none, so indicate in your response. Acceptance of the terms and conditions of the Agreement is considered as a major factor in the selection of the successful vendor.

AGREEMENT FOR SERVICES

SERVICES

This Agreement (the "Agreement") is made and entered into this ___ day of month, 20___, by and between the City of La Marque, a Texas home-rule municipality, and **company name** ("Company") located at **list address here**. By entering into this Agreement, Company agrees that City of La Marque is entering into this agreement in its governmental capacity, and not a proprietary one.

WHEREAS the City of La Marque desires to obtain services in connection with its **"services rendered"**, within the City of La Marque and **vendor name** ("Company") desires to provide such services; and

WHEREAS this Agreement between the Parties consist of the terms and conditions set forth herein, and **Exhibit A**, identified as the proposal from the Company for the scope of services, and those document(s), attached and incorporated for all purposes for the following Project:

Agreement Type Here and RFP or Bid # if there is one

NOW, THEREFORE, for and in consideration of the mutual covenants hereinafter set forth, the parties do mutually agree as follows:

1. **TERM:** Agreement shall be effective upon execution by the City of La Marque until work has been completed to the satisfaction of the City of La Marque unless sooner terminated under the terms set forth herein. It is agreed that City of La Marque will have the option to extend the Agreement for up to two (2) additional years. To exercise this option, City of La Marque shall serve notice a minimum 30 days prior to agreement termination. The Option to Extend will not be considered if funding is unavailable or if the company's past performance is not within the industry standard or acceptable to the City of La Marque. This Agreement shall automatically renew for successive one-year periods under the existing terms and conditions, unless either party gives the other party written notice of non-renewal at least 30 days prior to such renewal date.

2. **SCOPE OF SERVICES:** Company will provide the services ("Work") to the City of La Marque in connection with the Project, more specifically described in **Exhibit A** (and any applicable exhibits attached herein), attached and fully incorporated for all intents and purposes.

3. **COMPENSATION:** City of La Marque shall compensate Company for the Work at the agreed upon **(Insert Agreement Value)**, more specifically described in **Exhibit A**. Company will furnish an invoice to the City of La Marque detailing activities performed and reflecting actual time and expenses incurred during the preceding month. All invoices are due under Government Code Sec. 2251.021 and are payable to Company at **Company full Address**. City of La Marque shall not be responsible for any payment to Company for any additional services or expenses not specifically included in **Exhibit A**, except upon execution of an amendment to this Agreement in writing by both parties. Parties shall attempt to resolve any payment disputes within thirty (30) days after the invoice date.

4. **SCHEDULE AND DELIVERABLES:** The City of La Marque and its agencies will cooperate with Company to facilitate the performance of the work described in the agreement. Company will perform the Work in accordance with the schedules/timetables described in detail in the attached **Exhibit A**.

In the event that one or more of the members of the Company cannot perform because of ill health, physical disability or other reasons beyond his/her control, Company shall use its best efforts to furnish a substitute of similar stature for such member of the Company whom City of La Marque agrees to accept. City of La Marque does not have to accept any substitutes provided by the Company but may contract a substitute of their own.

5. **CHANGES:** The City of La Marque may request changes in the scope of the services to be

performed hereunder. Such changes, including any increase or decrease in the amount of compensation to Company, which are mutually agreed upon by and between the City of La Marque and Company, shall be incorporated in written amendments to this Agreement. No changes in the terms of this Agreement shall be binding unless it is in writing and signed by an authorized representative of both parties.

6. **STANDARD OF CARE**: The standard of care for all services performed or furnished by Company under this agreement will be the care and skill ordinarily used by members of the subject profession practicing under similar circumstances at the same time and in the same locality.

7. **PERMITS**: The Company warrants and represents that it has obtained any and all permits, approvals, and licenses and necessary for **SERVICES BEING RENDERED**. All permits associated with the project shall be the sole responsibility of Company.

8. **INDEPENDENT CONTRACTORS**: The parties are independent contractors as to each other. Nothing in this Agreement shall be construed as creating any agency or employment relationship. Neither Party shall make any representations tending to create an apparent or implied agency or employment relationship; neither party has the authority to act for the other or to create obligations or debts binding on the other; and neither party shall be responsible for any obligations or expenses incurred by the other.

It is the intent of the parties to this agreement that the Company as an independent contractor will control the manner and means of its performance(s). The City of La Marque will control the scheduling of the performance(s). The exclusive nature of this agreement is limited to the duration of the performance, and it is expected that the performer will enter into other similar agreements with other customers.

9. **COMPLIANCE WITH LOCAL, STATE AND FEDERAL LAWS** – Company shall comply with all applicable laws, ordinances, and codes of the federal, state, and local governments.

10. **INSURANCE REQUIREMENTS**: Company shall provide all required City of La Marque certificates of coverage and all renewals throughout the duration of the Project. For each policy except Workers' Compensation protection, Company shall name City of La Marque as an additional insured and shall provide that the policy requires the insurance carrier to notify City of La Marque a minimum of thirty days (30) in advance of cancellation of all or part of the policy. All insurance policies are to be issued by an insurance company authorized to do business in the State of Texas and using an insurance company with an A.M. Best rating of B+ or better. All subcontractors utilized must also comply with these specifications as if they were the winning proposer.

11. **APPROPRIATIONS**: The obligations of City of La Marque to make payment under this Agreement are expressly subject to appropriations by the City of La Marque of funds that are lawfully available to be applied to such purpose.

12. **FORCE MAJEURE**: In the event that the performance of any of the covenants of this agreement shall be prevented by an act of God, pandemic, the acts and regulations of public

authorities, or labor disputes, acts of the public enemy, acts of superior governmental authority, or other circumstances, or cause beyond their or its reasonable control, City of La Marque and Company shall be respectively relieved of their obligations hereunder with respect to the performance(s) so prevented. In the above-mentioned event, Company grants City of La Marque the right to reschedule the performance(s) under the same terms and conditions of this Agreement.

13. **INDEMNIFICATION.** FOR CONSIDERATION RECEIVED, Company shall, to the extent allowable, indemnify, defend, save and hold City of La Marque of La Marque harmless, including City of La Marque's officers, agents, employees and servants, from any claims, actions, lawsuits, proceedings, damages, loss, judgments, liabilities or expense on account of damage to property and injuries, including death, to the extent caused by any negligent act, intentional tort, intellectual property infringement, or failure to pay a subcontractor or supplier of Company or those acting under Company's supervision or control. Company shall not be responsible, however, for any loss, damage, liability, or expense on account of damage to property and injuries, including death, by which may arise from the negligence of City of La Marque. Company shall comply with the requirements of all current applicable laws, rules and regulations and shall indemnify and hold harmless City of La Marque and its agency members from and against the failure to comply with those laws, and shall assume full responsibility for payments of Federal, State, and local taxes on contributions imposed or required under the Social Security, worker's compensation and income tax laws.

14. **COPYRIGHT:** The Company specifically warrants and represents that all copyrighted material to be performed has been licensed or authorized by the copyright owners or their representatives. The Company indemnifies City of La Marque for any copyright infringement and any expenses that may result from such copyright infringement during or as the result of the performance(s).

15. **TAXES** - Company will pay when due all taxes or assessments applicable to Company. Company will comply with the provisions of all Applicable Laws related to taxes and taxing authority.

16. **ASSIGNMENT:** Neither party hereto may assign its rights or delegate its obligations hereunder without the written consent of the other party.

17. **NO WAIVER:** The failure of any party to enforce any provision of this Agreement shall not be construed as a waiver or limitation of that party's right to subsequently enforce that or any other provision of this Agreement.

18. **SEVERABILITY CLAUSE:** The phrases, clauses, sentences, paragraphs, or sections of these conditions are severable. If any phrase, clause, sentence, paragraph, or section of these conditions should be declared invalid by the final decree or judgment of any court of competent jurisdiction, such invalidity shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of these conditions.

19. **ATTORNEY'S FEES:** In the event there is a dispute concerning this Agreement, each party shall be responsible for its own costs and expenses including attorneys' fees and court costs incurred in the course of any dispute, mediation, or legal proceeding.

20. **APPLICABLE LAW, VENUE, AND JURISDICTION:** This Agreement shall be performable in Galveston County, Texas and be construed under and in accordance with the laws of the State of Texas, with jurisdiction in the courts of the State of Texas and venue in Galveston, County. By execution of this Agreement, the parties agree to subject themselves to the jurisdiction of the Courts of the State of Texas in all matters relating to or arising out of this Agreement or the Work.

21. **NOTICES** - All notices required or permitted under this Agreement shall be in writing and shall be deemed given when delivered in person or three days after deposit in the United States Mail, postage prepaid, addressed to the party's address reflected at the end of this

Agreement. A party's notice address may be changed from time to time by that party's providing written notice to the other. A copy of the notice to City of La Marque shall be sent to:

City Attorney
City of La Marque
1111 Bayou Rd.
La Marque, Texas
77568

Company Name
(Address)
(Address)

22. **Dispute Resolution** - Parties shall attempt to resolve any payment disputes within sixty (60) days or the matter may be submitted to mediation.

Nothing herein shall hinder, prevent, or be construed as a waiver of City of La Marque's right to seek redress on any disputed matter in a court of competent jurisdiction.

Nothing herein shall waive or be construed as a waiver of the City of La Marque's sovereign immunity.

Neither the occurrence of an event giving rise to a breach of contract claim nor the pendency of a claim constitute grounds for the suspension of performance by Company, in whole or in part. City of La Marque and Company agree that any periods set forth in this Agreement for notice and cure of defaults are not waived, delayed, or suspended.

Except in the case of a breach of contract or termination for cause, in the event there is a dispute concerning this Agreement, each party shall be responsible for its own costs and expenses including attorneys' fees and court costs incurred in the course of any dispute, mediation, or legal proceeding.

23. **TERMINATION:** This Agreement may be terminated prior to completion of the Work by either party upon 10 days' written notice to the other. If, through any cause, Company shall fail to fulfill in a timely and proper manner his/her obligations under this Agreement, City of La Marque shall thereupon have the right to terminate this Agreement by giving written notice to Company of such termination and specifying the effective date thereof, at least five days before the effective date of such termination. In the event of early termination, City of La Marque shall pay Company for all work performed and expenses incurred to the date specified in the notice of termination. Notwithstanding the above, Company shall not be relieved of liability to City of La Marque for damages sustained by City of La Marque by virtue of any breach of the Agreement by Company or its subordinates and City of La Marque may withhold any payments to Company for the purpose of set-off until such time as the exact amount of damages due City of La Marque from Company is determined.

24. **BINDING EFFECT** - This Agreement is binding upon and inures to the benefit of the parties and their respective permitted successors and assigns.

25. **EXHIBITS** - All Exhibits attached hereto are incorporated herein by reference for all purposes as part of this Agreement. To the extent of any conflict, this Agreement will control.

Exhibit 1 – Scope of Work and Compensation

Exhibit 2 – Appendix B – Conflict of Interest Form Executed

Appendix C – House Bill 89, 13, 19 Verification Form Executed

Appendix D – Property Tax Statement Executed

Appendix E – Nepotism Statement Executed

Appendix F – Non-Collusion Statement Executed

Appendix G – Document 00435 Debarment

Exhibit 3 – Federal Clauses Executed

26. **ENTIRE AGREEMENT:** This Agreement supersedes all prior agreements, written or oral, between Company and City of La Marque and constitutes the entire and integrated Agreement and understanding between the parties with respect to the subject matter of the Agreement.

This Agreement may only be amended by a written instrument signed by both parties.

IN WITNESS WHEREOF, the parties have executed this Agreement in duplicate on the day and year first above written.

CITY OF LA MARQUE, TEXAS

Company

By: _____

City Manager

By: _____

ATTEST:

City Secretary

APPROVED AS TO FORM

City Attorney