

Leon County Hazard Mitigation Action Plan

2025

"Under the Federal Disaster Mitigation Act of 2000 (DMA 2000 or "the Act"), Leon County (County) is required to have a Federal Emergency Management Agency ("FEMA") - approved Local Hazard Mitigation Plan ("the Plan") in order to be eligible for certain pre- and post-disaster mitigation funds. Adoption of this Plan by the County and approval by FEMA will serve the dual objectives of providing direction and guidance on implementing hazard mitigation in the County, and qualify the County to obtain federal assistance for hazard mitigation. Solely to help achieve these objectives, the Plan attempts to systematically identify and address hazards that can affect the County. Nothing in this Plan is intended to be an admission, either expressed or implied, by or on behalf of the County, of any County obligation, responsibility, duty, fault or liability for any particular hazard or hazardous condition, and no such County obligation, responsibility, duty, fault or liability should be inferred or implied from the Plan, except where expressly stated."

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1. Introduction and Background

1) Participating Jurisdictions

The 2025 Leon County Hazard Mitigation Action Plan (HMAP) is an update of the County's most recent plan that expired in October 2024. The 2025 Plan update includes ten participating jurisdictions: Leon County, the City of Buffalo, the City of Centerville, the City of Jewett, the City of Leona, the City of Marquez, the City of Normangee, the City of Oakwood, Concord Robbins Water Service Company (WSC), and Flo Community Water Service Company (WSC).

2) Hazards to be Addressed

Previously, the expired plan identified 15 hazards facing the County: hurricane / tropical storms, drought, hailstorms, flooding, tornados, windstorms, wildfire, lightning, extreme heat, severe winter storms, dam/ levee failure (City of Normangee only), riverine erosion (Leon County only), Earthquakes (City of Jewett only), Expansive Soils (Leon County, City of Buffalo, City of Jewett, City of Marquez, City of Normangee, and City of Oakwood only), and land subsidence (Leon County, City of Centerville, City of Jewett, City of Normangee, and City of Oakwood only).

The mitigation planning regulation of the Disaster Mitigation Act¹ requires that mitigation plans be reviewed and updated every five years to maintain eligibility for mitigation grant funding. As part of this plan, Leon County will develop a schedule to ensure that its hazard mitigation plan is regularly updated.

The 2025 Leon County Hazard Mitigation Action Plan update will address the following natural hazards identified in the State of Texas' 2018 Hazard Mitigation Plan as threats throughout the state. The participating jurisdictions will address the following natural hazards listed below in Table 1.

¹ 44 CFR §201.6(d)(3)

Table 1: List of Hazards Addressed

Hazard	Jurisdiction									
	Leon County	City of Buffalo	City of Centerville	City of Jewett	City of Leona	City of Marquez	City of Normangee	City of Oakwood	Concord Robbins WSC	Flo Community WSC
Hurricanes, Tropical Storms and Depressions	X	X	X	X	X	X	X	X	X	X
Drought	X	X	X	X	X	X	X	X	X	X
Hailstorm	X	X	X	X	X	X	X	X	X	X
Flood	X	X	X	X	X	X	X	X	X	X
Tornados	X	X	X	X	X	X	X	X	X	X
Windstorms	X	X	X	X	X	X	X	X	X	X
Wildfire	X	X	X	X	X	X	X	X	X	X
Winter Weather	X	X	X	X	X	X	X	X	X	X
Lightning	X	X	X	X	X	X	X	X	X	X
Extreme Cold	X	X	X	X	X	X	X	X	X	X
Extreme Heat	X	X	X	X	X	X	X	X	X	X
Additional Optional Hazards										
Coastal Erosion										
Riverine Erosion	X									
Land Subsidence / Sinkhole										
Earthquakes										
Expansive Soils										
Dam Failure	X						X			

A) Omission Statements

Leon County and the participating jurisdictions will not be addressing the following hazards: Expansive Soils, Earthquakes, and Land Subsidence. The history of impacts for all the omitted hazards have been negligible (or non-existent), therefore the County and participating jurisdictions expect that future impacts will be negligible as well, nor do the County and participating jurisdictions anticipate applying for grant funding to address any of them.

Only Leon County will be profiling Riverine Erosion. The remaining jurisdictions will not be profiling riverine erosion as their boundaries face no impact from this hazard.

Only Leon County and the City of Normangee will be profiling Dam / Levee Failure. The remaining jurisdictions have no dams or levees nearby that pose an inundation risk and therefore face no impact.

2. Planning Process

The Leon County Hazard Mitigation Action Plan (HMAP) is a multi-jurisdiction plan. Representatives of the local planning team were selected by each jurisdiction. Planning team members represented the following offices and departments:

Table 2: Local Planning Team Representatives

Title	Jurisdiction
County Judge	Leon County
Emergency Management Coordinator	
Judge's Assistant	
County Auditor	
Assistant Auditor	
County Clerk	
Mayor	City of Buffalo
Assistant City Secretary	
Mayor	City of Centerville
City Manager	
Mayor	City of Jewett
City Secretary	
Public Works Director	
Mayor	City of Leona
Mayor Pro-Tem	
City Secretary	
Mayor	City of Marquez
City Manager	

Mayor	City of Normangee
City Secretary	
Mayor	City of Oakwood
City Secretary	
General Manager	Concord Robbins WSC
Field Manager	Flo Community WSC
Office Manager	

Once the planning team was established, members developed a schedule with specific goals and proposed meeting dates over the planning period.

Hazard mitigation planning team (HMPT) members contributed to the following activities throughout the planning process:

1. Providing technical assistance and necessary data to the HMPT.
2. Scheduling, coordinating, and facilitating community meetings.
3. Providing necessary materials for public planning meetings.
4. Collecting and analyzing data.
5. Developing mitigation goals and implementation strategies.
6. Preparing the first draft of the plan and providing technical writing assistance for review, editing, and formatting.

Each member of the HMPT participated in the following activities associated with development of the plan:

1. Identifying, contacting, coordinating, and implementing input from stakeholders.
2. Attending, conferencing in, or providing meeting support and information for regular HMPT meetings.
3. Identifying hazards and estimating potential losses from future hazard events.
4. Developing and prioritizing mitigation actions to address identified risks.
5. Coordinating public meetings to develop the plan.
6. Identifying community resources available to support planning effort.
7. Submitting proposed plan to all appropriate departments for review and comment and working with the County to incorporate the resulting comments into the proposed plan.

Table 3: Plan Schedule

Timeline												
Project Tasks	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
Organize Resources and Identify Planning Team												
Create Outreach Strategy												
Review Community Capabilities												
Conduct Risk Assessment												
Identify Mitigation Goals and Actions												
Develop Action Plan for Implementation												
Identify Plan Maintenance Procedures												
Review Final Draft												
Submit Plan to State and FEMA												
Adopt Plan												
Meetings												
Planning Team	10/22/24				2/20/2025							
Public Outreach												

Stakeholder Outreach												
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1) Existing Plans, Reports, Ordinances, and Technical Information Sources

Each planning team member worked to collect and provide the input and information necessary to develop the hazard mitigation strategy. Research was coordinated and conducted by local planning team members. The local planning team reviewed the following documents during the planning process:

Table 4: Planning Team Data Sources

Data Source	Data Incorporation	Purpose
National Centers for Environmental Information (NCEI)	Hazard occurrences	Previous event occurrences, damage dollars, and mapping for all hazards
National Oceanic and Atmospheric Administration (NOAA)	Historic Weather Data	Previous event occurrences, damage dollars, and mapping for all hazards
State of Texas Hazard Mitigation Plan 2018 Update	Hazard Descriptions	Official descriptions of hazards and their potential impacts
Estimated Base Flood Elevation – Federal Emergency Management (FEMA)	Flood Zones maps	GIS mapping of flood zones and potential flooding risk areas
Leon County Hazard Mitigation Plan, 2019-2024	Previous planning approach, hazards addressed, and mitigation actions	Previous planning team representatives, plan maintenance, hazard histories, and mitigation actions
Leon County Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Buffalo Comprehensive Plan	Long range city planning approach	Long range city planning strategy and goals
City of Buffalo Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Buffalo Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact
City of Buffalo Manufactured Housing Ordinance	Requirements for Manufactured Housing in City	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Buffalo Nuisance Ordinance	Nuisance definitions and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Buffalo Substandard Structures Ordinance	Substandard property definition and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events

City of Buffalo Street and Drainage Ordinance	Construction requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Centerville Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact
City of Jewett Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Centerville Substandard Structures Ordinance	Substandard property definition and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Centerville Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Jewett Minimum Property Standards	Minimum Standards for property owners	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Jewett Junked Vehicle Ordinance	Junked vehicle definition and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Jewett Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Jewett Minimum Property Standards	Minimum Standards for property owners	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Jewett Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact
City of Jewett Substandard Structures Ordinance	Substandard property definition and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Jewett Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Jewett Zoning Ordinance	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure
City of Marquez Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact
City of Marquez Community Wildfire Protection Plan	Wildfire Planning	Identifying City strategies in preparation for wildfire events

City of Marquez Manufactured Housing Ordinance	Requirements for Manufactured Housing in City	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Marquez Nuisance Ordinance	Nuisance definitions and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Marquez Junked Vehicle Ordinance	Junked vehicle definition and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Normangee Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Normangee Junked Vehicle Ordinance	Junked vehicle definition and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Normangee Nuisance Ordinance	Nuisance definitions and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Oakwood Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Oakwood Substandard Structures Ordinance	Substandard property definition and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Oakwood Manufactured Housing Ordinance	Requirements for Manufactured Housing in City	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Oakwood Nuisance Ordinance	Nuisance definitions and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events

Additional information sources included: USDA Census of Agriculture, United States Geological Survey, Vaisala, and specific details about previous natural hazard events from planning team participants. Sources are noted throughout the document. Report titles and links to the most recently accessed websites hosting the related information are also noted, where appropriate.

Area stakeholders contacted to participate in the planning process included the following offices and departments within the participating jurisdictions and neighboring jurisdictions. In

many cases of non-participation, the title listed is reflective of the office the planning team tried to contact.

Table 5: Local Stakeholders Contacted

Stakeholder	Title	Participated
Freestone County	Emergency Management Coordinator	N
Anderson County	Emergency Management Coordinator	Y
Houston County	Emergency Management Coordinator	N
Madison County	Emergency Management Coordinator	N
Robertson County	Emergency Management Coordinator	N
Limestone County	Emergency Management Coordinator	Y
Brazos County	Emergency Management Coordinator	N
Lord's Pantry	Director	N
City of San Perlita	Hazard Mitigation Project Manager	N
Centerville United Methodist Church	Library food distribution center coordinator	N
Texas A&M University	Leon County Extension Agent - Agriculture and Natural Resources	N
Texas A&M University	Leon County Extension Agent -Family and Community Health	N
North Creek Baptist Church	Food Pantry Coordinators	N
All Around Cowboy Church	Pastor	N
Son-Shine Center Food Pantry	Coordinator	N
Oakwood Community Food Pantry	Coordinator	N

Area stakeholders were contacted by phone and email. Each stakeholder was contacted at least twice in an effort to increase participation. Local academia, businesses, community based- and/or non-profit organizations were contacted in order to reach a diverse group of stakeholders. Those organizations included the Texas A&M AgriLife Extension, Lord's Pantry, Centerville United Methodist Church Food distribution Center, North Creek Baptist Church Food

Pantry, All Around Cowboy Church Food Pantry, Son-Shine Center Food Pantry, and Oakwood Community Food Pantry. These organizations focus on multiple community needs such as education, food, health and safety, and financial stability. Area stakeholders who chose to participate provided important supplemental input and information that helped shape mitigation strategies for each hazard, by making the planning team aware of actions neighboring communities were successful in implementing, and what actions they think should take priority.

2) Project Meetings

The planning team met on two separate occasions. Additional communication was regularly carried out via email and over the phone.

The first planning team meeting was held virtually on October 22, 2024. During this meeting, the planning team decided which hazards needed to be addressed in the mitigation plan and which were not relevant. To make these decisions, a hazard handout was produced to show previous occurrences of each hazard, associated deaths and injuries, and total dollar damages. The team agreed to use the collected hazard data, as the foundation for its hazard risk assessment and ongoing research into hazard extent, impact, and vulnerability. At the end of the meeting, planning team members were tasked with compiling relevant data, including city ordinances; identifying critical facilities; identifying stakeholders, and completing a capability assessment.

The second planning team meeting was virtually on February 20, 2025. To stay on schedule, the planning team needed to meet the following objectives: Provide a status update on previous mitigation actions, review and refine the critical facilities list, and review possible mitigation actions and potential eligible projects for each participant. The planning team discussed and identified new mitigation actions, discussed changes to the plan drafts, and agreed to work on completing all deliverables for the plan. Additional work was done over email in preparation for submitting the plan for official review in October 2025.

3) Public Input

Members of the public were invited to participate in two public comment periods to provide input and feedback during the planning process. The public comment periods were held virtually. The first public comment period took place in May 2025. A Microsoft Form survey was posted to the County website and Facebook page for a period of two weeks for members of the public to fill out. A newspaper ad was placed to announce to the public for the opportunity to provide input via online survey. In an effort to reach the widest audience possible, especially socially vulnerable populations, the County and participating jurisdictions actively announced the online survey through newspaper ads and on their own websites. Stakeholders who support vulnerable populations were also provided with a link to the survey and encouraged to share it with their community. The planning team appreciated receiving responses to the survey which

helped inform them when identifying and prioritizing new mitigation actions for this plan update. However the survey received only 1 anonymous response.

The survey asked nine questions:

1. Where do you live?
2. Do you own or rent?
3. Leon County is looking at addressing the following hazards. Which hazards do you believe impact the County and/or participating cities the most? Please select all that apply (multiple choice answer).
4. Which of the above hazards have affected you directly within the past five years? Please select all that apply (multiple choice answer).
5. How have you been affected by the hazards selected above? (Open-ended question)
6. Have you taken any actions to reduce your risk to these hazards? If so, what actions have you taken? (Open-ended question)
7. Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community? Please check all that apply (multiple choice answer).
8. What is the best means of communication for you? Please select all that apply (multiple choice answer).
9. Do you have any other thoughts or concerns relating to the Hazard Mitigation Plan? (Open-ended question).

1. Where do you live? Please include the name of your town/city/community, if applicable.

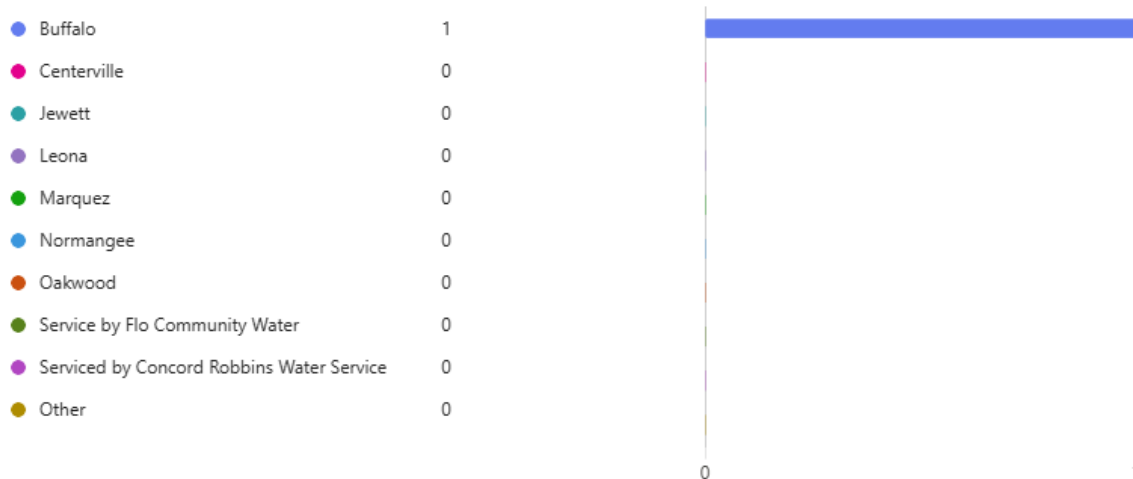


Figure 1: Survey Responses for Question 1

2. Do you own your home/ property?

Own	1
Rent	0
Both	0



Figure 2: Survey Responses for Question 2

3. Leon County is looking at addressing the following hazards. Which hazards do you believe impact the County and/or participating cities the most? Please select all that apply.

Hurricanes / Tropical Storms	0
Drought	1
Hailstorm	0
Flooding	1
Tornado	1
Windstorm	1
Wildfire	1
Winter Weather	0
Lightning	1
Extreme Cold	0
Extreme Heat	0



Figure 3: Survey Response for Question 3

The chart in Figure 3 above shows the breakdown of responses for survey question three. Drought, Hailstorm, Flooding, Tornadoes, Windstorms, Wildfire, and Lightning ranked the highest out of all the hazards addressed in the plan, with each choice getting more than 100% of the votes.

4. Which of the above hazards have affected you directly within the past five years? Please select all that apply.

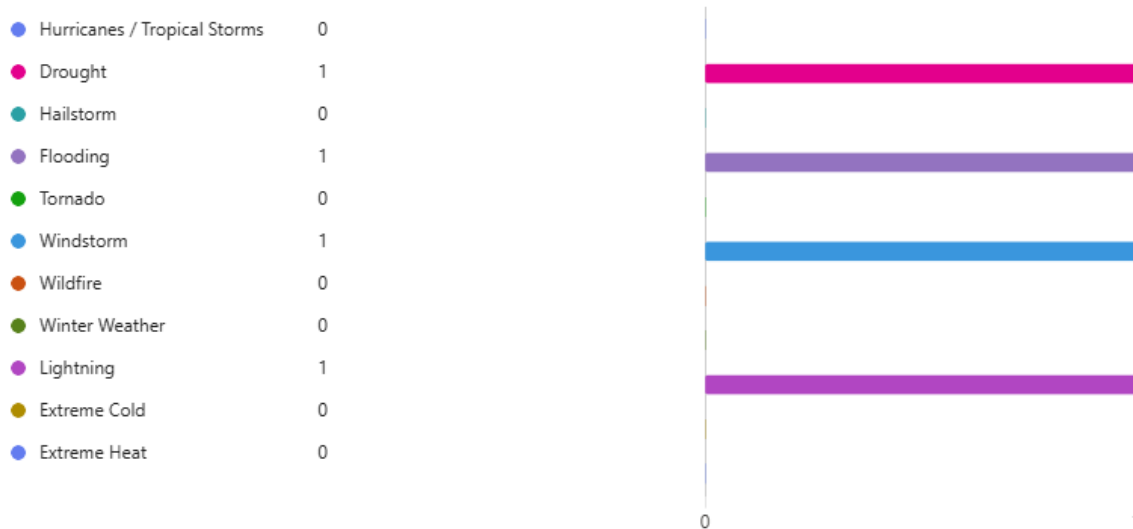


Figure 4: Survey Response for Question 4

5. How have you been affected by the hazards selected above?



Figure 5: Survey Response for Question 5

6. Have you taken any actions to reduce your risk to these hazards? If so, what actions have you taken?

[More details](#)

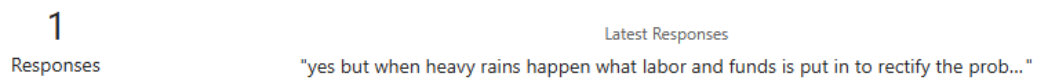


Figure 6: Survey Response for Question 6

7. Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community? Please check all that apply.

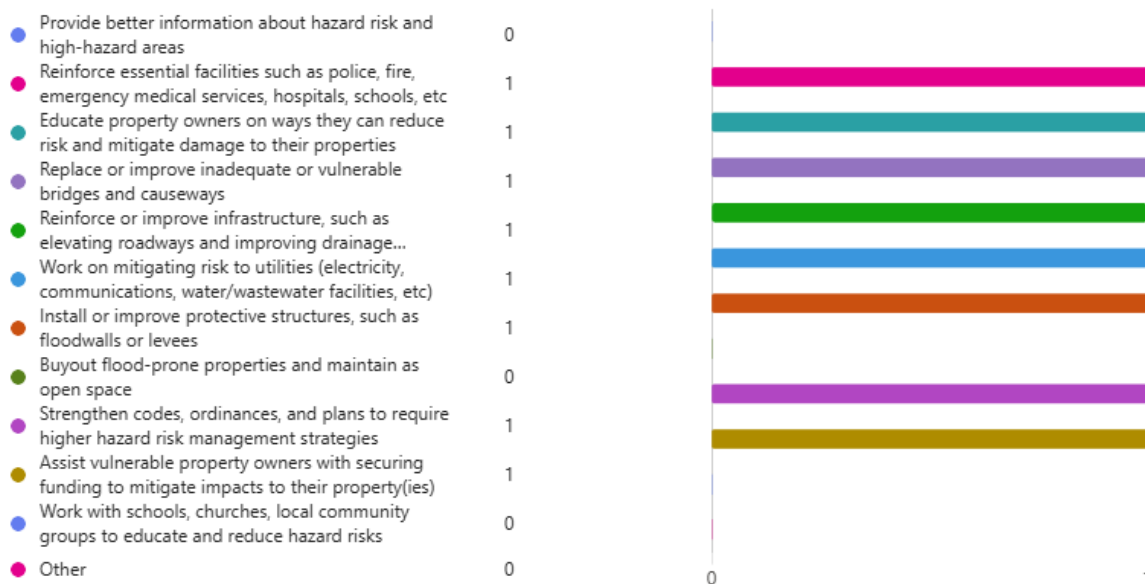


Figure 7: Survey Choices for Question 7

Figure 7 shows the choices for Question 7: Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community? Please check all that apply. Respondents could choose from 11 answers such as “Provide better information about hazard risk and high-hazard areas,” “Reinforce or improve infrastructure, such as elevating roadways and improving drainage systems,” “Install or improve protective structures, such as floodwalls or levees,” or input their own answer. The most popular answers were: “Reinforce essential facilities such as police, fire, emergency medical services, hospitals, schools, etc,” “Educate property owners on ways they can reduce risk and mitigate damage to their properties,” “Replace or improve inadequate or vulnerable bridges and causeways,” “Reinforce or improve infrastructure, such as elevating roadways and improving drainage systems,” “Work on mitigating risk to utilities (electricity, communications, water/wastewater facilities, etc),” “Install or improve protective structures, such as floodwalls or levees,” “Strengthen codes, ordinances, and plans to require higher hazard risk management strategies,” and “Assist vulnerable property owners with securing funding to mitigate impacts to their property(ies),” with 100% of respondents voting for those interventions.

The second public comment period took place in October 2025. A copy of the in-progress plan draft was posted to the County website for two weeks for the public to review and comment or provide suggestions. This public comment period was advertised in the newspaper and shared on social media. X responses were received.

4) Plan Maintenance

The hazard mitigation plan is not a static document. As conditions change and mitigation actions are implemented, the plan will need to be updated to reflect new and changing conditions in each jurisdiction.

The planning team has identified specific departments to oversee action implementation in each jurisdiction. The planning team has also identified potential funding sources and an implementation timeframe for each mitigation action. The expected timeframes will be an important component in determining whether actions are implemented efficiently. The departments or persons identified for each jurisdiction include but are not limited to:

Table 6: Maintenance Responsibility

Title	Jurisdiction	Agency or Department
County Judge	Leon County	County Judge
Emergency Management Coordinator	Leon County	Emergency Management
County Auditor	Leon County	County Administration
County Clerk	Leon County	County Administration
Mayor	City of Buffalo	Mayor's Office
Assistant City Secretary	City of Buffalo	City Administration
Mayor	City of Centerville	Mayor's Office
City Manager	City of Centerville	City Administration
Mayor	City of Jewett	Mayor's Office
City Secretary	City of Jewett	City Administration
Public Works Director	City of Jewett	Public Works
Mayor	City of Leona	Mayor's Office
City Secretary	City of Leona	City Administration
Mayor	City of Marquez	Mayor's Office
City Manager	City of Marquez	City Administration

Mayor	City of Normangee	Mayor's Office
City Secretary	City of Normangee	City Administration
Mayor	City of Oakwood	Mayor's Office
City Secretary	City of Oakwood	City Administration
General Manager	Concord Robbins WSC	Administration & Operations
Field Manager	Flo Community WSC	Administration & Operations

Within one year of adoption of this plan, each department or agency will review and, as appropriate, integrate implementation of their respective mitigation actions with their existing internal plans and policies relating to capital improvements, land use, design and construction, and emergency management.

On a biannual basis, representatives from each jurisdiction serving as the planning team will evaluate progress on implementing the plan's mitigation actions. The planning team will review departmental / agency findings, public input, and future development plans to evaluate the effectiveness and appropriateness of the plan.

Considering changing funding sources, hazard vulnerability, and local mitigation priorities, the planning team will identify changes to plan goals and priorities for their respective jurisdictions, and they will report their findings to the rest of the planning team. It will be the planning team's responsibility to identify relevant reasons for delay or obstacles to completing the plan's mitigation actions, along with recommended strategies to overcome any deficiencies.

Any significant change to the plan will require the County and participating jurisdictions to provide opportunities for the public to make its views and concerns known. Leon County and the participating jurisdictions will provide notice to the public through announcements in the local paper, fliers posted at City and County offices, and on the County's website and/or social media accounts.

5) Plan Monitoring

The Leon County Emergency Management Coordinator (EMC) will be responsible for the overall continued coordination and monitoring of the mitigation plan in its entirety, including but not limited to the planning process, risk assessment, strategy, and the actions assigned for each hazard. The agency or department identified above in Table 6 shall serve as the responsible party for each respective jurisdiction. The plan monitoring worksheet outlined below will serve as the basis for revision of the plan.

At a minimum, the mitigation plan will be reviewed by the EMC and planning team representatives from each jurisdiction quarterly, during budget workshops, and as other plans are being developed or revised including comprehensive plans, capital improvement project plans, and emergency plans.

Regularly monitoring the plan implementation process in each participating jurisdiction will ensure that every component of the plan gets reviewed for potential amendments.

After adoption of this plan, it will be posted to each participating jurisdiction's website or Facebook page, and a printed copy will be available for review in the Office of Emergency Management. The goal is to create the opportunity for constant and continued feedback from local officials, stakeholders, and the public.

6) Plan Evaluation

Proper evaluation will measure the progress and effectiveness of the mitigation actions identified in the plan. On a bi-annual basis the Emergency Management Coordinator along with the planning team representatives from each jurisdiction will use the following criteria, along with additional metrics as necessary, to assess the effectiveness of the plan in its entirety, including but not limited to the planning process, risk assessment, strategy, and the actions:

- Do the specified goals and objectives still address current and expected conditions?
- Has the nature, magnitude, and/or risk of any hazard changed?
- Have there been changes in land development that the plan needs to address?
- Are available resources suitable for implementing the plan?
- Is funding budgeted or available to successfully implement prioritized mitigation actions?
- Are there opportunities in the local budgeting process or local, state, and national grant funding cycles to increase funding to implement mitigation actions?

Other steps will include site visits to completed mitigation projects in each jurisdiction to measure and ensure their success. The planning team will evaluate the causes of the shortcoming in the event that a mitigation project fails to meet its goal. The planning team will use their assessment to amend the project and related projects in other jurisdictions, allocate additional resources to achieve the desired outcome for the project and related projects in other jurisdictions, or replace the project and similar projects in other jurisdictions with better projects.

The EMC and planning team members will also work to implement any additional revisions required to ensure that the plan and their respective jurisdiction is in full compliance with federal regulations and state statutes.

The approved plan will be hosted on the County website to allow the public to view and provide feedback during the 5-year lifespan of the plan.

7) Plan Update

The plan is designed to address a five-year period. In accordance with 44CFR Section 201.6, it will be updated every five years to maintain compliance with State and Federal regulations. However, at least every two years from the date of approval, and quarterly on the fifth and final year of the plan, the EMC and planning team representatives from each participating jurisdiction will thoroughly review any significant changes in their respective jurisdictions that might impact the plan update.

During the update process, planning team representatives will do the following for their respective jurisdictions: collect data on recent occurrences of each natural hazard identified in the plan, record how each natural hazard impacted their jurisdiction during the preceding years, determine whether or not implemented mitigation actions produced the desired outcomes in their jurisdiction, and determine whether or not to modify their jurisdiction's list of hazards to be addressed in the update.

Additional considerations to address on a jurisdictional level include but are not limited to changes in local development, changes in exposure to natural hazards, the development of new mitigation capabilities or techniques, and revisions to state or federal legislation.

The update process will provide continued opportunity for the public and elected officials to determine which actions succeeded, failed, or are no longer relevant. It is also an opportunity for each jurisdiction to identify recent losses due to natural hazards and to consider whether any of those losses could have been avoided.

3. Determining Risk

1) Risk Assessment

Throughout the plan, each hazard addressed will be considered in light of its history, likelihood of future events, extent, jurisdictional vulnerability, location and impact.

Likelihood of Future Events is measured based on a hazard's expected frequency of occurrence in terms of previous frequency. Each hazard's likelihood of future events will be considered using the following standardized parameters:

- **Highly likely** – event probable in the next year
- **Likely** – event probable in the next three years
- **Occasional** – event possible in the next five years
- **Unlikely** – event possible in the next 10 years

Given this plan's five-year duration, hazards likely to occur during that period will be given priority when selecting and prioritizing mitigation actions.

The populations of Leon County, and the Cities of Buffalo, Jewett, Leona, Normangee and Oakwood have stayed relatively consistent over the last five years, and there has been little development. The Cities of Centerville and Marquez have seen moderate population growth and new housing in the past five years. Concord Robbins WSC has seen progressive population growth at an average of 3% annually. Flo Community WSC has also seen population growth, with 2 new subdivisions comprising approximately 200-250 new water meters in the past five years. This population growth increases the potential vulnerabilities of residents to future hazards. Additionally, the effects of climate change have increased the frequency and intensity of hazard events. Climate change is expected to exacerbate hazard events in the future. Climate change may also affect population migration and land use development in the future. As climate change exacerbates hazards, habitability of certain areas may be impacted. It is unclear how these effects will intersect with population migration patterns and land use changes. Additionally, populations within participating jurisdictions may consider relocation if appropriate measures are not taken.

A) Major Disaster Declarations

The following table outlines all major disaster declarations that have occurred in Leon County since the 2018 HMAP.

Table 7: Major Disaster Declarations since 2019

Leon County Major Disaster Declarations		
Disaster	Incident Period	Declaration Date
DR-4485 Texas Covid-19 Pandemic	January 20, 2020 – May 11, 2023	March 25, 2020
DR-4586 Texas Severe Winter Storms	February 11, 2021 - February 21, 2021	February 19, 2021
DR-4705 Texas Severe Winter Storm	January 30, 2023 - February 2, 2023	April 21, 2023
DR-4781 Texas Severe Storms, Straight-line Winds, Tornadoes, and Flooding	April 26, 2024 - June 5, 2024	May 17, 2024
DR-4798 Hurricane Beryl	July 5, 2024 – July 9, 2024	July 9, 2024

2) Distribution of Property by Housing Density and Potential Damage Values

Table 8: Estimated Values by Location²

Category	Leon County	City of Buffalo	City of Centerville	City of Jewett	City of Leona	City of Marquez	City of Normangee	City of Oakwood
Total Housing Units³	9,018	965	482	417	125	101	416	263
Housing Unit Density (per square mile)	8 units/sq . mi	102 units/sq . mi	278 units/sq . mi	199 units/sq . mi	57 units/sq . mi	77 units/sq . mi	371 units/sq . mi	233 units/sq . mi
Median Housing Value⁴	\$177,400	\$62,300	\$115,924	\$117,800	\$185,500	\$146,870	\$186,400	\$102,000
Estimated Value of Housing Units⁵	\$1.6 billion	\$60.12 million	\$55.88 million	\$49.12 million	\$23.19 Million	\$14.83 Million	\$77.54 million	\$26.83 million

3) Distribution of Vulnerable Populations

The planning team identified a set of indicators it could use to identify each jurisdiction's vulnerable population. The indicators include demographic data like age and income, as well as geographic data including the location of low income or subsidized housing units, concentrations of manufactured and mobile homes, and concentrations of homes in substandard condition.

A) Age, Disability, and Income

The populations of each jurisdiction were broken down into four categories: young residents, elderly residents, disabled residents, and low-income residents. Residents falling into these

² Source: U.S. Census 2023 American Community Survey 5-Year Estimates.

³ Table [B25001](#) 2023 ACS Housing unit information for Leon County includes totals for cities and unincorporated areas.

⁴ Table [B25077](#) 2023 ACS

⁵ Total value of housing units derived from median value multiplied by number of units

categories were deemed most likely to suffer disproportionate losses due to natural hazards because of their potentially limited means to prepare for and recover from a hazard event.

Table 9: Age, Disability, and Poverty Level Percentages by Jurisdiction⁶

Demographic Category	Leon County	City of Buffalo	City of Centerville	City of Jewett	City of Leona	City of Marquez	City of Normangee	City of Oakwood	Texas	U.S.
Population Under Age 5⁷	5.3%	13%	3.8%	4.8%	5.8%	11.3%	0.0%	1.6%	6.5%	5.7%
Population Over Age 65	23.7%	15.9%	17.1%	5.3%	18.1%	11.4%	7.2%	40.2%	13.2%	16.8%
Disability Status⁸	22.5%	13.4%	36.7%	8%	5.1%	16.1%	13.2%	33.3%	12 %	13%
Individuals Below Poverty Level⁹	9.9%	11.9%	8.3%	26.8 %	0.0%	21.6%	2.8%	11.6%	10.5%	8.7%

B) Distribution of Vulnerable Populations

The following vulnerable populations maps are based on a social vulnerability index created specifically for the planning area. The index considers six relevant Census Block Group-level factors: poverty rate, population of residents 65 years old and older, population of residents younger than 18, the population of residents without a high school diploma or GED, the population of residents with a low English proficiency, and the number of homes constructed before 1980.

⁶ Source: U.S. Census 2023 American Community Survey 5-Year Estimates

⁷ [Table S0101](#), Age and Sex, 2023 ACS 5-Year Estimates

⁸ [Table S1810](#), Disability Characteristics. The U.S. Census defines a person as having a work disability if one or more of the following conditions are met:

1. Persons with a health problem or disability which prevents them from working or which limits the kind or amount of work they can do
2. Persons who have retired or left a job for health reasons
3. Persons currently not in the labor force because of a disability.
4. Persons who did not work at all in the previous year because of illness or disability
5. Under 65 years old and covered by Medicare in previous year.
6. Under 65 years old and received Supplemental Security Income (SSI) in previous year.
7. Received VA disability income in previous year.

⁹ [Table DP03](#), Selected Economic Characteristics, 2023 5-Year Estimates

To create the index, each factor is re-scaled by assigning the largest population in each category a score of 1. The remaining population counts for each category are then given a score based on the ratio of the relevant population to the largest population. Once each factor has a re-scaled score, the scores for each factor are totaled to create an overall index number for each Census Block Group. The vulnerable populations map is representative of each Census Block Group's overall vulnerability, based on the six factors outlined above, relative to the other Census Block Groups in the planning area.

I. Leon County

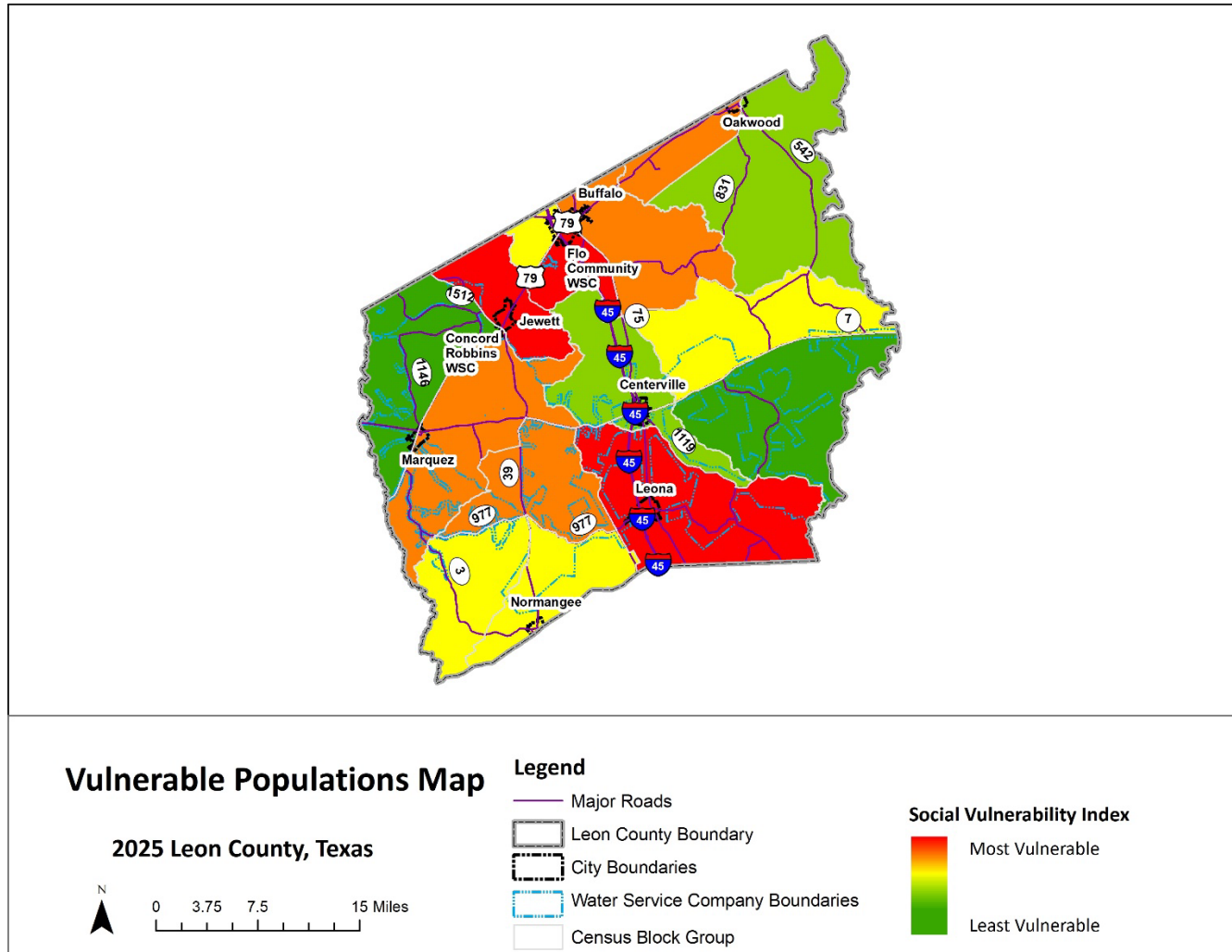


Figure 8: Leon County Social Vulnerability Index

II. City of Buffalo

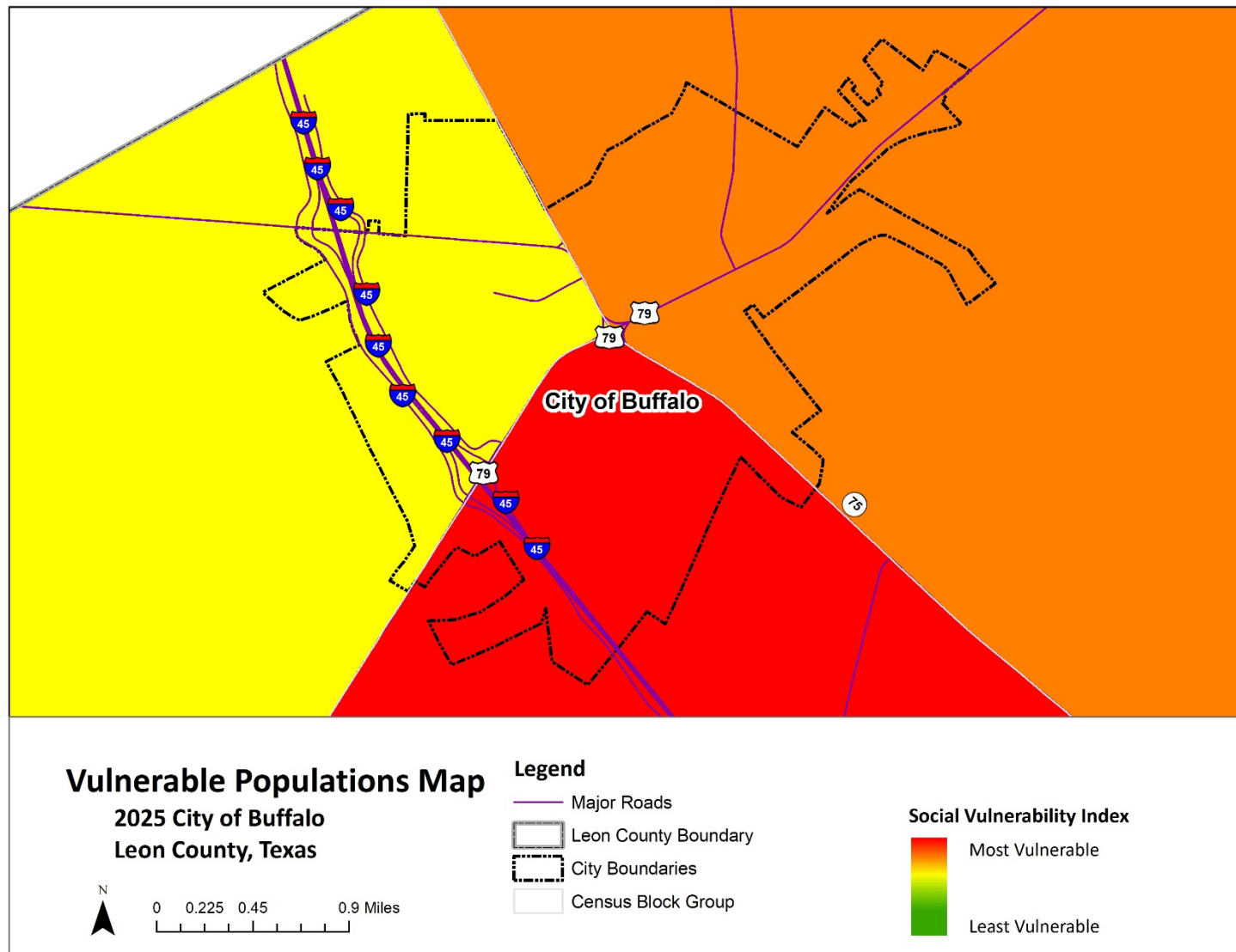


Figure 9: City of Buffalo Social Vulnerability Index

III. City of Centerville

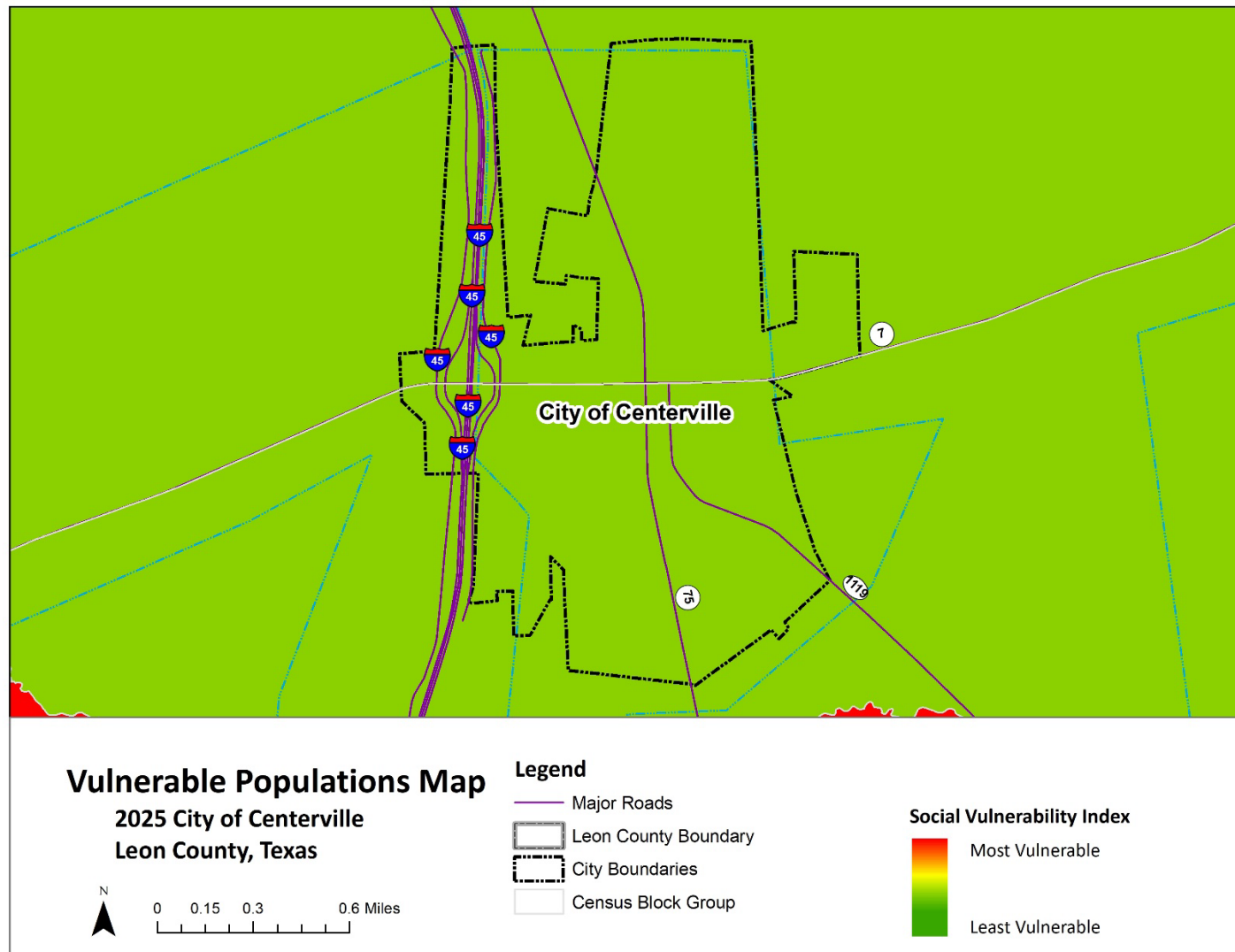


Figure 10: City of Centerville Social Vulnerability Index

IV. City of Jewett

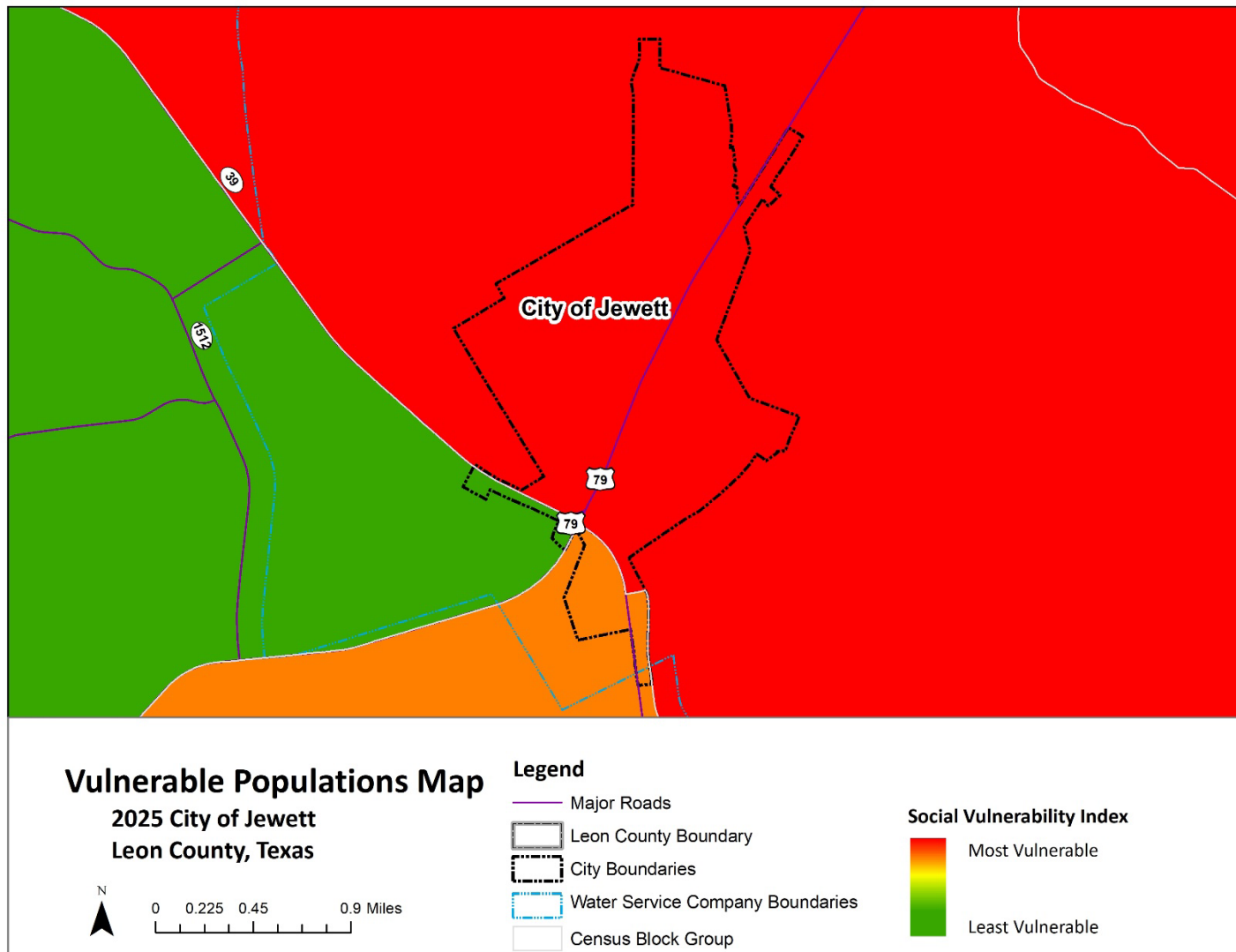


Figure 11: City of Jewett Social Vulnerability Index

V. City of Leona

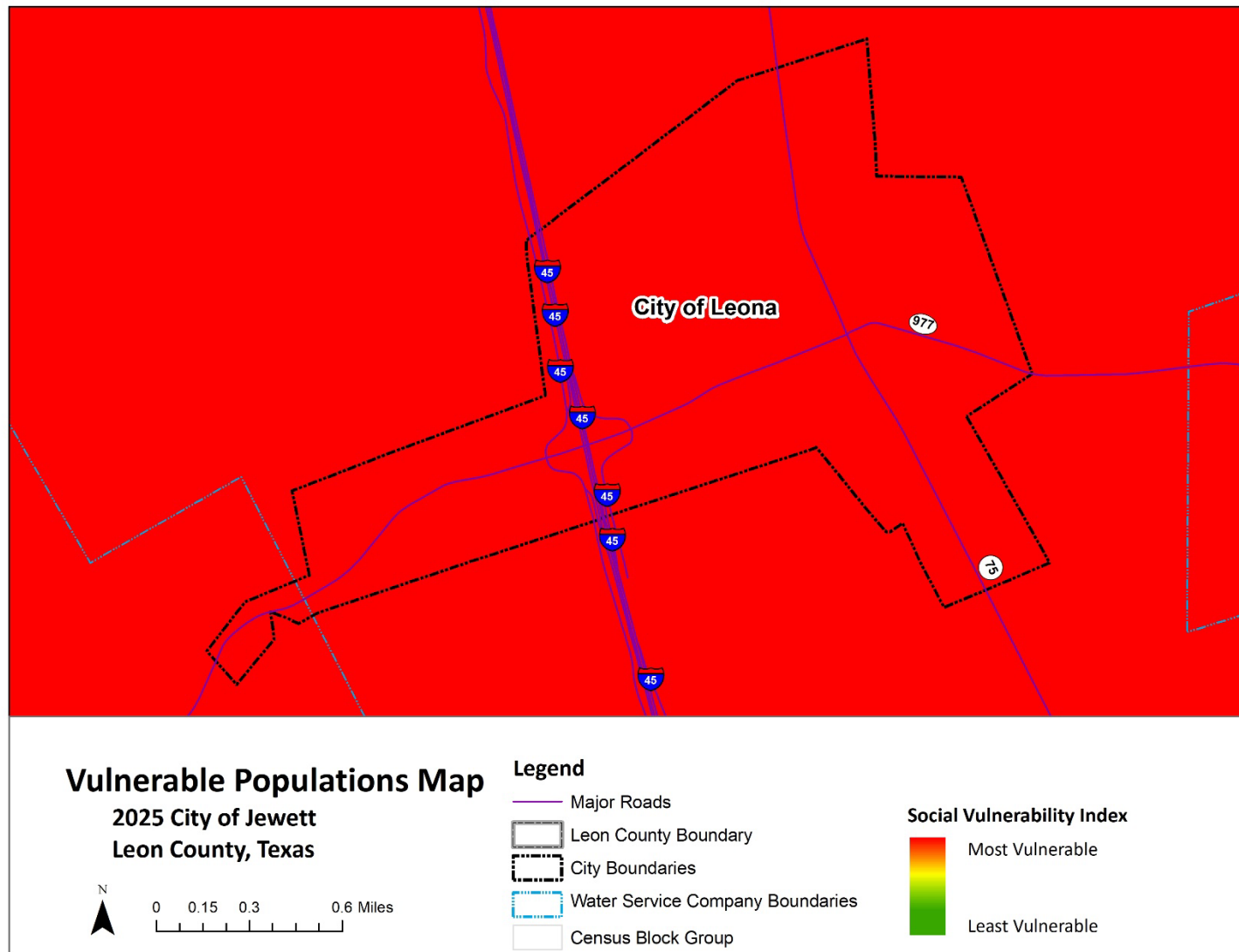


Figure 12: City of Leona Social Vulnerability Index

VI. City of Marquez

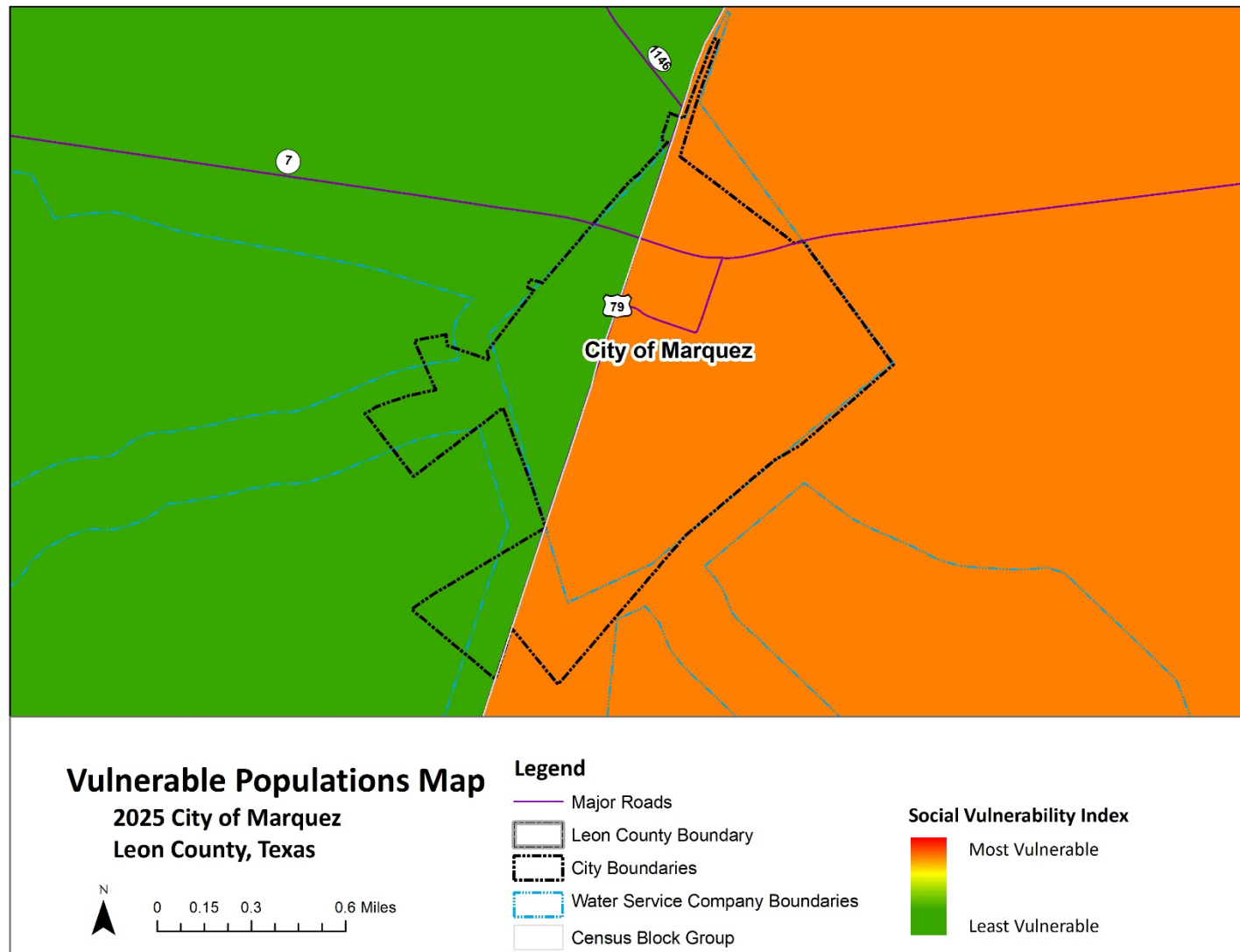


Figure 13: City of Marquez Social Vulnerability Index

VII. City of Normangee

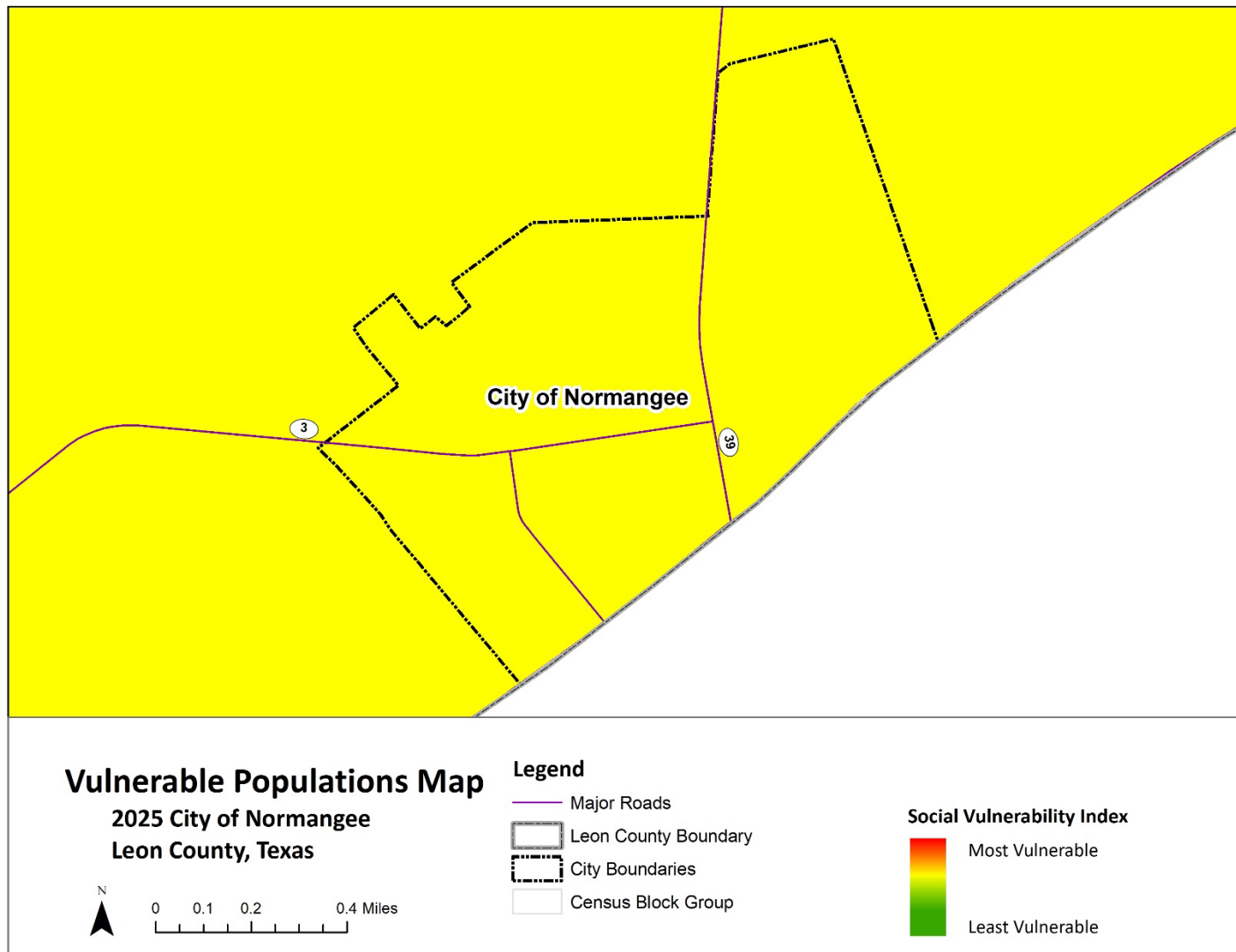


Figure 14: City of Normangee Social Vulnerability Index

VIII. City of Oakwood

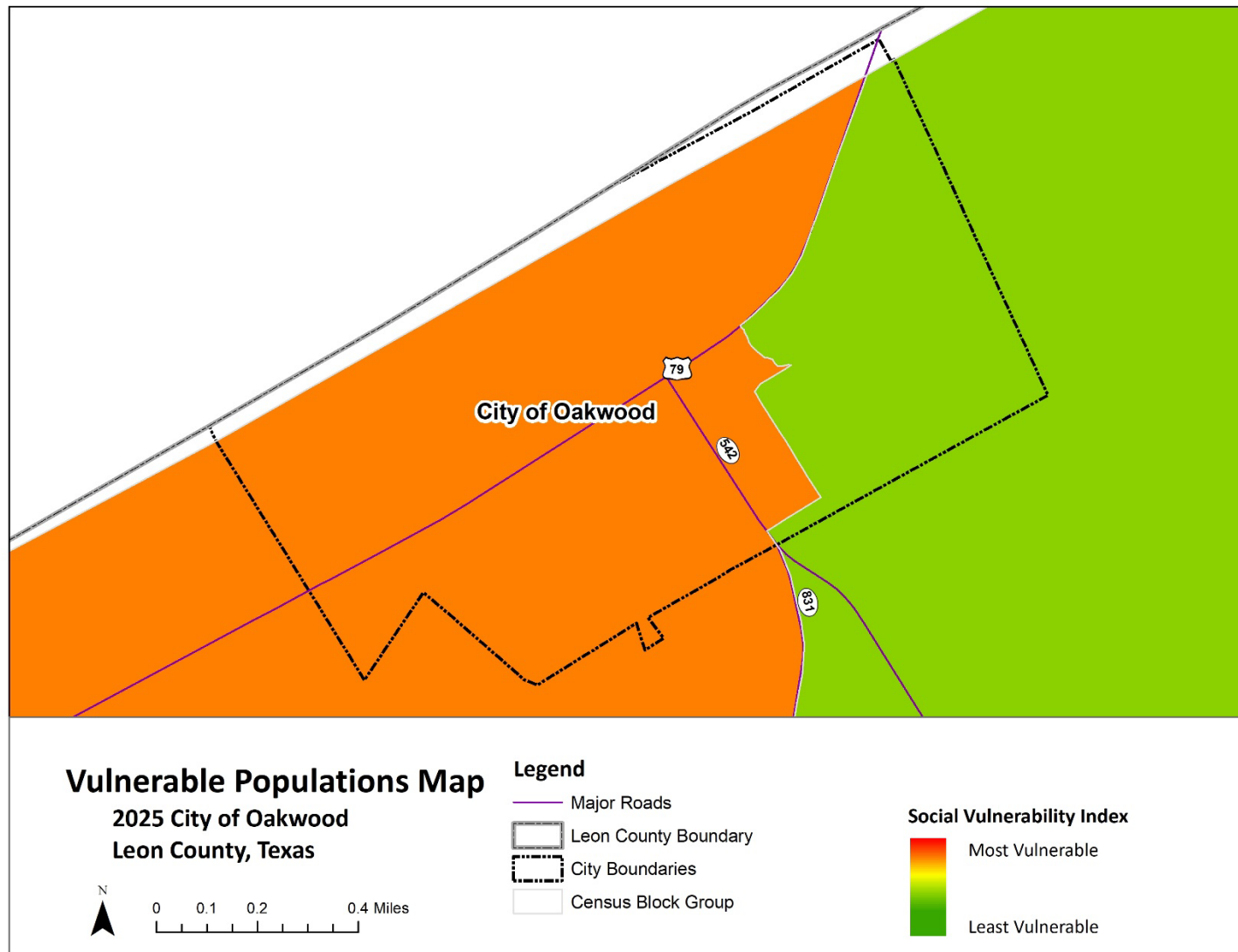


Figure 15: City of Oakwood Social Vulnerability Index

IX. Concord Robbins WSC

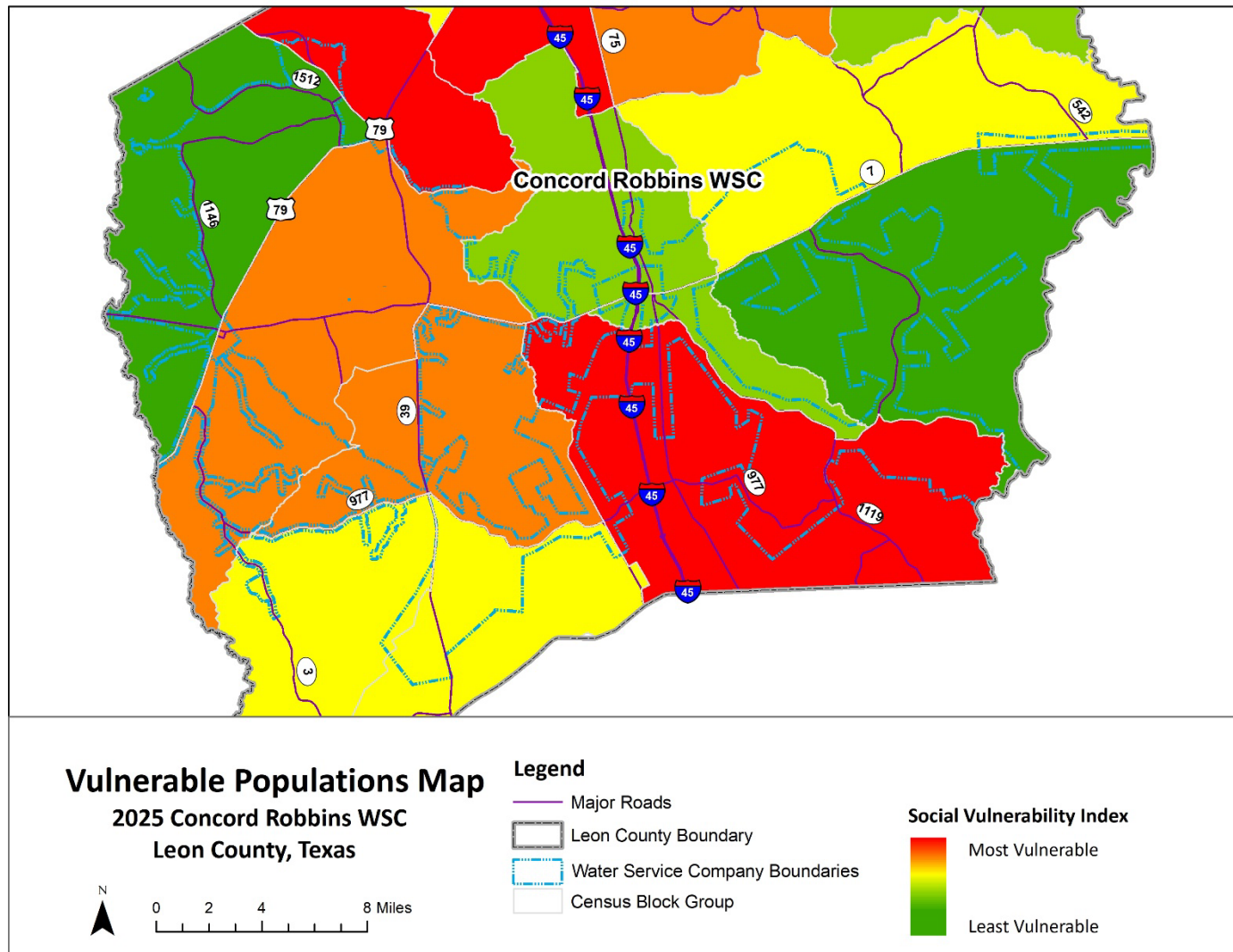


Figure 16: Concord Robbins WSC Social Vulnerability Index

X. Flo Community WSC

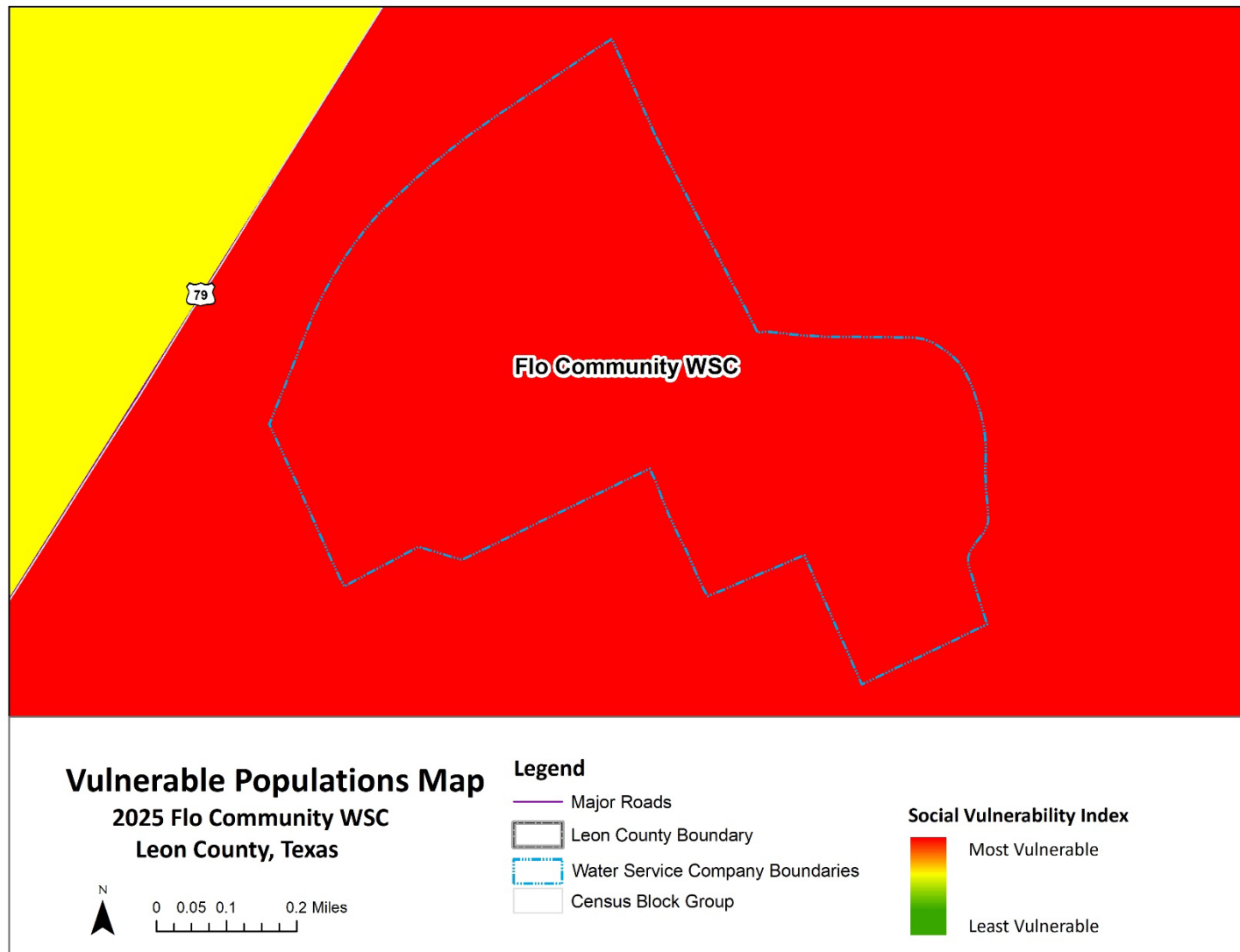


Figure 17: Flo Community WSC Social Vulnerability Index

C) Low Income and Subsidized Housing

Low-income residents in Leon County are primarily served through rental assistance programs and low-income housing. The Centerville Housing Authority is the primary operator of low-income housing in the County¹⁰. There is one facility 50 units in Leon County, the majority of which are in the City of Centerville.¹¹

Residents of low-income housing and/or subsidized housing facilities are expected to suffer disproportionate losses due to natural hazards because of their potentially limited means to prepare for and recover from a hazard event.

D) Housing Type and Condition

The participating jurisdictions have used housing type and housing conditions to identify additional vulnerable areas and concentrations of vulnerable residents.

I. Manufactured / Mobile Homes

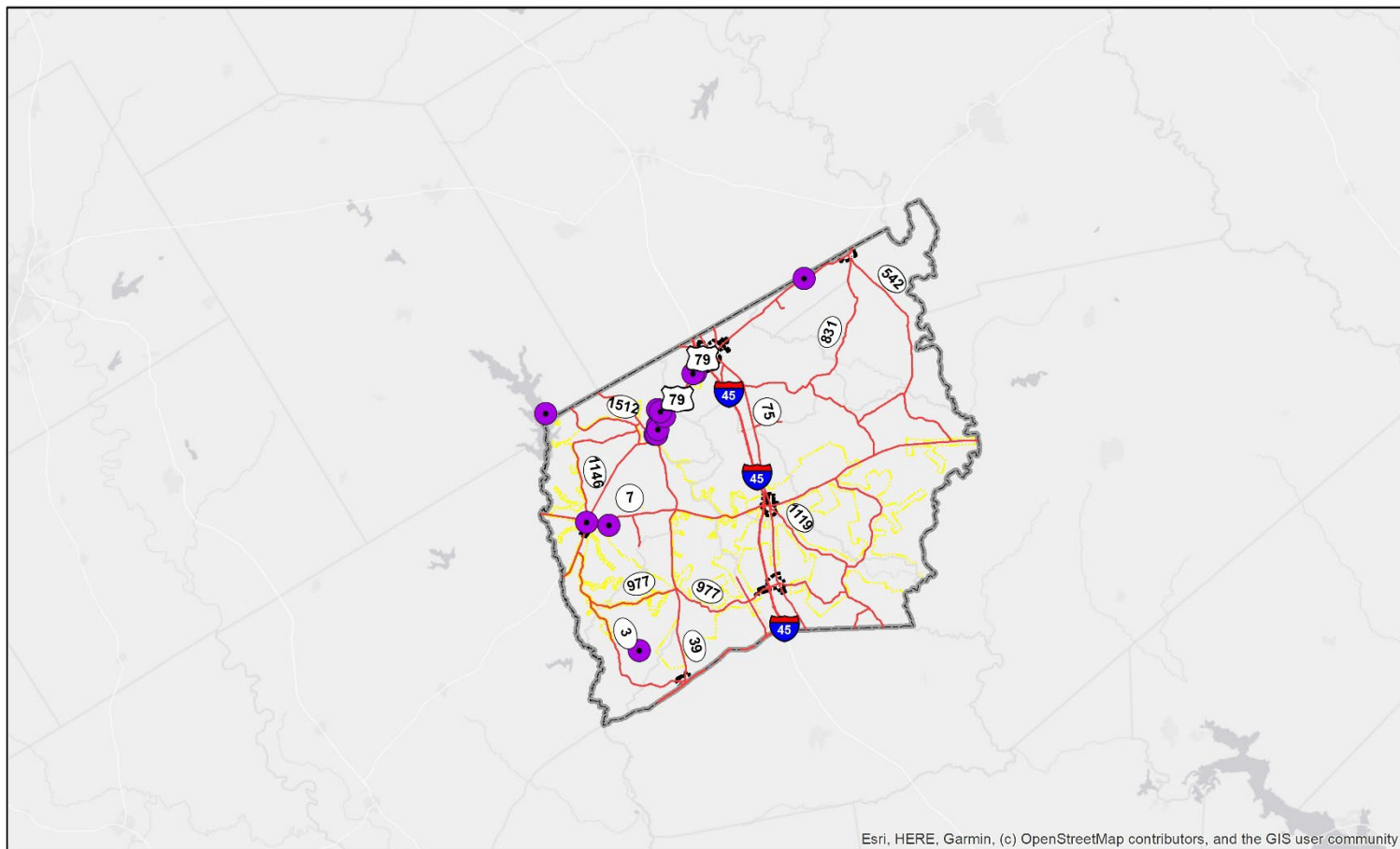
In particular, the jurisdictions have identified areas with large numbers of mobile/manufactured housing as being disproportionately vulnerable to certain hazards including but not limited to hurricanes and tropical storms, floods, tornados, droughts, and severe winds.

Mobile and manufactured homes can be found throughout Leon County, including several RV parks. These parks' populations fluctuate on a seasonal basis. Due to the express portability of RVs, most of these structures are expected to evacuate ahead of hazard events with significant warning times. However, RVs may not have enough time to evacuate ahead of less predictable hazard events like tornados.

Locations with clusters of three or more mobile / manufactured homes, including named mobile home parks, are shown in Figure 18 below.

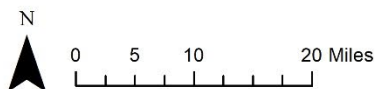
¹⁰ https://www.lowincomehousing.us/det/Centerville_Housing_Authority-75833-j4

¹¹ <http://www.officialhousingauthority.com/texas/centerville-housing-authority-2/>



Mobile Housing Clusters

2025 Leon County, TX



Legend

- Mobile Housing Clusters
- Major Roads
- Census Block Group
- County Boundary
- City Boundaries
- WSC Boundary

Figure 18: Mobile and Manufacturing Clusters in Leon County and the Participating Jurisdictions

II. Homes in Substandard Condition

The jurisdictions have determined that homes in sub-standard condition, regardless of structure type, may indicate that residents are low-income or otherwise means-limited and thus more vulnerable to certain hazards.

To be considered standard condition, a home must show few or no minor visible exterior defects such as:

- cracked, peeling, or missing paint
- cracked, sagging, rotting, or missing siding, steps, porch planks, or other wooden surfaces
- cracked or broken windowpanes
- cracked masonry, brick, or mortar surfaces
- missing or damaged roof shingles
- small rust spots on mobile homes

Structures in sub-standard condition may provide less protection to residents during certain hazard events like tropical storms, tornados, or hurricanes. Furthermore, because they're already in a state of disrepair, additional damages due to hazard events may compound existing ones and potentially make these homes uninhabitable.

4. Hurricane / Tropical Storms

Once a tropical depression has intensified to the point where its maximum sustained winds are between 35-64 knots (39 – 73 mph), it becomes a tropical storm. At these wind speeds the storm becomes more organized and begins to become more circular in shape – resembling a hurricane. The rotation of a tropical storm is more recognizable than for a tropical depression. Tropical storms can cause many problems without becoming a hurricane. However, most of the problems a tropical storm causes stem from heavy rainfall and high winds.

According to National Oceanic and Atmospheric Administration (NOAA)¹², a hurricane is an intense tropical weather system of strong thunderstorms with a well-defined surface circulation and maximum sustained winds of 74 mph or higher. Hurricanes are categorized according to the strength of their winds using the Saffir-Simpson Hurricane Scale. A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest.

1) Hurricanes / Tropical Storms History

The 2019 Leon County HMAP recorded 3 hurricane/tropical storm events between 1961 – 2008 that impacted Leon County. A Category 5 hurricane was reported in 1961, and two Category 2 hurricanes were reported in 2008. There have been no recorded events impacting Leon County since the 2019 HMAP.

2) Likelihood of Future Occurrence

Hurricanes occur in seasonal patterns between June 1 and November 30. Based on the historical frequency of hurricane events in Leon County and the participating jurisdictions outlined above, the likelihood of a future event affecting any of the participating jurisdictions is occasional, that is a hurricane is possible in the next five years.

3) Extent

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential. Wind, pressure, and surge are combined to estimate potential damage. Categories 3, 4 and 5 are classified as “major” hurricanes. Major hurricanes comprise only 20 percent of total tropical cyclone landfalls but they account for over 70 percent of the damage in the United States. Damage from hurricanes can result from spawned tornados, coastal flooding from storm surge, and inland flooding from heavy rainfall.

¹² <https://www.noaa.gov/education/resource-collections/weather-atmosphere/hurricanes>

Table 10: Saffir-Simpson Scale

Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)	Storm Surge (Feet)
1	74-95	Greater than 980	3-5
2	96-110	979-965	6-8
3	111-130	964-945	9-12
4	131-155	944-920	13-18
5	155+	Less than 920	19+

The worst hurricanes known to have affected Leon County and the participating jurisdictions have been as intense as Category 5 with sustained wind gusts exceeding 155 MPH.

Future hurricanes affecting the participating jurisdictions may meet previous worst-case Category 5 events in terms of storm strength, storm surge, damage inflicted, flooding, injuries, and even death.

4) Location and Impact

A) Location

Location is often referred to in terms of Tier I and II counties, designated by TDI for windstorm insurance purposes, to represent differing levels of loss exposure to coastal counties and adjacent counties. Tier I are those counties adjacent to the Gulf of Mexico and Tier II are those counties adjacent to Tier I counties.

Tier I counties include:

Newton, Orange, Hardin, Liberty, Jefferson, Harris, Chambers, Galveston, Brazoria, Matagorda, Jackson, Calhoun, Refugio, Aransas, San Patricio, Nueces, Kleberg, Kenedy, Willacy and Cameron counties.

Tier II counties include:

Jasper, Fort Bend, Wharton, Victoria, Goliad, Bee, Live Oak, Jim Wells, Brooks and Hidalgo counties.

Leon County is neither a Tier I nor Tier II county, however still occasionally experiences impacts both directly and indirectly, including associated flooding and high winds. The effects of tropical storms and hurricanes begin to diminish as they move inland. Tropical storms and hurricanes vary tremendously in terms of size, location, intensity, and duration.

B) Impact

Impacts from a tropical Storm or hurricane in Leon County and the participating jurisdictions may include but are not limited to: loss of power due to downed lines caused by flying debris or fallen trees, flooding, flooding due to damaged or destroyed roofs, damaged or broken windows, damage due to flying debris, wind damage, escaped livestock and pets, injured or killed livestock and pets, crop damage or destruction. In the worst storms, residents may be injured or even killed.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a hurricane or tropical storm.

Residents of mobile / manufactured housing are of particular concern. These structures are never considered safe during a hurricane, and depending on tie-down methods, may also be unsafe during strong tropical storms.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a tropical storm or hurricane, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a hurricane or tropical storm than structures in standard condition. Existing structural weaknesses may mean increased damages, injuries, or loss of life.

B) Critical Facilities

The planning team identified 170 critical facilities spread across Leon County and participating jurisdictions. Even though Leon County's status is not a Tier 1 or 2 County, all critical facilities, no matter their jurisdictional location, are equally vulnerable to a hurricane / tropical storm event. The following critical facilities and infrastructure in each jurisdiction are expected to play particularly important roles in a hurricane or tropical storm recovery process.

Table 11: Leon County Critical Facilities Vulnerable to Hurricanes and Tropical Storms

Jurisdiction	Critical Facilities	Potential Hurricane Impacts							Injuries	Death
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage		
Leon County	Leon County Courthouse Complex	X	X	X	X	X	X	X	X	X
	County Annex	X	X	X	X	X	X	X	X	X
	County Annex 2	X	X	X	X	X	X	X	X	X
	Lassiter St. Centerville Health Point Complex	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #1	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #2	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #3	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #4	X	X	X	X	X	X	X	X	X
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North	X	X	X	X	X	X	X	X	X
	Leon County Sheriff's Office and Jail	X	X	X	X	X	X	X	X	X
	Leon County Communications Tower Centerville	X	X	X	X			X		
	Leon County Communications Tower Flynn	X	X	X	X			X		
	Leon County Communications Tower Normangee Lake	X	X	X	X			X		
	Leon County Communications Tower Flo	X	X	X	X			X		
	Leon County Communications Tower Oakwood	X	X	X	X			X		
	Leon County ESD/Ambulance Barn	X	X	X	X	X	X	X	X	X
	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement	X	X	X	X	X	X	X	X	X

	Justice of the Peace, Pct 4 Marquez	X	X	X	X	X	X	X	X	X
	Justice of the Peace, Pct 2	X	X	X	X	X	X	X	X	X
	Leon County Expo Center	X	X	X	X	X	X	X	X	X
	Champion Technologies (Chemical)	X	X	X	X	X	X	X	X	X
	Cochran Chemicals	X	X	X	X	X	X	X	X	X
	Leon Solar Farm	X	X	X	X			X	X	X
	Pecan Prairie Solar Farm and Battery Storage Facility	X	X	X	X	X	X	X	X	X
	NUCOR Steel Jewett, including Helipad for Life Flight Helicopters	X	X	X	X	X	X	X	X	X
	Leon County Waste Disposal Pct 1	X	X	X	X	X	X	X	X	X
	Leon County Waste Disposal Pct 2	X	X	X	X	X	X	X	X	X
	Leon County Waste Disposal Pct 3	X	X	X	X	X	X	X	X	X
	Leon County Waste Disposal Pct 4	X	X	X	X	X	X	X	X	X
	Leon County Appraisal District Office	X	X	X	X	X	X	X	X	X
	Buffalo ISD- Elementary School	X	X	X	X	X	X	X	X	X
	Buffalo ISD- Junior High School	X	X	X	X	X	X	X	X	X
	Buffalo ISD- High School	X	X	X	X	X	X	X	X	X
	Leon ISD - Elementary School	X	X	X	X	X	X	X	X	X
	Leon ISD- Junior High School	X	X	X	X	X	X	X	X	X
	Leon ISD- High School	X	X	X	X	X	X	X	X	X
	Normangee ISD - Elementary School	X	X	X	X	X	X	X	X	X
	Normangee ISD- Junior High School	X	X	X	X	X	X	X	X	X
	Normangee ISD- High School	X	X	X	X	X	X	X	X	X
	Oakwood ISD - Elementary School	X	X	X	X	X	X	X	X	X
	Oakwood ISD- Junior High School	X	X	X	X	X	X	X	X	X
	Oakwood ISD- High School	X	X	X	X	X	X	X	X	X
	Leon Gas	X	X	X	X	X	X	X	X	X
	Leon Gas Storage Tanks	X	X	X	X			X		
	Leon Gas Storage Tanks	X	X	X	X			X		
	Leon Gas Storage Tanks	X	X	X	X			X		
	Houston County Electric CO-OP, Middleton Substation	X	X	X	X			X		
	ONCOR Electric Glaze Lake Substation Switch	X	X	X	X			X		
	ONCOR Electric Jewett Substation	X	X	X	X			X		

	ONCOR Electric Jewett Substation and Switching Yard	X	X	X	X			X		
	ONCOR Electric Centerville I-45 Substation	X	X	X	X			X		
	ONCOR Electric Centerville I-45	X	X	X	X			X		
	ONCOR Electric Brown Magnolia Substation	X	X	X	X			X		
	Flynn Fire Station	X	X	X	X	X	X	X	X	X
	Hilltop Lakes Fire and EMS	X	X	X	X	X	X	X	X	X
	Hilltop Lakes Town administration POA	X	X	X	X	X	X	X	X	X
	Hilltop Lakes Water Supply Corporation	X	X	X	X	X	X	X	X	X
	Hilltop Lakes Airport	X	X	X	X	X	X	X	X	X
Buffalo	City Hall/Convention Center	X	X	X	X	X	X	X	X	X
	Buffalo Civic Center	X	X	X	X	X	X	X	X	X
	Buffalo Public Library	X	X	X	X	X	X	X	X	X
	Public Safety Building/Police/Court	X	X	X	X	X	X	X	X	X
	Buffalo Treatment Plant	X	X	X	X	X	X	X	X	X
	Buffalo Volunteer Fire Dept	X	X	X	X	X	X	X	X	X
	Buffalo Maintenance Barn	X	X	X	X	X	X	X	X	X
	New School Well	X	X	X	X			X		
	Avant Well	X	X	X	X			X		
	Pearlstone Storage Tank	X	X	X	X			X		
	Pate Park Storage Tank	X	X	X	X			X		
	Fire Station Well	X	X	X	X			X		
	Hwy 164 Well	X	X	X	X			X		
	<i>Buffalo Lift Stations:</i>									
	Hwy 75 South	X	X	X	X			X		
	Charlie Scott	X	X	X	X			X		
	Hwy 75 Lynch	X	X	X	X			X		
	Turtle Creek Dr	X	X	X	X			X		
	S Center St Best	X	X	X	X			X		
	S Center St Dead End	X	X	X	X			X		
	1905 E Railroad (Hammond)	X	X	X	X			X		
	Ray St	X	X	X	X			X		
	Post Oak/Kayla Ln	X	X	X	X			X		
	FM 1848 North	X	X	X	X			X		

	FM 1848 South	X	X	X	X			X		
	Brown Chapel Road	X	X	X	X			X		
	John H Bullock End	X	X	X	X			X		
	Hwy 164	X	X	X	X			X		
	Ridley Block	X	X	X	X			X		
	Chevron	X	X	X	X			X		
	Lee St	X	X	X	X			X		
	Candy Lane	X	X	X	X			X		
	524 Sycamore	X	X	X	X			X		
	531 Ray	X	X	X	X			X		
	Lanely Rd	X	X	X	X			X		
	528 Ray	X	X	X	X			X		
Centerville	Centerville Water Plant	X	X	X	X	X	X	X	X	X
	Centerville Sewer Plant	X	X	X	X	X	X	X	X	X
	Centerville Elementary School	X	X	X	X	X	X	X	X	X
	Centerville Jr. High/ High School	X	X	X	X	X	X	X	X	X
	Centerville Sherriff's Office	X	X	X	X	X	X	X	X	X
	Centerville City Hall	X	X	X	X	X	X	X	X	X
	Centerville Volunteer Fire Dept.	X	X	X	X	X	X	X	X	X
	Centerville Nursing Home	X	X	X	X	X	X	X	X	X
	Texan Food Mart	X	X	X	X	X	X	X	X	X
	Eshan/ TimeMax	X	X	X	X	X	X	X	X	X
	Woody's #1	X	X	X	X	X	X	X	X	X
	Woody's #2	X	X	X	X	X	X	X	X	X
	Panther Petroleum	X	X	X	X	X	X	X	X	X
	Centerville Healthpoint/ Health Clinic	X	X	X	X	X	X	X	X	X
	I st Baptist Church of Centerville	X	X	X	X	X	X	X	X	X
	Centerville Lutheran Church	X	X	X	X	X	X	X	X	X
	Centerville Methodist Church	X	X	X	X	X	X	X	X	X
	Centerville Church of Christ	X	X	X	X	X	X	X	X	X
	Centerville Helipad	X	X	X	X	X	X	X	X	X
	Centerville Lift Station #1	X	X	X	X			X		
	Centerville Lift Station #2	X	X	X	X			X		
	Centerville Lift Station #3	X	X	X	X			X		
	Centerville Lift Station #4	X	X	X	X			X		
	Centerville Lift Station #5	X	X	X	X			X		

Jewett	City Hall	X	X	X	X	X	X	X	X	X
	Jewett Fire Department	X	X	X	X	X	X	X	X	X
Leona	Leona Fire Department	X	X	X	X	X	X	X	X	X
	Leona Post Office	X	X	X	X	X	X	X	X	X
	Leona Community Center	X	X	X	X	X	X	X	X	X
Marquez	Marquez Water Well #1	X	X	X	X			X		
	Marquez Water Well #2	X	X	X	X			X		
	Marquez Water Well #3	X	X	X	X			X		
	Marquez Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X
	Marquez City Hall	X	X	X	X	X	X	X	X	X
	Marquez Fire Dept.	X	X	X	X	X	X	X	X	X
	Kountry Korner Store	X	X	X	X	X	X	X	X	X
	CrossRoads Store	X	X	X	X	X	X	X	X	X
	Marquez Farm & Ranch	X	X	X	X	X	X	X	X	X
	Marquez Tire	X	X	X	X	X	X	X	X	X
Normangee	City Hall	X	X	X	X	X	X	X	X	X
	Normangee Police Dept	X	X	X	X	X	X	X	X	X
	Brookshire Brothers Grocery Store	X	X	X	X	X	X	X	X	X
Oakwood	Oakwood Water Tower #1	X	X	X	X			X		
	Oakwood Water Tower #2	X	X	X	X			X		
	Oakwood Pump Station	X	X	X	X			X		
	Oakwood Lift Station	X	X	X	X			X		
	Oakwood Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X
Concord Robbins WSC	Plant #1	X	X	X	X	X	X	X	X	X
	Plant #1B	X	X	X	X	X	X	X	X	X
	Plant #2	X	X	X	X	X	X	X	X	X
	Plant #3	X	X	X	X	X	X	X	X	X
	Plant #3A	X	X	X	X	X	X	X	X	X
	Plant #4	X	X	X	X	X	X	X	X	X
	Plant #5	X	X	X	X	X	X	X	X	X
	Plant #6	X	X	X	X	X	X	X	X	X
	Plant #7	X	X	X	X	X	X	X	X	X
	Flynn Booster Station	X	X	X	X	X	X	X	X	X
	Concord Robbins Office	X	X	X	X	X	X	X	X	X
	Remote Wells	X	X	X	X			X		
	Well # 1R	X	X	X	X			X		

	Well #2	X	X	X	X			X		
	Well #3	X	X	X	X			X		
	Well #4	X	X	X	X			X		
	Well #5	X	X	X	X			X		
	Well #6 Remote	X	X	X	X			X		
	Well #7	X	X	X	X			X		
	Leona Water Well Pump	X	X	X	X			X		
Flo Community WSC	Flo Plant	X	X	X	X	X	X	X	X	X
	Flo Remote Well	X	X	X	X			X		
	Keechi Plant	X	X	X	X	X	X	X	X	X
	Hwy 75 Plant (Pump Station)	X	X	X	X			X		
	Weedon Plant	X	X	X	X	X	X	X	X	X
	Russel #1 Well	X	X	X	X			X		
	Russel #2 Well (Plant)	X	X	X	X			X		
	I618 Plant	X	X	X	X	X	X	X	X	X
	Flo Office	X	X	X	X	X	X	X	X	X

C) Critical Infrastructure

Interstate Highway 45 is a TxDOT-designated major hurricane evacuation route for Leon County. The distance between the southernmost and northernmost points of IH-45 that serves as a designated evacuation route in Leon County is roughly 130 miles. The highway passes through the Cities of Buffalo, Centerville and Leona.

US Route 79 is a TxDOT-designated major hurricane evacuation route for Leon County. It runs for 43 miles northeast-southwest in Leon County, passing through the cities of Oakwood, Buffalo, Jewett, and Marquez.

Flooding on either of these routes during a hurricane evacuation could strand motorists trying to escape the storm. These drivers may need to be rescued and could be injured or killed.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“Climate change is expected to affect tropical cyclones by increasing sea surface temperatures, a key factor that influences cyclone formation and behavior. The U.S. Global Change Research Program and the Intergovernmental Panel on Climate Change¹³ project that tropical cyclones will become more intense over the 21st century, with higher wind speeds and heavier rains.”¹⁴

¹³ <https://science2017.globalchange.gov/www.ipcc.ch/report/ar5/wg1>

¹⁴ <https://www.epa.gov/climate-indicators/climate-change-indicators-tropical-cyclone-activity#ref1>

5. Floods

According to the National Oceanic and Atmospheric Administration, flood is defined as an overflow of water onto normally dry land. The inundation of a normally dry area caused by rising water in an existing waterway, such as a river, stream, or drainage ditch. Ponding of the water at or near the point where the rain fell. Flooding is a longer-term event than flash flooding: it may last days or weeks.

Flash flood is defined as a flood caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through riverbeds, urban streets, or mountain canyons sweeping everything before them. They can occur within minutes or a few hours of excessive rainfall. They can also occur even if no rain has fallen, for instance after a levee or dam has failed, or after a sudden release of water by a debris or ice jam.¹⁵

1) Flood History

The planning team relied on data from the National Centers for Environmental Information (NCEI) to develop a flood history for the County and each participating jurisdiction.

According to the 2019 Leon County HMAP, the County and jurisdictions addressing the hazard recorded 34 flood events between 1970 and 2016. The 2019 plan recorded about \$1.3 million in property damages during that time, adjusted to \$2025. The 2019 plan found that the frequency of flood occurrences is highly likely.

Flood events are only recorded at the county or city level, therefore there are no recorded events for Concord Robbins WSC or Flo Community WSC. For planning purposes, we can assume that events recorded for the County may have also impacted the WSCs.

There have been 7 recorded events for Leon County, 1 recorded event for the City of Buffalo, 1 recorded event for the City of Centerville, 1 recorded event for the City of Leona, and 1 recorded event for the City of Oakwood since the 2019 HMAP. There have been no recorded events for the Cities of Jewett, Marquez, or Normangee since the 2019 HMAP. Floods are recorded at the County and City level only. It is reasonable to assume that Concord Robbins WSC and Flo Community WSC have experienced the same events as Leon County.

A) National Flood Insurance Program

The National Flood Insurance Program (NFIP) is administered by FEMA to provide flood insurance coverage to the nation. Leon County, and the Cities of Buffalo, Centerville, Jewett, Marquez, Normangee, Leona, and Oakwood are participating NFIP communities in the FEMA

¹⁵ https://www.weather.gov/mrx/flood_and_flash

Community Status Book Report. Concord Robbins WSCA and Flo Community are not eligible to participate in the NFIP.

Leon County has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 11/20/2013. Leon County's Flood Damage Prevention Ordinance designates the County Judge as the Floodplain Administrator responsible for implementing its floodplain management regulations and ensuring regulations meet or exceed the minimum NFIP requirements. Leon County's County Judge also serves as the County's Floodplain Administrator and oversees floodplain administration in unincorporated Leon County as well as the cities of Centerville, Leona, and Marquez. Floodplain management ordinances and any future updates will guide the jurisdiction as it continues to comply with NFIP requirements through permitting, inspection, and recordkeeping, especially for new and substantially redeveloped construction (i.e. substantially damaged repairs). The permitting process, presented to the floodplain administrator, may include plans showing location, dimension, and elevation of proposed landscape alterations, existing and proposed structures, and the location of the foregoing in relation to areas of the special flood hazard. Additionally, information including elevation of new and substantially improved structures, nonresidential structures, floodproofing, certificates from registered professional engineers, watercourse or natural drainage alterations, and records are required. Permitting also requires the costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilizes and facilities such as sewer, gas, electrical and water systems. Variances may be issued for the repair or rehabilitation of historic structures. General standards for all new construction or substantial improvements require prevention of floatation, collapse or lateral movement and practices that minimize flood damage.

The City of Buffalo has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 11/20/2013. The City of Buffalo's Flood Damage Prevention Ordinance designates the Mayor as the Floodplain Administrator responsible for implementing its floodplain management regulations and ensuring regulations meet or exceed the minimum NFIP requirements. Floodplain management ordinances and any future updates will guide the jurisdiction as it continues to comply with NFIP requirements through permitting, inspection, and recordkeeping, especially for new and substantially redeveloped construction (i.e. substantially damaged repairs). The permitting process, presented to the floodplain administrator, may include plans showing location, dimension, and elevation of proposed landscape alterations, existing and proposed structures, and the location of the foregoing in relation to areas of the special flood hazard. Additionally, information including elevation of new and substantially improved structures, nonresidential structures, floodproofing, certificates from registered professional engineers, watercourse or natural drainage alterations, and records are required. Permitting also requires the costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilizes and facilities such as sewer, gas, electrical and water systems. Variances may be issued for the repair or rehabilitation of historic structures. General standards for all new

construction or substantial improvements require prevention of floatation, collapse or lateral movement and practices that minimize flood damage.

The City of Jewett has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 11/20/2013. The City of Jewett's Flood Damage Prevention Ordinance designates the Director of Public Works as the Floodplain Administrator responsible for implementing its floodplain management regulations and ensuring regulations meet or exceed the minimum NFIP requirements. Floodplain management ordinances and any future updates will guide the jurisdiction as it continues to comply with NFIP requirements through permitting, inspection, and recordkeeping, especially for new and substantially redeveloped construction (i.e. substantially damaged repairs). The permitting process, presented to the floodplain administrator, may include plans showing location, dimension, and elevation of proposed landscape alterations, existing and proposed structures, and the location of the foregoing in relation to areas of the special flood hazard. Additionally, information including elevation of new and substantially improved structures, nonresidential structures, floodproofing, certificates from registered professional engineers, watercourse or natural drainage alterations, and records are required. Permitting also requires the costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilities and facilities such as sewer, gas, electrical and water systems. Variances may be issued for the repair or rehabilitation of historic structures. General standards for all new construction or substantial improvements require prevention of floatation, collapse or lateral movement and practices that minimize flood damage.

The City of Normangee has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 11/20/2013. The City of Normangee's Flood Damage Prevention Ordinance designates the Mayor as the Floodplain Administrator responsible for implementing its floodplain management regulations and ensuring regulations meet or exceed the minimum NFIP requirements. Floodplain management ordinances and any future updates will guide the jurisdiction as it continues to comply with NFIP requirements through permitting, inspection, and recordkeeping, especially for new and substantially redeveloped construction (i.e. substantially damaged repairs). The permitting process, presented to the floodplain administrator, may include plans showing location, dimension, and elevation of proposed landscape alterations, existing and proposed structures, and the location of the foregoing in relation to areas of the special flood hazard. Additionally, information including elevation of new and substantially improved structures, nonresidential structures, floodproofing, certificates from registered professional engineers, watercourse or natural drainage alterations, and records are required. Permitting also requires the costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilities and facilities such as sewer, gas, electrical and water

systems. Variances may be issued for the repair or rehabilitation of historic structures. General standards for all new construction or substantial improvements require prevention of floatation, collapse or lateral movement and practices that minimize flood damage.

The City of Oakwood has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 11/20/2013. The City of Oakwood's Flood Damage Prevention Ordinance designates the Director of Public Works as the Floodplain Administrator responsible for implementing its floodplain management regulations and ensuring regulations meet or exceed the minimum NFIP requirements. Floodplain management ordinances and any future updates will guide the jurisdiction as it continues to comply with NFIP requirements through permitting, inspection, and recordkeeping, especially for new and substantially redeveloped construction (i.e. substantially damaged repairs). The permitting process, presented to the floodplain administrator, may include plans showing location, dimension, and elevation of proposed landscape alterations, existing and proposed structures, and the location of the foregoing in relation to areas of the special flood hazard. Additionally, information including elevation of new and substantially improved structures, nonresidential structures, floodproofing, certificates from registered professional engineers, watercourse or natural drainage alterations, and records are required. Permitting also requires the costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilizes and facilities such as sewer, gas, electrical and water systems. Variances may be issued for the repair or rehabilitation of historic structures. General standards for all new construction or substantial improvements require prevention of floatation, collapse or lateral movement and practices that minimize flood damage.

The flood mitigation actions outlined in Chapter 17 below were developed with flood mitigation and NFIP compliance in mind. Public engagement will be an ongoing effort in each participating jurisdiction to reduce future losses due to flooding and will continue even after recommended corrective actions have been implemented.

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling ten-year period, since 1978. According to the best information available, there is 1 RL property in the City of Oakwood, which is a residential property. There are no other RL properties in Leon County or in any of the other participating jurisdictions.

A severe repetitive loss (SRL) property is: a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments 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 2 separate claims

payments have been made with the cumulative amount of such claims exceeding the reported value of the property. According to the best information available, there are no SRL properties Leon County or in any of the other participating jurisdictions.

2) Likelihood of Future Events

In the case of the FEMA 100-year floodplain there is a 1% annual chance, while in the 500-year floodplain there is a 0.02% annual chance. Thus, the likelihood of a 100-year flood event is occasional and the likelihood of a 500-year flood event is unlikely. However, based on the frequency of previous flood events, every jurisdiction can expect to experience some type of flooding that may or may not meet the definition of a 100-year or 500-year event on a more regular basis.

The local planning team determined it is probable that Leon County and the participating jurisdictions will experience a flood event in the next three years, meaning an event is likely.

3) Extent

Flood magnitude is generally measured by depth of flood waters in feet or inches. Throughout Leon County and the participating jurisdictions, the worst flood events have resulted in up to 18' of water and inflicted over \$410,000 in damages.¹⁶

Future worst-case flood events in Leon County and the participating jurisdictions may meet or exceed previous worst-case 18' flood depths.

4) Location and Impact

Roughly .01% (943.40 out of 692,295.32 acres) of Leon County is in the FEMA Base Floodplain (Zone AE). In contrast, about 16% (114,093.13 out of 692,295.32 acres) of Leon County is in the FEMA 100-year floodplain (Zone A), and roughly 77% (535,364.17 out of 692,295.32 acres) of Leon County is in the 500-year floodplain (Zone X). As such, approximately 93% of Leon County falls within the 100 and 500-year floodplains.

A) Location

¹⁶ 2019 Leon County Hazard Mitigation Plan

I. Leon County

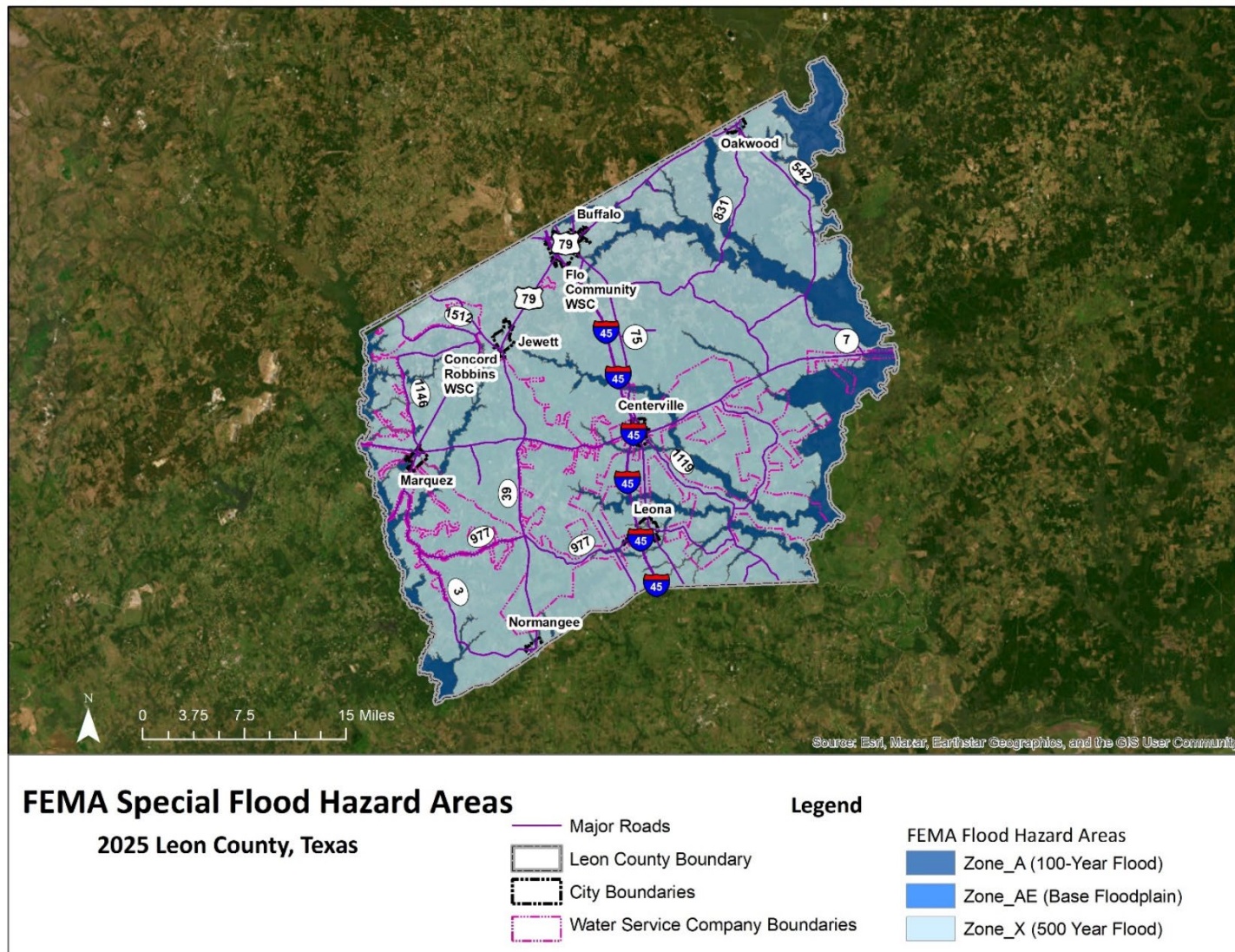


Figure 19: Leon County FEMA Special Flood Hazard Areas

II. City of Buffalo

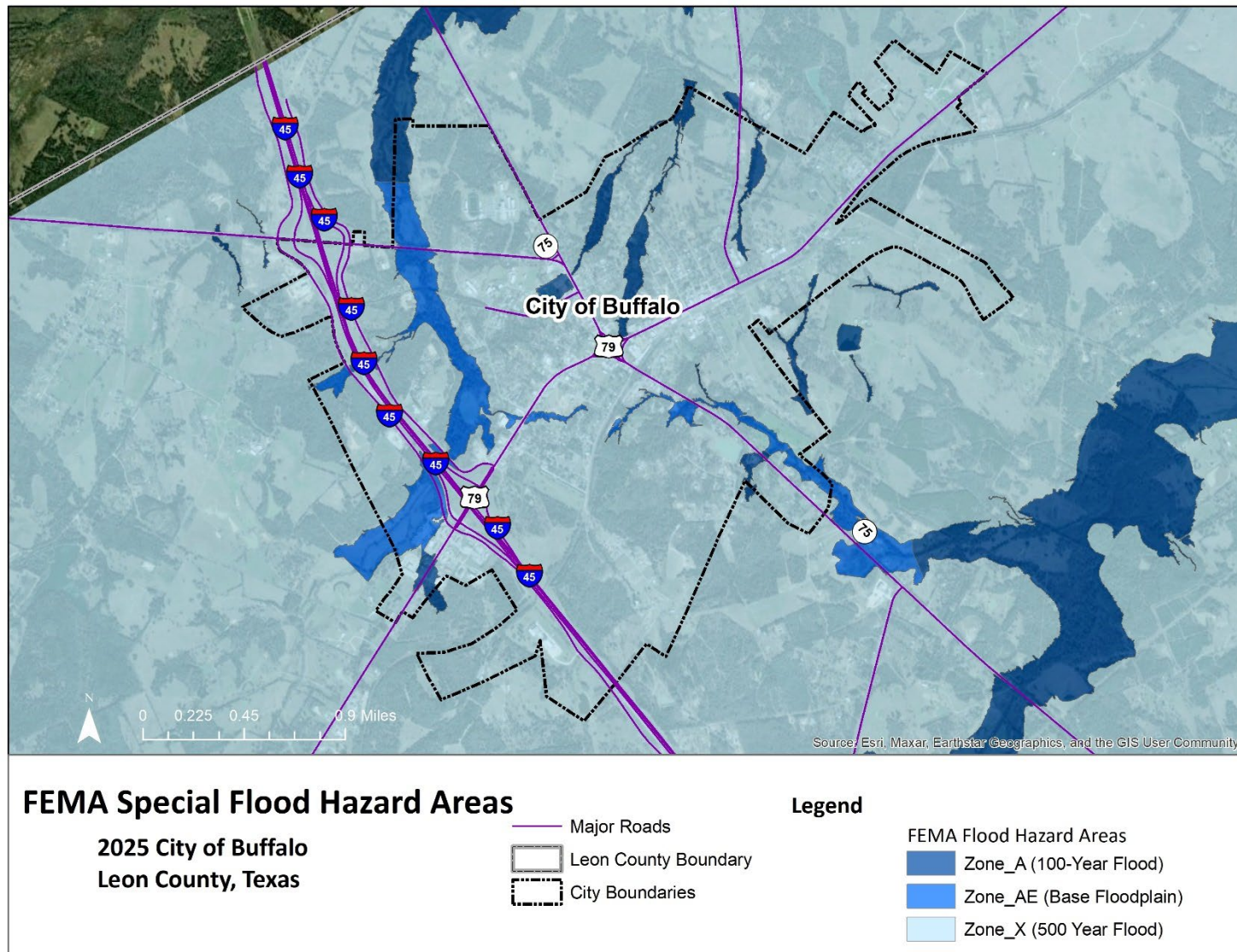


Figure 20: City of Buffalo FEMA Special Flood Hazard Areas

III. City of Centerville

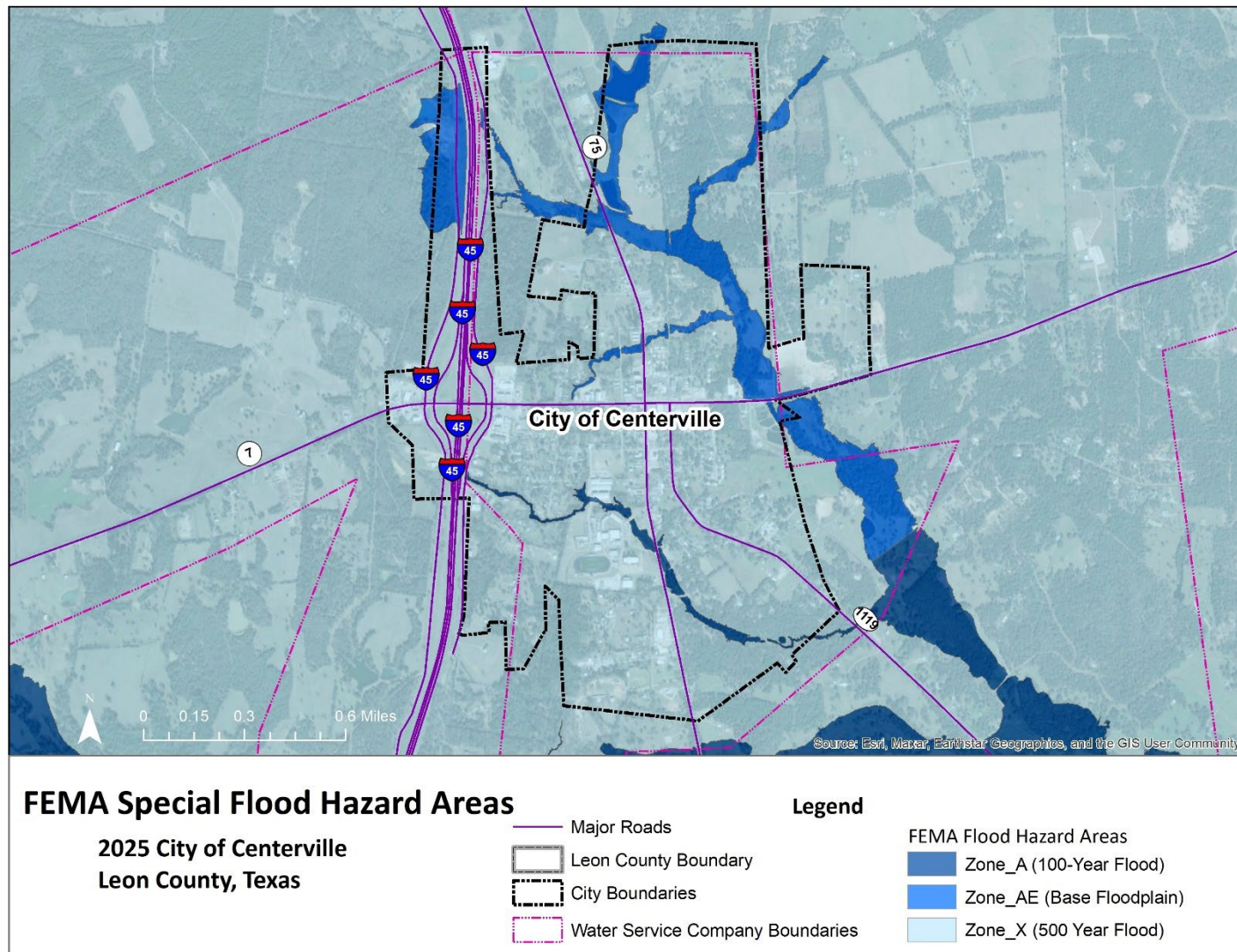


Figure 21: City of Centerville FEMA Special Flood Hazard Areas

IV. City of Jewett

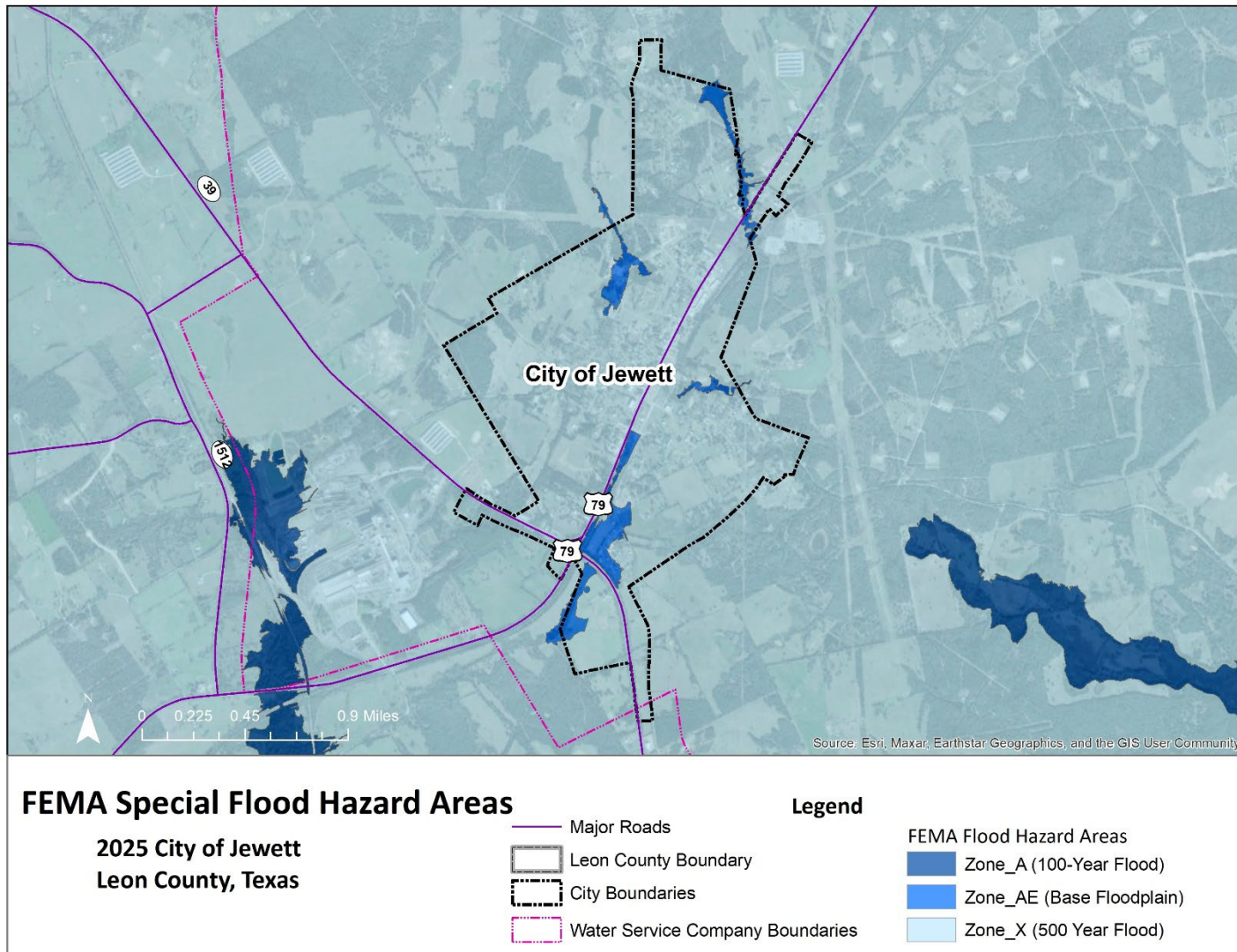


Figure 22: City of Jewett FEMA Special Flood Hazard Areas

V. City of Leona

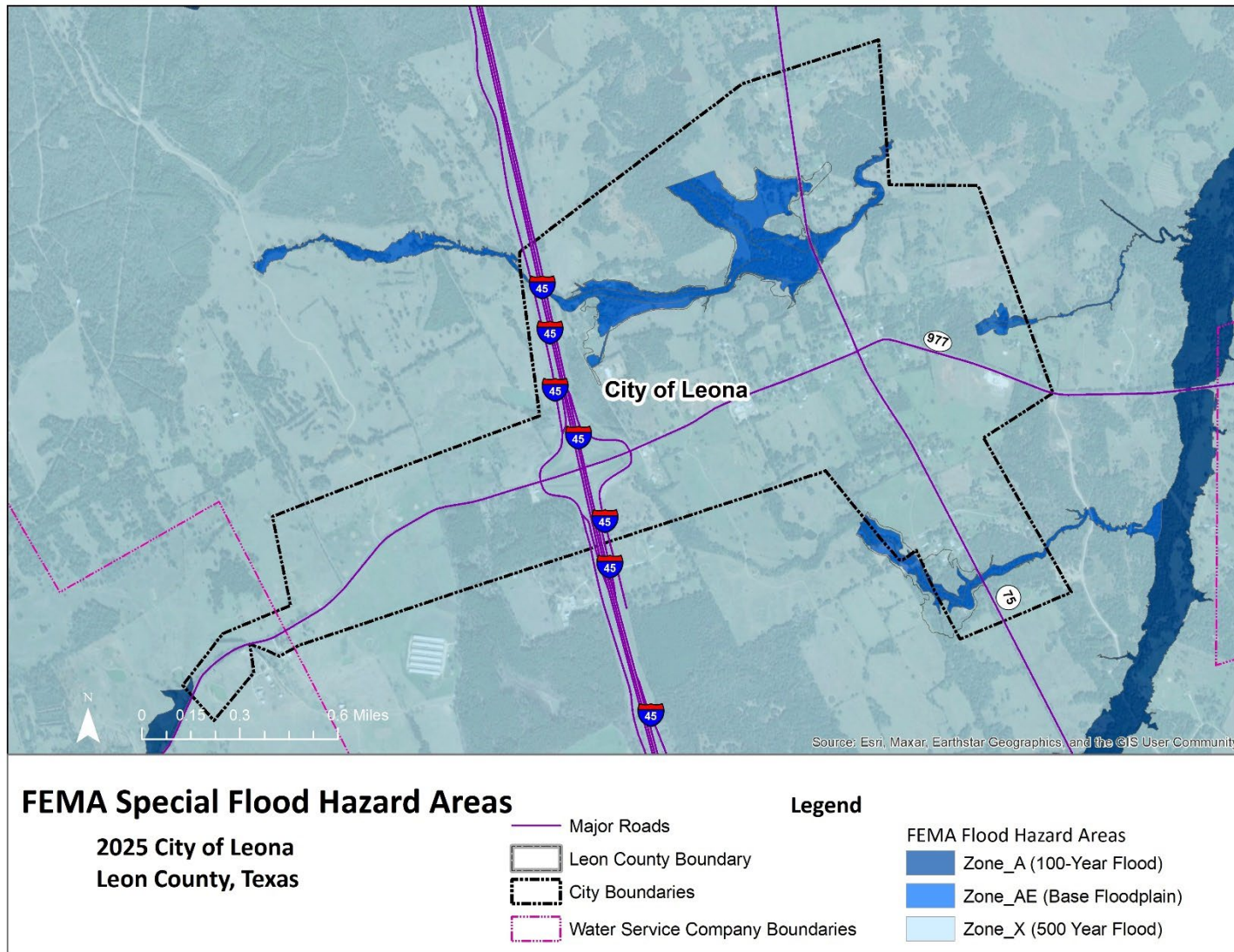


Figure 23: City of Leona FEMA Special Flood Hazard Areas

VI. City of Marquez

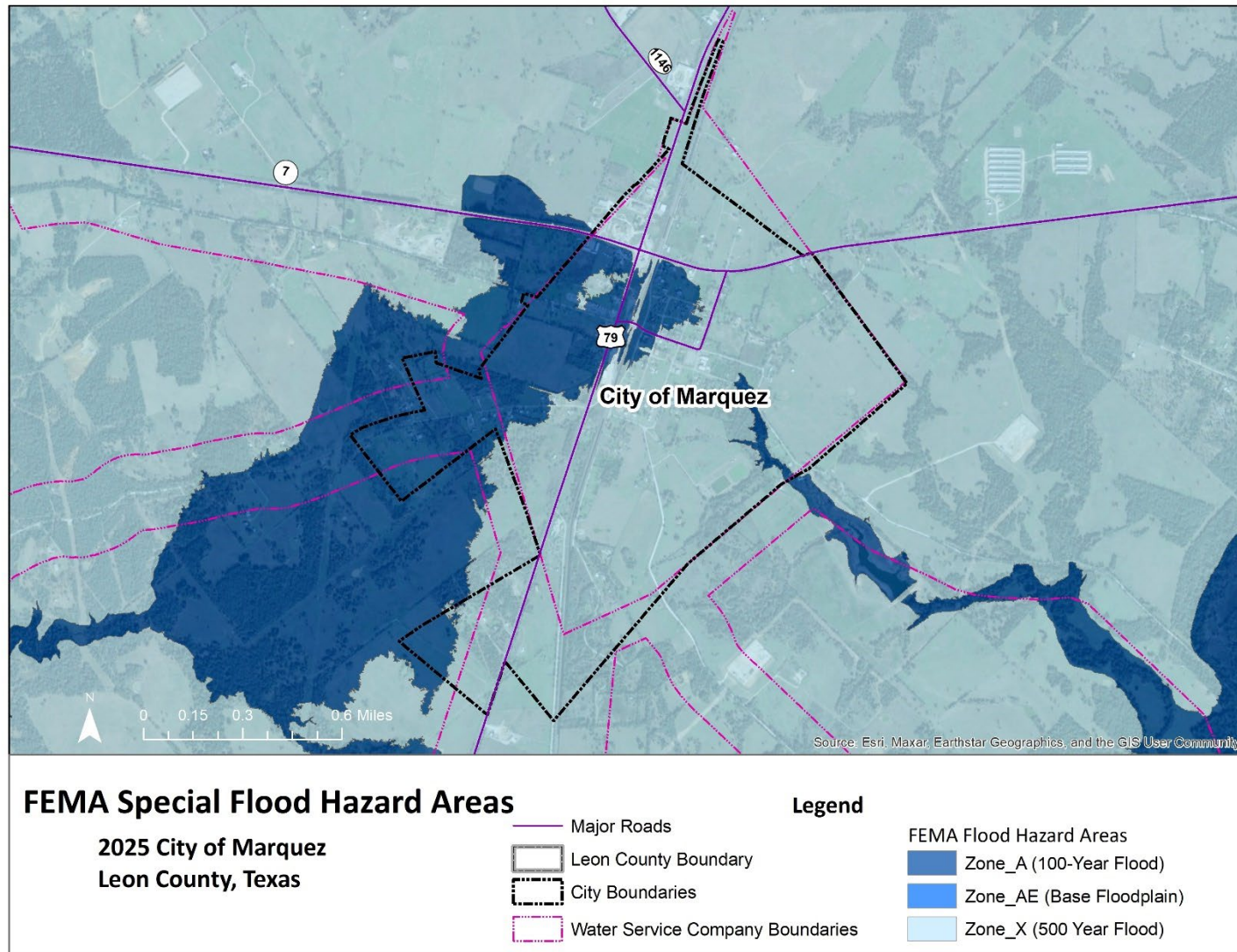


Figure 24: City of Marquez FEMA Special Flood Hazard Areas

VII. City of Normangee

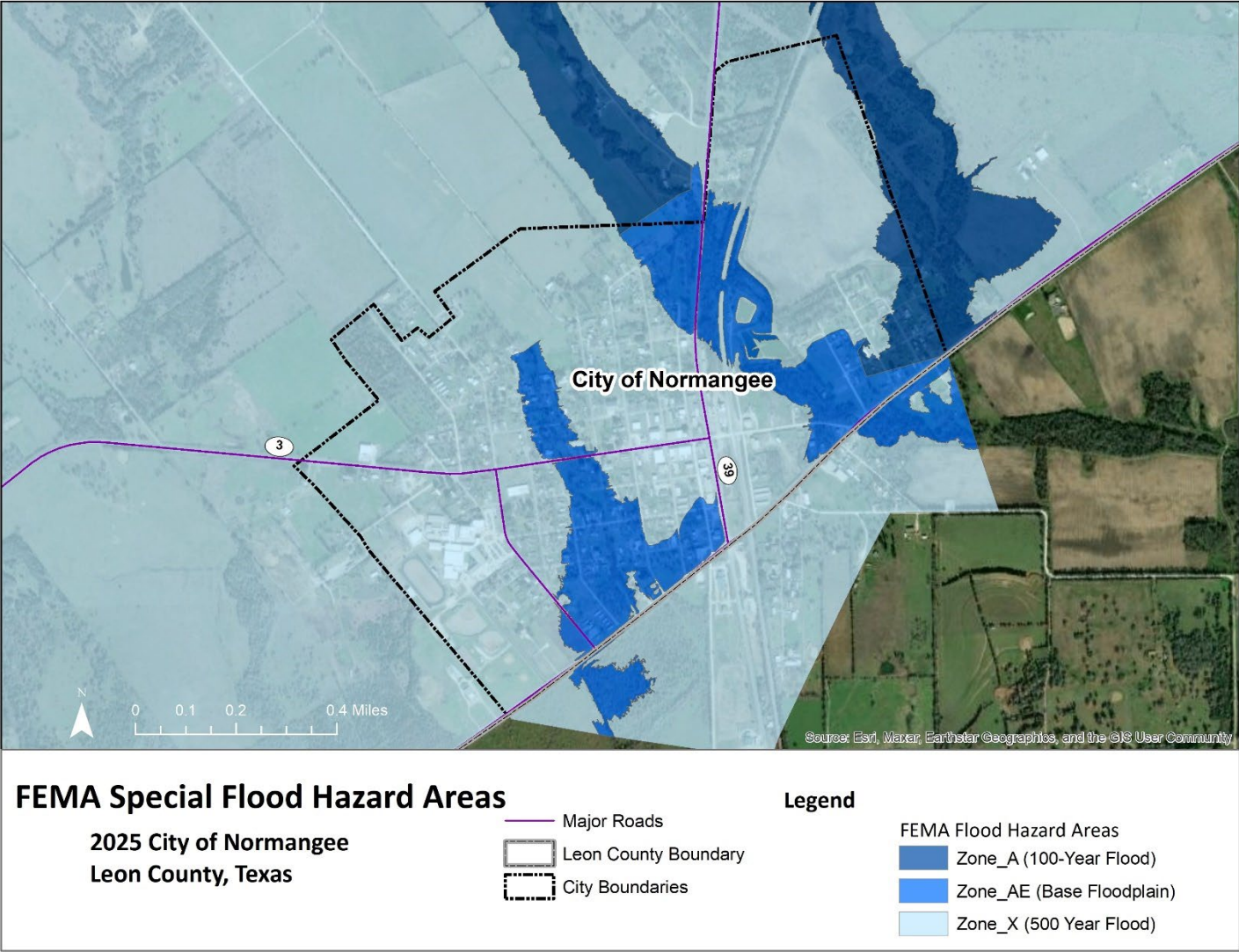


Figure 25: City of Normangee FEMA Special Flood Hazard Areas

VIII. City of Oakwood

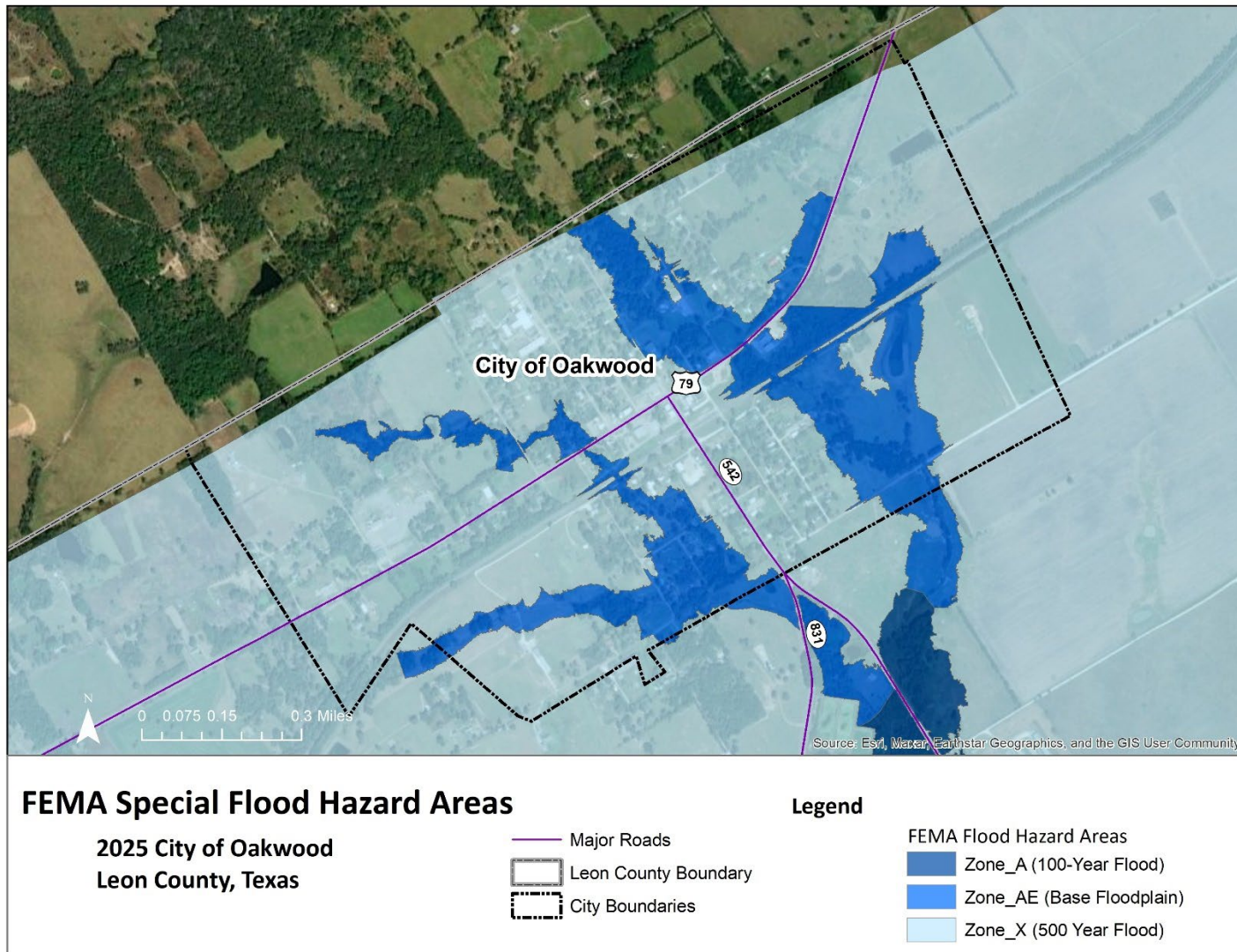


Figure 26: City of Oakwood FEMA Special Flood Hazard Areas

IX. Concord Robbins Water Service Company

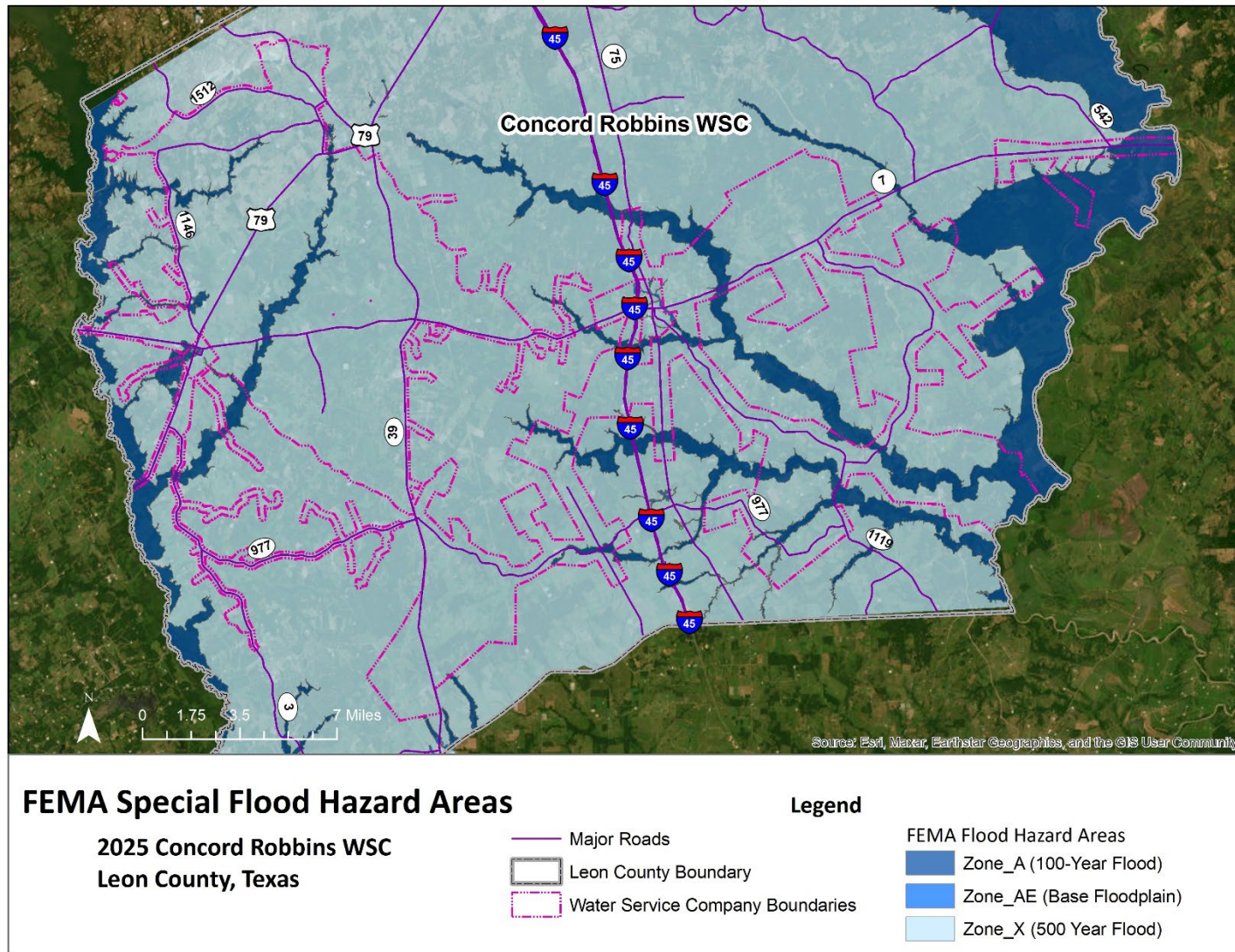


Figure 27: Concord Robbins WSC FEMA Special Flood Hazard Areas

X. Flo Community Water Service Company

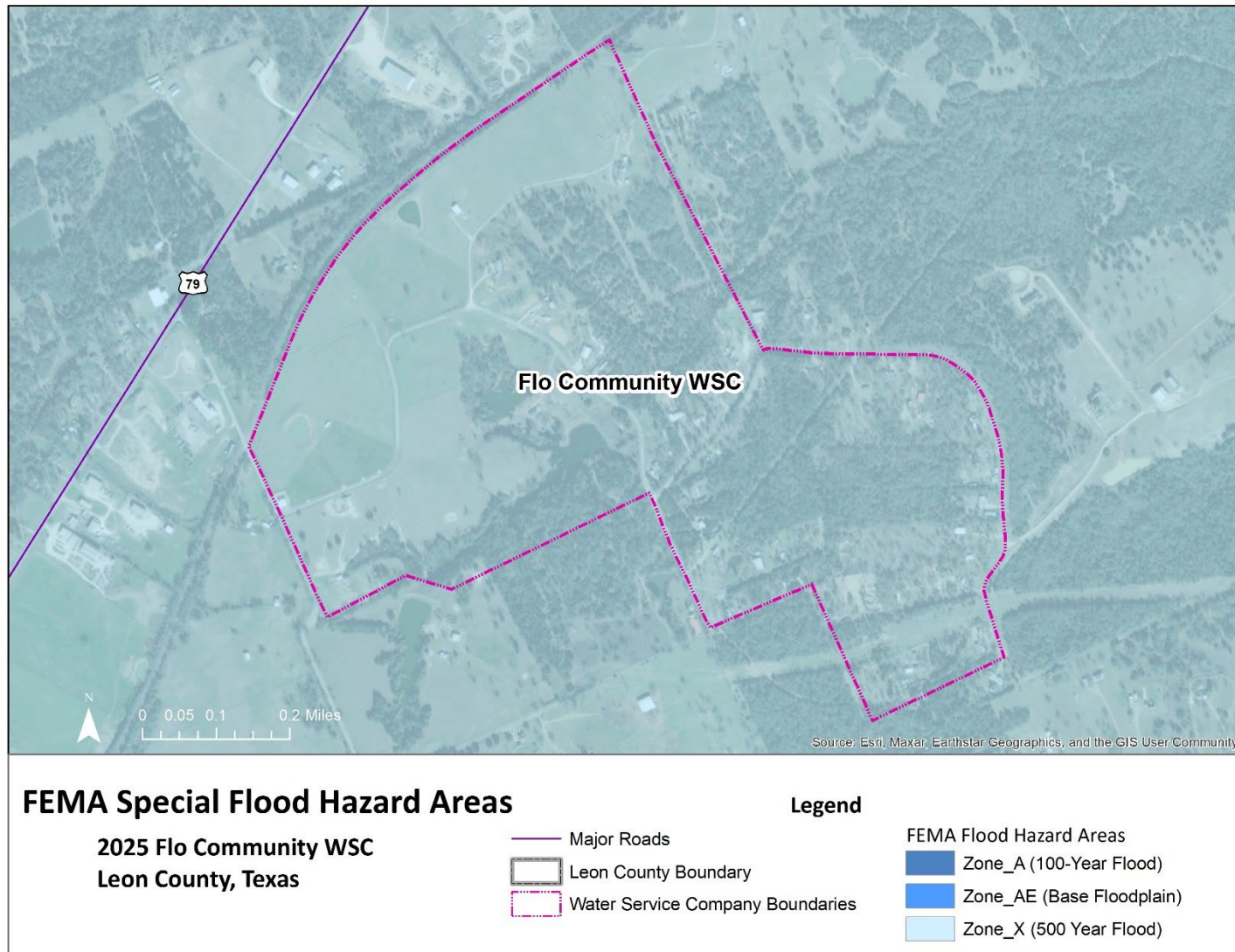


Figure 28: Flo Community WSC FEMA Special Flood Hazard Areas

B) Impact

Residents in the participating jurisdictions may temporarily lose power due to downed power lines. Motorists and residents may be left stranded and needing rescue. Affected structures may be flooded, damaged by foodborne contaminants, damaged by debris flow, or even completely washed away. Crops may be damaged or destroyed

Despite the unlikely probability of a so-called 500-year flood, 0.02% in any given year, the danger is not negligible. Similar to 100-year flood events, parts of the County may temporarily lose power due to downed power lines; motorists and residents may be left stranded and needing rescue; affected structures may be flooded, damaged by flood borne contaminants, damaged by debris flow, or even completely washed away; crops may be damaged or destroyed.

In addition to flooding's direct effects, the participating jurisdictions may be subject to indirect effects. These may include but aren't limited to loss of power, limited travel due to flooded and/or washed-out roads, and limited access to nearby emergency care centers.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a flood.

Residents of mobile / manufactured housing are of particular concern. These structures are never considered safe during a flood, and depending on tie-down methods, may threaten surrounding structures.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a flood, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a flood than structures in standard condition. Existing structural weaknesses may mean increased damages, injuries, or loss of life.

B) Critical Facilities

The planning team identified 170 critical facilities spread across the County and participating jurisdictions. All are located in either Flood Zone A (100-Year Flood Zone) or Flood Zone X (500-Year Flood Zone).

Table 12: Leon County Critical Facilities Vulnerable to Flooding

Jurisdiction	Critical Facilities
Leon County	Leon County Courthouse Complex
	County Annex
	County Annex 2
	Lassiter St. Centerville Health Point Complex
	Commissioner Precinct Road and Bridge Barn #1
	Commissioner Precinct Road and Bridge Barn #2
	Commissioner Precinct Road and Bridge Barn #3
	Commissioner Precinct Road and Bridge Barn #4
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North
	Leon County Sheriff's Office and Jail
	Leon County Communications Tower Centerville
	Leon County Communications Tower Flynn
	Leon County Communications Tower Normangee Lake
	Leon County Communications Tower Flo
	Leon County Communications Tower Oakwood
	Leon County ESD/Ambulance Barn
	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement
	Justice of the Peace, Pct 4 Marquez
	Justice of the Peace, Pct 2
	Leon County Expo Center
	Champion Technologies (Chemical)
	Cochran Chemicals
	Leon Solar Farm
	Pecan Prairie Solar Farm and Battery Storage Facility
	NUCOR Steel Jewett, including Helipad for Life Flight Helicopters
	Leon County Waste Disposal Pct 1
	Leon County Waste Disposal Pct 2
	Leon County Waste Disposal Pct 3
	Leon County Waste Disposal Pct 4
	Leon County Appraisal District Office
	Buffalo ISD- Elementary School
	Buffalo ISD- Junior High School
	Buffalo ISD- High School
	Leon ISD - Elementary School
	Leon ISD- Junior High School
	Leon ISD- High School
	Normangee ISD - Elementary School
	Normangee ISD- Junior High School
	Normangee ISD- High School
	Oakwood ISD - Elementary School
	Oakwood ISD- Junior High School

	Oakwood ISD- High School
	Leon Gas
	Leon Gas Storage Tanks
	Leon Gas Storage Tanks
	Leon Gas Storage Tanks
	Houston County Electric CO-OP, Middleton Substation
	ONCOR Electric Glaze Lake Substation Switch
	ONCOR Electric Jewett Substation
	ONCOR Electric Jewett Substation and Switching Yard
	ONCOR Electric Centerville I-45 Substation
	ONCOR Electric Centerville I-45
	ONCOR Electric Brown Magnolia Substation
	Flynn Fire Station
	Hilltop Lakes Fire and EMS
	Hilltop Lakes Town administration POA
	Hilltop Lakes Water Supply Corporation
	Hilltop Lakes Airport
Buffalo	City Hall/Convention Center
	Buffalo Civic Center
	Buffalo Public Library
	Public Safety Building/Police/Court
	Buffalo Treatment Plant
	Buffalo Volunteer Fire Dept
	Buffalo Maintenance Barn
	New School Well
	Avant Well
	Pearlstone Storage Tank
	Pate Park Storage Tank
	Fire Station Well
	Hwy 164 Well
	<i>Buffalo Lift Stations:</i>
	Hwy 75 South
	Charlie Scott
	Hwy 75 Lynch
	Turtle Creek Dr
	S Center St Best
	S Center St Dead End
	1905 E Railroad (Hammond)
	Ray St
	Post Oak/Kayla Ln
	FM 1848 North
	FM 1848 South
	Brown Chapel Road
	John H Bullock End
	Hwy 164

	Ridley Block
	Chevron
	Lee St
	Candy Lane
	524 Sycamore
	531 Ray
	Lanely Rd
	528 Ray
Centerville	Centerville Water Plant
	Centerville Sewer Plant
	Centerville Elementary School
	Centerville Jr. High/ High School
	Centerville Sherriff's Office
	Centerville City Hall
	Centerville Volunteer Fire Dept.
	Centerville Nursing Home
	Texan Food Mart
	Eshan/ TimeMax
	Woody's #1
	Woody's #2
	Panther Petroleum
	Centerville Healthpoint/ Health Clinic
	1 st Baptist Church of Centerville
	Centerville Lutheran Church
	Centerville Methodist Church
	Centerville Church of Christ
	Centerville Helipad
	Centerville Lift Station #1
	Centerville Lift Station #2
	Centerville Lift Station #3
	Centerville Lift Station #4
	Centerville Lift Station #5
Jewett	Jewett City Hall
	Jewett Fire Department
Leona	Leona Fire Department
	Leona Post Office
	Leona Community Center
Marquez	Marquez Water Well #1
	Marquez Water Well #2
	Marquez Water Well #3
	Marquez Wastewater Treatment Plant
	Marquez City Hall
	Marquez Fire Dept.
	Kountry Korner Store
	CrossRoads Store
	Marquez Farm & Ranch

	Marquez Tire
Normangee	City Hall
	Normangee Police Dept
	Brookshire Brothers Grocery Store
Oakwood	Oakwood Water Tower #1
	Oakwood Water Tower #2
	Oakwood Pump Station
	Oakwood Lift Station
	Oakwood Wastewater Treatment Plant
Concord Robbins WSC	Plant #1
	Plant #1B
	Plant #2
	Plant #3
	Plant #3A
	Plant #4
	Plant #5
	Plant #6
	Plant #7
	Flynn Booster Station
	Concord Robbins Office
	Remote Wells
	Well # 1R
	Well #2
	Well #3
	Well #4
	Well #5
	Well #6 Remote
	Well #7
	Leona Water Well Pump
Flo Community WSC	Flo Plant
	Flo Remote Well
	Keechi Plant
	Hwy 75 Plant (Pump Station)
	Weedon Plant
	Russel #1 Well
	Russel #2 Well (Plant)
	1618 Plant
	Flo Office

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what

extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“Climate change may cause river floods to become larger or more frequent than they used to be in some places yet become smaller and less frequent in other places. As warmer temperatures cause more water to evaporate from the land and oceans, changes in the size and frequency of heavy precipitation events may in turn affect the size and frequency of river flooding.”¹⁷

¹⁷ <https://www.epa.gov/climate-indicators/climate-change-indicators-river-flooding>

6. Wildfire

Wildfire is defined as a sweeping and destructive conflagration and can be further categorized as wildland, interface, or intermix fires.

Wildland fires are fueled almost exclusively by natural vegetation. Wildland/Urban Interface (WUI) fires include both vegetation and the built environment. The wildfire disaster cycle begins when homes are built adjacent to wildland areas. When what would have been rural wildfires occur, they advance through all available fuels, which can include homes and structures.¹⁸

1) Wildfire History

The Texas A&M Forest Service Wildfire Risk Assessment Portal provides wildfire data on fires that occurred as recently as 2015. Additional data came from local planning team members.

In the 2019 Leon County HMAP, the County and participating jurisdictions looked at Texas A&M Forest Service Wildfire Risk Assessment Portal data to determine wildfire risk across Leon County. The 2019 plan reported 359 wildfires between 2005 - 2015.

The following table represents all events recorded in the National Centers for Environmental Information (NCEI) database and the Texas A&M Forest Service database between 2018 – 2023. Wildfire events are only recorded at the county level, therefore there are no recorded events for the Cities or for the WSCs. For planning purposes, we can assume that events recorded for the County may have also impacted the Cities and WSCs.

Table 13: Leon County Wildfire History

Location	Date Range	Wildfire Events	Acres Burned
Countywide	1/1/2019 – 7/1/2024	50	466

2) Likelihood of Future Events

Although the County and participating jurisdictions recorded 50 wildfire events since the 2019 HMAP, it is possible that some wildfires may have gone unreported. A wildfire event in any of the jurisdictions addressing the hazard is highly likely, meaning an event is probable within the next five years.

¹⁸ 2018 State of Texas Hazard Mitigation Plan

3) Extent

The Texas A&M Forest Service's Characteristic Fire Intensity Scale (FIS) specifically identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist. The FIS is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. According to Texas A&M Forest Service data, Leon County and the participating jurisdictions are rated between Class 1 and Class 4.

Table 14: Characteristic Fire Intensity Scale¹⁹

Class 1 Very Low	Very small, discontinuous flames, usually less than one foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
Class 2 Low	Small flames, usually less than two feet long; small amount of very short-range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
Class 3 Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
Class 4 High	Large flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
Class 5 Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

The National Wildfire Coordinating Group (NWCG) provides an additional way to measure extent by accounting for fire size. Based on Texas A&M Forest Service data, the average fire in Leon County and the participating jurisdictions is a Class C event.

¹⁹ <https://www.texaswildfirerisk.com>

Table 15: National Wildfire Coordinating Group Size Class of Fire²⁰

Class A	¼ acre or less
Class B	More than ¼ acre, but less than 10 acres
Class C	10 acres or more, but less than 100 acres
Class D	100 acres or more, but less than 300 acres
Class E	300 acres or more, but less than 1,000 acres
Class F	1,000 acres or more, but less than 5,000 acres
Class G	5,000 acres or more

Future fire events in Leon County and the participating jurisdictions may meet previous worst-case Class C (NWCGSCF) and Class 4 (FIS) wildfires in terms of intensity, acreage burned, and inflicted damage.

4) Location and Impact

A) Location

Due to wildfire's ability to inflict damages to both structures and landscapes, wildfire location has been assessed by parcel, rather than by structure. Parcels have been determined to be either partially or completely vulnerable to wildfire based on TxWRAP's Wildland Urban Interface boundaries.

Because wildfires are dynamically unpredictable, the following maps and tables may not be representative of every location and parcel at risk of wildfire.

²⁰ <http://www.nwcg.gov/term/glossary/size-class-of-fire>

I. Leon County

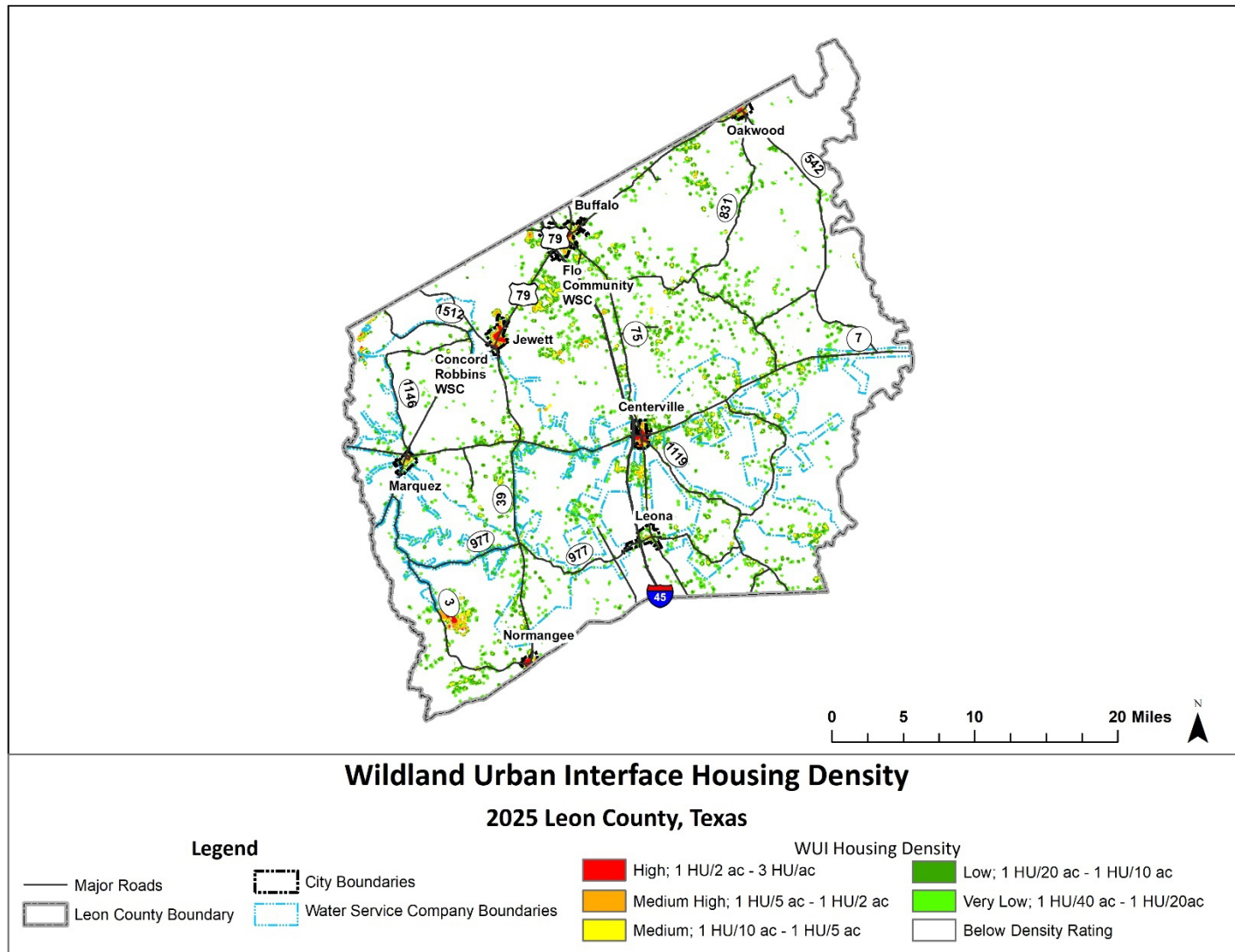


Figure 29: Leon County Wildland Urban Interface

II. City of Buffalo

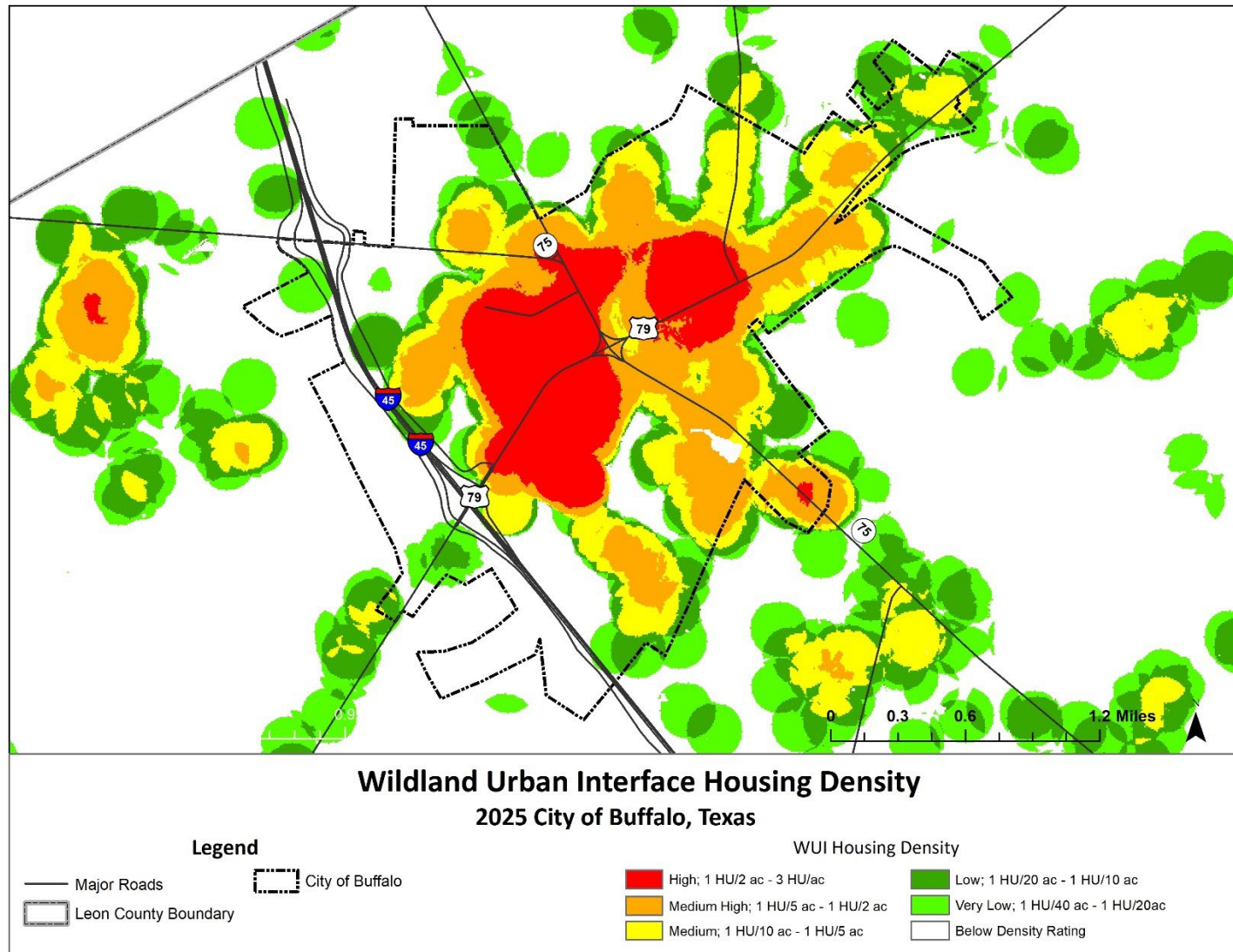


Figure 30: City of Buffalo Wildland Urban Interface

III. City of Centerville

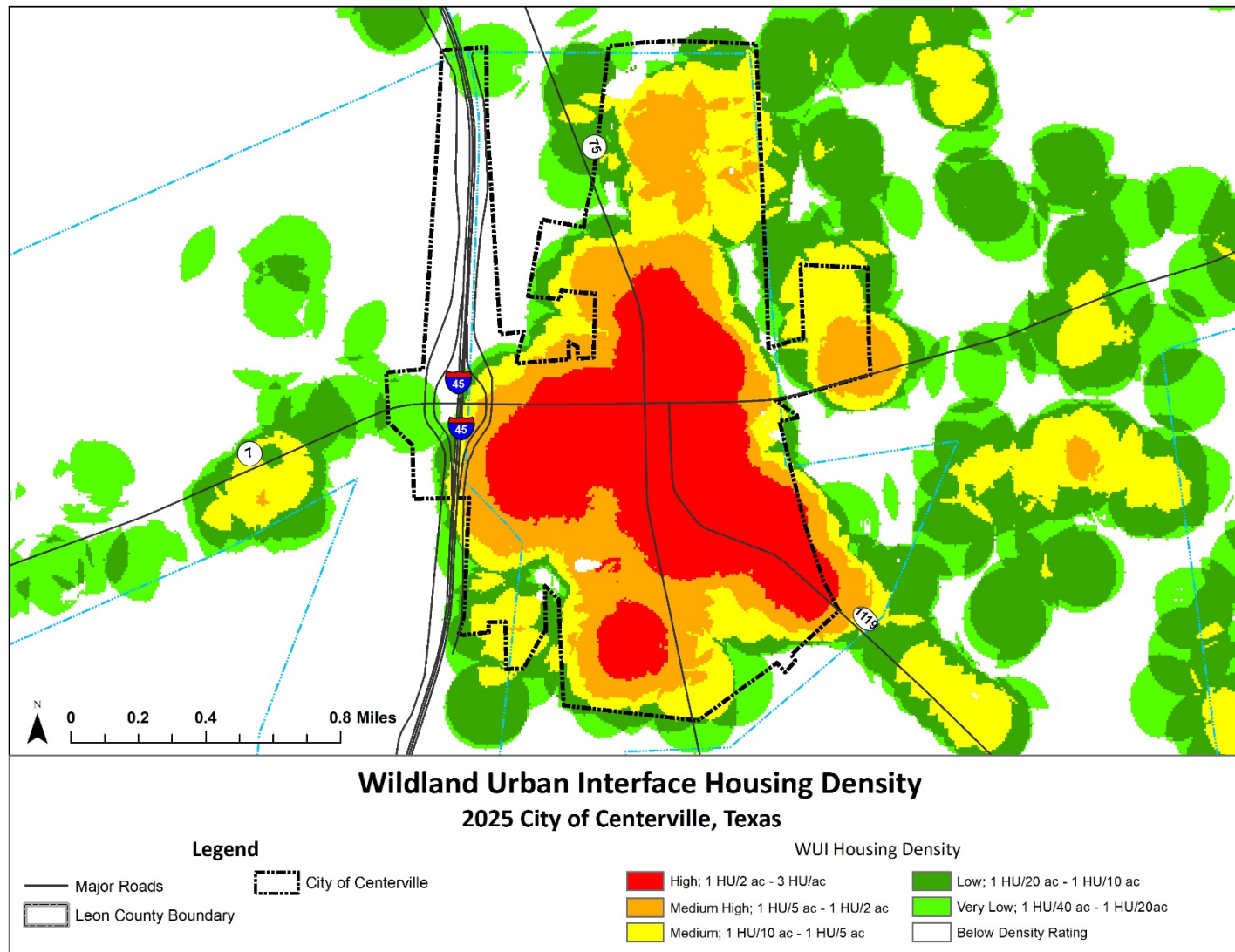


Figure 31: City of Centerville Wildland Urban Interface

IV. City of Jewett

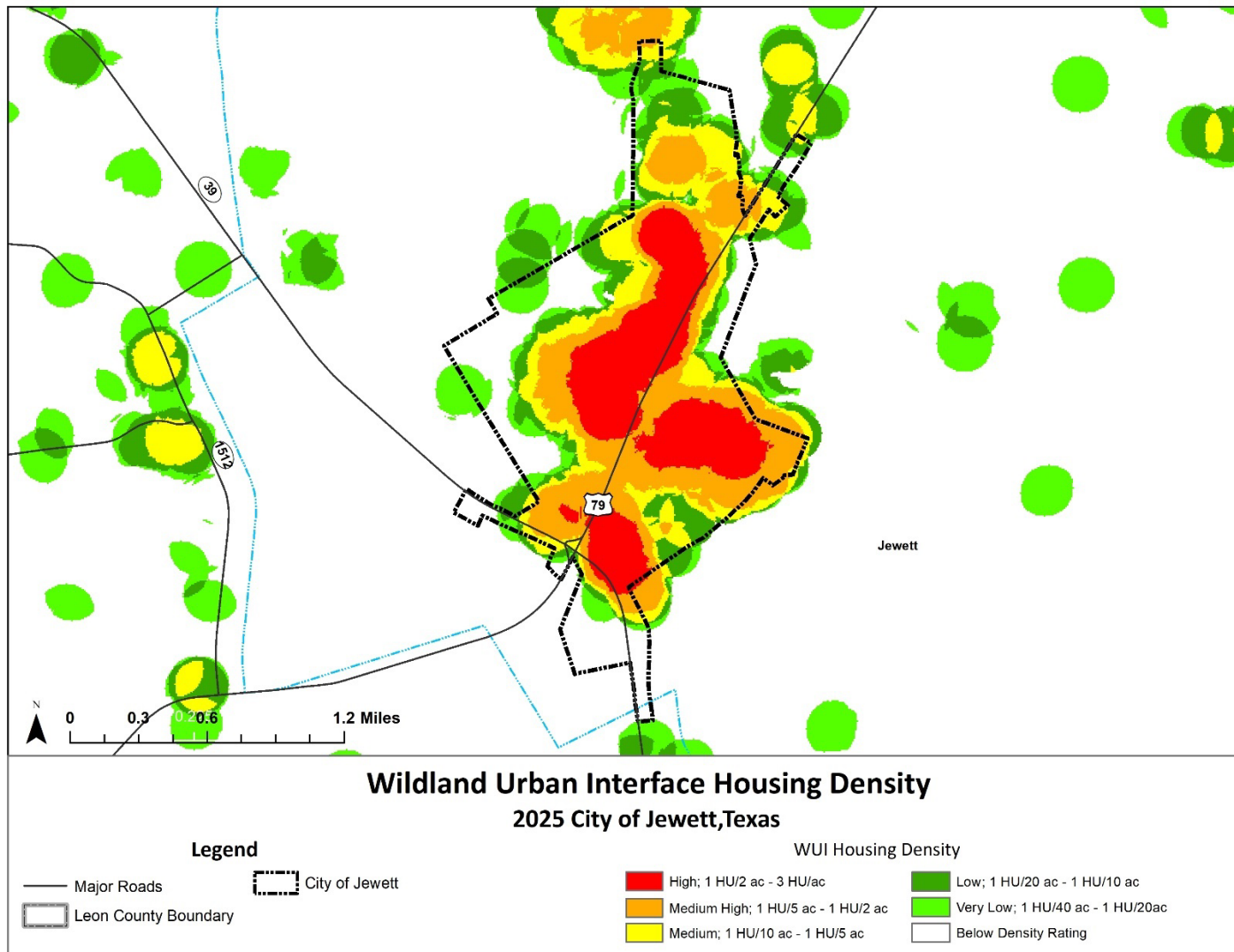


Figure 32: City of Jewett Wildland Urban Interface

V. City of Leona

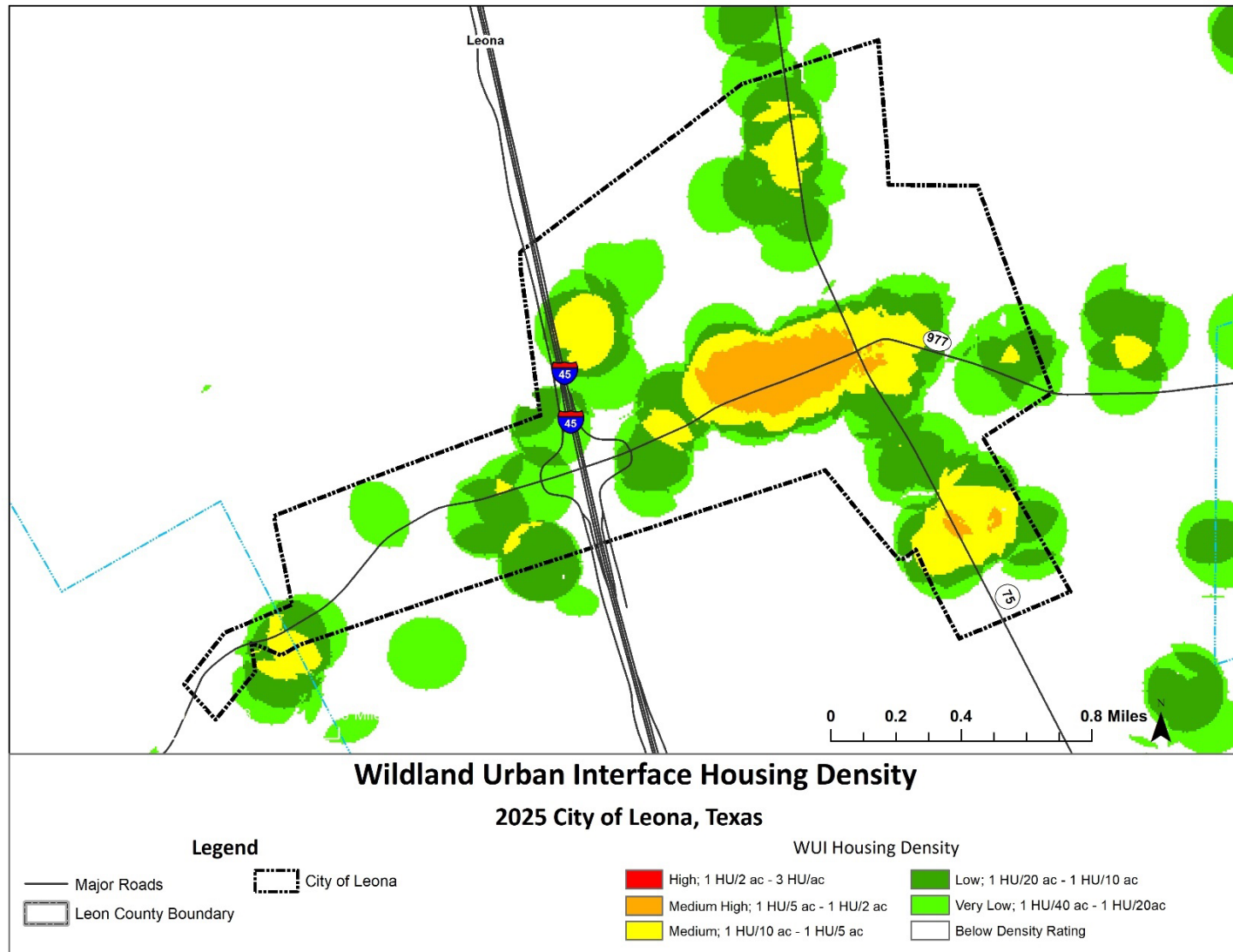


Figure 33: City of Leona Wildland Urban Interface

VI. City of Marquez

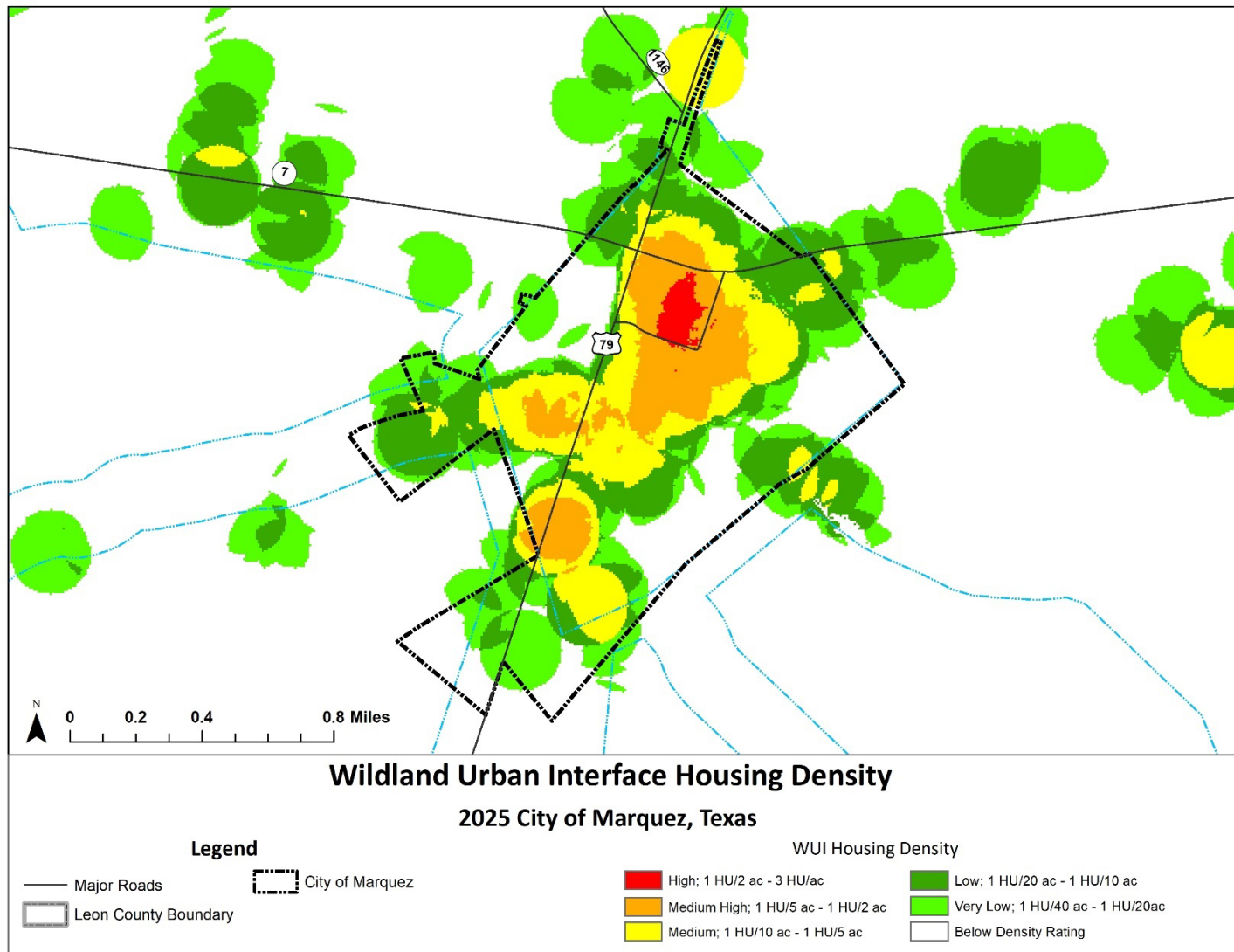


Figure 34: City of Marquez Wildland Urban Interface

VII. City of Normangee

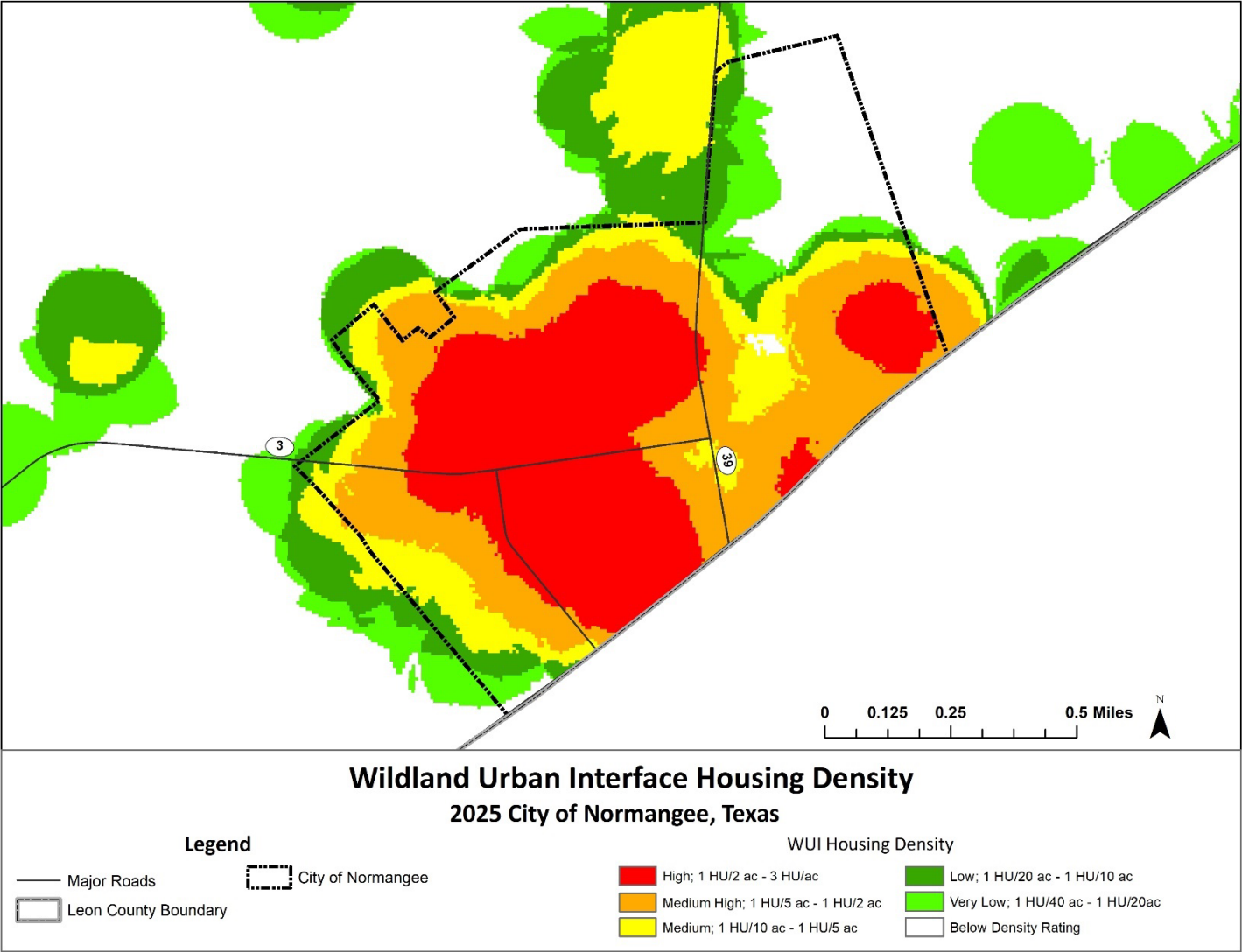


Figure 35: City of Normangee Wildland Urban Interface

VIII. City of Oakwood

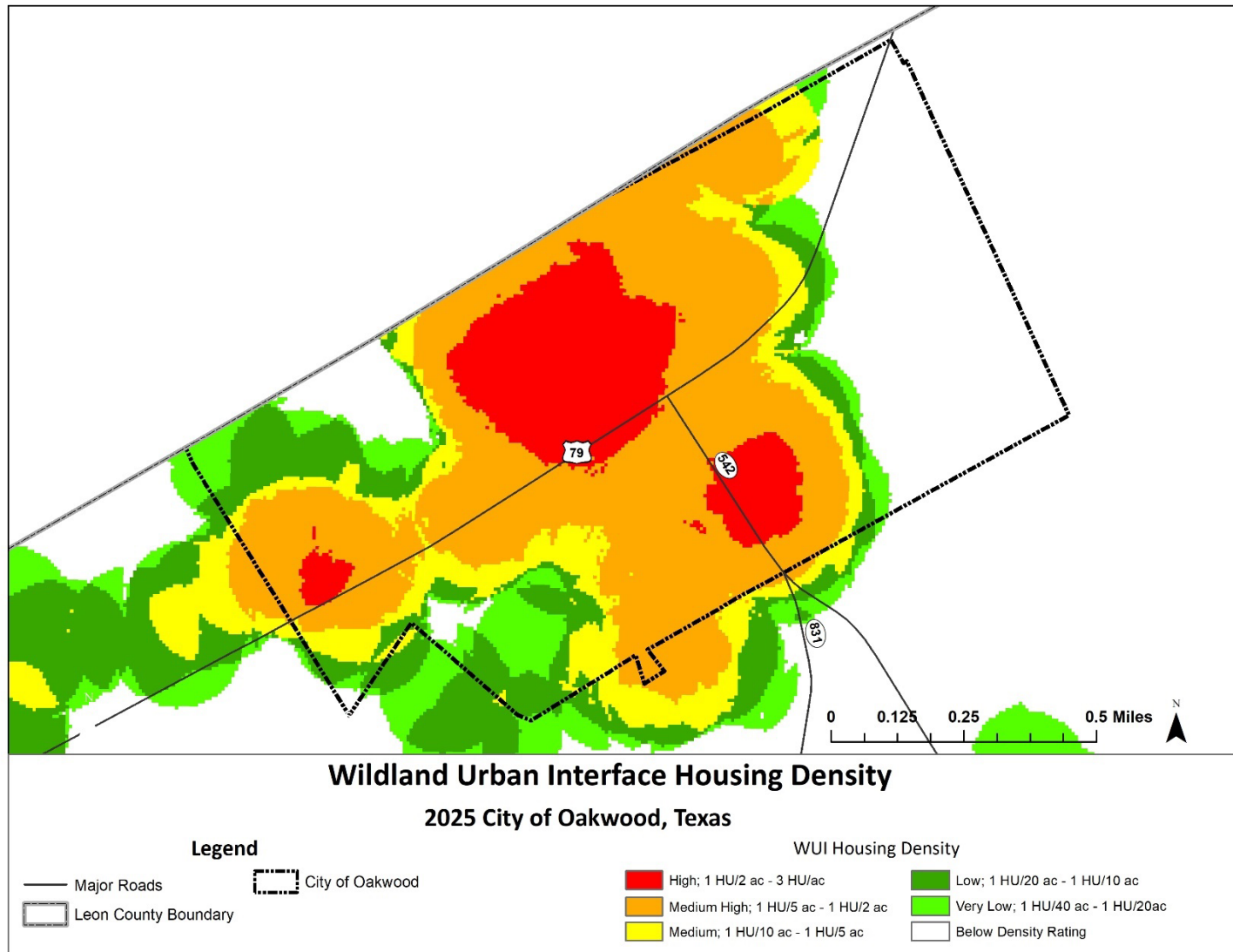


Figure 36: City of Oakwood Wildland Urban Interface

IX. Concord Robbins Water Service District

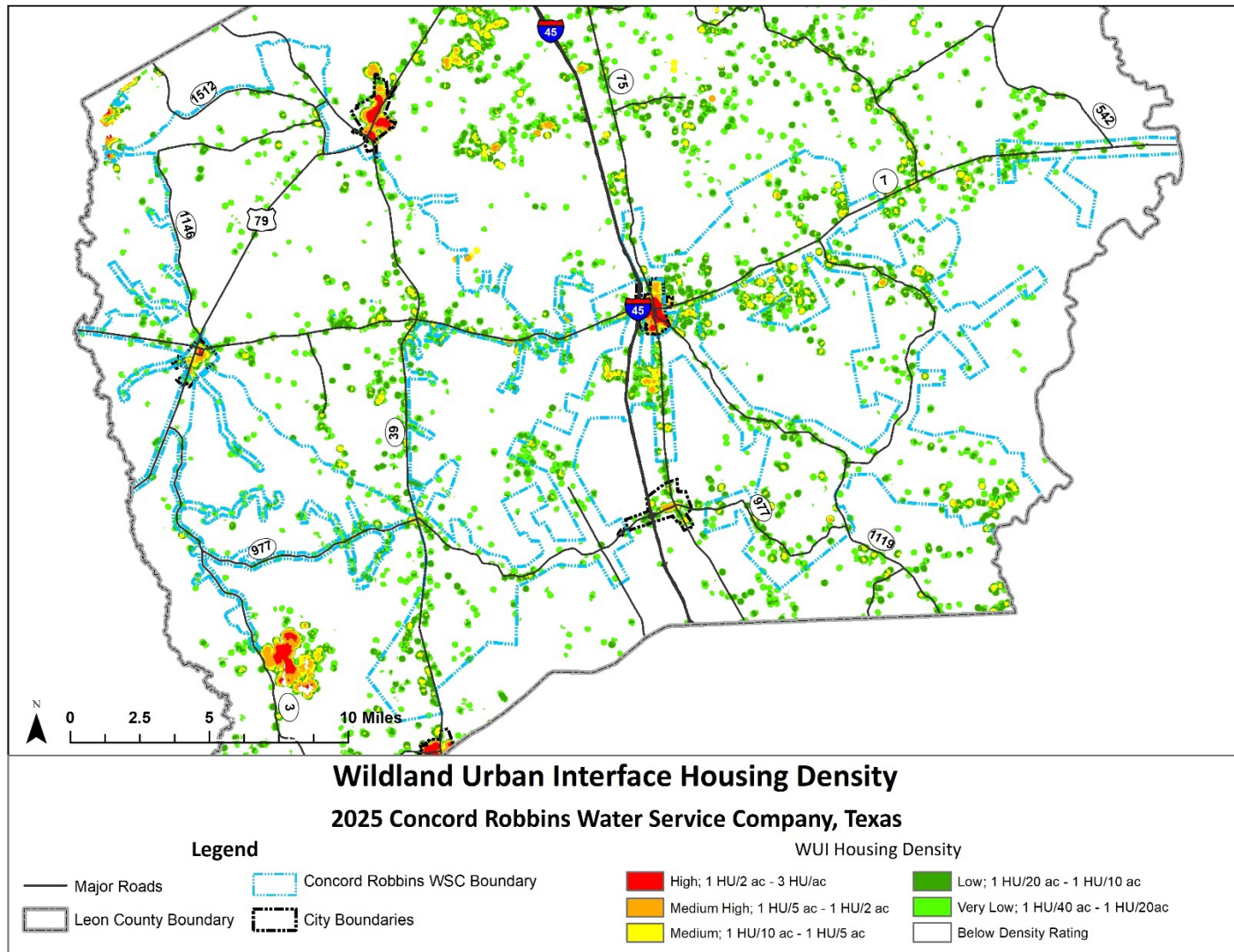


Figure 37: Concord Robbins WSC Wildland Urban Interface

X. Flo Community Water Service District

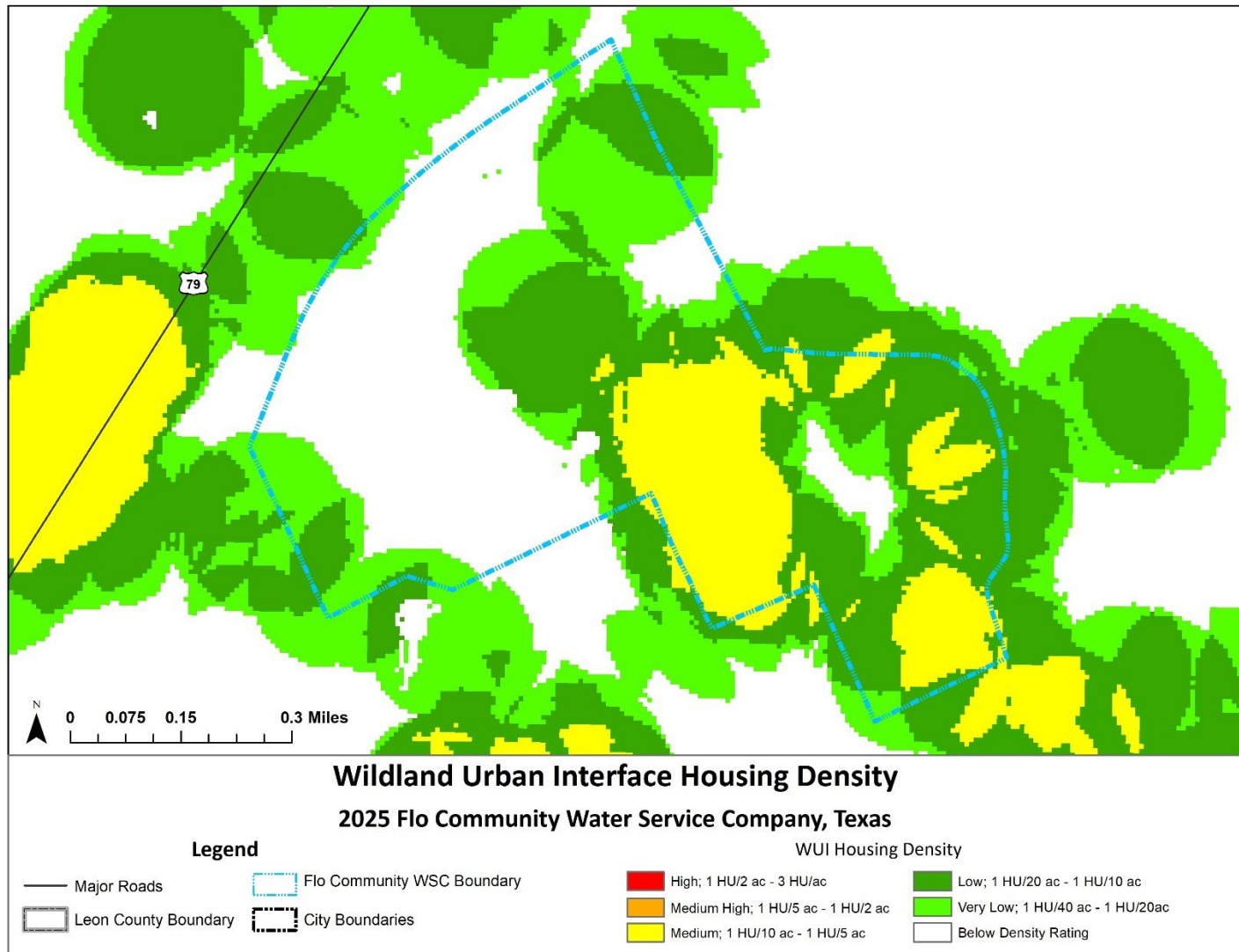


Figure 38: Flo Community WSC Wildland Urban Interface

B) Impact

Impacts from a wildfire in Leon County and the participating jurisdictions may include but are not limited to crop damage or destruction; damaged or destroyed agricultural, residential, commercial, and industrial buildings; escaped, lost, injured, or killed livestock and pets. In the worst cases, residents may be injured or killed.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from wildfire.

Residents of mobile homes, specifically those built before HUD's Manufactured Housing and Standards requirements were introduced in 1976, are of particular concern²¹. These structures are more prone to fire and have a higher incidence of occupant death than modern manufactured homes.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a wildfire, whether due to structural damage, missing windows or doors, holes in exterior walls or the roof, may be less safe during a wildfire than structures in standard condition. Exterior damage may make the homes more prone to fire by more readily exposing flammable materials to flame. Missing windows and other exterior gaps may leave residents and structures prone to smoke inhalation and smoke damage.

All of these issues may increase damages and lead to injuries or loss of life.

²¹ <https://www.usfa.fema.gov/downloads/pdf/statistics/rural.pdf>

B) Critical Facilities

There are 170 critical facilities located throughout the County and participating jurisdictions. Of the 170 critical facilities, 132 are located in the wildland urban interface (WUI), as defined by the Texas A&M Forest Service. Because of their location in the WUI, the density of development, and proximity to wildland areas, these facilities are believed to be particularly susceptible to future wildfire threats.

Table 16: Critical Facilities Vulnerable to Wildfire and Potential Impacts

Jurisdiction	Critical Facilities	Potential Wildfire Impacts				
		Destruction	Partial Destruction	Heat Damage	Smoke Damage	Water Damage
Leon County	Leon County Courthouse Complex	X	X	X	X	X
	County Annex	X	X	X	X	X
	County Annex 2	X	X	X	X	X
	Lassiter St. Centerville Health Point Complex	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #1	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #2	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #3	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #4	X	X	X	X	X
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North	X	X	X	X	X
	Leon County Sheriff's Office and Jail	X	X	X	X	X
	Leon County Communications Tower Centerville	X	X	X	X	X
	Leon County Communications Tower Flynn	X	X	X	X	X
	Leon County Communications Tower Normangee Lake	X	X	X	X	X
	Leon County Communications Tower Flo	X	X	X	X	X
	Leon County Communications Tower Oakwood	X	X	X	X	X
	Leon County ESD/Ambulance Barn	X	X	X	X	X
	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement	X	X	X	X	X
	Justice of the Peace, Pct 4 Marquez	X	X	X	X	X
	Justice of the Peace, Pct 2	X	X	X	X	X
	Leon County Expo Center					

	Champion Technologies (Chemical)	X	X	X	X	X
	Cochran Chemicals	X	X	X	X	X
	Leon Solar Farm					
	Pecan Prairie Solar Farm and Battery Storage Facility					
	NUCOR Steel Jewett, including Helipad for Life Flight Helicopters					
	Leon County Waste Disposal Pct 1					
	Leon County Waste Disposal Pct 2					
	Leon County Waste Disposal Pct 3					
	Leon County Waste Disposal Pct 4					
	Leon County Appraisal District Office	X	X	X	X	X
	Buffalo ISD- Elementary School	X	X	X	X	X
	Buffalo ISD- Junior High School	X	X	X	X	X
	Buffalo ISD- High School	X	X	X	X	X
	Leon ISD - Elementary School					
	Leon ISD- Junior High School					
	Leon ISD- High School					
	Normangee ISD - Elementary School	X	X	X	X	X
	Normangee ISD- Junior High School	X	X	X	X	X
	Normangee ISD- High School	X	X	X	X	X
	Oakwood ISD - Elementary School	X	X	X	X	X
	Oakwood ISD- Junior High School	X	X	X	X	X
	Oakwood ISD- High School	X	X	X	X	X
	Leon Gas	X	X	X	X	X
	Leon Gas Storage Tanks					
	Leon Gas Storage Tanks	X	X	X	X	X
	Leon Gas Storage Tanks					
	Houston County Electric CO-OP, Middleton Substation					
	ONCOR Electric Glaze Lake Substation Switch					
	ONCOR Electric Jewett Substation	X	X	X	X	X
	ONCOR Electric Jewett Substation and Switching Yard	X	X	X	X	X
	ONCOR Electric Centerville I-45 Substation					
	ONCOR Electric Centerville I-45					
	ONCOR Electric Brown Magnolia Substation					
	Flynn Fire Station	X	X	X	X	X
	Hilltop Lakes Fire and EMS	X	X	X	X	X
	Hilltop Lakes Town administration POA	X	X	X	X	X

	Hilltop Lakes Water Supply Corporation	X	X	X	X	X
	Hilltop Lakes Airport	X	X	X	X	X
Buffalo	City Hall/Convention Center	X	X	X	X	X
	Buffalo Civic Center	X	X	X	X	X
	Buffalo Public Library	X	X	X	X	X
	Public Safety Building/Police/Court	X	X	X	X	X
	Buffalo Treatment Plant	X	X	X	X	X
	Buffalo Volunteer Fire Dept	X	X	X	X	X
	Buffalo Maintenance Barn	X	X	X	X	X
	New School Well	X	X	X	X	X
	Avant Well	X	X	X	X	X
	Pearlstone Storage Tank	X	X	X	X	X
	Pate Park Storage Tank	X	X	X	X	X
	Fire Station Well	X	X	X	X	X
	Hwy 164 Well	X	X	X	X	X
	<i>Buffalo Lift Stations:</i>	X	X	X	X	X
	Hwy 75 South	X	X	X	X	X
	Charlie Scott	X	X	X	X	X
	Hwy 75 Lynch	X	X	X	X	X
	Turtle Creek Dr	X	X	X	X	X
	S Center St Best					
	S Center St Dead End	X	X	X	X	X
	1905 E Railroad (Hammond)	X	X	X	X	X
	Ray St	X	X	X	X	X
	Post Oak/Kayla Ln					
	FM 1848 North	X	X	X	X	X
	FM 1848 South	X	X	X	X	X
	Brown Chapel Road	X	X	X	X	X
	John H Bullock End					
	Hwy 164					
	Ridley Block	X	X	X	X	X
	Chevron	X	X	X	X	X
	Lee St	X	X	X	X	X
	Candy Lane	X	X	X	X	X
	524 Sycamore	X	X	X	X	X

	531 Ray	X	X	X	X	X
	Lanely Rd	X	X	X	X	X
	528 Ray	X	X	X	X	X
Centerville	Centerville Water Plant	X	X	X	X	X
	Centerville Sewer Plant	X	X	X	X	X
	Centerville Elementary School	X	X	X	X	X
	Centerville Jr. High/ High School	X	X	X	X	X
	Centerville Sherriff's Office	X	X	X	X	X
	Centerville City Hall	X	X	X	X	X
	Centerville Volunteer Fire Dept.	X	X	X	X	X
	Centerville Nursing Home	X	X	X	X	X
	Texan Food Mart	X	X	X	X	X
	Eshan/ TimeMax	X	X	X	X	X
	Woody's #1	X	X	X	X	X
	Woody's #2	X	X	X	X	X
	Panther Petroleum	X	X	X	X	X
	Centerville Healthpoint/ Health Clinic	X	X	X	X	X
	1 st Baptist Church of Centerville	X	X	X	X	X
	Centerville Lutheran Church	X	X	X	X	X
	Centerville Methodist Church	X	X	X	X	X
	Centerville Church of Christ	X	X	X	X	X
	Centerville Helipad	X	X	X	X	X
	Centerville Lift Station #1	X	X	X	X	X
	Centerville Lift Station #2	X	X	X	X	X
	Centerville Lift Station #3	X	X	X	X	X
	Centerville Lift Station #4	X	X	X	X	X
	Centerville Lift Station #5	X	X	X	X	X
Jewett	City Hall	X	X	X	X	X
	Jewett Fire Department	X	X	X	X	X
Leona	Leona Fire Department	X	X	X	X	X
	Leona Post Office	X	X	X	X	X
	Leona Community Center	X	X	X	X	X
Marquez	Marquez Water Well #1	X	X	X	X	X
	Marquez Water Well #2	X	X	X	X	X
	Marquez Water Well #3					
	Marquez Wastewater Treatment Plant	X	X	X	X	X

	Marquez City Hall	X	X	X	X	X
	Marquez Fire Dept.	X	X	X	X	X
	Kountry Korner Store	X	X	X	X	X
	CrossRoads Store	X	X	X	X	X
	Marquez Farm & Ranch	X	X	X	X	X
	Marquez Tire	X	X	X	X	X
Normangee	City Hall	X	X	X	X	X
	Normangee Police Dept	X	X	X	X	X
	Brookshire Brothers Grocery Store	X	X	X	X	X
Oakwood	Oakwood Water Tower #1	X	X	X	X	X
	Oakwood Water Tower #2	X	X	X	X	X
	Oakwood Pump Station	X	X	X	X	X
	Oakwood Lift Station					
	Oakwood Wastewater Treatment Plant					
Concord Robbins WSC	Plant #1	X	X	X	X	X
	Plant #1B	X	X	X	X	X
	Plant #2	X	X	X	X	X
	Plant #3					
	Plant #3A					
	Plant #4	X	X	X	X	X
	Plant #5	X	X	X	X	X
	Plant #6					
	Plant #7	X	X	X	X	X
	Flynn Booster Station					
	Concord Robbins Office	X	X	X	X	X
	Remote Wells	X	X	X	X	X
	Well # 1R					
	Well #2					
	Well #3					
	Well #4	X	X	X	X	X
	Well #5	X	X	X	X	X
	Well #6 Remote	X	X	X	X	X
	Well #7	X	X	X	X	X
	Leona Water Well Pump	X	X	X	X	X
Flo Community WSC	Flo Plant					
	Flo Remote Well					

	Keechi Plant	X	X	X	X	X
	Hwy 75 Plant (Pump Station)	X	X	X	X	X
	Weedon Plant	X	X	X	X	X
	Russel #1 Well	X	X	X	X	X
	Russel #2 Well (Plant)	X	X	X	X	X
	1618 Plant	X	X	X	X	X
	Flo Office	X	X	X	X	X

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“Research shows that changes in climate create warmer, drier conditions, leading to longer and more active fire seasons. Increases in temperatures and the thirst of the atmosphere due to climate change have increased aridity of forest fuels during the fire season. These drivers were found to be responsible for over half the observed decrease in the moisture content of fuels in western U.S. forests from 1979 to 2015, and the doubling of forest fire burned area over the period 1984 to 2015. For much of the U.S. West, projections show that an average annual 1 degree C temperature increase would increase the median burned area per year by as much as 600%.²²

²² <https://www.noaa.gov/noaa-wildfire/wildfire-climate-connection#:~:text=Research%20shows%20that%20changes%20in,fuels%20during%20the%20fire%20season.https://www.c2es.org/content/wildfires-and-climate-change/#:~:text=For%20much%20of%20the%20U.S.,in%20some%20types%20of%20forests.>

7. Tornado

A tornado is defined as a violently rotating column of air touching the ground, usually attached to the base of a thunderstorm.²³ Most of the time, vortices remain suspended in the atmosphere and are visible as a funnel cloud. However, when the lower tip of a vortex touches the ground, the tornado becomes a force of destruction. Tornado strength is currently measured using the Enhanced Fujita (EF) Scale. Like the previously used Fujita scale, the EF Scale uses damage to estimate tornado wind speeds and assign a number between 0 and 5. A rating of EF0 represents minor to no damage whereas a rating of EF5 represents destruction of buildings.

1) Tornado History

The 2019 Leon County HMAP reported 21 tornadoes between 1953 – 2011 for the County and jurisdictions. The following table represents all recorded events between 2019 – 2024. Tornado events are only recorded at the county or city level, therefore there are no recorded events for Concord Robbins WSC or Flo Community WSC. For planning purposes, we can assume that events recorded for the County may have also impacted the Districts. There have been four recorded tornado events for Leon County since the 2019 HMAP.

Table 17: Leon County Tornado History

Location	Date Range	Number of Tornadoes	F / EF Magnitude Range	Fatalities	Injuries	Property Damage \$2025	Crop Damage \$2025
Leon County	4/13/2019	2	EF0- EF1	0	0	\$12,636.00	\$0
Jewett	5/6/2025	1	EF1	0	0	\$100,000.00	\$0
Buffalo	5/6/2025	1	EF1	0	0	\$10,000.00	\$0

2) Likelihood of Future Events

The likelihood of future tornadoes will be determined in consideration of all tornadoes in Leon County. Tornado events in Leon County are considered an occasional hazard given the frequency of previous tornadoes in the County and participating jurisdictions, meaning one is possible in the next five years.

²³ <https://www.weather.gov/phi/TornadoDefinition>

3) Extent

Before 2007, the Fujita Scale was used for rating tornado strength. The Fujita Scale is based on damage intensity instead of wind speed, with estimated wind speed ranges based on the extent of observed damage.

Table 18: Fujita Scale

Fujita Scale			
Enhanced Fujita Category	Wind Speed (MPH)	Character	Potential Damage
Zero (F0)	40-72	Weak	Light Damage. Some damage to chimneys; branches broken off trees, shallow-rooted trees uprooted, sign boards damaged.
One (F1)	73-112	Weak	Moderate damage. Roof surfaces peeled off; mobile homes pushed foundations or overturned; moving autos pushed off road.
Two (F2)	113-157	Strong	Considerable damage. Roofs torn from frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light objects become projectiles.
Three (F3)	158-206	Strong	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
Four (F4)	207-260	Violent	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
Five (F5)	260-318	Violent	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Adopted after 2007, the Enhanced Fujita Scale, or EF Scale, is the scale for rating the strength of tornados via the damage they cause. Six categories from zero to five represent increasing degrees of damage. The scale considers how most structures are designed and is thought to be an accurate representation of the surface wind speeds in the most violent tornados.

Table 19: Enhanced Fujita Scale²⁴

Enhanced Fujita (EF) Scale		
Enhanced Fujita Category	Wind Speed (MPH)	Potential Damage
EF0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	200+	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

The most recent tornados in Leon County and the participating jurisdictions have been classified as EF0 – EF1s on the Enhanced Fujita Scale. Leon County sits within Zone III (200 mph winds) of the IBC’s wind speed map²⁵. Future tornados in Leon County and the participating jurisdictions may meet up to EF5 on the Enhanced Fujita Category.

4) Location and Impact

A) Location

Tornados are not constrained by any distinct geographic boundary. Tornados can occur across all participating jurisdictions and may freely cross from one jurisdiction into another.

B) Impact

Impacts from a tornado may include but are not limited to damaged or destroyed personal property including vehicles, damaged or destroyed agricultural, residential, commercial, and industrial buildings, and loss of power. Crops may be damaged or destroyed. Pets and livestock

²⁴ 2018 State of Texas Hazard Mitigation Plan

²⁵ <https://iibec.org/giving-tornadoes-their-due/>

may be injured or killed by tornados or flying debris. Pets and livestock may escape due to damaged or destroyed structures and fences.

In the worst cases, tornados may cause injuries and/or be deadly.

5) Vulnerability

Tornadoes have the potential to impact the entire planning area. All existing and future buildings, critical facilities, critical infrastructure, improved property, and the population of the participating jurisdictions are considered vulnerable to this hazard.

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a tornado. Residents of mobile / manufactured homes are of particular concern. These structures are never considered safe during a tornado.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a tornado, whether due to structural damage, missing windows or doors, holes in exterior walls or the roof, may be less safe during a tornado than structures in standard condition. Existing structural weaknesses, due to housing type or existing damages, may lead to compounded damages, injuries, or loss of life.

B) Critical Facilities

Certain critical facilities and infrastructure in each jurisdiction may be particularly vulnerable to tornados. These facilities have been identified for reasons including: the number of people who use the facility or infrastructure, the facility's role in providing basic services to begin the cleanup process and get the jurisdictions running again, and the facility's ability to offer goods and materials residents will need to resume normalcy as quickly as possible. The selected critical facilities are built from a variety of materials with varying levels of resistance to tornadic damage. Additionally, their varying ages mean they weren't constructed to uniform building standards. Given tornados' violent nature, these facilities may experience increased levels of vulnerability to the hazards. Damage to any of these facilities may have a disproportionately negative impact on each jurisdiction's recovery from a tornado if that damage affects the facility's ability to reopen and resume normal business right away.

Table 20: Critical Facilities Vulnerable to Tornadoes and Potential Impacts

Jurisdiction	Critical Facilities	Potential Tornado Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Leon County	Leon County Courthouse Complex	X	X	X	X	X	X	X	X	X
	County Annex	X	X	X	X	X	X	X	X	X
	County Annex 2	X	X	X	X	X	X	X	X	X
	Lassiter St. Centerville Health Point Complex	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #1	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #2	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #3	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #4	X	X	X	X	X	X	X	X	X
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North	X	X	X	X	X	X	X	X	X
	Leon County Sheriff's Office and Jail	X	X	X	X	X	X	X	X	X
	Leon County Communications Tower Centerville	X	X	X	X	X	X	X	X	X
	Leon County Communications Tower Flynn	X	X	X	X			X		
	Leon County Communications Tower Normangee Lake	X	X	X	X			X		
	Leon County Communications Tower Flo	X	X	X	X			X		
	Leon County Communications Tower Oakwood	X	X	X	X			X		
	Leon County ESD/Ambulance Barn	X	X	X	X	X	X	X	X	X
	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement	X	X	X	X	X	X	X	X	X
	Justice of the Peace, Pct 4 Marquez	X	X	X	X	X	X	X	X	X
	Justice of the Peace, Pct 2	X	X	X	X	X	X	X	X	X
	Leon County Expo Center	X	X	X	X	X	X	X	X	X
	Champion Technologies (Chemical)	X	X	X	X	X	X	X	X	X
	Cochran Chemicals	X	X	X	X	X	X	X	X	X
	Leon Solar Farm	X	X	X	X	X		X	X	X
	Pecan Prairie Solar Farm and Battery Storage Facility	X	X	X	X	X	X	X	X	X

NUCOR Steel Jewett, including Helipad for Life Flight Helicopters	X	X	X	X	X	X	X	X	X	X
Leon County Waste Disposal Pct 1	X	X	X	X	X	X	X	X	X	X
Leon County Waste Disposal Pct 2	X	X	X	X	X	X	X	X	X	X
Leon County Waste Disposal Pct 3	X	X	X	X	X	X	X	X	X	X
Leon County Waste Disposal Pct 4	X	X	X	X	X	X	X	X	X	X
Leon County Appraisal District Office	X	X	X	X	X	X	X	X	X	X
Buffalo ISD- Elementary School	X	X	X	X	X	X	X	X	X	X
Buffalo ISD- Junior High School	X	X	X	X	X	X	X	X	X	X
Buffalo ISD- High School	X	X	X	X	X	X	X	X	X	X
Leon ISD - Elementary School	X	X	X	X	X	X	X	X	X	X
Leon ISD- Junior High School	X	X	X	X	X	X	X	X	X	X
Leon ISD- High School	X	X	X	X	X	X	X	X	X	X
Normangee ISD - Elementary School	X	X	X	X	X	X	X	X	X	X
Normangee ISD- Junior High School	X	X	X	X	X	X	X	X	X	X
Normangee ISD- High School	X	X	X	X	X	X	X	X	X	X
Oakwood ISD - Elementary School	X	X	X	X	X	X	X	X	X	X
Oakwood ISD- Junior High School	X	X	X	X	X	X	X	X	X	X
Oakwood ISD- High School	X	X	X	X	X	X	X	X	X	X
Leon Gas	X	X	X	X	X	X	X	X	X	X
Leon Gas Storage Tanks	X	X	X	X	X	X	X	X	X	X
Leon Gas Storage Tanks	X	X	X	X	X	X	X	X	X	X
Leon Gas Storage Tanks	X	X	X	X	X	X	X	X	X	X
Houston County Electric CO-OP, Middleton Substation	X	X	X	X			X			
ONCOR Electric Glaze Lake Substation Switch	X	X	X	X			X			
ONCOR Electric Jewett Substation	X	X	X	X			X			
ONCOR Electric Jewett Substation and Switching Yard	X	X	X	X			X			
ONCOR Electric Centerville I-45 Substation	X	X	X	X			X			
ONCOR Electric Centerville I-45	X	X	X	X			X			
ONCOR Electric Brown Magnolia Substation	X	X	X	X			X			
Flynn Fire Station	X	X	X	X	X	X	X	X	X	X
Hilltop Lakes Fire and EMS	X	X	X	X	X	X	X	X	X	X
Hilltop Lakes Town administration POA	X	X	X	X	X	X	X	X	X	X
Hilltop Lakes Water Supply Corporation	X	X	X	X	X	X	X	X	X	X

	Hilltop Lakes Airport	X	X	X	X	X	X	X	X	X
Buffalo	City Hall/Convention Center	X	X	X	X	X	X	X	X	X
	Buffalo Civic Center	X	X	X	X	X	X	X	X	X
	Buffalo Public Library	X	X	X	X	X	X	X	X	X
	Public Safety Building/Police/Court	X	X	X	X	X	X	X	X	X
	Buffalo Treatment Plant	X	X	X	X	X	X	X	X	X
	Buffalo Volunteer Fire Dept	X	X	X	X	X	X	X	X	X
	Buffalo Maintenance Barn	X	X	X	X	X	X	X	X	X
	New School Well	X	X	X	X			X		
	Avant Well	X	X	X	X			X		
	Pearlstone Storage Tank	X	X	X	X			X		
	Pate Park Storage Tank	X	X	X	X			X		
	Fire Station Well	X	X	X	X			X		
	Hwy 164 Well	X	X	X	X			X		
	<i>Buffalo Lift Stations:</i>	X	X	X	X	X	X	X	X	X
	Hwy 75 South	X	X	X	X			X		
	Charlie Scott	X	X	X	X			X		
	Hwy 75 Lynch	X	X	X	X			X		
	Turtle Creek Dr	X	X	X	X			X		
	S Center St Best	X	X	X	X			X		
	S Center St Dead End	X	X	X	X			X		
	1905 E Railroad (Hammond)	X	X	X	X			X		
	Ray St	X	X	X	X			X		
	Post Oak/Kayla Ln	X	X	X	X			X		
	FM 1848 North	X	X	X	X			X		
	FM 1848 South	X	X	X	X			X		
	Brown Chapel Road	X	X	X	X			X		
	John H Bullock End	X	X	X	X			X		
	Hwy 164	X	X	X	X			X		
	Ridley Block	X	X	X	X			X		
	Chevron	X	X	X	X			X		
	Lee St	X	X	X	X			X		
	Candy Lane	X	X	X	X			X		
	524 Sycamore	X	X	X	X			X		
	531 Ray	X	X	X	X			X		

	Lanely Rd	X	X	X	X			X		
	528 Ray	X	X	X	X			X		
Centerville	Centerville Water Plant	X	X	X	X	X	X	X	X	X
	Centerville Sewer Plant	X	X	X	X	X	X	X	X	X
	Centerville Elementary School	X	X	X	X	X	X	X	X	X
	Centerville Jr. High/ High School	X	X	X	X	X	X	X	X	X
	Centerville Sherriff's Office	X	X	X	X	X	X	X	X	X
	Centerville City Hall	X	X	X	X	X	X	X	X	X
	Centerville Volunteer Fire Dept.	X	X	X	X	X	X	X	X	X
	Centerville Nursing Home	X	X	X	X	X	X	X	X	X
	Texan Food Mart	X	X	X	X	X	X	X	X	X
	Eshan/ TimeMax	X	X	X	X	X	X	X	X	X
	Woody's #1	X	X	X	X	X	X	X	X	X
	Woody's #2	X	X	X	X	X	X	X	X	X
	Panther Petroleum	X	X	X	X	X	X	X	X	X
	Centerville Healthpoint/ Health Clinic	X	X	X	X	X	X	X	X	X
	1 st Baptist Church of Centerville	X	X	X	X	X	X	X	X	X
	Centerville Lutheran Church	X	X	X	X	X	X	X	X	X
	Centerville Methodist Church	X	X	X	X	X	X	X	X	X
	Centerville Church of Christ	X	X	X	X	X	X	X	X	X
	Centerville Helipad	X	X	X	X			X	X	X
	Centerville Lift Station #1	X	X	X	X			X		
	Centerville Lift Station #2	X	X	X	X			X		
	Centerville Lift Station #3	X	X	X	X			X		
	Centerville Lift Station #4	X	X	X	X			X		
	Centerville Lift Station #5	X	X	X	X			X		
Jewett	City Hall	X	X	X	X	X	X	X	X	X
	Jewett Fire Department	X	X	X	X	X	X	X	X	X
Leona	Leona Fire Department	X	X	X	X	X	X	X	X	X
	Leona Post Office	X	X	X	X	X	X	X	X	X
	Leona Community Center	X	X	X	X	X	X	X	X	X
Marquez	Marquez Water Well #1	X	X	X	X			X		
	Marquez Water Well #2	X	X	X	X			X		
	Marquez Water Well #3	X	X	X	X			X		
	Marquez Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X
	Marquez City Hall	X	X	X	X	X	X	X	X	X

	Marquez Fire Dept.	X	X	X	X	X	X	X	X	X
	Kountry Korner Store	X	X	X	X	X	X	X	X	X
	CrossRoads Store	X	X	X	X	X	X	X	X	X
	Marquez Farm & Ranch	X	X	X	X	X	X	X	X	X
	Marquez Tire	X	X	X	X	X	X	X	X	X
Normangee	City Hall	X	X	X	X	X	X	X	X	X
	Normangee Police Dept	X	X	X	X	X	X	X	X	X
	Brookshire Brothers Grocery Store	X	X	X	X	X	X	X	X	X
Oakwood	Oakwood Water Tower #1	X	X	X	X			X		
	Oakwood Water Tower #2	X	X	X	X			X		
	Oakwood Pump Station	X	X	X	X			X		
	Oakwood Lift Station	X	X	X	X			X		
	Oakwood Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X
Concord Robbins WSC	Plant #1	X	X	X	X			X		
	Plant #1B	X	X	X	X			X		
	Plant #2	X	X	X	X			X		
	Plant #3	X	X	X	X			X		
	Plant #3A	X	X	X	X			X		
	Plant #4	X	X	X	X			X		
	Plant #5	X	X	X	X			X		
	Plant #6	X	X	X	X			X		
	Plant #7	X	X	X	X			X		
	Flynn Booster Station	X	X	X	X			X		
	Concord Robbins Office	X	X	X	X	X	X	X	X	X
	Remote Wells	X	X	X	X			X		
	Well # 1R	X	X	X	X			X		
	Well #2	X	X	X	X			X		
	Well #3	X	X	X	X			X		
	Well #4	X	X	X	X			X		
	Well #5	X	X	X	X			X		
	Well #6 Remote	X	X	X	X			X		
	Well #7	X	X	X	X			X		
	Leona Water Well Pump	X	X	X	X			X		
Flo Community WSC	Flo Plant	X	X	X	X	X	X	X	X	X
	Flo Remote Well	X	X	X	X			X		
	Keechi Plant	X	X	X	X	X	X	X	X	X

	Hwy 75 Plant (Pump Station)	X	X	X	X			X		
	Weedon Plant	X	X	X	X	X	X	X	X	X
	Russel #1 Well	X	X	X	X			X		
	Russel #2 Well (Plant)	X	X	X	X			X		
	1618 Plant	X	X	X	X	X	X	X	X	X
	Flo Office	X	X	X	X	X	X	X	X	X

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“Scientists must attempt to predict how climate change might affect the individual weather ‘ingredients’ that support the development of supercell thunderstorms (the type that produce tornadoes). These weather ingredients are:

- warm, moist air;
- an unstable atmosphere; and
- wind at different levels moving in different directions at different speeds, a phenomenon known as wind shear.

Some studies predict that climate change could provide the opportunity for more severe thunderstorms to form. However, this does not necessarily mean that more tornadoes will occur, especially in light of the fact that only about 20 percent of supercell thunderstorms produce tornadoes.”²⁶

²⁶ <https://education.nationalgeographic.org/resource/tornadoes-and-climate-change/>

8. Drought

Drought is defined as the consequence of a natural reduction in the amount of precipitation expected over an extended period, usually a season or more in length.²⁷

Droughts are one of the most complex natural hazards to identify because it is difficult to determine their precise beginning or end. In addition, droughts can lead to other hazards such as extreme heat and wildfires. Their impact on wildlife and area farming is enormous, often killing crops, grazing land, edible plants and even in severe cases, trees. A secondary hazard to drought is wildfire because dying vegetation serves as a prime ignition source. Therefore, a heat wave combined with a drought is a very dangerous situation.

Table 21: Drought Classifications

Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
Hydrologic Drought	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
Agricultural Drought	Soil moisture deficiencies relative to water demands of plant life, usually crops.
Socioeconomic Drought	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

²⁷ 2018 State of Texas Hazard Mitigation Plan

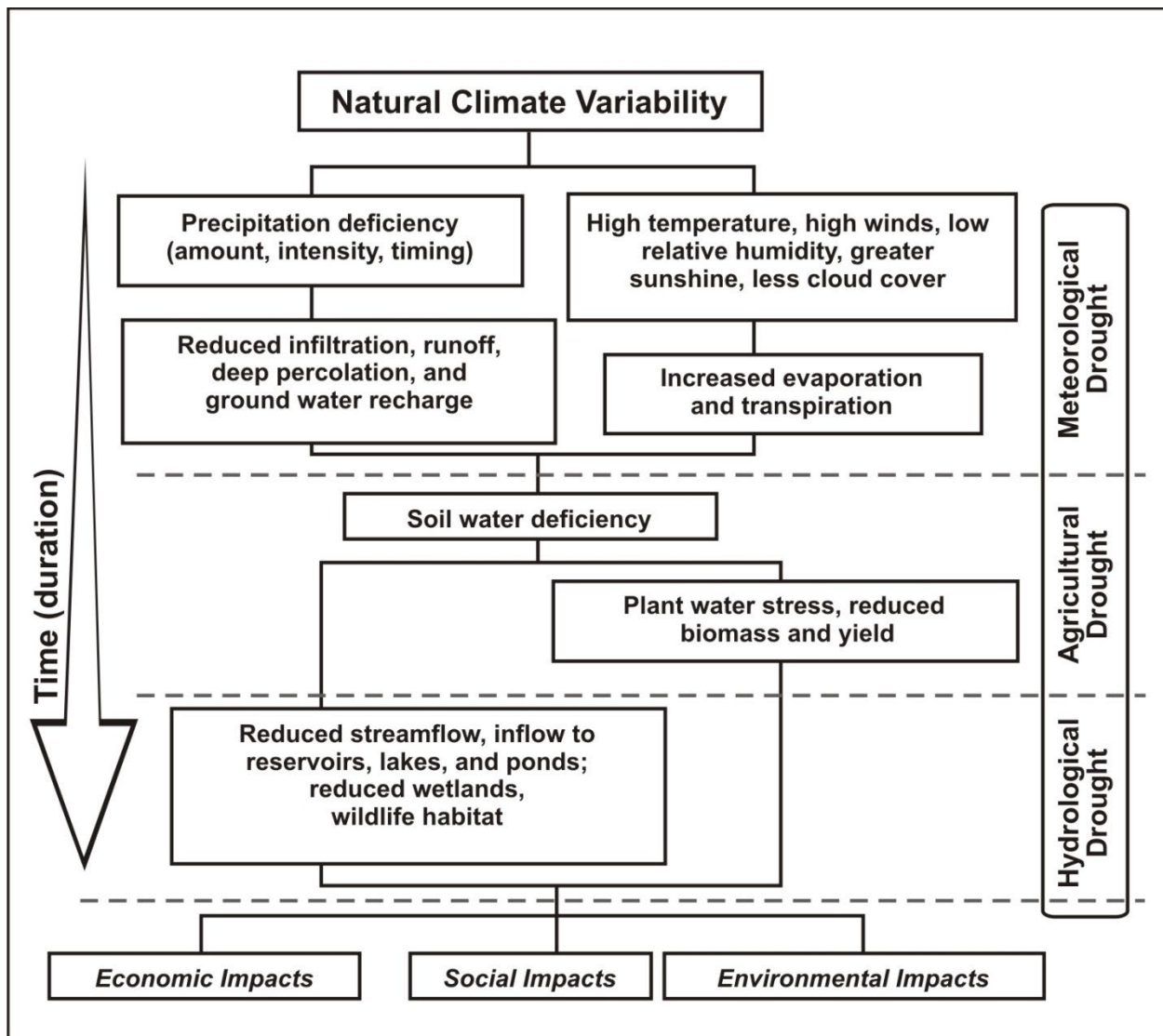


Figure 39: Sequence of Drought Occurrence and Impacts for Commonly Accepted Drought Types²⁸

²⁸ Source: National Drought Mitigation Center, University of Nebraska-Lincoln, <http://drought.unl.edu/DroughtBasics/TypesofDrought.aspx>

1) Drought History

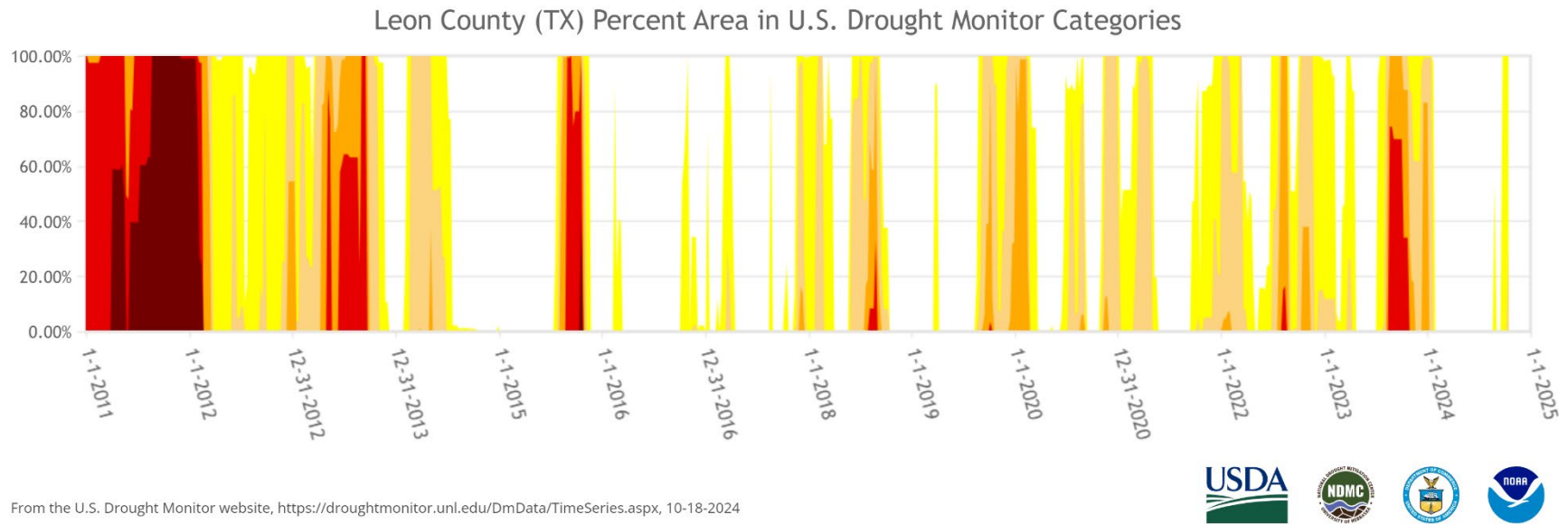


Figure 40: Leon County Drought History²⁹

²⁹ Source: United States Drought Monitor <https://droughtmonitor.unl.edu/Data.aspx>

Drought history is recorded at the county level. However, the data is measured by the percentage of the county affected by drought. Although no specific data regarding drought's occurrences in the remaining jurisdictions is available, it's possible to use the data in Figure 21 to infer when the participating jurisdictions addressing the hazard previously experienced drought conditions due to the fact that the conditions impacted 100% of the county. According to the data, Leon County and the participating jurisdictions have regularly experienced drought conditions since 2000.

Table 22: Leon County Drought History

Location	Date Range	Number of Drought Events	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Countywide	1/1/2019 – 7/1/2024	18	0	0	\$0	\$0

2) Likelihood of Future Events

Based on historical drought in Texas and Leon County, it is highly likely that a future drought will affect Leon County and the participating jurisdictions, meaning an event affecting any or all the participating jurisdictions is probable in the next year, and a major drought every 20 years.

3) Extent

Since 2000, Leon County has regularly experienced county-wide droughts classified as periods ranging from abnormal dryness to exceptional drought. Between 2011 and 2016, the entire County, including all participating jurisdictions, was in a state of extreme or exceptional drought, the most severe drought categories.

The Palmer Drought Index is used to measure the extent of drought by measuring the duration and intensity of long-term drought-inducing circulation patterns. Long-term drought is cumulative, with the intensity of drought during the current month dependent upon the current weather patterns plus the cumulative patterns of previous months. The hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop.

Table 23: Palmer Drought Index

Drought Index	Drought Conditions Classifications						
	Extreme	Severe	Moderate	Normal	Mostly Moist	Very Moist	Extremely Moist
Z Index	-2.75 and below	-2.00 to -2.74	-1.25 to -1.99	-1.24 to +.99	+1.00 to +2.49	+2.50 to +3.49	n/a
Meteorological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.00	+3.00 to +3.00	+4.00 and above
Hydrological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.00	+3.00 to +3.00	+4.00 and above

Table 24: Palmer Drought Category Descriptions³⁰

Category	Description	Possible Impacts	Palmer Drought Index
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing, or imminent, voluntary water use restrictions requested.	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions.	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies.	-5.0 or less

Drought is monitored nationwide by the National Drought Mitigation Center (NDMC). Indicators are used to describe broad scale drought conditions across the U.S. Indicators correspond to the intensity of drought.

Based on the historical occurrences of drought, Leon County and all participating jurisdictions should anticipate experiencing droughts ranging from abnormally dry to exceptional drought or D0 to D4 based on the Palmer Drought Category. Given varying conditions, droughts may start

³⁰ www.droughtmonitor.unl.edu

on the low end of the Index but will intensify with duration and ongoing lack of precipitation. Future drought events may reach the intensity of D4 on the Palmer Drought Index.

4) Location and Impact

A) Location

Drought has no distinct geographic boundary. Drought can occur across all participating jurisdictions.

B) Impact

General impacts may include water shortage, risk to public safety due to wildfire risk increases, respiratory impacts to the public due to affected air quality, and degradation of fish and wildlife habitat. Economic impacts may include increased prices for food, unemployment for farm workers and ranch hands, livestock mortality from limited grazing availability, and reduced tax revenues because of reduced supplies of agriculture products and livestock that are dependent on rainfall, along with other supply shortages.

The City of Buffalo adopted its current Drought Contingency Plan in May 2014. The plan describes three stages of water restrictions ranging from voluntary conservation to pro rata water consumption. At each stage, the plan outlines a process to reduce total water usage from as little as 0% during a Stage 1 response to as much as 20% during a Stage 3 response, or to a greater percentage set by the City based on water availability. The percent of daily consumption of the City's production capacity is the trigger for all stages of drought contingency.

The City of Centerville adopted its current Drought Contingency Plan in August 2000. The plan describes five stages of water restrictions ranging from voluntary conservation to restricting all non-essential water uses described in the plan. The plan does not include the percentages of water consumption to be reduced at each stage. The percent of daily consumption of the City's production capacity is the trigger for all stages of drought contingency.

The City of Jewett adopted its current Drought Contingency Plan in February 2011. The plan describes five stages of water restrictions ranging from voluntary conservation to restricting all non-essential water uses described in the plan. At each stage, the plan outlines a process to reduce total water usage from 15% during a Stage 1 response to as much as 50% during a Stage 5 response. The triggers for all stages of drought contingency are when total water demand equals or exceeds amounts indicated in the plan for three consecutive days except Stage 5, which is triggered by a major water line break or contamination of the water supply.

The City of Marquez adopted its current Drought Contingency Plan in August 2012. The plan describes five stages of water restrictions ranging from voluntary conservation to restricting all

non-essential water uses described in the plan. At each stage, the plan outlines a process to reduce total water usage from as little as 10% during a Stage 1 response to as much as 50% during a Stage 5 response, or to a greater percentage set by the City based on water availability. The percent of daily consumption of the City's production capacity is the trigger for all stages of drought contingency besides Stage 5, which is triggered by a major water line break or contamination of the water supply.

Drought Contingency Plans were not available for Leona, Normangee, Oakwood, Leon County, Concord Robbins WSC and Flo Community WSC

5) Vulnerability

Because drought has the potential to impact every jurisdiction equally, all improved property and the entire population is exposed to this hazard. General impacts may include water shortage, risk to public safety due to wildfire risk increases, respiratory impacts to the public due to affected air quality, and degradation of fish and wildlife habitat.

Economic impacts may include increased prices for food, unemployment for farm workers and ranch hands, livestock mortality from limited grazing availability, and reduced tax revenues because of reduced supplies of agriculture products and livestock that are dependent on rainfall.

Lower income populations who may not have the resources to buy large quantities of bottled water in the event of a shortage may be more vulnerable than other populations.

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a drought. Lower income populations who may not have the resources to buy large quantities of bottled water in the event of a shortage may be more vulnerable than other populations.

B) Critical Facilities

In addition to triggering various components of participating jurisdictions' Drought Contingency Plans, drought conditions may affect local critical facilities. Area fire departments may see increased demand for controlling wildland fire due to dry conditions. Drought is likely to require increased output from the local power companies to keep up with electrical demand.

Depending on factors like time of year, temperature, and duration, increased electrical demand may cause brownouts that would impact critical facilities.

Table 25: Critical Facilities Vulnerable to Drought and Potential Impacts

Jurisdiction	Critical Facilities	Potential Drought Impacts	
		Increased Demand for Services	Economic Damages
Leon County	Leon County Courthouse Complex	X	X
	County Annex	X	X
	County Annex 2	X	X
	Lassiter St. Centerville Health Point Complex	X	X
	Commissioner Precinct Road and Bridge Barn #1	X	X
	Commissioner Precinct Road and Bridge Barn #2	X	X
	Commissioner Precinct Road and Bridge Barn #3	X	X
	Commissioner Precinct Road and Bridge Barn #4	X	X
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North	X	X
	Leon County Sheriff's Office and Jail	X	X
	Leon County Communications Tower Centerville	X	X
	Leon County Communications Tower Flynn	X	X
	Leon County Communications Tower Normangee Lake	X	X
	Leon County Communications Tower Flo	X	X
	Leon County Communications Tower Oakwood	X	X
	Leon County ESD/Ambulance Barn	X	X
	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement	X	X
	Justice of the Peace, Pct 4 Marquez	X	X
	Justice of the Peace, Pct 2	X	X
	Leon County Expo Center	X	X
	Champion Technologies (Chemical)	X	X
	Cochran Chemicals	X	X
	Leon Solar Farm	X	X
	Pecan Prairie Solar Farm and Battery Storage Facility	X	X
	NUCOR Steel Jewett, including Helipad for Life Flight Helicopters	X	X
	Leon County Waste Disposal Pct 1	X	X
	Leon County Waste Disposal Pct 2	X	X

	Leon County Waste Disposal Pct 3	X	X
	Leon County Waste Disposal Pct 4	X	X
	Leon County Appraisal District Office	X	X
	Buffalo ISD- Elementary School	X	X
	Buffalo ISD- Junior High School	X	X
	Buffalo ISD- High School	X	X
	Leon ISD - Elementary School	X	X
	Leon ISD- Junior High School	X	X
	Leon ISD- High School	X	X
	Normangee ISD - Elementary School	X	X
	Normangee ISD- Junior High School	X	X
	Normangee ISD- High School	X	X
	Oakwood ISD - Elementary School	X	X
	Oakwood ISD- Junior High School	X	X
	Oakwood ISD- High School	X	X
	Leon Gas	X	X
	Leon Gas Storage Tanks	X	X
	Leon Gas Storage Tanks	X	X
	Leon Gas Storage Tanks	X	X
	Houston County Electric CO-OP, Middleton Substation	X	X
	ONCOR Electric Glaze Lake Substation Switch	X	X
	ONCOR Electric Jewett Substation	X	X
	ONCOR Electric Jewett Substation and Switching Yard	X	X
	ONCOR Electric Centerville I-45 Substation	X	X
	ONCOR Electric Centerville I-45	X	X
	ONCOR Electric Brown Magnolia Substation	X	X
	Flynn Fire Station	X	X
	Hilltop Lakes Fire and EMS	X	X
	Hilltop Lakes Town administration POA	X	X
	Hilltop Lakes Water Supply Corporation	X	X
	Hilltop Lakes Airport	X	X
Buffalo	City Hall/Convention Center	X	X
	Buffalo Civic Center	X	X
	Buffalo Public Library	X	X
	Public Safety Building/Police/Court	X	X
	Buffalo Treatment Plant	X	X

	Buffalo Volunteer Fire Dept	X	X
	Buffalo Maintenance Barn	X	X
	New School Well	X	X
	Avant Well	X	X
	Pearlstone Storage Tank	X	X
	Pate Park Storage Tank	X	X
	Fire Station Well	X	X
	Hwy 164 Well	X	X
	<i>Buffalo Lift Stations:</i>	X	X
	Hwy 75 South	X	X
	Charlie Scott	X	X
	Hwy 75 Lynch	X	X
	Turtle Creek Dr	X	X
	S Center St Best	X	X
	S Center St Dead End	X	X
	1905 E Railroad (Hammond)	X	X
	Ray St	X	X
	Post Oak/Kayla Ln	X	X
	FM 1848 North	X	X
	FM 1848 South	X	X
	Brown Chapel Road	X	X
	John H Bullock End	X	X
	Hwy 164	X	X
	Ridley Block	X	X
	Chevron	X	X
	Lee St	X	X
	Candy Lane	X	X
	524 Sycamore	X	X
	531 Ray	X	X
	Lanely Rd	X	X
	528 Ray	X	X
Centerville	Centerville Water Plant	X	X
	Centerville Sewer Plant	X	X
	Centerville Elementary School	X	X
	Centerville Jr. High/ High School	X	X

	Centerville Sherriff's Office	X	X
	Centerville City Hall	X	X
	Centerville Volunteer Fire Dept.	X	X
	Centerville Nursing Home	X	X
	Texan Food Mart	X	X
	Eshan/ TimeMax	X	X
	Woody's #1	X	X
	Woody's #2	X	X
	Panther Petroleum	X	X
	Centerville Healthpoint/ Health Clinic	X	X
	1 st Baptist Church of Centerville	X	X
	Centerville Lutheran Church	X	X
	Centerville Methodist Church	X	X
	Centerville Church of Christ	X	X
	Centerville Helipad	X	X
	Centerville Lift Station #1	X	X
	Centerville Lift Station #2	X	X
	Centerville Lift Station #3	X	X
	Centerville Lift Station #4	X	X
	Centerville Lift Station #5	X	X
Jewett	City Hall	X	X
	Jewett Fire Department	X	X
Leona	Leona Fire Department	X	X
	Leona Post Office	X	X
	Leona Community Center	X	X
Marquez	Marquez Water Well #1	X	X
	Marquez Water Well #2	X	X
	Marquez Water Well #3	X	X
	Marquez Wastewater Treatment Plant	X	X
	Marquez City Hall	X	X
	Marquez Fire Dept.	X	X
	Kountry Korner Store	X	X
	CrossRoads Store	X	X
	Marquez Farm & Ranch	X	X
Normangee	Marquez Tire	X	X
	City Hall	X	X

	Normangee Police Dept	X	X
	Brookshire Brothers Grocery Store	X	X
Oakwood	Oakwood Water Tower #1	X	X
	Oakwood Water Tower #2	X	X
	Oakwood Pump Station	X	X
	Oakwood Lift Station	X	X
	Oakwood Wastewater Treatment Plant	X	X
Concord Robbins WSC	Plant #1	X	X
	Plant #1B	X	X
	Plant #2	X	X
	Plant #3	X	X
	Plant #3A	X	X
	Plant #4	X	X
	Plant #5	X	X
	Plant #6	X	X
	Plant #7	X	X
	Flynn Booster Station	X	X
	Concord Robbins Office	X	X
	Remote Wells	X	X
	Well # 1R	X	X
	Well #2	X	X
	Well #3	X	X
	Well #4	X	X
	Well #5	X	X
	Well #6 Remote	X	X
	Well #7	X	X
	Leona Water Well Pump	X	X
Flo Community WSC	Flo Plant	X	X
	Flo Remote Well	X	X
	Keechi Plant	X	X
	Hwy 75 Plant (Pump Station)	X	X
	Weedon Plant	X	X
	Russel #1 Well	X	X
	Russel #2 Well (Plant)	X	X
	1618 Plant	X	X
	Flo Office	X	X

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“As average temperatures have risen because of climate change, the Earth’s water cycle has sped up through an increase in the rate of evaporation from soil and transpiration from plants. An increase in evapotranspiration makes more water available in the air for precipitation, but contributes to drying over some land areas, leaving less moisture in the soil. As the climate continues to change, many historically wet areas are likely to experience increased precipitation and increased risk of flooding, while historically dry areas are likely to experience less precipitation and increased risk of drought.”³¹

³¹ <https://www.epa.gov/climate-indicators/climate-change-indicators-drought>

9. Extreme Cold

Extreme cold can happen anywhere in the state, although its levels can range extensively. In the panhandle extreme cold means days below zero Fahrenheit while in the Rio Grande Valley it means reaching temperatures below freezing.³² Extreme cold is an issue any time winter temperatures drop significantly below normal and make staying warm and safe a challenge.

Extreme cold can accompany winter weather, but it can also be independent of those storms. For that reason, the impacts of extreme cold are presented here separately from the impacts of winter weather.

1) Extreme Cold History

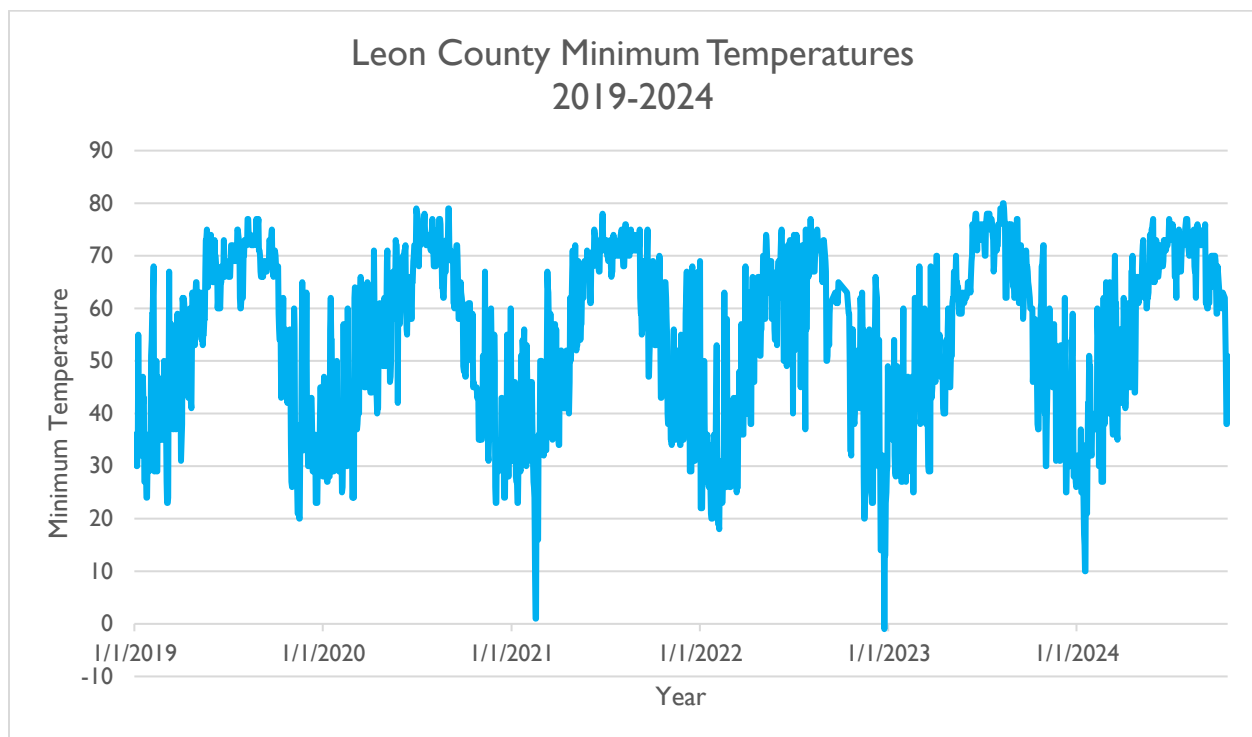


Figure 41: Minimum Recorded Daily Temperature 2019-2024³³

Leon County and the jurisdictions addressing the hazard have not previously included extreme cold in their mitigation plan as a standalone hazard. Prior to the 2018 update to the State of Texas Mitigation Plan, extreme cold was considered part of the winter weather hazard.

³² 2018 State of Texas Hazard Mitigation Plan

³³ Source: National Centers for Environmental Information, <https://www.ncdc.noaa.gov/cdo-web/datasets>

Between 2019 to 2024, Leon County experienced 284 days with a minimum temperature of 32°F or colder. At least 15 of those days had a maximum temperature of 32°F or below. During the same timeframe, the coldest temperature recorded was -1°F on December 24, 2022.

Temperature data is recorded at the county level. However, given the nature of extreme cold and the proximity of all jurisdictions to each other, it is assumed that all jurisdictions addressing the hazard experienced the same extreme cold events. There was one event recorded at the County level in the NCEI database between 2019 – 2024, on 2/15/2021. In that incident, 1 death occurred and approximately \$94,000.00 in property damage occurred. Based on recorded daily temperatures, it is clear that many events have gone unreported.

2) Likelihood of Future Occurrence

Based on historic weather data, extreme cold in Leon County and the participating jurisdictions is likely, meaning an event affecting any or all the participating jurisdictions is probable in the next 1-2 years.

3) Extent

The magnitude or intensity of an extreme cold event is measured according to temperature in relation to wind speed. The relationship is referred to as the “Wind Chill,” and is depicted in Figure 22.

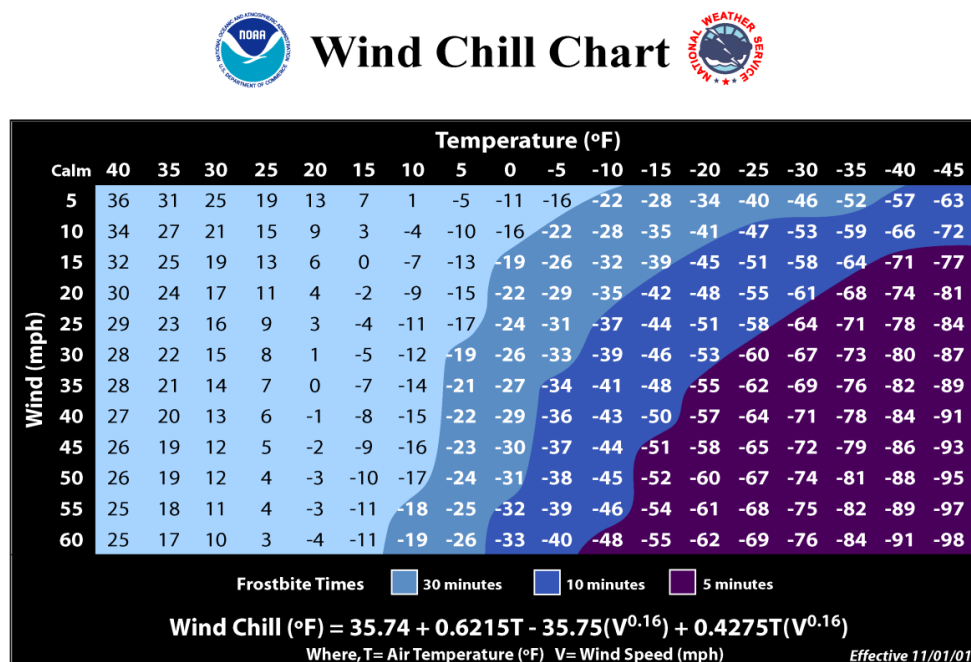


Figure 42: NOAA's NWS Wind Chill Index

As displayed in Figure 22, the wind chill temperature is a measurement of how cold the wind makes the air feel to the human body. Since wind can dramatically accelerate heat loss from the body, a 20° day could feel just as cold as a calm day with 0° temperatures. The Wind Chill Chart factors the wind chill; it is not applicable in calm winds or when the temperature is over 50°.

The coldest temperatures in Leon County and the participating jurisdictions may meet or exceed the current record temperature of -1°F. Future extreme cold events may be as intense, long-lasting, and dangerous as previous ones.

4) Location and Impact

A) Location

Extreme cold has no distinct geographic boundary. Extreme cold can occur across the entire planning area and uniformly affect all participating jurisdictions.

B) Impact

The potential impact of extreme cold is normally minor, resulting in few, if any, injuries. No crop damage specifically tied to extreme cold events has been recorded in any of the participating jurisdictions. Only one incident was recorded where property damage occurred. That same incident resulted in one death. However this was the only death related to extreme cold ever reported in the participating jurisdictions. Based on the hazard's potential, in the worst cases, especially if combined with winter weather, the hazard may inflict property or crop damage, and it can be deadly. Electrical grid failure, power outages, impacts to water and sewer infrastructure and pipe damage due to freezes are possible. Any shutdown of facilities due to extreme cold is expected to be temporary.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Areas with concentrations of young, elderly, and low-income residents may feel greater impacts from extreme cold due to those populations' limited ability to properly address the hazard. Deficiencies may include but aren't limited to lack of heating in their homes or vehicles, lack of access to heated public spaces during the coldest part of the day or night, and frozen pipes that may jeopardize access to drinking water, and in the worst cases, lead to severe structural damage that can render a home unlivable. The consequences for these populations' exposure to extreme cold may include but are not limited to complications for those suffering from hypertension, hypothyroidism, and diabetes, as well as exhaustion, hypothermia, trench foot, or death.

B) Critical Facilities

While all the jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities were historically not considered vulnerable to damages significant enough to interrupt or stop normal operations. However, damage to existing buildings and infrastructure as a result of winter weather and extreme cold in recent years has shown exceptions to long held assumptions about the threat of extreme cold. Therefore, all facilities are potentially vulnerable to the impacts noted in section 4b.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“Stretching of the Arctic polar vortex—a strong band of winds in the stratosphere surrounding the North Pole— has increased with Arctic amplification, and is linked with extreme cold across parts of Asia and North America. Climate change is favorable for increasing Arctic polar vortex stretching events.³⁴ When the Arctic polar vortex is strong and stable, the polar air remains in place over the North Pole; when the polar vortex weakens or stretches, extremely cold air can dip south. Results show that stronger Arctic polar vortex conditions are decreasing in frequency, while weaker Arctic polar vortex conditions and stretching disruptions are increasing in frequency for October through February.”³⁵

³⁴ <https://cpo.noaa.gov/Divisions-Programs/Earth-System-Science-and-Modeling/MAPP>

³⁵ <https://cpo.noaa.gov/Divisions-Programs/Communication-Education-and-Engagement/CEE-News/ArtMID/8293/ArticleID/2369/Research-Links-Extreme-Cold-Weather-in-the-United-States-to-Arctic-Warming>

10. Extreme Heat

Extreme heat is defined as a combination of very high temperatures and, usually, exceptionally humid conditions.³⁶ Humid conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground.

Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens. The major human risks associated with severe summer heat include heat cramps; sunburn; dehydration; fatigue; heat exhaustion; and heat stroke. The most vulnerable population to heat casualties are children and the elderly or infirm, who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their wellbeing.

Severe summer heat is an invisible killer. Although a heat wave does not happen with the spectacle of other hazards such as tornados and floods, the National Center for Environmental Health reports that extreme heat caused 7,415 heat-related deaths in the United States from 1999 to 2010³⁷. Extreme heat kills more people than hurricanes, floods, tornados, and lightning combined, according to the National Weather Service. In 2001, 300 deaths were caused by excessive heat exposure.

³⁶ 2018 State of Texas Hazard Mitigation Plan

³⁷ http://www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp

1) Extreme Heat History

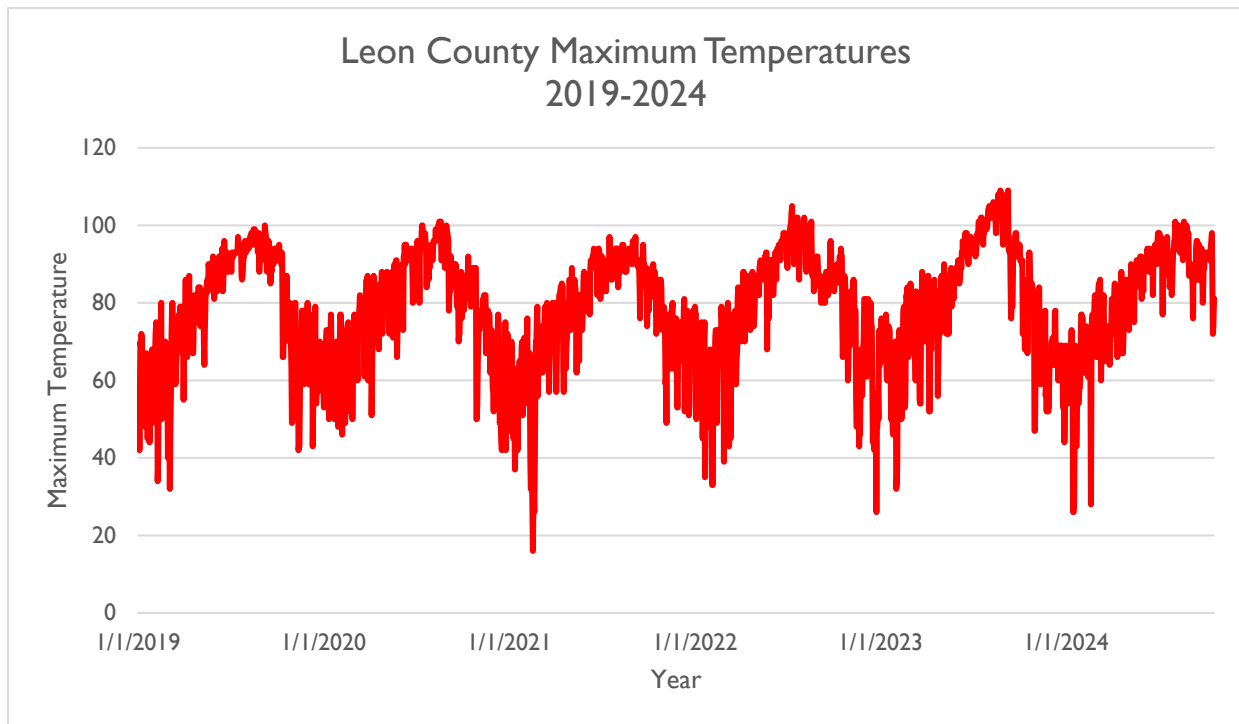


Figure 43: Maximum Recorded Daily Temperature 2019-2024³⁸

In the 2019 HMAP, Leon County and the participating jurisdictions reported 202 days with a maximum temperature of 100°F or hotter from 2000 – 2017. The 2019 HMAP also reported that it is highly likely Leon County and its jurisdictions, will experience extreme heat with urban areas possibly being at greater risk than within rural areas.

Between 2019 to 2024, Leon County and the participating jurisdictions experienced 76 days with a maximum temperature of 100°F or hotter and 121 days where the combination of humidity and moderate-to-high temperatures warranted a heat advisory, if not an extreme heat warning.

Extreme heat data is recorded at the county level. However, given the nature of extreme heat and the proximity of all jurisdictions to each other, it is assumed that all jurisdictions experienced the same extreme heat events. There were 9 events recorded in the NCEI database from 2019 – 2024, however based on recorded daily temperatures, it is clear that many events have gone unreported.

³⁸ Source: National Centers for Environmental Information, <https://www.ncdc.noaa.gov/cdo-web/datasets>

2) Likelihood of Future Events

Based on historic weather data, extreme heat in Leon County and the participating jurisdictions is highly likely, meaning an event affecting any or all of the participating jurisdictions is probable in the next year.

3) Extent

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmospheric Administration (NOAA), this relationship is referred to as the “Heat Index,” and is depicted in Figure 24. This index measures how hot it feels outside when humidity is combined with high temperatures.

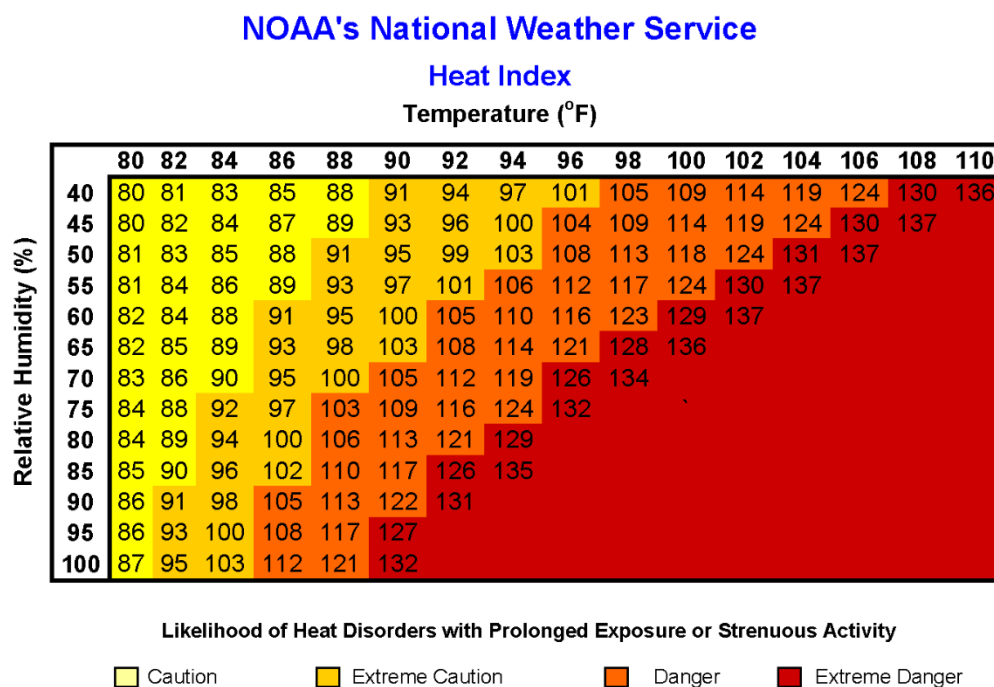


Figure 44: NOAA's NWS Heat Index Chart³⁹

The extent scale in Figure 24 displays varying degrees of caution depending on the relative humidity combined with the temperature. For example, when the temperature is below 90°F, caution should be exercised if the humidity level is at or above 40 percent.

³⁹ <http://www.nws.noaa.gov/om/heat/ht-images/heatindexchart.png>

The shaded zones on the chart indicate varying symptoms or disorders that could occur depending on the magnitude or intensity of the event. “Caution” is the first level of intensity where fatigue due to heat exposure is possible. “Extreme Caution” indicates that sunstroke, muscle cramps or heat exhaustion are possible, whereas a “Danger” level means that these symptoms are likely. “Extreme Danger” indicates that heat stroke is likely.

The National Weather Service (NWS) initiates alerts based on the Heat Index Intensity as shown in Table 36.

Table 26: Heat Index Intensity

Intensity	Description
Heat Advisory	Extreme heat index making it feel hot, typically between 105°F to 110°F for 3 hours or more during the day and at or above 75°F at night.
Excessive Heat Warning	Extreme heat index making it feel very hot, typically above 105°F for 3 hours or more during the day and at or above 80°F at night.

Given an estimated daily average relative humidity level of 75%⁴⁰, highs as low as 89°F can produce a heat index temperature of 106°F. The combination of high humidity and moderate temperatures creates an environment that reaches the Danger Zone on NOAA’s Heat Index Chart and may trigger an NWS Heat Advisory.

Between 2019 and 2024 Leon County and the participating jurisdictions experienced 121 days with highs of 89°F or hotter and overnight lows of 75°F or hotter. Based on the NWS descriptions in Table 36 above, and the average daily humidity level, these days likely warranted a heat advisory.

The hottest temperature recorded in Leon County in the recent past, 109°F, was reached on both August 25, 2023 and again on September 9, 2023. Based on the NWS descriptions in Table 36 above, at least 3 of the 121 heat advisory days warranted an excessive heat warning based on daytime highs, the average daily humidity level, and overnight lows not falling below 80°F.

Future extreme heat events may meet the heat index requirements for issuing an Excessive Heat Warning as described in the Heat Intensity scale in Table 36 above. The hottest temperatures in Leon County and the participating jurisdictions may meet or exceed the

⁴⁰ Used Houston Average, closest to County - <https://www.currentresults.com/Weather/Texas/humidity-annual.php>

current record temperature of 109°F. Future extreme heat events may be as intense, long-lasting, and dangerous as previous ones.

4) Location and Impact

A) Location

Extreme heat has no distinct geographic boundary. Extreme heat can occur across the entire planning area and uniformly affect all participating jurisdictions.

B) Impact

The potential impact of excessive summer heat is normally minor, resulting in few, if any, injuries. No property or crop damage specifically tied to extreme heat events has been recorded in any of the participating jurisdictions. No deaths related to extreme heat have ever been reported in the participating jurisdictions. However, based on the hazard's potential, in the worst cases, especially if combined with drought conditions, the hazard may inflict property or crop damage, and it can even be deadly. Electrical grid failure, power outages, and damage to critical roadways are potential impacts. Any shutdown of facilities due to extreme heat is expected to be temporary.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Vulnerable populations may feel greater impacts from extreme heat due to these populations' limited ability to properly address the hazard due to deficiencies including but not limited to lack of air conditioning in their homes or vehicles, lack of access to air-conditioned public spaces during the hottest part of the day, insufficient numbers of box or ceiling fans, or lack of access to other means of cooling. The consequences for these populations' exposure to extreme heat can include but are not limited to heat cramps, sunburn, dehydration, fatigue, heat exhaustion, heat stroke, or death.

B) Critical Facilities

While all the jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities were historically not considered vulnerable to damages significant enough to interrupt or stop normal operations. However, damage to existing building and infrastructure as a result of extended periods of extreme heat and record high temperatures in recent years has shown exceptions to long held assumptions about the threat of extreme heat. Therefore, all critical facilities are potentially vulnerable to the impacts noted in section 4b.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“Record-setting daily temperatures, heat waves, and cold spells are a natural part of day-to-day variation in weather. As the Earth’s climate warms overall, however, heat waves are expected to become more frequent and more intense. Higher heat index values (which combine temperature and humidity to describe perceived temperature) are expected to increase discomfort and aggravate health issues.”⁴¹

⁴¹ <https://www.epa.gov/climate-indicators/climate-change-indicators-high-and-low-temperatures>
<https://science2017.globalchange.gov/>

11. Hailstorm

Hail is a form of solid precipitation. It consists of balls or irregular lumps of ice, each of which is called a hailstone. Hailstones usually measure between 5 millimeters (0.2 in) and 15 centimeters (6 in) in diameter. Hail is possible within most thunderstorms as it is produced by cumulonimbus clouds. Hail formation requires environments of strong, upward motion of air, similar to tornadoes, and lowered heights of the freezing level. In the mid-latitudes, hail forms near the interiors of continents, while in the tropics, it tends to be confined to high elevations. Any thunderstorm which produces hail that reaches the ground is known as a hailstorm. Hailstorms can happen anywhere in the state of Texas.

Hailstones form by colliding with super cooled water drops. Super cooled water will freeze on contact with ice crystals, frozen raindrops, dust or some other nuclei. The storm's updraft blows the forming hailstones up the cloud. As the hailstone ascends it passes into areas of the cloud where the concentration of humidity and super cooled water droplets varies. When the hailstone moves into an area with a high concentration of water droplets, it captures the latter and acquires a translucent layer. Should the hailstone move into an area where mostly water vapor is available, it acquires a layer of opaque white ice.

The hailstone will keep rising in the thunderstorm until its mass can no longer be supported by the updraft. It then falls toward the ground while continuing to grow, based on the same processes, until it leaves the cloud. It will later begin to melt as it passes into air that is above freezing temperature.⁴²

1) Hailstorm History

The 2019 Leon County HMAP reported that Leon County and the participating jurisdictions experienced 22 hail events between 1984– 2018, with the likelihood of many events going unreported. Historically, the County reported highly likely probability of hailstorms, particularly in association with seasonal patterns during the spring and early fall.

The following table identifies the most comprehensive list available of hailstorm events and associated damages in Leon County and the participating jurisdictions from 2019 -2024. Hailstorm events are only recorded at the county or city level, therefore there are no recorded events for Concord Robbins WSC or Flo Community WSC. For planning purposes, we can assume that events recorded for the County may have also impacted the WSCs. There have been no recorded events for the Cities of Centerville, Marquez, or Normangee since the 2019 HMAP.

⁴² 2018 State of Texas Hazard Mitigation Plan

Table 27: Leon County Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Countywide	1/1/2019 – 7/1/2024	9	0.75 – 2 in	0	0	\$51,000	\$0

Table 28: City of Buffalo Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Buffalo	1/1/2019 – 7/1/2024	1	1.25 in	0	0	\$0	\$0

Table 29: City of Jewett Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Jewett	1/1/2019 – 7/1/2024	1	1 in	0	0	\$0	\$0

Table 30: City of Leona Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Leona	1/1/2019 – 7/1/2024	3	0.75 – 1.75 in	0	0	\$27,000	\$0

Table 31: City of Normangee Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Normangee	1/1/2019 – 7/1/2024	0	0	0	0	\$0	\$0

Table 32: City of Oakwood Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Oakwood	1/1/2019 – 7/1/2024	15	0	0	0	\$0	\$0

2) Likelihood of Future Events

Based on the history of hailstorms, and the likelihood that many events have gone unreported, a hailstorm in Leon County and each of the participating jurisdictions is likely, meaning that an event is probable within the next three years.

3) Extent

The severity of hail events ranges based on the size of the hail, wind speed, and the number and types of structures in the path of the hailstorm. Storms that produce high winds in addition to hail are most damaging and can result in numerous broken windows and damaged siding.

When hail breaks windows, water damage from accompanying rains can also be significant. A major hailstorm can easily cause damage running into the millions of dollars. Nationwide hail is responsible for over \$1 billion in property and crop damages per year. The scale showing intensity categories in

Table 38 was developed by combining data from National Climatic Data Center (NCDC) and the Tornado and Storm Research Organization (TORRO).

Table 33: Hailstorm Intensity^{43,44}

Size Code	Intensity Category	Size (Diameter in inches)	Descriptive Term	Typical Damage
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33-.060	Mothball	Slight damage to plants and crops
H2	Significant	.060-.080	Penny	Significant damage to fruit, crops, and vegetation
H3	Severe ⁴⁵	0.80-1.20	Nickel – Half dollar	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored

⁴³ <http://www1.ncdc.noaa.gov/pub/data/cmb/extremes/scec/reports/SCEC-Hail-Guide.pdf>

⁴⁴ <http://www.torro.org.uk/hyscale.php>

⁴⁵ Hail must be 1" or larger to be classified as severe.

H4	Severe	1.2-1.6	Half dollar – Ping pong ball	Widespread glass damage and vehicle bodywork damage
H5	Destructive	1.6-2.0	Ping pong ball – hen egg	Wholesale destruction of glass, damage to tiled roofs, and significant risk of injuries
H6	Destructive	2.0-2.4	Hen egg – tennis ball	Bodywork of grounded aircraft dented, and brick walls pitted
H7	Destructive	2.4-3.0	Tennis ball – Baseball	Severe roof damage and risk of serious injuries
H8	Destructive	3.0-3.5	Hockey puck	Severe damage to aircraft bodywork
H9	Super Hailstorms	3.5-4.0	Softball	Extensive structural damage could cause fatal injuries
H10	Super Hailstorms	4.0+	Greater than softball-sized	Extensive structural damage could cause fatal injuries

According to NCEI data, the worst hailstorms in Leon County and the participating jurisdictions have produced hail up to 1.75” in diameter, H5 on the Hailstorm Intensity Scale.

Future hailstorms may meet or exceed previous worst-case H5 storms in terms of strength, intensity, hailstone size, damage dollars inflicted, and the number of residents injured or killed.

4) Location and Impact

A) Location

Hailstorms vary in terms of size, location, intensity, and duration but are considered frequent occurrences in the planning area. Each jurisdiction is uniformly exposed to hail events just as each is uniformly exposed to the thunderstorms that typically produce the hail events.

B) Impact

The severity of a hailstorm’s impact is considered limited since they generally result in injuries treatable with first aid, shut down critical facilities and services for 24 hours or less, and less than ten percent of affected properties are destroyed or suffer major damage. All existing and future buildings, facilities, and populations in the participating jurisdictions are considered exposed to this hazard and could potentially be impacted.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors

including but not limited to age, ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

Since hailstorms arise with little to no warning, the participating jurisdictions recognize that vulnerable populations may primarily need additional help recovering from a hailstorm. Residents of sub-standard structures are of particular concern. Structures in sub-standard condition ahead of a hailstorm, whether due to structural damage, missing windows or doors, holes in exterior walls or the roof, may sustain more damage than structures in standard condition.

Existing weaknesses, especially those related to the condition of a structure's roof, due to housing type or existing damages, may lead to compounded damage, injuries, or loss of life.

B) Critical Facilities

The presence of older structures that have not been hardened against hailstorms, and/or the presence of metal buildings that may be more susceptible to hail. Thus, the following critical facilities were determined to be especially vulnerable to hailstorms due to the presence of structures with flat roofs and its increased vulnerability.

Table 34: Critical Facilities Vulnerable to Hailstorms and Potential Impacts

Jurisdiction	Critical Facilities	Potential Hailstorm Impacts		
		Damaged or Destroyed Roof	Damaged Windows	Water damage due to Physical Damages
Leon County	Leon County Courthouse Complex	X	X	X
	County Annex	X	X	X
	County Annex 2	X	X	X
	Lassiter St. Centerville Health Point Complex	X	X	X
	Commissioner Precinct Road and Bridge Barn #1	X	X	X
	Commissioner Precinct Road and Bridge Barn #2	X	X	X
	Commissioner Precinct Road and Bridge Barn #3	X	X	X
	Commissioner Precinct Road and Bridge Barn #4	X	X	X
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North	X	X	X
	Leon County Sheriff's Office and Jail	X	X	X
	Leon County Communications Tower Centerville	X	X	X
	Leon County Communications Tower Flynn			X

	Leon County Communications Tower Normangee Lake			X
	Leon County Communications Tower Flo			X
	Leon County Communications Tower Oakwood			X
	Leon County ESD/Ambulance Barn	X	X	X
	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement	X	X	X
	Justice of the Peace, Pct 4 Marquez	X	X	X
	Justice of the Peace, Pct 2	X	X	X
	Leon County Expo Center	X	X	X
	Champion Technologies (Chemical)	X	X	X
	Cochran Chemicals	X	X	X
	Leon Solar Farm	X	X	X
	Pecan Prairie Solar Farm and Battery Storage Facility	X	X	X
	NUCOR Steel Jewett, including Helipad for Life Flight Helicopters	X	X	X
	Leon County Waste Disposal Pct 1	X	X	X
	Leon County Waste Disposal Pct 2	X	X	X
	Leon County Waste Disposal Pct 3	X	X	X
	Leon County Waste Disposal Pct 4	X	X	X
	Leon County Appraisal District Office	X	X	X
	Buffalo ISD- Elementary School	X	X	X
	Buffalo ISD- Junior High School	X	X	X
	Buffalo ISD- High School	X	X	X
	Leon ISD - Elementary School	X	X	X
	Leon ISD- Junior High School	X	X	X
	Leon ISD- High School	X	X	X
	Normangee ISD - Elementary School	X	X	X
	Normangee ISD- Junior High School	X	X	X
	Normangee ISD- High School	X	X	X
	Oakwood ISD - Elementary School	X	X	X
	Oakwood ISD- Junior High School	X	X	X
	Oakwood ISD- High School	X	X	X
	Leon Gas	X	X	X
	Leon Gas Storage Tanks			X
	Leon Gas Storage Tanks			X
	Leon Gas Storage Tanks			X
	Houston County Electric CO-OP, Middleton Substation			X
	ONCOR Electric Glaze Lake Substation Switch			X
	ONCOR Electric Jewett Substation			X
	ONCOR Electric Jewett Substation and Switching Yard	X	X	X
	ONCOR Electric Centerville I-45 Substation			X
	ONCOR Electric Centerville I-45			X
	ONCOR Electric Brown Magnolia Substation			X
	Flynn Fire Station	X	X	X

	Hilltop Lakes Fire and EMS	X	X	X
	Hilltop Lakes Town administration POA	X	X	X
	Hilltop Lakes Water Supply Corporation	X	X	X
	Hilltop Lakes Airport	X	X	X
Buffalo	City Hall/Convention Center	X	X	X
	Buffalo Civic Center	X	X	X
	Buffalo Public Library	X	X	X
	Public Safety Building/Police/Court	X	X	X
	Buffalo Treatment Plant	X	X	X
	Buffalo Volunteer Fire Dept	X	X	X
	Buffalo Maintenance Barn	X	X	X
	New School Well			
	Avant Well			
	Pearlstone Storage Tank			X
	Pate Park Storage Tank			X
	Fire Station Well			
	Hwy 164 Well			
	<i>Buffalo Lift Stations:</i>			
	Hwy 75 South			
	Charlie Scott			
	Hwy 75 Lynch			
	Turtle Creek Dr			
	S Center St Best			
	S Center St Dead End			
	1905 E Railroad (Hammond)			
	Ray St			
	Post Oak/Kayla Ln			
	FM 1848 North			
	FM 1848 South			
	Brown Chapel Road			
	John H Bullock End			
	Hwy 164			
	Ridley Block			
	Chevron			
	Lee St			
	Candy Lane			
	524 Sycamore			
	531 Ray			
	Lanely Rd			
	528 Ray			
Centerville	Centerville Water Plant	X	X	X
	Centerville Sewer Plant	X	X	X
	Centerville Elementary School	X	X	X
	Centerville Jr. High/ High School	X	X	X
	Centerville Sherriff's Office	X	X	X
	Centerville City Hall	X	X	X
	Centerville Volunteer Fire Dept.	X	X	X
	Centerville Nursing Home	X	X	X
	Texan Food Mart	X	X	X

	Eshan/ TimeMax	X	X	X
	Woody's #1	X	X	X
	Woody's #2	X	X	X
	Panther Petroleum	X	X	X
	Centerville Healthpoint/ Health Clinic	X	X	X
	1 st Baptist Church of Centerville	X	X	X
	Centerville Lutheran Church	X	X	X
	Centerville Methodist Church	X	X	X
	Centerville Church of Christ	X	X	X
	Centerville Helipad			X
	Centerville Lift Station #1			
	Centerville Lift Station #2			
	Centerville Lift Station #3			
	Centerville Lift Station #4			
	Centerville Lift Station #5			
Jewett	City Hall	X	X	X
	Jewett Fire Department	X	X	X
Leona	Leona Fire Department	X	X	X
	Leona Post Office	X	X	X
	Leona Community Center	X	X	X
Marquez	Marquez Water Well #1			
	Marquez Water Well #2			
	Marquez Water Well #3			
	Marquez Wastewater Treatment Plant	X	X	X
	Marquez City Hall	X	X	X
	Marquez Fire Dept.	X	X	X
	Kountry Korner Store	X	X	X
	CrossRoads Store	X	X	X
	Marquez Farm & Ranch	X	X	X
Normangee	Marquez Tire	X	X	X
	City Hall	X	X	X
	Normangee Police Dept	X	X	X
Oakwood	Brookshire Brothers Grocery Store	X	X	X
	Oakwood Water Tower #1	X		
	Oakwood Water Tower #2	X		
	Oakwood Pump Station			
	Oakwood Lift Station			
Concord Robbins WSC	Oakwood Wastewater Treatment Plant	X	X	X
	Plant #1	X	X	X
	Plant #1B	X	X	X
	Plant #2	X	X	X
	Plant #3	X	X	X
	Plant #3A	X	X	X
	Plant #4	X	X	X
	Plant #5	X	X	X
	Plant #6	X	X	X
	Plant #7	X	X	X
	Flynn Booster Station	X	X	X
	Concord Robbins Office	X	X	X
	Remote Wells			

	Well # 1R			
	Well #2			
	Well #3			
	Well #4			
	Well #5			
	Well #6 Remote			
	Well #7			
	Leona Water Well Pump	X		X
Flo Community WSC	Flo Plant	X	X	X
	Flo Remote Well			
	Keechi Plant	X	X	X
	Hwy 75 Plant (Pump Station)	X		X
	Weedon Plant	X	X	X
	Russel #1 Well			
	Russel #2 Well (Plant)			
	1618 Plant	X	X	X
	Flo Office	X	X	X

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“As a result of anthropogenic warming, it is generally anticipated that low-level moisture and convective instability will increase, raising hailstorm likelihood and enabling the formation of larger hailstones; the melting height will rise, enhancing hail melt and increasing the average size of surviving hailstones.”⁴⁶

⁴⁶ <https://www.nature.com/articles/s43017-020-00133-9>

12. Winter Storms

Winter storms includes heavy snow and blizzards, sleet, ice storms (or freezing rain), frost/freeze or a mix of these. Winter storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries. The effect of winter storms on Texas is quite disruptive compared to other regions that normally experience winter storms.

A heavy snowfall for the State is an accumulation of four or more inches of snow in a 12-hour period. This amount of snow accumulation usually occurs in the northern half of the state and in the higher elevations of West Texas. South of the line from Del Rio to Port Arthur snow is rare.

Blizzards are the most perilous of all winter storms, characterized by low temperatures and strong winds in excess of 35 mph, bearing large amounts of blowing or drifting snow. Blizzards take a terrible toll on livestock and people caught in the open. In Texas, blizzards are most likely to occur in the Panhandle and South Plains Regions.

An ice storm occurs when rain falls out of the warm upper layers of the atmosphere into a cold and dry layer near the ground. The rain freezes on contact with the cold ground and accumulates on exposed surfaces. Damage can occur with half an inch of rain freezing on trees and utility wires; the damage increases if there are high winds. Based on this, an icing event is categorized an ice storm at half an inch.⁴⁷

1) Winter Storm History

The 2019 Leon County HMAP did not profile Winter Storm as a specific hazard. It combined winter storms and extreme cold under the hazard of “winter weather”. These hazards have been separated for the 2025 update.

NCEI data shows that the participating jurisdictions experienced 1 winter storm event between 2019 – 2024. The most significant winter storms in recent history was Winter Storm Uri in February 2021, during which Leon County was impacted with up to 1/4” in ice accumulation. Winter storm events are only recorded at the county or city level, therefore there are no recorded events for Concord Robbins WSC or Flo Community WSC. For planning purposes, we can assume that events recorded for the County may have also impacted the WSCs. The following table represents all recorded events between 2019 - 2024 for the County and all participating jurisdictions.

⁴⁷ 2018 State of Texas Hazard Mitigation Plan

Table 35: Leon County Winter Storm History

Location	Date Range	Number of Winter Storms	Winter Storm Types	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Countywide	1/1/2019 – 7/1/2024	1	Winter Storm / Winter Weather	0	0	\$0	\$0

2) Likelihood of Future Events

Future winter storms in Leon County and the participating jurisdictions are considered likely, meaning an event affecting any or all of the participating jurisdictions is probable in the next three years.

3) Extent

Table 36 below displays the magnitude of winter storms.

Table 36: Winter Storm Extent Scale⁴⁸

Frost Advisory*	Issued when nighttime minimum temperatures are expected to range from 33°F to 36°F in the growing season.
Freeze Warning*	Issued when nighttime minimum temperatures are expected to reach 32°F or lower in the growing season. They are usually issued to highlight the first few freezes of the fall or unusually late freezes in the spring. <i>A Freeze Watch is issued when these conditions may be met 12 to 48 hours in the future.</i>
Snow Advisory	Issued when accumulating snow of 2 to 4 inches is expected. An advisory may still be warranted if lesser accumulations will produce travel difficulties, especially early in the winter season.
Blowing Snow Advisory	Issued when blowing snow is expected to occasionally reduce visibilities to 1/4 mile or less with winds generally 25 to 34 mph. The event should last at least 3 hours.
Snow and Blowing Snow Advisory	Issued when winds of 25 to 34 mph are expected to be accompanied by falling snow and blowing snow, occasionally reducing the visibility to 1/4 mile or less. The event should last at least 3 hours
Freezing Rain / Drizzle Advisory	Issued for freezing rain when ice accumulations are expected to cause travel problems, but not exceed 1/4".
Sleet Advisory	Issued for accumulating sleet of 1/4" to 1". Because sleet usually occurs with other precipitation types, a winter weather advisory will almost always be used in such cases.
Winter Weather Advisory	Issued for a winter weather event in which there is more than one hazard present, but all precipitation is expected to remain below warning criteria.

⁴⁸ Source: National Weather Service Weather Forecast Office; Norman, Oklahoma. <http://www.srh.noaa.gov/oun/?n=spotter-wwa-definitions>

	For example, it would be issued if 2 inches of snow were expected with a small amount of sleet mixing in at times.
Wind Chill Advisory ⁴⁹	Issued when wind chill temperatures are expected to be a significant inconvenience to life with prolonged exposure, and, if caution is not exercised, could lead to hazardous exposure.
Wind Chill Warning ⁵⁰	Issued when wind chill temperatures are expected to be hazardous to life within several minutes of exposure.
Ice Storm Warning	Issued when a period of freezing rain is expected to produce ice accumulations of 1/4" or greater, or cause significant disruptions to travel or utilities.
Heavy Sleet Warning	Issued when a period of sleet is expected to produce ice accumulations of 1" or greater, or cause significant disruptions to travel or utilities.
Heavy Snow Warning	Issued when snow is expected to accumulate 4 inches or more in 12 hours, or 6 inches or more in 24 hours.
Winter Storm Warning	Issued for a winter weather event in which there is more than one hazard present, and one of the warning criteria listed above is expected to be met. For example, it would be issued if 5 inches of snow were expected in 12 hours, with some sleet mixing in at times. It is commonly issued for heavy snow with strong winds of 25-34 mph that will cause blowing and drifting of the snow. <i>A Winter Storm Watch is issued when these conditions may be met 12 to 48 hours in the future.</i>
Blizzard Warning	Issued for sustained wind or frequent gusts greater than or equal to 35 mph accompanied by falling and/or blowing snow, frequently reducing visibility to less than 1/4 mile for three hours or more. <i>A Blizzard Watch is issued when these conditions may be met 12 to 48 hours in the future.</i>

* - Non-precipitation watch / warning / advisory

Based on previous winter storm events, future events in Leon County and the participating jurisdictions may see ice accumulation of up to 1/4".

4) Location and Impact

A) Location

Winter storms have no distinct geographic boundary. Winter storms can occur across the entire planning area and uniformly affect all participating jurisdictions.

⁴⁹ https://www.osha.gov/dts/weather/winter_weather/windchill.html

⁵⁰ https://www.osha.gov/dts/weather/winter_weather/windchill.html

B) Impact

The potential impact of winter storms is normally minor, resulting in few, if any, injuries. Drivers, especially those unfamiliar with or unable to drive in icy conditions, may be at the highest risk of crashing their vehicle and sustaining injuries.

Beyond accidents caused by icy conditions, winter storms have the potential to cause widespread power outages. Trees and other vegetation that grow along or near power lines and utility lines can become overburdened by ice and snow accumulation. Falling limbs or trees can easily take down power and utility lines. Neglected vegetation is especially at risk of failure due to increased weight loads. Power outages can create a cascading effect depending on residents' ability to heat their homes without electricity, especially for those young, elderly, and low-income residents as identified in Section 3 of Chapter 3 above. Although no deaths related to winter storms have been reported in the participating jurisdictions, in the worst cases, the hazard has the potential to be deadly.

Winter storms will likely cause only minor property damage and minimal disruption to the quality of life in the participating jurisdictions.

Depending on when the event happens, winter storms may damage or destroy crops.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Areas with concentrations of young, elderly, and low-income residents may feel greater impacts from winter storms due to those populations' limited ability to properly address the hazard. Deficiencies may include but aren't limited to lack of heating in their homes or vehicles, lack of access to heated public spaces during the coldest part of the day or night, and frozen pipes that may jeopardize access to drinking water, and in the worst cases, lead to severe structural damage that can render a home unlivable. The consequences for these populations' exposure to winter storms can include but are not limited to complications for those suffering from hypertension, hypothyroidism, and diabetes, as well as exhaustion, hypothermia, trench foot, or death.

B) Critical Facilities

Any shutdown of critical facilities due to winter storms is expected to be temporary. However, based on the proximity of trees and powerlines on their properties, the following critical facilities may be at a higher risk of losing power due to falling limbs.

Table 37: Critical Facilities Vulnerable to Winter Storms

Jurisdiction	Critical Facilities	Potential Winter Storm Impacts
		Falling Tree Limbs
Leon County	Leon County Courthouse Complex	X
	County Annex	X
	County Annex 2	X
	Lassiter St. Centerville Health Point Complex	X
	Commissioner Precinct Road and Bridge Barn #1	X
	Commissioner Precinct Road and Bridge Barn #2	X
	Commissioner Precinct Road and Bridge Barn #3	X
	Commissioner Precinct Road and Bridge Barn #4	X
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North	X
	Leon County Sheriff's Office and Jail	X
	Leon County Communications Tower Centerville	X
	Leon County Communications Tower Flynn	X
	Leon County Communications Tower Normangee Lake	X
	Leon County Communications Tower Flo	X
	Leon County Communications Tower Oakwood	X
	Leon County ESD/Ambulance Barn	X
	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement	X
	Justice of the Peace, Pct 4 Marquez	X
	Justice of the Peace, Pct 2	X
	Leon County Expo Center	X
	Champion Technologies (Chemical)	X
	Cochran Chemicals	X
	Leon Solar Farm	X
	Pecan Prairie Solar Farm and Battery Storage Facility	X
	NUCOR Steel Jewett, including Helipad for Life Flight Helicopters	X
	Leon County Waste Disposal Pct 1	X
	Leon County Waste Disposal Pct 2	X
	Leon County Waste Disposal Pct 3	X
	Leon County Waste Disposal Pct 4	X
	Leon County Appraisal District Office	X
	Buffalo ISD- Elementary School	X
	Buffalo ISD- Junior High School	X
	Buffalo ISD- High School	X
	Leon ISD - Elementary School	X
	Leon ISD- Junior High School	X
	Leon ISD- High School	X
	Normangee ISD - Elementary School	X
	Normangee ISD- Junior High School	X
	Normangee ISD- High School	X

	Oakwood ISD - Elementary School	X
	Oakwood ISD- Junior High School	X
	Oakwood ISD- High School	X
	Leon Gas	X
	Leon Gas Storage Tanks	X
	Leon Gas Storage Tanks	X
	Leon Gas Storage Tanks	X
	Houston County Electric CO-OP, Middleton Substation	X
	ONCOR Electric Glaze Lake Substation Switch	X
	ONCOR Electric Jewett Substation	X
	ONCOR Electric Jewett Substation and Switching Yard	X
	ONCOR Electric Centerville I-45 Substation	X
	ONCOR Electric Centerville I-45	X
	ONCOR Electric Brown Magnolia Substation	X
	Flynn Fire Station	X
	Hilltop Lakes Fire and EMS	X
	Hilltop Lakes Town administration POA	X
	Hilltop Lakes Water Supply Corporation	X
	Hilltop Lakes Airport	X
Buffalo	City Hall/Convention Center	X
	Buffalo Civic Center	X
	Buffalo Public Library	X
	Public Safety Building/Police/Court	X
	Buffalo Treatment Plant	X
	Buffalo Volunteer Fire Dept	X
	Buffalo Maintenance Barn	X
	New School Well	X
	Avant Well	X
	Pearlstone Storage Tank	X
	Pate Park Storage Tank	X
	Fire Station Well	X
	Hwy 164 Well	X
	<i>Buffalo Lift Stations:</i>	X
	Hwy 75 South	X
	Charlie Scott	X
	Hwy 75 Lynch	X
	Turtle Creek Dr	X
	S Center St Best	X
	S Center St Dead End	X
	1905 E Railroad (Hammond)	X
	Ray St	X
	Post Oak/Kayla Ln	X
	FM 1848 North	X
	FM 1848 South	X
	Brown Chapel Road	X
	John H Bullock End	X
	Hwy 164	X
	Ridley Block	X
	Chevron	X

	Lee St	X
	Candy Lane	X
	524 Sycamore	X
	531 Ray	X
	Lanely Rd	X
	528 Ray	X
Centerville	Centerville Water Plant	X
	Centerville Sewer Plant	X
	Centerville Elementary School	X
	Centerville Jr. High/ High School	X
	Centerville Sherriff's Office	X
	Centerville City Hall	X
	Centerville Volunteer Fire Dept.	X
	Centerville Nursing Home	X
	Texan Food Mart	X
	Eshan/ TimeMax	X
	Woody's #1	X
	Woody's #2	X
	Panther Petroleum	X
	Centerville Healthpoint/ Health Clinic	X
	1 st Baptist Church of Centerville	X
	Centerville Lutheran Church	X
	Centerville Methodist Church	X
	Centerville Church of Christ	X
	Centerville Helipad	X
	Centerville Lift Station #1	X
	Centerville Lift Station #2	X
	Centerville Lift Station #3	X
	Centerville Lift Station #4	X
	Centerville Lift Station #5	X
Jewett	City Hall	X
	Jewett Fire Department	X
Leona	Leona Fire Department	X
	Leona Post Office	X
	Leona Community Center	X
Marquez	Marquez Water Well #1	X
	Marquez Water Well #2	X
	Marquez Water Well #3	X
	Marquez Wastewater Treatment Plant	X
	Marquez City Hall	X
	Marquez Fire Dept.	X
	Kountry Korner Store	X
	CrossRoads Store	X
	Marquez Farm & Ranch	X
	Marquez Tire	X
Normangee	City Hall	X
	Normangee Police Dept	X
	Brookshire Brothers Grocery Store	X
Oakwood	Oakwood Water Tower #1	X
	Oakwood Water Tower #2	X

	Oakwood Pump Station	X
	Oakwood Lift Station	X
	Oakwood Wastewater Treatment Plant	X
Concord Robbins WSC	Plant #1	X
	Plant #1B	X
	Plant #2	X
	Plant #3	X
	Plant #3A	X
	Plant #4	X
	Plant #5	X
	Plant #6	X
	Plant #7	X
	Flynn Booster Station	X
	Concord Robbins Office	X
	Remote Wells	X
	Well # 1R	X
	Well #2	X
	Well #3	X
	Well #4	X
	Well #5	X
	Well #6 Remote	X
	Well #7	X
	Leona Water Well Pump	X
Flo Community WSC	Flo Plant	X
	Flo Remote Well	X
	Keechi Plant	X
	Hwy 75 Plant (Pump Station)	X
	Weedon Plant	X
	Russel #1 Well	X
	Russel #2 Well (Plant)	X
	1618 Plant	X
	Flo Office	X

C) Infrastructure

While all of the participating jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not considered vulnerable to significant damage caused by severe winter storm events. This determination was made based on the expectation that most roofs can support 20 lbs. / square foot of snow⁵¹. Although it's not impossible⁵² for that much snow to cause structural damage, given that the snow weight is well below the threshold where damage is likely, structural damages are not expected. Additionally, 1" of ice is roughly equivalent in weight per square foot to 1" of snow. Considering the worst ice storms in the participating jurisdictions cause ice accumulations of 1/4", it is unlikely, but not

⁵¹ <https://disastersafety.org/freezing-weather/prevent-roof-collapse-homes/>

⁵² https://www.fema.gov/media-library-data/7d8c55d1c4f815edf3d7e7d1c120383f/FEMA957_Snowload_508.pdf - The weight of a foot a snow can vary widely based on how wet the snow is, between 3 and 21 lbs. per square foot. However, wet snow primarily affects the East Coast, Pacific Northwest, and southwestern Alaska.

impossible, that an ice storm causing structural ice accumulations of less than 4" will cause significant structural damages.

However, significant damages may be incurred indirectly. Examples include, but are not limited to, trees and limbs that fall after being overburdened with snow or ice, building strikes due to vehicles losing traction on snow or ice-covered roads, and power outages that affect building temperature regulation and allow pipes to freeze and burst.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"Warmer temperatures cause more water to evaporate from the land and oceans, which leads to more precipitation, larger storms, and more variation in precipitation in some areas. In general, a warmer climate causes more of this precipitation to fall in the form of rain instead of snow. Some places, however, could see more snowfall if temperatures rise but still remain below the freezing point, or if storm tracks change. Areas near large lakes might also experience more snowfall as lakes remain unfrozen for longer periods, allowing more water to evaporate. In contrast, other areas might experience less snowfall as a result of wintertime droughts."⁵³

⁵³ <https://www.epa.gov/climate-indicators/climate-change-indicators-snowfall>

13. Windstorms

Windstorms are classified as any wind that is strong enough to cause at least light damage to trees and buildings, which may or may not be accompanied by precipitation. Wind speeds during a windstorm typically exceed 41 knots. Damage can be attributed to gusts or longer periods of sustained winds. Although tornados and tropical cyclones also produce wind damage, they are usually classified separately.

Windstorms may last for just a few minutes when caused by downbursts from thunderstorms, or they may last for hours (and even several days) when they result from large-scale weather systems. A windstorm that travels in a straight line and is caused by the gust front (the boundary between descending cold air and warm air at the surface) of an approaching thunderstorm is called a derecho. Derechos are capable of causing widespread damage and landscape devastation.⁵⁴

1) Windstorm History

In the 2019 Leon County HMAP, Leon County and the participating jurisdictions recorded 106 windstorm events between 1981 - 2017. Historically, the County reported a likely probability of windstorms.

The following tables identify the most comprehensive list available of windstorm events and associated damages in Leon County and the participating jurisdictions from 2019 - 2024. Windstorm events are only recorded at the county or city level, therefore there are no recorded events for Concord Robbins WSC or Flo Community WSC. For planning purposes, we can assume that events recorded for the County may have also impacted the WSCs. There have been no recorded events for the Cities of Jewett, Leona, Normangee or Oakwood since the 2019 HMAP, but some events may have gone unreported.

⁵⁴ <https://www.britannica.com/science/windstorm>

Table 38: Leon County Windstorm History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Countywide	1/1/2019 – 7/1/2024	9	48 - 78	0	0	\$1,365,329	\$0

Table 39: City of Buffalo Windstorm History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Buffalo	1/1/2019 – 7/1/2024	2	48 - 78	0	0	\$1,042,028	\$0

Table 40: City of Centerville Windstorm History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Centerville	1/1/2019 – 7/1/2024	2	61 - 65	0	0	\$41,391	\$0

Table 41: City of Marquez Windstorm History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage \$2023	Crop Damage \$2023
Marquez	1/1/2019 – 7/1/2024	3	55 - 75	0	0	\$101,130	\$0

2) Likelihood of Future Events

Given the frequency of past events in all jurisdictions, a damaging windstorm event in the future is likely, meaning that an event is probable in the next three years.

3) Extent

The generally accepted extent scale for wind events is the Beaufort Wind Scale. The following table lists categories, measurement, classification, and appearance descriptions.

Table 42: Beaufort Wind Scale⁵⁵

Beaufort Wind Scale				
Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 feet becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 feet taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 feet, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 feet, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 feet) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 feet), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 feet) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 feet) waves, foam patches cover sea, visibility more reduced	

⁵⁵ Source: www.spc.noaa.gov/faq/tornado/beaufort.html

12	64+	Hurricane	Air filled with foam, waves over 45 feet, sea completely white with driving spray, visibility greatly reduced	
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The worst windstorm events in Leon County and the participating jurisdictions have ranged up to 12 on the Beaufort Wind Scale. No recent windstorm events in any of the participating jurisdictions have caused any injuries, deaths, or crop damage, however significant property damage has occurred. Future windstorm events may meet previous worst-case Force 12 events in terms of strength and intensity of wind speed.

4) Location and Impact

A) Location

Windstorms are not constrained by any distinct geographic boundary. Windstorms can occur across all participating jurisdictions.

B) Impact

Impacts from a windstorm may include but are not limited to damaged or destroyed personal property including vehicles, damaged or destroyed agricultural, residential, commercial, and industrial buildings. Crops may be damaged or destroyed. Pets and livestock may be injured or killed by flying debris. Pets and livestock may escape due to damaged or destroyed structures and fences.

In the worst cases, windstorms may cause injuries and/or be deadly.

5) Vulnerability

Windstorms have the potential to impact all participating jurisdictions. Therefore, each jurisdiction is equally exposed to the hazard. Improved property, critical facilities, critical infrastructure, and the entire population are considered vulnerable to windstorms.

Based on windstorm data collected for the participating jurisdictions, windstorms primarily damage physical structures. However, there is no uniformity with respect to the type of structures that have been damaged by windstorms in any of the participating jurisdictions. Windstorm damages can be directly caused by the wind itself, flying debris, and falling trees, or indirectly by damages like power outages.

A) Population

As described in Section 3 of Chapter 3 above, Leon County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a windstorm.

Residents of mobile / manufactured homes are of particular concern. These structures may not be safe during a windstorm.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a windstorm, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a windstorm than structures in standard condition.

Existing structural weaknesses, due to housing type or existing damages, may lead to compounded damages, injuries, or loss of life.

B) Critical Facilities

Certain critical facilities and infrastructure in each jurisdiction may be particularly vulnerable to windstorms, similar to hurricane and tornado events. These facilities have been identified for reasons including: the number of people who use the facility or infrastructure, the facility's role in providing basic services to begin the cleanup process and get the jurisdictions running again, and the facility's ability to offer goods and materials residents will need to resume normalcy as quickly as possible. The selected critical facilities are built from a variety of materials with varying levels of resistance to wind damage. Additionally, their varying ages mean they weren't constructed to uniform building standards. Given wind's potentially violent nature, these facilities may experience increased levels of vulnerability to the hazards. Damage to any of these facilities may have a disproportionately negative impact on each jurisdiction's recovery from a windstorm if that damage affects the facility's ability to reopen and resume normal business right away.

Table 43: Critical Facilities Vulnerable to Windstorms and Potential Impacts

Jurisdiction	Critical Facilities	Potential Windstorm Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Leon County	Leon County Courthouse Complex	X	X	X	X	X	X	X	X	X
	County Annex	X	X	X	X	X	X	X	X	X
	County Annex 2	X	X	X	X	X	X	X	X	X
	Lassiter St. Centerville Health Point Complex	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #1	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #2	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #3	X	X	X	X	X	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #4	X	X	X	X	X	X	X	X	X
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North	X	X	X	X	X	X	X	X	X
	Leon County Sheriff's Office and Jail	X	X	X	X	X	X	X	X	X
	Leon County Communications Tower Centerville	X	X	X	X	X	X	X	X	X
	Leon County Communications Tower Flynn	X	X	X	X	X	X	X	X	X
	Leon County Communications Tower Normangee Lake	X	X	X	X			X	X	X
	Leon County Communications Tower Flo	X	X	X	X			X	X	X
	Leon County Communications Tower Oakwood	X	X	X	X			X	X	X
	Leon County ESD/Ambulance Barn	X	X	X	X	X	X	X	X	X
	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement	X	X	X	X	X	X	X	X	X
	Justice of the Peace, Pct 4 Marquez	X	X	X	X	X	X	X	X	X

	Justice of the Peace, Pct 2	X	X	X	X	X	X	X	X	X
	Leon County Expo Center	X	X	X	X	X	X	X	X	X
	Champion Technologies (Chemical)	X	X	X	X	X	X	X	X	X
	Cochran Chemicals	X	X	X	X	X	X	X	X	X
	Leon Solar Farm	X	X	X	X	X	X	X	X	X
	Pecan Prairie Solar Farm and Battery Storage Facility	X	X	X	X	X	X	X	X	X
	NUCOR Steel Jewett, including Helipad for Life Flight Helicopters	X	X	X	X	X	X	X	X	X
	Leon County Waste Disposal Pct 1	X	X	X	X	X	X	X	X	X
	Leon County Waste Disposal Pct 2	X	X	X	X	X	X	X	X	X
	Leon County Waste Disposal Pct 3	X	X	X	X	X	X	X	X	X
	Leon County Waste Disposal Pct 4	X	X	X	X	X	X	X	X	X
	Leon County Appraisal District Office	X	X	X	X	X	X	X	X	X
	Buffalo ISD- Elementary School	X	X	X	X	X	X	X	X	X
	Buffalo ISD- Junior High School	X	X	X	X	X	X	X	X	X
	Buffalo ISD- High School	X	X	X	X	X	X	X	X	X
	Leon ISD - Elementary School	X	X	X	X	X	X	X	X	X
	Leon ISD- Junior High School	X	X	X	X	X	X	X	X	X
	Leon ISD- High School	X	X	X	X	X	X	X	X	X
	Normangee ISD - Elementary School	X	X	X	X	X	X	X	X	X
	Normangee ISD- Junior High School	X	X	X	X	X	X	X	X	X
	Normangee ISD- High School	X	X	X	X	X	X	X	X	X
	Oakwood ISD - Elementary School	X	X	X	X	X	X	X	X	X
	Oakwood ISD- Junior High School	X	X	X	X	X	X	X	X	X
	Oakwood ISD- High School	X	X	X	X	X	X	X	X	X
	Leon Gas	X	X	X	X	X	X	X	X	X
	Leon Gas Storage Tanks	X	X	X	X			X	X	X
	Leon Gas Storage Tanks	X	X	X	X			X	X	X
	Leon Gas Storage Tanks	X	X	X	X			X	X	X
	Houston County Electric CO-OP, Middleton Substation	X	X	X	X			X	X	X
	ONCOR Electric Glaze Lake Substation Switch	X	X	X	X			X	X	X
	ONCOR Electric Jewett Substation	X	X	X	X			X	X	X

	ONCOR Electric Jewett Substation and Switching Yard	X	X	X	X			X	X	X
	ONCOR Electric Centerville I-45 Substation	X	X	X	X			X	X	X
	ONCOR Electric Centerville I-45	X	X	X	X			X	X	X
	ONCOR Electric Brown Magnolia Substation	X	X	X	X			X	X	X
	Flynn Fire Station	X	X	X	X	X	X	X	X	X
	Hilltop Lakes Fire and EMS	X	X	X	X	X	X	X	X	X
	Hilltop Lakes Town administration POA	X	X	X	X	X	X	X	X	X
	Hilltop Lakes Water Supply Corporation	X	X	X	X	X	X	X	X	X
	Hilltop Lakes Airport	X	X	X	X	X	X	X	X	X
Buffalo	City Hall/Convention Center	X	X	X	X	X	X	X	X	X
	Buffalo Civic Center	X	X	X	X	X	X	X	X	X
	Buffalo Public Library	X	X	X	X	X	X	X	X	X
	Public Safety Building/Police/Court	X	X	X	X	X	X	X	X	X
	Buffalo Treatment Plant	X	X	X	X	X	X	X	X	X
	Buffalo Volunteer Fire Dept	X	X	X	X	X	X	X	X	X
	Buffalo Maintenance Barn	X	X	X	X	X	X	X	X	X
	New School Well	X	X	X	X			X	X	X
	Avant Well	X	X	X	X			X	X	X
	Pearlstone Storage Tank	X	X	X	X			X	X	X
	Pate Park Storage Tank	X	X	X	X			X	X	X
	Fire Station Well	X	X	X	X			X	X	X
	Hwy 164 Well	X	X	X	X			X	X	X
	<i>Buffalo Lift Stations:</i>									
	Hwy 75 South	X	X	X	X			X	X	X
	Charlie Scott	X	X	X	X			X	X	X
	Hwy 75 Lynch	X	X	X	X			X	X	X
	Turtle Creek Dr	X	X	X	X			X	X	X
	S Center St Best	X	X	X	X			X	X	X
	S Center St Dead End	X	X	X	X			X	X	X
	1905 E Railroad (Hammond)	X	X	X	X			X	X	X
	Ray St	X	X	X	X			X	X	X
	Post Oak/Kayla Ln	X	X	X	X			X	X	X
	FM 1848 North	X	X	X	X			X	X	X
	FM 1848 South	X	X	X	X			X	X	X

	Brown Chapel Road	X	X	X	X			X	X	X
	John H Bullock End	X	X	X	X			X	X	X
	Hwy 164	X	X	X	X			X	X	X
	Ridley Block	X	X	X	X			X	X	X
	Chevron	X	X	X	X			X	X	X
	Lee St	X	X	X	X			X	X	X
	Candy Lane	X	X	X	X			X	X	X
	524 Sycamore	X	X	X	X			X	X	X
	531 Ray	X	X	X	X			X	X	X
	Lanely Rd	X	X	X	X			X	X	X
	528 Ray	X	X	X	X			X	X	X
Centerville	Centerville Water Plant	X	X	X	X	X	X	X	X	X
	Centerville Sewer Plant	X	X	X	X	X	X	X	X	X
	Centerville Elementary School	X	X	X	X	X	X	X	X	X
	Centerville Jr. High/ High School	X	X	X	X	X	X	X	X	X
	Centerville Sherriff's Office	X	X	X	X	X	X	X	X	X
	Centerville City Hall	X	X	X	X	X	X	X	X	X
	Centerville Volunteer Fire Dept.	X	X	X	X	X	X	X	X	X
	Centerville Nursing Home	X	X	X	X	X	X	X	X	X
	Texan Food Mart	X	X	X	X	X	X	X	X	X
	Eshan/ TimeMax	X	X	X	X	X	X	X	X	X
	Woody's #1	X	X	X	X	X	X	X	X	X
	Woody's #2	X	X	X	X	X	X	X	X	X
	Panther Petroleum	X	X	X	X	X	X	X	X	X
	Centerville Healthpoint/ Health Clinic	X	X	X	X	X	X	X	X	X
	1 st Baptist Church of Centerville	X	X	X	X	X	X	X	X	X
	Centerville Lutheran Church	X	X	X	X	X	X	X	X	X
	Centerville Methodist Church	X	X	X	X	X	X	X	X	X
	Centerville Church of Christ	X	X	X	X	X	X	X	X	X
	Centerville Helipad	X	X	X	X			X	X	X
	Centerville Lift Station #1	X	X	X	X			X	X	X
	Centerville Lift Station #2	X	X	X	X			X	X	X
	Centerville Lift Station #3	X	X	X	X			X	X	X
	Centerville Lift Station #4	X	X	X	X			X	X	X
	Centerville Lift Station #5	X	X	X	X			X	X	X
Jewett	City Hall	X	X	X	X	X	X	X	X	X

	Jewett Fire Department	X	X	X	X	X	X	X	X	X
Leona	Leona Fire Department	X	X	X	X	X	X	X	X	X
	Leona Post Office	X	X	X	X	X	X	X	X	X
	Leona Community Center	X	X	X	X	X	X	X	X	X
Marquez	Marquez Water Well #1	X	X	X	X			X	X	X
	Marquez Water Well #2	X	X	X	X			X	X	X
	Marquez Water Well #3	X	X	X	X			X	X	X
	Marquez Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X
	Marquez City Hall	X	X	X	X	X	X	X	X	X
	Marquez Fire Dept.	X	X	X	X	X	X	X	X	X
	Kountry Korner Store	X	X	X	X	X	X	X	X	X
	CrossRoads Store	X	X	X	X	X	X	X	X	X
	Marquez Farm & Ranch	X	X	X	X	X	X	X	X	X
	Marquez Tire	X	X	X	X	X	X	X	X	X
Normangee	City Hall	X	X	X	X	X	X	X	X	X
	Normangee Police Dept	X	X	X	X	X	X	X	X	X
	Brookshire Brothers Grocery Store	X	X	X	X	X	X	X	X	X
Oakwood	Oakwood Water Tower #1	X	X	X	X			X	X	X
	Oakwood Water Tower #2	X	X	X	X			X	X	X
	Oakwood Pump Station	X	X	X	X			X	X	X
	Oakwood Lift Station	X	X	X	X			X	X	X
	Oakwood Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X
Concord Robbins WSC	Plant #1	X	X	X	X	X	X	X	X	X
	Plant #1B	X	X	X	X	X	X	X	X	X
	Plant #2	X	X	X	X	X	X	X	X	X
	Plant #3	X	X	X	X	X	X	X	X	X
	Plant #3A	X	X	X	X	X	X	X	X	X
	Plant #4	X	X	X	X	X	X	X	X	X
	Plant #5	X	X	X	X	X	X	X	X	X
	Plant #6	X	X	X	X	X	X	X	X	X
	Plant #7	X	X	X	X	X	X	X	X	X
	Flynn Booster Station	X	X	X	X	X	X	X	X	X
	Concord Robbins Office	X	X	X	X	X	X	X	X	X
	Remote Wells	X	X	X	X			X	X	X
	Well # 1R	X	X	X	X			X	X	X
	Well #2	X	X	X	X			X	X	X

	Well #3	X	X	X	X			X	X	X
	Well #4	X	X	X	X			X	X	X
	Well #5	X	X	X	X			X	X	X
	Well #6 Remote	X	X	X	X			X	X	X
	Well #7	X	X	X	X			X	X	X
	Leona Water Well Pump	X	X	X	X			X	X	X
Flo Community WSC	Flo Plant	X	X	X	X	X	X	X	X	X
	Flo Remote Well	X	X	X	X			X	X	X
	Keechi Plant	X	X	X	X	X	X	X	X	X
	Hwy 75 Plant (Pump Station)	X	X	X	X			X	X	X
	Weedon Plant	X	X	X	X	X	X	X	X	X
	Russel #1 Well	X	X	X	X			X	X	X
	Russel #2 Well (Plant)	X	X	X	X			X	X	X
	1618 Plant	X	X	X	X	X	X	X	X	X
	Flo Office	X	X	X	X	X	X	X	X	X

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“The Arctic has warmed more than lower latitudes, and as a result the temperature difference between the mid-latitudes and the polar regions has become reduced, which has changed the path of the northern hemisphere jet stream so that it now moves north and south over a greater range of latitudes. As the atmosphere continues to warm, we expect to see much deeper north-south waves, which will cause a slowing down, or even blocking, of the jet stream. This could result in weather systems that persist for much longer than would be considered normal over any particular region.”⁵⁶

“Another recent study found that there will be regional and seasonal variability in winds in the United States as carbon dioxide levels increase: by 2100, wind speeds will decrease over most of the western U.S. and the East Coast, but the central U.S. will see an increase.”⁵⁷

⁵⁶ <https://ugc.berkeley.edu/background-content/wind/#:~:text=The%20global%20atmospheric%20circulation%20pattern,by%20transporting%20heat%20and%20water.>

⁵⁷ <https://e360.yale.edu/features/global-stilling-is-climate-change-slowing-the-worlds-wind/#:~:text=Another%20recent%20study%20found%20that,U.S.%20will%20see%20an%20increase.>

14. Lightning

Lightning is a massive electrostatic discharge between electrically charged regions within clouds, or between a cloud and the Earth's surface.⁵⁸

Lightning damage can result in electrocution of humans and animals; vaporization of materials along the path of the strike; fire caused by the high temperature produced by the strike; and sudden power surges that can damage electrical and electronic equipment. Millions of dollars of direct and indirect damages result from lightning strikes on electric utility substations and distribution lines. While property damage is the major hazard associated with lightning, it should be noted that lightning strikes kill nearly 49 people⁵⁹ each year in the United States.

1) Lightning History

The 2019 Leon County HMAP recorded 6 lightning events between 1963 - 2015. According to the NCEI database, there have been no recorded events since the 2019 HMAP; however, the planning team determined that lightning events occur multiple times annually.

Hazard events are only recorded at the county or city level, therefore there are no recorded events for Concord Robbins WSC or Flo Community WSC. For planning purposes, we can assume that events recorded for the County may have also impacted the WSCs.

2) Likelihood of Future Events

Lightning is especially associated with thunderstorms. Despite the lack of officially reported instances of lightning-caused damage, a lightning event is highly likely, meaning an event affecting any of the participating jurisdictions is probable in the next year. According to information from VAISALA⁶⁰, Leon County can expect about 48-64 lightning flashes per square kilometer per year.

3) Extent

The extent for lightning can be expressed in terms of the number of strikes within an interval. Given the lack of lightning history data, it is expected that Leon County and all participating jurisdictions may experience lightning events between LAL 1 and LAL 5. Dry thunderstorms, LAL 6, are not expected.

⁵⁸ 2018 State of Texas Hazard Mitigation Plan

⁵⁹ <https://www.weather.gov/safety/lightning-victims>

⁶⁰ https://interactive-lightning-map.vaisala.com/?_ga=2.5242931.1264928209.1618846219-1260101299.1617036001

Table 44: Lightning Activity Levels⁶¹

Lightning Activity Level (LAL)		
Activity levels are valuable guidance tools to aid in the preparation for possible fire initiation from cloud-to-ground lightning.		
LAL	Cloud and Storm Development	Lightning Strikes per 15 Minutes
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reaches the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common, and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	25+
6	Similar to LAL 3 except thunderstorms are dry.	

4) Location and Impact

A) Location

Lightning strikes have no distinct geographic boundary. Lightning can occur across each participating jurisdiction.

B) Impact

Impacts from lightning in all jurisdictions may include but are not limited to loss of power due to electrical surges, damaged or destroyed personal property including computers and other

⁶¹ Source: <http://www.prh.noaa.gov/hnl/pages/LAL.php>

electronics, damaged or destroyed agricultural, residential, commercial, and industrial buildings. Crops may be damaged or destroyed. Livestock may be injured or killed by lightning. In the worst cases, lightning may cause injuries or even loss of life.

5) Vulnerability

According to the Lightning Protection Institute, it is a myth⁶² that lightning always strikes the tallest objects. Given lightning's indiscriminate nature, it is impossible to identify buildings that are at an increased risk of being struck by lightning. All existing and future buildings, critical facilities, critical infrastructure, improved property, and the population are exposed to this hazard. However, structures without adequate lightning protection and those with large concentrations of electronic equipment like computers, servers, and printers, are most vulnerable, as are locations that may have outside crowds during a lightning event.

A) Critical Facilities

Table 45: Critical Facilities Vulnerable to Lightning and Potential Impacts

Jurisdiction	Critical Facilities	Potential Lightning Impacts			
		Physical Damage	Electrical Damage	Data Damage or Loss	Fire
Leon County	Leon County Courthouse Complex	X	X	X	X
	County Annex	X	X	X	X
	County Annex 2	X	X	X	X
	Lassiter St. Centerville Health Point Complex	X	X	X	X
	Commissioner Precinct Road and Bridge Barn #1	X	X		X
	Commissioner Precinct Road and Bridge Barn #2	X	X		X
	Commissioner Precinct Road and Bridge Barn #3	X	X		X
	Commissioner Precinct Road and Bridge Barn #4	X	X		X
	ESD 1 Helipad, Hanger and Living Quarters for AirMed 12 North	X	X	X	X
	Leon County Sheriff's Office and Jail	X	X	X	X
	Leon County Communications Tower Centerville	X	X	X	X
	Leon County Communications Tower Flynn	X	X	X	X
	Leon County Communications Tower Normangee Lake	X	X	X	X
	Leon County Communications Tower Flo	X	X	X	X
	Leon County Communications Tower Oakwood	X	X	X	X
	Leon County ESD/Ambulance Barn	X	X	X	X

⁶² http://lightning.org/wp-content/uploads/2015/06/LPI_lightning_infographic_2015.jpg

	Justice of the Peace, Pct 1 Buffalo and Court Building including DPS Commercial Enforcement	X	X	X	X
	Justice of the Peace, Pct 4 Marquez	X	X	X	X
	Justice of the Peace, Pct 2	X	X	X	X
	Leon County Expo Center	X	X	X	X
	Champion Technologies (Chemical)	X	X	X	X
	Cochran Chemicals	X	X	X	X
	Leon Solar Farm	X	X	X	X
	Pecan Prairie Solar Farm and Battery Storage Facility	X	X	X	X
	NUCOR Steel Jewett, including Helipad for Life Flight Helicopters	X	X	X	X
	Leon County Waste Disposal Pct 1	X	X		X
	Leon County Waste Disposal Pct 2	X	X		X
	Leon County Waste Disposal Pct 3	X	X		X
	Leon County Waste Disposal Pct 4	X	X		X
	Leon County Appraisal District Office	X	X	X	X
	Buffalo ISD- Elementary School	X	X	X	X
	Buffalo ISD- Junior High School	X	X	X	X
	Buffalo ISD- High School	X	X	X	X
	Leon ISD - Elementary School	X	X	X	X
	Leon ISD- Junior High School	X	X	X	X
	Leon ISD- High School	X	X	X	X
	Normangee ISD - Elementary School	X	X	X	X
	Normangee ISD- Junior High School	X	X	X	X
	Normangee ISD- High School	X	X	X	X
	Oakwood ISD - Elementary School	X	X	X	X
	Oakwood ISD- Junior High School	X	X	X	X
	Oakwood ISD- High School	X	X	X	X
	Leon Gas	X	X	X	X
	Leon Gas Storage Tanks	X			X
	Leon Gas Storage Tanks	X			X
	Leon Gas Storage Tanks	X			X
	Houston County Electric CO-OP, Middleton Substation	X	X	X	X
	ONCOR Electric Glaze Lake Substation Switch	X	X	X	X
	ONCOR Electric Jewett Substation	X	X	X	X
	ONCOR Electric Jewett Substation and Switching Yard	X	X	X	X
	ONCOR Electric Centerville I-45 Substation	X	X	X	X
	ONCOR Electric Centerville I-45	X	X	X	X
	ONCOR Electric Brown Magnolia Substation	X	X	X	X
	Flynn Fire Station	X	X	X	X
	Hilltop Lakes Fire and EMS	X	X	X	X
	Hilltop Lakes Town administration POA	X	X	X	X
	Hilltop Lakes Water Supply Corporation	X	X	X	X
	Hilltop Lakes Airport	X	X	X	X
Buffalo	City Hall/Convention Center	X	X	X	X
	Buffalo Civic Center	X	X	X	X
	Buffalo Public Library	X	X	X	X

	Public Safety Building/Police/Court	X	X	X	X
	Buffalo Treatment Plant	X	X	X	X
	Buffalo Volunteer Fire Dept	X	X	X	X
	Buffalo Maintenance Barn	X	X	X	X
	New School Well	X	X	X	X
	Avant Well	X			X
	Pearlstone Storage Tank	X			X
	Pate Park Storage Tank	X			X
	Fire Station Well	X			X
	Hwy 164 Well	X			X
	<i>Buffalo Lift Stations:</i>				
	Hwy 75 South	X	X		X
	Charlie Scott	X	X		X
	Hwy 75 Lynch	X	X		X
	Turtle Creek Dr	X	X		X
	S Center St Best	X	X		X
	S Center St Dead End	X	X		X
	1905 E Railroad (Hammond)	X	X		X
	Ray St	X	X		X
	Post Oak/Kayla Ln	X	X		X
	FM 1848 North	X	X		X
	FM 1848 South	X	X		X
	Brown Chapel Road	X	X		X
	John H Bullock End	X	X		X
	Hwy 164	X	X		X
	Ridley Block	X	X		X
	Chevron	X	X		X
	Lee St	X	X		X
	Candy Lane	X	X		X
	524 Sycamore	X	X		X
	531 Ray	X	X		X
	Lanely Rd	X	X		X
	528 Ray	X	X		X
Centerville	Centerville Water Plant	X	X	X	X
	Centerville Sewer Plant	X	X	X	X
	Centerville Elementary School	X	X	X	X
	Centerville Jr. High/ High School	X	X	X	X
	Centerville Sherriff's Office	X	X	X	X
	Centerville City Hall	X	X	X	X
	Centerville Volunteer Fire Dept.	X	X	X	X
	Centerville Nursing Home	X	X	X	X
	Texan Food Mart	X	X	X	X
	Eshan/ TimeMax	X	X	X	X
	Woody's #1	X	X	X	X
	Woody's #2	X	X	X	X
	Panther Petroleum	X	X	X	X
	Centerville Healthpoint/ Health Clinic	X	X	X	X
	1 st Baptist Church of Centerville	X	X	X	X
	Centerville Lutheran Church	X	X	X	X

	Centerville Methodist Church	X	X	X	X
	Centerville Church of Christ	X	X	X	X
	Centerville Helipad	X	X	X	X
	Centerville Lift Station #1	X	X		X
	Centerville Lift Station #2	X	X		X
	Centerville Lift Station #3	X	X		X
	Centerville Lift Station #4	X	X		X
	Centerville Lift Station #5	X	X		X
Jewett	City Hall	X	X	X	X
	Jewett Fire Department	X	X	X	X
Leona	Leona Fire Department	X	X	X	X
	Leona Post Office	X	X	X	X
	Leona Community Center	X	X	X	X
Marquez	Marquez Water Well #1	X			X
	Marquez Water Well #2	X			X
	Marquez Water Well #3	X			X
	Marquez Wastewater Treatment Plant	X	X	X	X
	Marquez City Hall	X	X	X	X
	Marquez Fire Dept.	X	X	X	X
	Kountry Korner Store	X	X	X	X
	CrossRoads Store	X	X	X	X
	Marquez Farm & Ranch	X	X	X	X
	Marquez Tire	X	X	X	X
Normangee	City Hall	X	X	X	X
	Normangee Police Dept	X	X	X	X
	Brookshire Brothers Grocery Store	X	X	X	X
Oakwood	Oakwood Water Tower #1	X			X
	Oakwood Water Tower #2	X			X
	Oakwood Pump Station	X	X		X
	Oakwood Lift Station	X	X	X	X
	Oakwood Wastewater Treatment Plant	X	X	X	X
Concord Robbins WSC	Plant #1	X	X		X
	Plant #1B	X	X		X
	Plant #2	X	X		X
	Plant #3	X	X		X
	Plant #3A	X	X		X
	Plant #4	X	X		X
	Plant #5	X	X		X
	Plant #6	X	X		X
	Plant #7	X	X		X
	Flynn Booster Station	X	X		X
	Concord Robbins Office	X	X	X	X
	Remote Wells	X			X
	Well # 1R	X			X
	Well #2	X			X
	Well #3	X			X
	Well #4	X			X
	Well #5	X			X
	Well #6 Remote	X			X
	Well #7	X			X

	Leona Water Well Pump	X	X		X
Flo Community WSC	Flo Plant	X	X	X	X
	Flo Remote Well	X			X
	Keechi Plant	X	X	X	X
	Hwy 75 Plant (Pump Station)	X	X	X	X
	Weedon Plant	X	X	X	X
	Russel #1 Well	X			X
	Russel #2 Well (Plant)	X			X
	1618 Plant	X	X	X	X
	Flo Office	X	X	X	X

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“New research from the University of California, Berkeley, found warming conditions would result in 50% more lightning strikes by the end of the century. The scientists found lightning strikes would increase by about 12% for every 1C of warming.”⁶³

⁶³ <https://romps.berkeley.edu/papers/pubdata/2014/lightning/guardian.pdf>

15. Dam / Levee Failure

A dam is defined as any barrier, wall, or embankment, along with its abutments and appurtenant works, constructed for the purpose of storing water or other liquid material either temporarily or permanently. The term dam failure means that the dam is overtopped or fails to operate in the manner for which it was designed. A catastrophic failure would be a breach that would allow the dam's reservoir to suddenly drain. Dam failure can occur with little or no warning, or it can be an anticipated event. Dam failure can cause mass fatalities, mass structural damage and/or a cascading potential if a populated area is located below the dam structure.

1) Dam History

Neither Leon County nor the City of Normangee have documented histories of damage caused by dam or levee failure. However, the planning team has determined that the hazard has the ability to affect structures and infrastructure in these jurisdictions. The remaining jurisdictions have no history of dam or levee failure, have no dams or levees nearby, or no high hazard dams nearby and will not be profiling the hazard.

The seven dams of concern are known as the Cherokee Lake Dam, Kickapoo Lake Dam, Lake Tonkawa Dam, Mirror Lake Dam, Sterling C Robertson Dam, Swan Lake Dam, and Upper Caney Creek WS SCS Site 1 Dam. Cherokee Lake Dam is privately owned, has a maximum storage of 190 acre-feet, and its purpose is for recreation. The dam was built in 1964. Kickapoo Lake Dam is owned by the City of Hilltop Lakes, has a maximum storage of 188 acre feet, and its purpose is for recreation. The dam was built in 1964. Lake Tonkawa Dam is owned by the City of Hilltop Lakes, has a maximum storage of 1,900 acre feet, and its purpose is for recreation. The dam was built in 1971. Mirror Lake Dam is owned by the City of Hilltop Lakes, has a maximum storage of 50 acre feet, and its purpose is for recreation. The dam was built in 1965. Sterling C. Robertson Dam is owned by the Brazos River Authority, has a maximum storage of 557,818 acre feet, and its purpose is for irrigation, recreation, and water supply. The dam was built in 1978. Swan Lake Dam is owned by the City of Hilltop Lakes, has a maximum storage of 175 acre feet, and its purpose is for recreation. The dam was built in 1971. Upper Caney Creek WS SCS Site 1 Dam is owned by the City of Normangee, has a maximum storage of 1,107 acre feet, and its purpose is for flood risk reduction. The dam was built in 1981.

2) Likelihood of Future Occurrence

Given the lack of a prior dam or levee failure in the participating jurisdictions, dam / levee failure is considered unlikely, meaning that one is possible in the next 10 years.

As information on the hazard is gathered more closely moving forward, its likelihood will be revised accordingly.

3) Extent

FEMA's classification system for dam / levee failure is a simple and straight-forward three tier system. It is based on whether there is any probability of a loss of human life, and whether there is a large economic, environmental, or lifeline loss. The low hazard potential classification is used for failures that will not result in any loss of human life, and the economic, environmental, and lifeline losses are low and generally limited to the dam owner. The significant hazard potential classification is used for failures that will not result in any loss of human life, but the economic, environmental, and lifeline losses would have a great impact on the community. The high hazard potential classification is used when the dam failure will cause the loss of at least one human life, regardless of what the economic, environmental, and lifeline losses are. A way to consider the hazard extent is to use the storage capacity behind the dam to estimate the ground surface that would be covered with a foot of water.

An acre-foot is 325,851 gallons and would cover one acre of land with a foot of water. A 1,000-acre-foot body of water could cover 40 acres with an average depth of 25 feet, and the volume of 1,000 acre-feet is approximately 326 million gallons of water.

Table 46: Dam Failure Extent Classification

Hazard Potential Classification	Loss of Human Life	Dam Storage Capacity
Low	None Expected	Less than 10,000 acre-feet
Significant	Probable (1-6)	Between 10,000 – 100,000 acre-feet
High	Loss of Life Expected (7 or more)	100,000 acre-feet or more

Cherokee Lake Dam's storage capacity is 190 acre-feet. If a failure of the Cherokee Lake Dam were to occur, approximately 7.6 acres of land could be inundated with an average depth of 25 feet.

Kickapoo Lake Dam's storage capacity is 188 acre-feet. If a failure of the Kickapoo Lake Dam were to occur, approximately 7.52 acres of land could be inundated with an average depth of 25 feet.

Lake Tonkawa Dam's storage capacity is 1,900 acre-feet. If a failure of Lake Tonkawa Dam were to occur, approximately 76 acres of land could be inundated with an average depth of 25 feet.

Mirror Lake Dam's storage capacity is 50 acre-feet. If a failure of Mirror Lake Dam were to occur, approximately 2 acres of land could be inundated with an average depth of 25 feet.

Sterling C. Roberson Dam's storage capacity is 557,818 acre-feet. If a failure of Sterling C. Roberson Dam were to occur, approximately 22,312.72 acres of land could be inundated with an average depth of 25 feet.

Swan Lake Dam's storage capacity is 175 acre-feet. If a failure of Swan Lake Dam were to occur, approximately 7 acres of land could be inundated with an average depth of 25 feet.

Upper Caney Creek WS SCS Site 1's storage capacity is 1107 acre-feet. If a failure of Upper Caney Creek WS SCS Site 1 were to occur, approximately 44.28 acres of land could be inundated with an average depth of 25 feet.

4) Location and Impact

A) Location

The figures below show the location of all dams and levees of concern within Leon County as well as their proximity to the participating jurisdictions.

I. Leon County

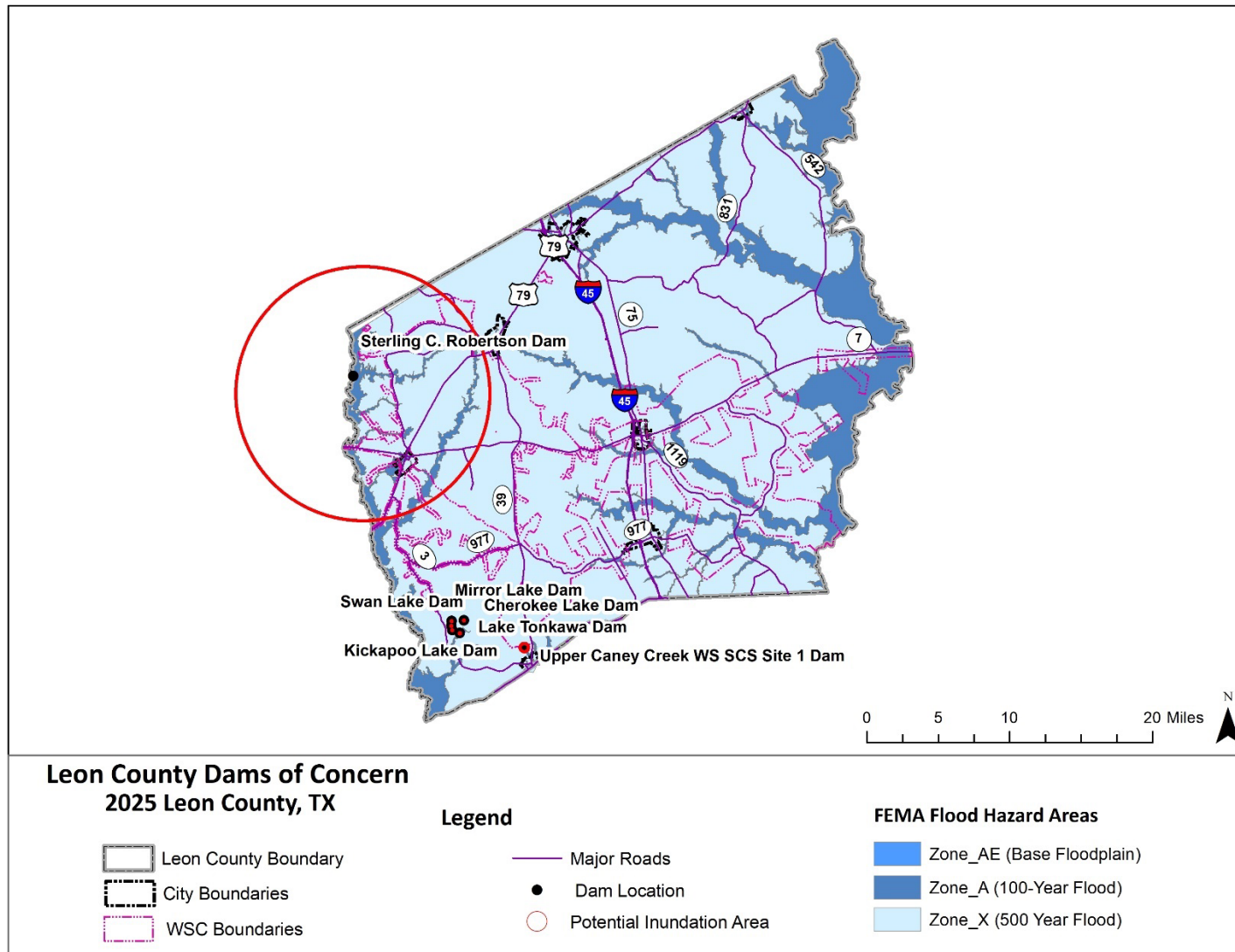


Figure 45: Leon County Dams of Concern

II. City of Normangee

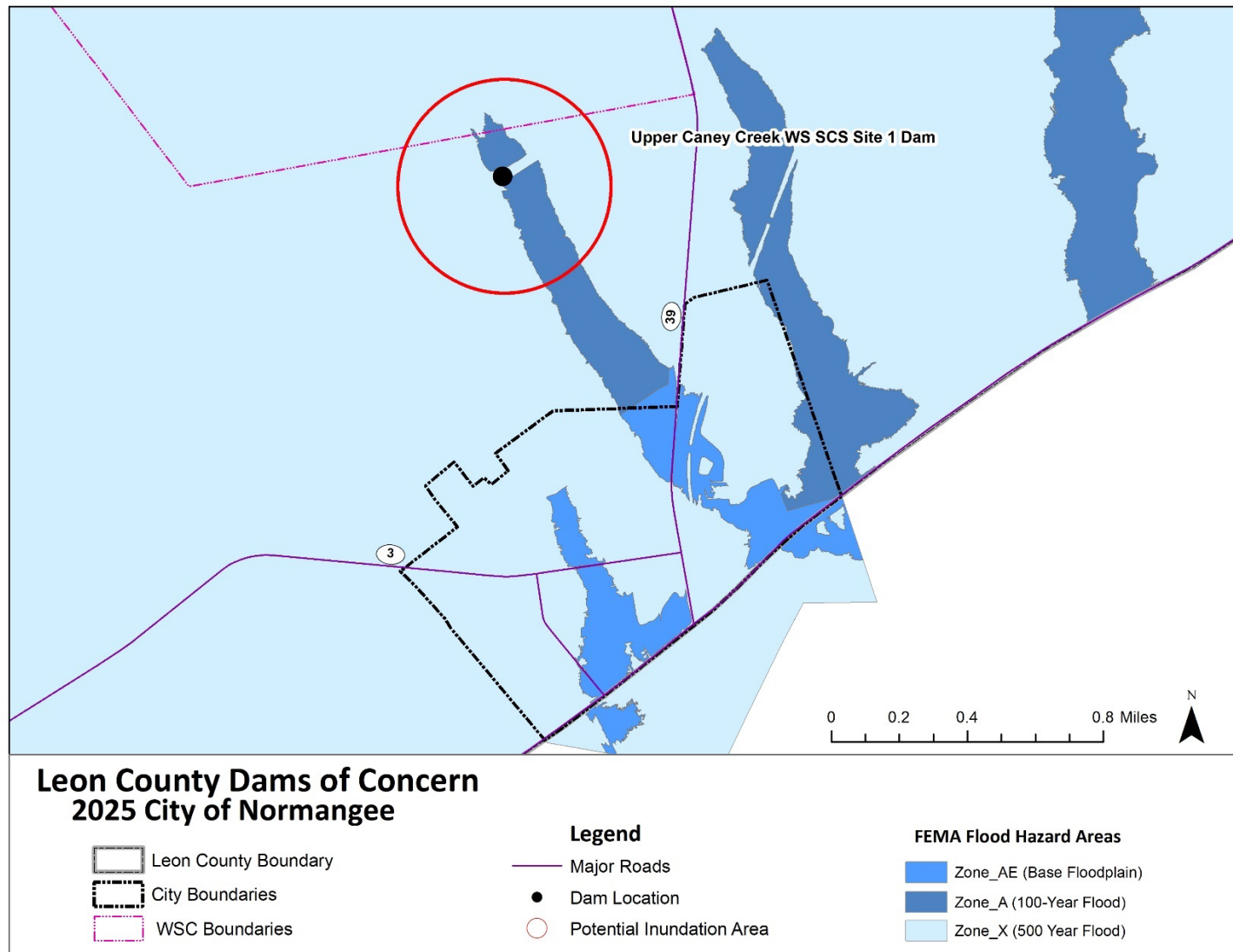


Figure 46: City of Normangee Dams of Concern

B) Impact

Structures at risk of dam failure may be flooded, damaged by flood borne contaminants, damaged by debris flow, or even completely washed away. Although no loss of life to dam failure is expected in Leon County, under the right conditions injury or loss of life are possible.

5) Vulnerability

A) Population

All dams and levees in the County are low hazard with small storage capacity. Therefore, negative impacts on the population is unlikely.

B) Critical Facilities

Out of the 170 critical facilities identified in the County and participating jurisdictions, 19 fall within a potential inundation zone. All of these facilities fall within the potential inundation zone of the Sterling C. Robertson Dam.

Table 47: Critical Facilities Vulnerable to Dam Failure

Leon County Critical Facilities
Leon ISD - Elementary School
Leon ISD- Junior High School
Leon ISD- High School
Leon County Commissioner Precinct Road and Bridge Barn #3
Leon County Waste Disposal Pct 4
NUCOR Steel Jewett, including Helipad for Life Flight Helicopters
Marquez Water Well #1
Marquez Water Well #2
Marquez Water Well #3
Marquez Wastewater Treatment Plant
Marquez City Hall
Marquez Fire Dept.
Kountry Korner Store
CrossRoads Store
Marquez Farm & Ranch
Marquez Tire
Concord Robbins Plant #4
Concord Robbins Plant #5
Concord Robbins Plant #7

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

Climate change could affect the safety of all dam structures, including large and small dams and earthen or concrete dams. Specifically, significant changes in a region's climate, such as increased incidence of extreme temperatures and the increased frequency of heavy precipitation, could seriously impact the integrity and viability of dams.

16. Riverine Erosion

Riverine erosion is the removal of a volume of sediment from a stream reach. However, in riverine areas, a stream reach can be stable and still migrate back and forth. Channel instability occurs when natural or man-induced processes lead to excessive erosion or deposition. Therefore, when a stream migrates laterally but maintains its dimensions, pattern, and profile, stability is achieved even though the river is “active” and moves across the floodplain. A reach experiencing such lateral migration is considered to be “eroding,” and thus has a riverine erosion hazard area. Such stream migration due to erosion can threaten buildings and infrastructure.

Property damaged by flood inundation can sometimes be considered a total loss, but property damaged by riverine erosion is not only destroyed, the land itself may be completely washed away leaving no chance to rebuild, let alone recover any property contents.

1) Erosion History

According to the local planning team, the participating jurisdictions experience varying riverine erosion rates of between 0’ – 10’ per year. During flash flooding, erosion rates may be even higher.

The planning team has determined that at least one riverine erosion event occurs annually in Leon County.

The Cities of Buffalo, Centerville, Jewett, Leona, Marquez, Normangee, and Oakwood as well as Concord Robbins WSC and Flo Community WSC have determined that any damages associated with riverine erosion are likely to be negligible and therefore are not addressing the hazard.

2) Likelihood of Future Occurrence

Given the ongoing nature of riverine erosion, a future event in Leon County is highly likely, meaning ongoing riverine erosion is probable in the next year.

3) Extent

Unlike the flood inundation zones identified in FEMA FIRM maps, riverine erosion hazards are not necessarily proportional to the peak flood discharge. Catastrophic losses may result from larger flood events; smaller, more frequent events; or from the cumulative effects of a series of smaller storms.

In fluvial geomorphic terms, a stream or river is described as a system, consisting of the stream itself, and the water that flows in it, and the sediment that is eroded from it, deposited in it, or transported through it; along with the watershed around the stream, from which water and sediment are conveyed to the stream. If climatic conditions and land use on the watershed stay about the same, a stream tends to reach a more or less stable state, known as dynamic

equilibrium, when large and abrupt changes in the characteristics of the stream do not occur under normal conditions. If the material (sediment) and energy (from flowing water) inputs to the stream change, however, then the system has to adjust to the changed conditions, until a new state of dynamic equilibrium is reached⁶⁴.

In the worst cases, riverbanks have seen collapses as large as 60' x 60' with a depth of 20', the equivalent of 72,000 cubic feet of land. Damages associated with riverine erosion have primarily affected public infrastructure, like roads, and have been estimated as high as \$100,000. Damages to structures have been minimal, but may become significant in the future. In addition to structural damages, erosion can decrease property values simply by reducing the amount of property a person owns.

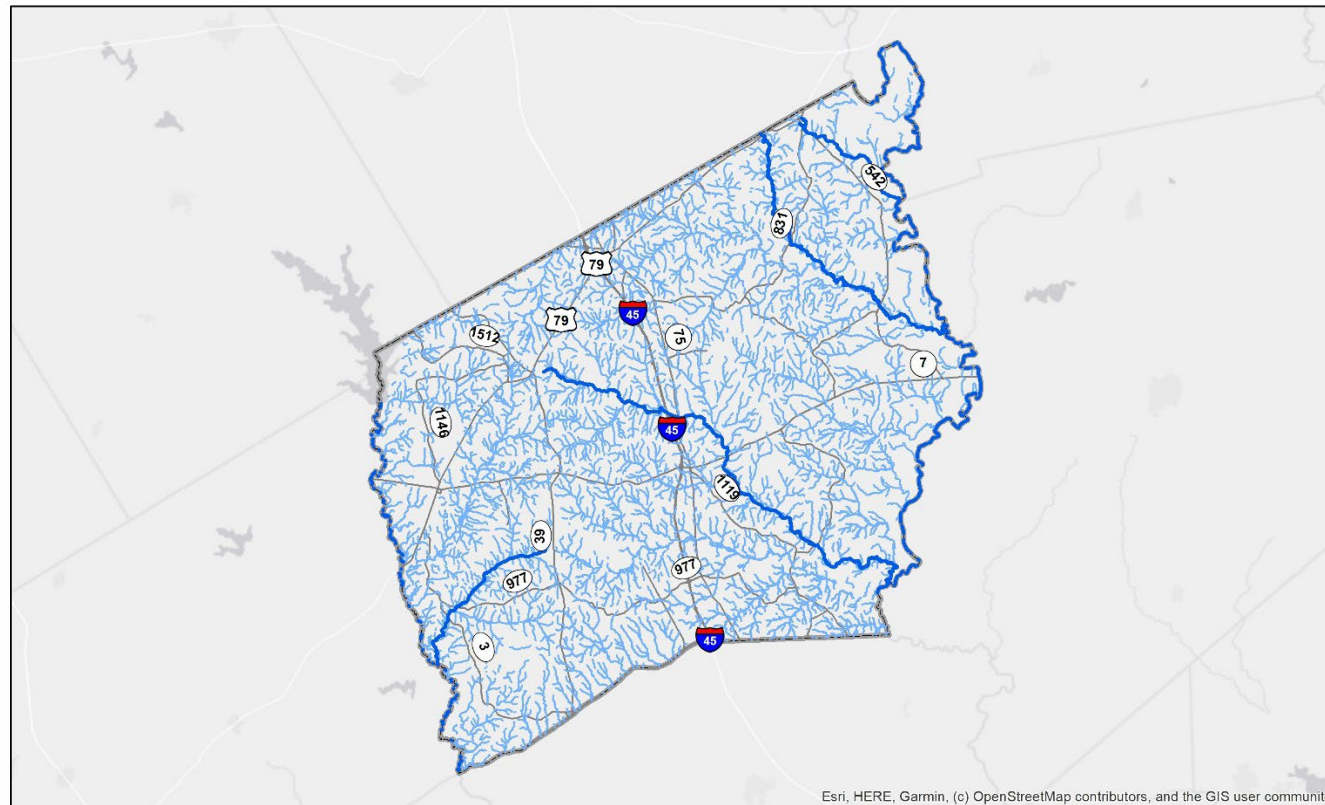
Future riverine erosion events may reach losses of 72,000 cubic feet of land, inflict over \$100,000 in damages, and may even cause injuries or fatalities.

4) Location and Impact

The figures below show potential riverine erosion locations in Leon County. Riverine erosion can occur along any river or stream.

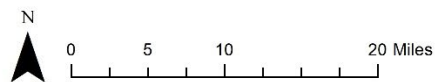
⁶⁴ <http://manualzz.com/doc/29211055/by-asfpm-riverine-erosion-hazards-working-group-february-...>

B) Location



Potential Riverine Erosion Locations

2025 Leon County, TX



Legend

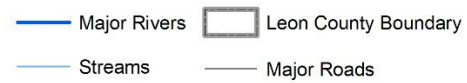


Figure 47: Leon County Potential Riverine Erosion Locations

B) Impact

The impacts of erosion may include but are not limited to decreasing property values, the partial or complete loss of structures, loss of land area and the ability to rebuild damaged or destroyed structures, economic losses to agricultural operations due to land and structure loss, damage to local infrastructure including, water and wastewater lines, roads and bridges.

5) Vulnerability

A) Critical Facilities

There are no critical facilities that are vulnerable to riverine erosion at this time. Other structures located near major streams in the County are vulnerable to riverine erosion, however. In addition, valuable ranch and cropland adjacent to major streams in the County are also vulnerable to riverine erosion.

There is no setback requirement in Leon County or any of the participating jurisdictions, so at this time, the primary controls on development near river and stream banks are determined by their location within FEMA Special Flood Hazard Areas and applicable flood damage prevention rules.

Even if construction is limited to areas outside of the FEMA Special Flood Hazard Areas, without mitigation, riverine erosion is likely to continue to have a negative impact on the property and economic values of land that abuts local rivers and streams.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“Climate change may cause river floods to become larger or more frequent than they used to be in some places yet become smaller and less frequent in other places. As warmer temperatures cause more water to evaporate from the land and oceans, changes in the size and frequency of heavy precipitation events may in turn affect the size and frequency of river flooding.”⁶⁵ As flooding increases, the risk of riverine erosion increases as well.

⁶⁵ <https://www.epa.gov/climate-indicators/climate-change-indicators-river-flooding>

17. Mitigation Strategy

1) Capability Assessment

Leon County and the participating jurisdictions have shown themselves to be highly capable, especially in terms of implementing hazard mitigation actions.

In addition to reviewing previous actions and the steps taken to implement them, the planning team reviewed existing regulatory capabilities and opportunities for establishing new capabilities and enhancing existing ones. At this time, all jurisdictions could improve their hazard mitigation capabilities through the following efforts: budgeting for mitigation actions and support, passing policies and procedures to implement mitigation actions, adopting, and implementing stricter mitigation regulations, approving the hiring, and training of staff for mitigation activities, and approving mitigation updates and additions to existing plans as new needs are recognized. The participating cities could further improve their capabilities by creating and adopting regularly updated comprehensive plans.

Table 48: Capability Assessment by Jurisdiction

Leon County Administrative, Financial, Regulatory, and Technical Abilities
Emergency Management
Floodplain Management
Subdivision
Building Code Enforcement
Road and Bridge Management
Comprehensive Planning
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

City of Buffalo Administrative, Financial, Regulatory, and Technical Abilities
Floodplain Management
Emergency Management

Drought Contingency Planning
Subdivision
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning
Comprehensive Planning
Economic Development
Grant Writing
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

City of Centerville Administrative, Financial, Regulatory, and Technical Abilities
Floodplain Management
Emergency Management
Subdivision
Zoning
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning
Comprehensive Planning
Economic Development
CIP Funding
CDBG Funding
State and Federal Grant Funding

City of Jewett Administrative, Financial, Regulatory, and Technical Abilities
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning

City of Leona Administrative, Financial, Regulatory, and Technical Abilities
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning

City of Marquez Administrative, Financial, Regulatory, and Technical Abilities
CDBG Funding
State and Federal Grant Funding

City of Normangee Administrative, Financial, Regulatory, and Technical Abilities
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning

City of Oakwood Administrative, Financial, Regulatory, and Technical Abilities
Drought Contingency Planning

Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning
Grant Writing
General Budgeting
CDBG Funding
State and Federal Grant Funding

Concord Robbins WSC Administrative, Financial, Regulatory, and Technical Abilities
Floodplain Management
Emergency Management
Drought Contingency Planning
Water Conservation Planning
Comprehensive Planning
General Budgeting
State and Federal Grant Funding

Flo Community WSC Administrative, Financial, Regulatory, and Technical Abilities
Emergency Management
Drought Contingency Planning
Water Conservation Planning

A) Building Codes

Table 49: Building Codes Per Jurisdiction

Jurisdiction	Codes	Description
Leon County	ICC – International Building Codes	The County follows the 2012 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fire Code, Energy Code, and Electrical Code.
Buffalo	ICC – International Building Codes	The City of Buffalo follows the 2012 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fire Code, Energy Code, and Electrical Code.
Centerville	ICC – International Building Codes	The City of Centerville follows the 2012 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fire Code, Energy Code, and Electrical Code.
Jewett	ICC – International Building Codes	The City of Jewett follows the 2012 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fire Code, Energy Code, and Electrical Code.
Leona	ICC – International Building Codes	The City of Leona follows the 2012 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fire Code, Energy Code, and Electrical Code.

Marquez	ICC – International Building Codes	The City of Marquez follows the 2012 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fire Code, Energy Code, and Electrical Code.
Normangee	ICC – International Building Codes	The City of Normangee follows the 2012 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fire Code, Energy Code, and Electrical Code.
Oakwood	ICC – International Building Codes	The City of Oakwood follows the 2012 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fire Code, Energy Code, and Electrical Code.
Concord Robbins WSC	N/A	Concord Robbins WSC does not follow or enforce building codes.
Flo Community WSC	N/A	Flo Community WSC does not follow or enforce building codes.

2) Incorporation and Integration of Existing Capabilities and Hazard Mitigation

As previously outlined, the planning team reviewed a range of codes, ordinances, and other planning mechanisms that have been adopted by the participating jurisdictions. The planning team's goal was to understand how these existing capabilities might affect mitigation actions in terms of implementation and enforcement as well as to identify opportunities for future plan integration.

Table 50: Plan Integration

Department	All Departments	Commissioners' Court, Road and Bridge, Mayor's Office/Council, Public Works, Economic Development	Planning, Zoning, Economic Development, Public Works, Mayor's Office, Floodplain Manager	Office of Emergency Management, Mayor's Office, Mayor and Council, Commissioners' Court	Office of Emergency Management, Mayor's Office, Chief of Fire Department	Office of Emergency Management, Mayor's Office, Administrative Office	Floodplain Manager, Mayor's Office
Activity	Annual Budget	Capital Improvement Projects	Comprehensive Master Plan	Public Involvement	Emergency Operations	Grant Application	Floodplain Management
Time Frame	Quarterly/ Annual workshops	Bi-annually	Every 10 Years	As Needed	Annually	Annual Funding Cycles	Annually
Integration Process	Discuss integration of medium and high priority actions with Commissioners' Court, Council, or Schoolboard (as appropriate) concerning feasibility, potential funding sources, and a preliminary cost benefit review.	Discuss inclusion of mitigation actions with CIPs. Ensure CIPs are consistent with mitigation actions, NFIP compliance, and any new land use development.	Review existing floodplain and land use controls to ensure that long term goals are consistent with actions in the HMAP.	Utilize jurisdictional web sites, social media, and other forms of advertising to make announcements of any periodic review activities concerning potential amendments or updating of the HMAP	Review prevention and protection projects for continued relevance. Ensure appropriate actions and information are included in the Emergency Operation Plan.	Review and update mitigation actions as necessary based on funding opportunities available through FEMA FMA, FEMA PDM, FEMA HMGP, and other grant funding sources.	Update and maintain floodplain information including but not limited to: maps, construction practices, permitting, and NFIP compliance.
Jurisdiction							
Leon County	x	x		x	x	x	x
City of Buffalo	x	x	x	x		x	x
City of Centerville	x	x	x	x	x	x	x
City of Jewett	x	x	x	x	x	x	x
City of Leona	x	x	x	x	x	x	x
City of Marquez	x	x	x	x	x	x	x
City of Normangee	x	x	x	x	x	x	x
City of Oakwood	x	x	x	x	x	x	x

As part of each jurisdiction’s commitment to transparency, all relevant information, including but not limited to that described above and in each action’s description, will be presented to the public before the action is formally adopted for implementation. After public notification, the integration process will resemble the one outlined in Table 59 below.

Table 51: Integration Process

Jurisdiction	Integration Process
Leon County	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the County Commissioners’ Court and County Judge. Leon County will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
City of Buffalo	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Buffalo will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
City of Centerville	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Centerville will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
City of Jewett	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Jewett will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for

	identified and future mitigation actions, as well as future planning processes.
City of Leona	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Leona will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
City of Marquez	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Marquez will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
City of Normangee	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Normangee will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
City of Oakwood	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Oakwood will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
Concord Robbins WSC	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the board.

	Concord Robbins WSC will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
Flo Community WSC	After considering integrating mitigation actions with the activities outlined in Table 58 above, mitigation actions will be presented, considered, and formally adopted by the board. Flo Community WSC will also use the Leon County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.

A) Past Integration – 2018 Plan

Each jurisdiction has its own established process for integrating new actions, codes, ordinances, plans, and studies into its existing capabilities. The 2019 HMAP was integrated into the County’s planning and financial decision making in order to prioritize mitigation actions and identify funding sources. Plan integration for the remaining jurisdictions is unknown. Therefore, new tracking measures may be implemented to ensure future staff are aware of plan integration moving forward. The planning team will ensure that each jurisdiction’s various departments continue to integrate hazard mitigation actions into their day-to-day processes. Concord Robbins WSC and Flo Community WSC were not participants in the previous plan and do not have any integration to report.

3) Goals and Objectives Overview

The hazard analysis has shown that Leon County and the participating jurisdictions are at risk of multiple natural hazards. The following goals and objectives take a broad approach to improving outcomes before, during, and after these anticipated natural hazard events.

The goals and objectives in this plan reflect the overarching priorities identified by the communities and are similar to the goals listed in the 2019 plan. They have been expanded to reflect changes in community priorities, including public services, public infrastructure, economic impacts, civic resources, and cultural resources as priorities in addition to reducing loss of life, injury, property damage, and preservation of natural resources. The mitigation actions the County and participating jurisdictions have selected are designed to address specific hazard-related issues in support of achieving the desired goals and objectives.

4) Long-Term Vision

The hazard mitigation plan must strike a balance between identifying long-term goals and objectives and prioritized mitigation actions that may be addressed sooner, depending on funding availability and local priorities. The result is that certain goals and objectives don't have a corresponding mitigation action. Instead, by taking the long view, the local planning team has created a framework that can be developed as the plan is updated over time.

5) Goals

A) Goal 1: To reduce loss of life and injury to persons

Objective 1.1

Improve the delivery and effectiveness of warning messages

Objective 1.2

Preserve public and private emergency response capability (9-1-1, law enforcement, fire services, emergency medical services, hospitals).

Objective 1.3

Utilize available mitigation measures to prevent or reduce life-threatening impacts of natural hazards.

Objective 1.4

Reduce obstacles to timely and safe evacuation of flood hazard areas.

Objective 1.5

Reduce vulnerability of individuals living in mobile homes / manufactured housing.

Objective 1.6

Reduce life or health threatening impacts on individuals with special physical care requirements.

Objective 1.7

Reduce secondary impacts to health and safety from cascading effects.

B) Goal 2: To reduce disruptions to essential public services and infrastructure

Objective 2.1

Minimize disruption to and enhance rapid restoration of utilities.

Objective 2.2

Minimize disruption to and enhance rapid restoration of essential transportation infrastructure.

Objective 2.3

Minimize disruption to governmental, educational, and other institutions providing services to the public.

C) Goal 3: To reduce economic impacts to individuals, businesses, and area institutions

Objective 3.1

Increase home and business owner investment in available mitigation measures for private property.

Objective 3.2

Increase home and business owner participation in appropriate insurance programs.

Objective 3.3

Increase public and private sector development and use of operations continuity strategies.

Objective 3.4

Utilize available mitigation measures to prevent or reduce economic losses from natural hazards.

Objective 3.5

Reduce vulnerability of existing development by encouraging property owners to participate in buy-out or flood-proofing opportunities.

Objective 3.6

Reduce vulnerability of future development by utilizing available planning and structural standards.

D) Goal 4: To reduce losses to civic, cultural, and environmental resources

Objective 4.1

Protect public investment in community-owned facilities and infrastructure through appropriate structural, non-structural, and financial methods.

Objective 4.2

Reduce future losses to the non-profit sector through participation in available mitigation opportunities.

Objective 4.3

Reduce vulnerability of historically or culturally significant structures.

Objective 4.4

Minimize environmental impacts from cascading effects.

6) Mitigation Action Plan

A) Mitigation Action Prioritization

The planning team members have identified at least one mitigation action per natural hazard. After review, the planning team has determined that the jurisdiction's priorities remain the same. For this update, action items were identified and prioritized in consideration of the following criteria:

- 1) Life safety and property protection improvements
- 2) Cost effectiveness – do the action's future benefits exceed its implementation costs
- 3) Technical feasibility – is the action reasonable given its technical requirements
- 4) Political acceptability
- 5) Administrative capabilities and legal authorities for implementation
- 6) Funding availability
- 7) The action's environmental impacts
- 8) The action's social acceptability
- 9) The action's ability to reduce risk to more than one hazard
- 10) The ease of implementation
- 11) The availability of a local champion
- 12) The action's relationship to other community objectives

In addition to considering an action's cost effectiveness as described above, the planning team considered TDEM's Cost-Effectiveness, Environmental Soundness and Technical Feasibility requirements as they relate to construction projects. Mitigation actions relating to physical infrastructure will meet the State's standards as outlined below:

- A. Any state government construction project, regardless of potential funding source, has to be cost effective, technically feasible and meet all of the appropriate federal, state, and local environmental laws and regulations before it is started.
- B. State government projects funded by Federal Mitigation Grant Programs administered by TDEM have to meet specific criteria related to cost effectiveness, environmental soundness and technical feasibility. These are outlined in the applicable FEMA grant program guidance for that particular funding program.

B) Mitigation Action Status – 2019 Plan

In addition to reviewing existing codes, ordinances, and planning studies, the planning team also examined the status of each mitigation action identified in the 2019 plan. Concord Robbins WSC and Flo Community WSC were not participants in the 2019 plan, and therefore do not have any previous actions to review.

Mitigation actions marked as abandoned are no longer considered relevant as written to the participating jurisdictions. Deferred and in progress actions are indicated with an asterisk (*) in the new actions tables in Chapter 17, Part C.

Table 52: Previous Mitigation Actions – All Jurisdictions

Leon County Mitigation Actions Status		
Hazards Addressed	Mitigation Actions	Status
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Riverine Erosion, Dam / Levee Failure, Expansive Soil, Extreme Heat, Hailstorm, Land Subsidence, Severe Winter Storm, Windstorm, Lightning	Educational Outreach: This action will create a program to educate the public about specific mitigation actions for multiple hazards, including but not limited to Wildfire Fuels Reduction, Tornado Safe Rooms, Improving Thermal Insulation, Structural Hardening, etc...	<i>Deferred to Plan Update</i>
Flood, Hurricane / Tropical Storm	Construct Storm Drainage Infrastructure: This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.	<i>Deferred to Plan Update</i>
Flood	Purchase Portable Pumps: This action proposes purchasing portable pumps that can be deployed as needed to reduce the potential impacts of future flood events.	<i>In Progress</i>
Flood	Automated Warning System: This action proposes a local flood warning system to reduce the potential impacts of future flood events.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Tornado, Hailstorm, Severe Winter Storm, Windstorm, Lightning	Harden Facilities: This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation,	<i>Deferred to Plan Update</i>

	building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.	
Tornado	Construct Safe Rooms: The action's goal is to minimize vulnerability to tornados by constructing strategically located safe rooms.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Extreme Heat, Hailstorm, Lightning	Purchase Back-Up Power Generators: Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm, Windstorm	Implement a Tree Trimming Program: This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm, Windstorm	Wildfire Fuels Reduction: This action will develop and implement a program to reduce wildfire fuels.	<i>Deferred to Plan Update</i>
Drought	Develop and Implement a New Drought Contingency Plan: Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.	<i>Deferred to Plan Update</i>
Riverine Erosion	Create and Adopt a Riverine Erosion Control Master Plan: This action will develop and implement master plan to limit riverine erosion.	<i>Deferred to Plan Update</i>
Riverine Erosion, Expansive Soils, Land Subsidence	Document Hazard Occurrences: This action will document occurrences of hazards within the next five years to address deficiencies in the data.	<i>Abandoned</i>
Dam/Levee Failure	Mandate Freeboard on Structures to Reduce Flooding Damage: This action proposes a re-evaluation of all existing floodplain construction restrictions to identify strengths and weaknesses in order to reduce future damages during flood events. Changes will include the addition of a freeboard requirement.	<i>Abandoned</i>

Dam / Levee Failure	Restrict development in high hazard areas: Re-evaluate all existing floodplain construction restrictions to identify strengths and weaknesses in order to produce a standalone floodplain development restriction ordinance, update its existing flood damage prevention ordinance, and / or update its subdivision ordinance.	<i>Abandoned</i>
Expansive Soils	Develop and Implement a New Road Construction Manual: Develop and enforce a new road construction manual to reduce vulnerability to expansive soils.	<i>Abandoned</i>
Extreme Heat	Set up Cooling Centers in Existing Facilities: The action's goal is to increase extreme heat resilience by limiting vulnerable populations' exposure to extreme heat.	<i>Completed</i>
Land Subsidence	Develop and Implement an Ordinance to Limit Groundwater Consumption: Re-evaluate all existing groundwater-use control measures to identify strengths and weaknesses in order to develop and enforce a new or updated groundwater consumption ordinance.	<i>Abandoned</i>
Severe Winter Storm	Set up Warming Centers in Existing Facilities: The action's goal is to increase severe winter storm resilience by limiting vulnerable populations' exposure to extreme cold.	<i>Completed</i>
Dam / Levee Failure	Restrict Development in High Hazard Areas: Leon County will re-evaluate all existing floodplain construction restrictions to identify strengths and weaknesses in order to produce a new ordinance that will reduce potential flood impacts due to dam / levee failure by restricting development in areas that may be subject to inundation due to dam / levee failure.	<i>Abandoned</i>
Windstorm	Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs: Re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.	<i>Abandoned</i>

Lightning	Install Surge Protection to Protect Electronic Assets: This action proposes installing surge protection at all Leon County facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.	<i>Completed</i>
Lightning	Install Grounding Systems to Protect Electronic Assets: This action proposes installing grounding systems including but not limited to: lightning arresters, grounding rods, and grounding electrodes at all public facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.	<i>Completed</i>
Flood, tornado, hurricane, winter storm, thunderstorm, hailstorm	Two new towers to be erected to provide emergency notification to communities where no current coverage exists: Leon County has rural areas where no radio coverage is received. This action will lead to the protection of life by notifying the public to impending natural hazards.	<i>In Progress</i>
Tornadoes, hailstorms, winter storms, thunderstorms, hurricanes, excessive heat	Build a dual-use community safe room at a recreation center located between the Cities of Buffalo and Centerville: Leon County has proposed to build a safe room recreational center between Buffalo and Centerville. The safe room would provide protection for the citizens at the recreational center should severe storms arise, and also act as a cooling center with air conditioning during periods of excessive heat.	<i>Abandoned</i>
Thunderstorms	Install lightning rods on critical utilities and communications facilities to prevent fires resulting from lightning strikes: Leon County has had many severe storms over the years (primarily March-August) that result in numerous lightning strikes throughout the county.	<i>Completed</i>
Hail, hurricanes, tornadoes	Strengthen existing critical facilities and utilities with braces, stronger bolts and protective coverings to protect them from	<i>Deferred to Plan Update</i>

	severe storms: Powerful hail storms can knock out power to critical facilities.	
Excessive heat, drought	Educate the public to use natural conservation methods around their homes, i.e., tree plantings and watering at appropriate times to minimize damage and loss due to excessive heat and drought: Leon County has been in a period of drought conditions for a period of five years and has had significant extended periods of 100+ degree weather. This is causing a significant strain on water resources.	<i>Deferred to Plan Update</i>
Drought, excessive heat, wildfires	Create and implement a drought contingency plan: Create a drought contingency plan to outline steps to be taken to prevent the county from experiencing loss of water pressure	<i>Deferred to Plan Update</i>
Winter Storms	Bury power lines to minimize damages to all individuals and private and public utilities resulting from severe winter storms: Leon County has had outages resulting from ice storms that affected the public welfare.	<i>Abandoned</i>
Dam failure, flooding	Per NFIP participation, acquire any repetitive loss structures located below the high hazard dams: There are a few structures located in the county that are downstream of a dam. Protection of life and property by removing people and structures from the identified dam failure inundation zone.	<i>Abandoned</i>
Floods	Per NFIP compliance, implement program to enlarge culverts and drains beneath county bridges to allow for more flood capacity: Leon County has been flooded in several areas of the county. Enlarging culverts and drains beneath bridges will prevent a back flow of floodwaters onto people's property.	<i>Deferred to Plan Update</i>
Dam failure	Acquisition of homes below high hazard dams: Although a dam failure event is unlikely in Leon County, there are some structures that may be located in the dam failure inundation area.	<i>Abandoned</i>

City of Buffalo Mitigation Actions Status		
Hazards Addressed	Mitigation Actions	Status
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning	Educational Outreach: This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc...	<i>Deferred to Plan Update</i>
Flood, Hurricane / Tropical Storm	Construct Storm Drainage Infrastructure: This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events. Develop a Drainage Master Plan to identify and address drainage issues. 00Equipment to aid in rescue due to flooding.	<i>Deferred to Plan Update</i>
Hailstorm	Harden Facilities: This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Extreme Heat, Hailstorm, Lightning	Purchase Back Up Power Generators: Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Emergency Sirens for warn0i000ng o0f0 000i0m0pending storms.	<i>Deferred to Plan Update</i>
Wildfire, Tornado, Hailstorm, Severe Winter Storm, Windstorm	Implement a Tree Trimming Program: This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events.	<i>Deferred to Plan Update</i>

Drought	Develop and Implement a New Drought Contingency Plan: Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.	<i>Deferred to Plan Update</i>
Expansive Soils	Develop and Implement a New Road Construction Manual: Develop and enforce a new road construction manual to reduce vulnerability to expansive soils.	<i>Abandoned</i>
Expansive Soils	Document Hazard Occurrences: This action will document occurrences of hazards within the next five years to address deficiencies in the data.	<i>Abandoned</i>
Flood, hurricane, thunderstorms	Per NFIP participation, acquire homes located in the floodplain: Some homes become flooded after heavy rain events, such as from hurricanes and thunderstorms. Acquiring these homes with FEMA mitigation grants will remove them from the identified flood hazard area.	<i>Abandoned</i>
Tornadoes, hail, winter storms, thunderstorms, hurricanes, excessive heat	Build a new dual-use community safe room for protection from severe storms: The City of Buffalo currently has no reinforced structures. The safe room would provide protection for the citizens at the recreational center should severe storms arise, and also act as a cooling center with air conditioning during periods of excessive heat.	<i>Abandoned</i>
Winter storms, hail, tornado	Bury power lines to minimize damages to all individuals and private and public utilities resulting from severe winter storms: The City of Buffalo is vulnerable to outages resulting from ice storms, hail storms, and tornadoes due to above-ground power lines being knocked down.	<i>Abandoned</i>
Drought	Identifying new available water supplies: Locating new water supplies to supplement current water availability will help to lessen the local vulnerability to drought.	<i>Deferred to Plan Update</i>
Wildfire	Develop and maintain a database to track community vulnerability to wildfire and then remove the dry brush from	<i>Abandoned</i>

	those areas: To identify wildfire hazard areas to assess overall community vulnerability, and then remove the dry brush from those areas to lessen the vulnerability.	
Hail	Improving roof sheathing to prevent hail penetration: For new construction as well as retrofitting existing buildings, require roof sheathing techniques to minimize hail damage.	<i>Abandoned</i>

City of Centerville Mitigation Actions Status		
Hazards Addressed	Mitigation Actions	Status
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning	Educational Outreach: This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc...	<i>Deferred to Plan Update</i>
Flood, Hurricane / Tropical Storm	Construct Storm Drainage Infrastructure: This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.	<i>In Progress</i>
Hurricane / Tropical Storm, Tornado	Construct Safe Rooms: The action's goal is to minimize vulnerability to tornados by constructing strategically located safe rooms.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Extreme Heat, Hailstorm, Lightning	Purchase Back Up Power Generators: Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.	<i>In Progress</i>
Wildfire, Tornado, Hailstorm, Severe Winter Storm, Windstorm	Implement a Tree Trimming Program: This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events.	<i>Deferred to Plan Update</i>

Wildfire, Drought	Develop an Alternative Water Source: This action proposes developing secondary water sources to minimize wildfire and drought impacts on the local water supply.	<i>Deferred to Plan Update</i>
Land Subsidence	Develop and Implement an Ordinance to Limit Groundwater Consumption: Re-evaluate all existing groundwater-use control measures to identify strengths and weaknesses in order to develop and enforce a new or updated groundwater consumption ordinance.	<i>Abandoned</i>
Expansive Soils	Document Hazard Occurrences: This action will document occurrences of hazards within the next five years to address deficiencies in the data.	<i>Abandoned</i>
Hurricane, tornadoes, thunderstorms, winter storms, floods, wildfires, excessive heat	Build a dual-use community safe room for the citizens of Centerville: In the past, the city and its residents have been vulnerable to severe storms. Currently, the city has no structures built strong enough to withstand tornadoes and other severe storms.	<i>Abandoned</i>
Flooding	Increase culvert sizes to allow for more flood water to flow beneath major roads: Some older culverts are not large enough to allow flood waters to flow safely beneath the road.	<i>In Progress</i>
Drought	Implement their Drought Contingency Plan response stages: The local Drought Contingency Plan contains specific, quantified targets for water use restrictions. This includes drought response stages with triggers to begin and end at each stage.	<i>In Progress</i>
Hail	Improving roof sheathing to prevent hail penetration: For new construction as well as retrofitting existing buildings, require roof sheathing techniques to minimize hail damage.	<i>Deferred to Plan Update</i>

City of Jewett Mitigation Actions Status		
Hazards Addressed	Mitigation Actions	Status
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning	Educational Outreach: This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc...	<i>Deferred to Plan Update</i>
Flood, Hurricane / Tropical Storm	Construct Storm Drainage Infrastructure: This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.	<i>Deferred to Plan Update</i>
Flood	Upgrade Drainage Pump Stations: This action proposes upgrading pump stations to reduce the potential impacts of future flood events.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Extreme Heat, Hailstorm, Lightning	Purchase Back Up Power Generators: Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.	<i>In Progress</i>
Wildfire, Tornado, Hailstorm, Severe Winter Storm, Windstorm	Implement a Tree Trimming Program: This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events.	<i>In Progress</i>
Hailstorm, Land Subsidence, Windstorm	Harden Facilities: This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.	<i>Deferred to Plan Update</i>
Drought	Replace Water Fixtures with Low Flow Units: This action's goal is to limit water consumption at City-owned and	<i>Abandoned</i>

	maintained facilities by replacing traditional water fixtures with low flow units.	
Earthquake, Expansive Soils, Land Subsidence	Update Building Code Requirements: Re-evaluate all existing building code requirements to identify strengths and weaknesses in order to develop and enforce a new or updated code that reduces structural vulnerability.	<i>Abandoned</i>
Windstorm	Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs: Re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.	<i>Deferred to Plan Update</i>
Lightning	Install Surge Protection to Protect Electronic Assets: This action will install surge protection at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.	<i>In Progress</i>
Expansive Soils, Land Subsidence	Document Hazard Occurrences: This action will document occurrences of hazards within the next five years to address deficiencies in the data.	<i>Abandoned</i>
Lightning	Install Grounding System to Protect Electronic Assets: This action will install grounding systems including but not limited to: lightning arresters, grounding rods, and grounding electrodes at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.	<i>Deferred to Plan Update</i>
Wildfires, Drought, Excessive Heat	Improve water supply and pressure to provide better fire fighting capabilities: Improve water supply and available fire hydrants in the city to enable firefighters to obtain water in a timely quantity and manner.	<i>Deferred to Plan Update</i>

Tornadoes, hail, winter storms, excessive heat, thunderstorms	Build a community safe room for protecting vulnerable people during severe storms: A community safe room is needed to protect citizens from the affects of severe storms.	
Drought, excessive heat	Provide a third well for Jewett and surrounding residents in the extra territorial jurisdiction (ETJ): Initiate water conservation measures during drought times: In the past 6 years, Jewett has suffered drought conditions depleting the water supply with two wells. A third well would help assure water during drought times.	<i>Deferred to Plan Update</i>
Floods, Thunderstorms	Retrofit larger ditches and bigger culverts to alleviate the problem of flooding due to storm water runoff: Water runs down streets causing potholes and erosion and increasing the flood risk. Reduce environmental problems due to erosion and stormwater runoff and reduce flood risks .	<i>Deferred to Plan Update</i>
Wildfire	Develop and maintain a database to track community vulnerability to wildfire and then remove the dry brush from those areas: To identify wildfire hazard areas to assess overall community vulnerability, and then remove the dry brush from those areas to lessen the vulnerability	<i>Abandoned</i>

City of Leona Mitigation Actions Status		
Hazards Addressed	Mitigation Actions	Status
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning	<u>Educational Outreach:</u> This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc...	<i>Deferred to Plan Update</i>
Flood, Hurricane / Tropical Storm	<u>Construct Storm Drainage Infrastructure:</u> This action proposes constructing new	<i>Deferred to Plan Update</i>

	storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.	
Hailstorm, Land Subsidence, Windstorm	<u>Harden Facilities:</u> This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Extreme Heat, Hailstorm	<u>Purchase Back Up Power Generators:</u> Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm	<u>Implement a Tree Trimming Program:</u> This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events	<i>Deferred to Plan Update</i>
Drought	<u>Develop and Implement a New Drought Contingency Plan:</u> Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.	<i>Deferred to Plan Update</i>
Extreme Heat	<u>Set up Cooling Centers in Existing Facilities:</u> The action's goal is to increase extreme heat resilience by limiting vulnerable populations' exposure to extreme heat.	<i>Deferred to Plan Update</i>
Severe Winter Storm	<u>Set up Warming Centers in Existing Facilities:</u> The action's goal is to increase severe winter storm resilience by limiting vulnerable populations' exposure to extreme cold.	<i>Deferred to Plan Update</i>
Lightning	<u>Install Surge Protection to Protect Electronic Assets:</u> This action will install surge protection at all critical facilities to	<i>Deferred to Plan Update</i>

	prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.	
Lightning	<u>Install Grounding System to Protect Electronic Assets:</u> This action will install grounding systems including but not limited to: lightning arresters, grounding rods, and grounding electrodes at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.	<i>Deferred to Plan Update</i>
Floods, hurricanes, thunderstorms	<u>Enlarge road culverts to handle higher water capacity:</u> Urban growth increases runoff in immediate vicinity. Debris and sediment needs to be cleared from drains and culverts enlarged to reduce flood risks.	<i>Deferred to Plan Update</i>
Hail, thunderstorms, hurricanes, tornadoes, winter storm	<u>Strengthen existing critical facilities and utilities with braces, stronger bolts and protective coverings to protect them from severe storms:</u> Powerful storms can knock out power to critical facilities.	<i>Deferred to Plan Update</i>
Floods, hurricanes, thunderstorms	<u>Acquire existing structures located in the identified flood hazard area:</u> The City of Leona may experience minor flooding that causes homes to flood. Purchase and removal of the structure will prevent future property damage.	<i>Abandoned</i>
Drought	<u>Implement their Drought Contingency Plan response stages:</u> The local Drought Contingency Plan contains specific, quantified targets for water use restrictions. This includes drought response stages with triggers to begin and end at each stage. Each drought response stage will reduce the availability of water for certain events. Examples include not allowing the washing of cars during the day or for restaurants to serve water only when requested by the customer.	<i>In Progress</i>

City of Marquez Mitigation Actions Status		
Hazards Addressed	Mitigation Actions	Status
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning	<u>Educational Outreach:</u> This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc...	<i>Deferred to Plan Update</i>
Flood, Hurricane / Tropical Storm	<u>Construct Storm Drainage Infrastructure:</u> This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.	<i>In Progress</i>
Hailstorm, Land Subsidence, Windstorm	<u>Harden Facilities:</u> This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.	<i>Abandoned</i>
Hurricane / Tropical Storm, Extreme Heat, Hailstorm	<u>Purchase Back Up Power Generators:</u> Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.	<i>Completed</i>
Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm	<u>Implement a Tree Trimming Program:</u> This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events	<i>Deferred to Plan Update</i>
Flood	<u>Purchase Portable Pumps:</u> This action proposes purchasing portable pumps that can be deployed as needed to reduce the potential impacts of future flood events.	<i>Deferred to Plan Update</i>
Drought	<u>Develop and Implement a New Water Conservation Ordinance:</u> Re-evaluate all existing water conservation measures to	<i>Completed</i>

	identify strengths and weaknesses in order to develop and enforce a new water conservation ordinance.	
Expansive Soils	Update Building Code Requirements: Re-evaluate all existing building code requirements to identify strengths and weaknesses in order to develop and enforce a new or updated code that reduces structural vulnerability.	<i>Abandoned</i>
Expansive Soils	Document Hazard Occurrences: This action will document occurrences of hazards within the next five years to address deficiencies in the data.	<i>Abandoned</i>
Hurricane, winter storm, tornadoes, hail, excessive heat, thunderstorms	Build a community safe room: Local citizens have no strengthened safe rooms to protect themselves from severe storms. Prevent the loss of life by providing a strengthened shelter during storm events.	<i>Abandoned</i>
Winter storms, hail, tornado, thunderstorms, hurricanes	Bury power lines to minimize damages to all individuals and private and public utilities resulting from severe storms: The City of Marquez is vulnerable to outages resulting from severe storms due to above-ground lines being knocked down.	<i>Abandoned</i>

City of Normangee Mitigation Actions Status		
Hazards Addressed	Mitigation Actions	Status
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning	Educational Outreach: This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc...	<i>Deferred to Plan Update</i>
Flood, Hurricane / Tropical Storm	Construct Storm Drainage Infrastructure: This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.	<i>Deferred to Plan Update</i>
Hailstorm, Land Subsidence, Windstorm	Harden Facilities: This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying	<i>Deferred to Plan Update</i>

	structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.	
Hurricane / Tropical Storm, Extreme Heat, Hailstorm	<u>Purchase Back Up Power Generators:</u> Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm	<u>Implement a Tree Trimming Program:</u> This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events	<i>Deferred to Plan Update</i>
Flood	<u>Purchase Portable Pumps:</u> This action proposes purchasing portable pumps that can be deployed as needed to reduce the potential impacts of future flood events.	<i>Deferred to Plan Update</i>
Tornado	<u>Construct Safe Rooms:</u> The action's goal is to minimize vulnerability to tornados by constructing strategically located safe rooms.	<i>Deferred to Plan Update</i>
Drought	<u>Develop and Implement a New Drought Contingency Plan:</u> Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.	<i>Deferred to Plan Update</i>
Dam/Levee Failure	<u>Mandate Freeboard on Structures to Reduce Flooding Damage:</u> This action proposes a re-evaluation of all existing floodplain construction restrictions to identify strengths and weaknesses in order to reduce future damages during flood events. Changes will include the addition of a freeboard requirement.	<i>Deferred to Plan Update</i>
Expansive Soils, Land Subsidence	<u>Update Building Code Requirements:</u> Re-evaluate all existing building code requirements to identify strengths and weaknesses in order to develop and	<i>Abandoned</i>

	enforce a new or updated code that reduces structural vulnerability.	
Expansive Soils	<u>Develop and Implement a New Road Construction Manual:</u> Develop and enforce a new road construction manual to reduce vulnerability to expansive soils.	<i>Abandoned</i>
Extreme Heat	<u>Set up Cooling Centers in Existing Facilities:</u> The action's goal is to increase extreme heat resilience by limiting vulnerable populations' exposure to extreme heat.	<i>Deferred to Plan Update</i>
Severe Winter Storm	<u>Set up Warming Centers in Existing Facilities:</u> The action's goal is to increase severe winter storm resilience by limiting vulnerable populations' exposure to extreme cold.	<i>Deferred to Plan Update</i>
Windstorm	<u>Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs:</u> Re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.	<i>Deferred to Plan Update</i>
Lightning	<u>Install Surge Protection to Protect Electronic Assets:</u> This action will install surge protection at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.	<i>Deferred to Plan Update</i>
Expansive Soils, Land Subsidence	<u>Document Hazard Occurrences:</u> This action will document occurrences of hazards within the next five years to address deficiencies in the data.	<i>Abandoned</i>
Hail, winter storm, tornado, hurricane, excessive heat	<u>Build a new dual-use community safe room:</u> The City of Normangee currently has no reinforced structures. The safe room would provide protection for the citizens at the recreational center should severe storms arise, and also act as a cooling center with air conditioning during periods of excessive heat.	<i>Deferred to Plan Update</i>
Hail, thunderstorms, hurricanes, tornadoes, winter storm	<u>Strengthen existing critical facilities and utilities with braces, stronger bolts and protective coverings to protect them from severe storms:</u> Powerful storms can knock out power to critical facilities.	<i>Deferred to Plan Update</i>

Hail, thunderstorm, tornado	Individual Safe Room Program: For new construction as well as retrofitting existing buildings, provide rebates for installing individual safe rooms into their homes for protection against hailstorms.	<i>Abandoned</i>
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City of Oakwood Mitigation Actions Status		
Hazards Addressed	Mitigation Actions	Status
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning	Educational Outreach: This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc...	<i>Deferred to Plan Update</i>
Flood	Purchase Portable Pumps: This action proposes purchasing portable pumps that can be deployed as needed to reduce the potential impacts of future flood events.	<i>Deferred to Plan Update</i>
Hailstorm, Land Subsidence, Windstorm	Harden Facilities: This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.	<i>Deferred to Plan Update</i>
Hurricane / Tropical Storm, Extreme Heat, Hailstorm	Purchase Back Up Power Generators: Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.	<i>Completed</i>
Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm	Implement a Tree Trimming Program: This action will develop and implement a tree trimming program to reduce wildfire fuels and minimize the amount of debris generated during natural hazard events	<i>Deferred to Plan Update</i>
Drought	Develop and Implement a New Water Conservation Ordinance: Re-evaluate all	<i>Completed</i>

	existing water conservation measures to identify strengths and weaknesses in order to develop and enforce a new water conservation ordinance.	
Expansive Soils, Land Subsidence	<u>Update Building Code Requirements:</u> Re-evaluate all existing building code requirements to identify strengths and weaknesses in order to develop and enforce a new or updated code that reduces structural vulnerability.	<i>In Progress</i>
Expansive Soils, Land Subsidence	<u>Document Hazard Occurrences:</u> This action will document occurrences of hazards within the next five years to address deficiencies in the data.	<i>Abandoned</i>
Lightning	<u>Install Surge Protection to Protect Electronic Assets:</u> This action will install surge protection at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.	<i>Deferred to Plan Update</i>
Floods, hurricanes, thunderstorms	<u>Acquire homes located in the identified flood hazard area:</u> Acquire homes in the flood plain located on College Street and Whitt Street.	<i>Deferred to Plan Update</i>
Hail, winter storm, tornado, hurricane, excessive heat	<u>Build a new dual-use community safe room:</u> The City of Oakwood currently has no reinforced structures. The safe room would provide protection for the citizens at the recreational center should severe storms arise, and also act as a cooling center with air conditioning during periods of excessive heat.	<i>Deferred to Plan Update</i>

C) Mitigation Actions by Jurisdiction and by Hazard

Each jurisdiction has selected actions that were identified as high, medium or low priority and that are in line with TDEM's recommended mitigation actions. However, many of the mitigation actions below are dependent upon outside grant funding for implementation. For all actions likely to require grant funding, potential sources have been identified. However, grant funding is awarded on a competitive basis, so applying for funding doesn't guarantee that funds will be received. Budget constraints will remain the determining factor for how and when each action is implemented. Each new mitigation action outlines the following requirements: the identified responsible department head or delegate will research all relevant information to confirm the

action's feasibility and prioritization, will formulate a plan of action, and will confirm funding sources and identify any fiscal liabilities associated with the mitigation action.

i. Leon County

Multi-Hazard Actions

Mitigation Action	Educational Outreach*
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Riverine Erosion, Dam / Levee Failure, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court, OEM
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood, Hurricane/ Tropical Storm, Riverine Erosion, Dam/Levee Failure
Priority	High
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Automated Flood Warning System*
Objective	This action proposes a local flood warning system to reduce the potential impacts of future flood events.
Hazard	Hurricane/Tropical Storms, Flood
Priority	Low
Estimated Cost	Greater than \$1,000,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court, OEM
Implementation Schedule	1 - 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Harden Facilities*
Objective	This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Hurricane / Tropical Storm, Tornado, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	Medium
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court, OEM
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Install Back Up Power Generators*
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Hailstorm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners Court, OEM
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program*
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Hurricane/Tropical Storm, Wildfire, Tornado, Winter Storm, Windstorm
Priority	Low
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners Court, OEM
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Wildfire Fuels Reduction*
Objective	This action will develop and implement a program to reduce wildfire fuels.
Hazard	Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm, Windstorm
Priority	Medium
Estimated Cost	More than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners Court, OEM
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Create and Adopt a Riverine Erosion Control Master Plan*
Objective	This action will develop and implement master plan to limit riverine erosion.
Hazard	Riverine Erosion
Priority	Medium
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court, OEM
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Single Hazard Actions

Mitigation Action	Construct Safe Rooms*
Objective	The action's goal is to minimize vulnerability to tornados by constructing strategically located safe rooms.
Hazard	Tornado
Priority	Medium
Estimated Cost	More than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court, OEM
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan*
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, TWDB
Responsible Department	Commissioners' Court, OEM
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Enlarge Culverts and Drains Beneath County Bridges*
Objective	This action proposes enlarging culverts and drains beneath bridges to allow for increased flood capacity and to prevent a back-flow of floodwaters onto adjacent properties.
Hazard	Flood
Priority	Medium
Estimated Cost	Less than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court, OEM
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

ii. City of Buffalo

Multi-Hazard Actions

Mitigation Action	Educational Outreach*
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Riverine Erosion, Dam / Levee Failure, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood, Hurricane / Tropical Storm
Priority	High
Estimated Cost	Greater than \$1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Harden Facilities*
Objective	This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Hurricane / Tropical Storm, Tornado, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	Medium
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Install Back Up Power Generators*
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Hailstorm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program*
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Hurricane/Tropical Storm, Wildfire, Tornado, Winter Storm, Windstorm
Priority	Low
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Construct Community Safe Rooms*
Objective	The action's goal is to minimize local population vulnerability to hazards by providing public safe rooms.
Hazard	Hurricane/Tropical Storm, Tornado, Wildfire, Windstorm, Winter Storm
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Install and Expand Warning Systems/Sirens
Objective	Warning systems will help limit local vulnerability to hazards by giving residents an opportunity to take shelter before one occurs.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Winter Storm, Windstorm, Lightning
Priority	Medium
Estimated Cost	\$1,000 - \$100,000 per device
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Construct New Fire Station and EMS Building
Objective	The action's goal is intended to better serve residents in need of emergency services
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Riverine Erosion, Dam / Levee Failure, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Purchase Emergency Response Vehicles
Objective	After disasters, some areas are inaccessible without specialized vehicles such as ATV equipment and Swift Water Rescue Vessels. This action would provide necessary rescue equipment for disaster response.
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Riverine Erosion, Dam / Levee Failure, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	\$10,000 - \$100,000 per vehicle
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Wildfire Fuels Reduction
Objective	This action will develop and implement a program to reduce wildfire fuels.
Hazard	Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorm, Severe Winter Storm, Windstorm
Priority	Medium
Estimated Cost	More than \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Single Hazard Actions

Mitigation Action	Develop and Implement a New Drought Contingency Plan*
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Identify New Available Water Supplies*
Objective	Locating new water supplies to supplement current water availability will help to lessen the local vulnerability to drought.
Hazard	Drought
Priority	Medium
Estimated Cost	More than \$10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Create and Adopt a Drainage Master Plan
Objective	This action will develop and implement master plan to identify and address long and short-term drainage issues
Hazard	Flood
Priority	High
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Install Sewer System in Areas without Sewer Access
Objective	This action will reduce flood impacts by connecting residents living in subdivisions without sewer connections to sewer systems.
Hazard	Flood
Priority	Medium
Estimated Cost	More than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population

iii. City of Centerville

Multi-Hazard Actions

Mitigation Action	Educational Outreach*
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	City Council
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Community Safe Rooms*
Objective	The action's goal is to minimize local population vulnerability to hazards by providing public safe rooms.
Hazard	Hurricane/Tropical Storm, Tornado, Wildfire, Windstorm, Winter Storm
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, Building Code
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Harden Facilities*
Objective	This action proposes hardening facilities. Hardening will include but is not limited to adding impact and wind-resistant doors, windows; reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Flood, Hurricane/Tropical Storms, Hailstorms, Winter Weather, Windstorm, Tornadoes, Lightning
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Planning Dept., Building Code
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Update Building Code Requirements
Objective	The City will re-evaluate current building codes and update where needed to improve building standards to withstand impacts from hazards.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning,
Priority	Medium
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, Planning Dept., City Administrator
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Set up Cooling and Heating Centers in Existing Facilities*
Objective	The action's goal is to increase extreme temperature resilience by limiting vulnerable populations' exposure to extreme temperatures by creating new, or opening up existing facilities as cooling centers or warming centers.
Hazard	Extreme Heat & Extreme Cold
Priority	Medium
Estimated Cost	Less than \$10,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department(s)	City Administration
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs*
Objective	Re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.
Hazard	Windstorm, Tornado, Hurricanes/Tropical Storm
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Council
Implementation Schedule	1 - 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Implement a Tree Trimming Program
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Winter Storm, Windstorm
Priority	High
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works, City Council
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Purchase Back Up Power Generators*
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Council, City Administrator, Police Dept., Fire Dept.
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Install and Expand Warning Systems/Weather Radio
Objective	Warning systems will help limit local vulnerability to hazards by giving residents an opportunity to take shelter before one occurs.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Winter Storm, Windstorm, Lightning
Priority	Medium
Estimated Cost	\$1,000 - \$100,000 per device
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works, Police Dept., City Council
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Purchase Portable Digital Warning Signs
Objective	Warning systems will help limit local vulnerability to hazards by giving residents an opportunity to take shelter before one occurs.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storms, Winter Storm, Windstorm, Lightning
Priority	Medium
Estimated Cost	\$1,000 - \$100,000 per device
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works, Police Dept., Fire Dept., City Council
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Single Hazard Actions

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Medium
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	City Council, Public Works
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Create Drainage Master Plan
Objective	This action proposes creating a drainage master plan for the City, in conjunction with the County, that will provide the City with a comprehensive planning document that provides basic information and necessary guidance for the county-wide drainage system, including but not limited to an H&H study.
Hazard	Flood
Priority	High
Estimated Cost	Less than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	City Council, City Administrator, Planning Dept.
Implementation Schedule	5 Years
Target	Existing and future infrastructure

Mitigation Action	Develop and Implement a New Flood Damage Prevention Ordinance
Objective	The City of Centerville will re-evaluate existing flood damage prevention and reduction measures to identify strengths and weaknesses in order to develop and enforce a new flood damage prevention ordinance.
Hazard	Flood
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	City Council, City Administrator, Planning Dept.
Implementation Schedule	1 - 2 Years
Target	Existing and future infrastructure

Mitigation Action	Construct New Drainage Pump Station and/or Purchase Portable Pumps
Objective	This action proposes constructing new drainage pump stations and/or purchasing portable pumps to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Medium
Estimated Cost	More than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Planning Dept., City Council
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Wildfire Fuels Reduction in WUI*
Objective	This action will develop and implement a program to identify and prioritize lands in the Wildland Urban Interface in need of fuels reduction and then reduce or remove wildfire fuels through various methods as appropriate.
Hazard	Wildfire
Priority	Low
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works, Emergency Management, City Council
Implementation Schedule	2 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Wildfire Breaks*
Objective	This action will develop and implement a program to identify and prioritize lands for creation of fire breaks and then reduce or remove wildfire fuels through various methods as appropriate.
Hazard	Wildfire
Priority	Low
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works, Emergency Management, City Council
Implementation Schedule	2 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Develop and Implement a New Water Conservation Ordinance*
Objective	City will re-evaluate all existing water conservation and reduction measures to identify strengths and weaknesses in order to develop and enforce a new water conservation ordinance.
Hazard	Drought
Priority	Low
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Council
Implementation Schedule	1 - 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan*
Objective	City will re-evaluate drought contingency plan to identify strengths and weaknesses in order to develop and enforce a new plan.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$50,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Council
Implementation Schedule	2 - 4 Years
Target	Existing and planned infrastructure

Mitigation Action	Plant Drought Resistant Vegetation*
Objective	To limit water consumption at City-owned and maintained facilities, the City of Centerville will adopt a policy of replanting landscaping with drought tolerant plant varieties. To the extent possible, landscaping will be replanted on an as-needed basis, as opposed to an immediate replanting of all landscaping.
Hazard	Drought
Priority	Medium
Estimated Cost	More than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	3 - 5 Years
Target	Existing and Future infrastructure

Mitigation Action	Replace Water Fixtures with Low Flow Units*
Objective	To limit water consumption at City-owned and maintained facilities, the City of Centerville will adopt a policy of replacing water fixtures with low flow units.
Hazard	Drought
Priority	Medium
Estimated Cost	More than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	3 - 5 Years
Target	Existing and Future infrastructure

Mitigation Action	Install Surge Protection and Grounding Systems to Protect Electronic Assets*
Objective	This action will install surge protection at all City facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	\$1,000 - \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works, Emergency Management, City Council
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

iv. City of Jewett

Multi-Hazard Actions

Mitigation Action	Educational Outreach*
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood, Hurricane/Tropical Storm
Priority	Medium
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Upgrade Drainage Pump Stations*
Objective	This action proposes upgrading pump stations to reduce the potential impacts of future flood events.
Hazard	Flood, Hurricane/Tropical Storm
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Harden Facilities*
Objective	This action proposes hardening facilities. Hardening will include but is not limited to adding impact and wind-resistant doors, windows; reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Flood, Hurricane/Tropical Storms, Hailstorms, Winter Weather, Windstorm, Tornadoes, Lightning
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs*
Objective	Re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.
Hazard	Windstorm, Tornado, Hurricanes/Tropical Storm
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Implement a Tree Trimming Program*
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Winter Storm, Windstorm
Priority	High
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Purchase Back Up Power Generators*
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Construct Community Safe Rooms*
Objective	The action's goal is to minimize local population vulnerability to hazards by providing public safe rooms.
Hazard	Hurricane/Tropical Storm, Tornado, Wildfire, Windstorm, Winter Storm
Priority	High
Estimated Cost	More than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Improve Water Supply and Pressure*
Objective	The action's goal is to minimize local population vulnerability to hazards by providing better firefighting capabilities
Hazard	Wildfire, Drought, Extreme Heat
Priority	High
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Construct a New Water Well*
Objective	The action's goal is to minimize local population vulnerability to hazards providing a third water well, increasing water supply to the City and surrounding areas.
Hazard	Drought, Extreme Heat
Priority	High
Estimated Cost	\$10,000 - \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Single Hazard Actions

Mitigation Action	Install Surge Protection to Protect Electronic Assets*
Objective	This action will install surge protection at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Install Grounding System to Protect Electronic Assets*
Objective	This action will install grounding systems including but not limited to: lightning arresters, grounding rods, and grounding electrodes at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 2 Years
Target	Existing and future infrastructure

v. City of Leona

Multi-Hazard Actions

Mitigation Action	Educational Outreach*
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	City Council
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood, Hurricane/Tropical Storm
Priority	Medium
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Harden Facilities*
Objective	This action proposes hardening facilities. Hardening will include but is not limited to adding impact and wind-resistant doors, windows; reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Flood, Hurricane/Tropical Storms, Hailstorms, Winter Weather, Windstorm, Tornadoes, Lightning
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Set up Cooling and Heating Centers in Existing Facilities*
Objective	The action's goal is to increase extreme temperature resilience by limiting vulnerable populations' exposure to extreme temperatures by creating new, or opening up existing facilities as cooling centers or warming centers.
Hazard	Extreme Heat, Extreme Cold
Priority	Medium
Estimated Cost	Less than \$10,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department(s)	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Implement a Tree Trimming Program
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Winter Storm, Windstorm
Priority	High
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Purchase Back Up Power Generators*
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Single Hazard Actions

Mitigation Action	Install Surge Protection to Protect Electronic Assets*
Objective	This action will install surge protection at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Install Grounding System to Protect Electronic Assets*
Objective	This action will install grounding systems including but not limited to: lightning arresters, grounding rods, and grounding electrodes at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 2 Years
Target	Existing and future infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan*
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

vi. City of Marquez

Multi-Hazard Actions

Mitigation Action	Educational Outreach*
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Implement a Tree Trimming Program *
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Winter Storm, Windstorm
Priority	High
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Medium
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Purchase Portable Digital Warning Signs
Objective	Warning systems will help limit local vulnerability to hazards by giving residents an opportunity to take shelter before one occurs.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storms, Winter Storm, Windstorm, Lightning
Priority	Medium
Estimated Cost	\$1,000 - \$100,000 per device
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works, Police Dept., Fire Dept., City Council
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Single Hazard Actions

Mitigation Action	Construct New Drainage Pump Station and/or Purchase Portable Pumps*
Objective	This action proposes constructing new drainage pump stations and/or purchasing portable pumps to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Medium
Estimated Cost	More than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

vii. City of Normangee

Multi-Hazard Actions

Mitigation Action	Educational Outreach*
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning, Dam/Levee Failure
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	High
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Purchase Back Up Power Generators*
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Construct Community Safe Rooms*
Objective	The action's goal is to minimize local population vulnerability to hazards by providing public safe rooms.
Hazard	Hurricane/Tropical Storm, Tornado, Windstorm, Winter Storm, Extreme Heat, Extreme Cold
Priority	Medium
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Harden Facilities*
Objective	This action proposes hardening facilities. Hardening will include but is not limited to adding impact and wind-resistant doors, windows; reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Flood, Hurricane/Tropical Storms, Hailstorms, Winter Storm, Windstorm, Tornadoes, Lightning
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Set up Cooling and Heating Centers in Existing Facilities*
Objective	The action's goal is to increase extreme temperature resilience by limiting vulnerable populations' exposure to extreme temperatures by creating new, or opening up existing facilities as cooling centers or warming centers.
Hazard	Extreme Heat & Extreme Cold
Priority	Medium
Estimated Cost	Less than \$10,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department(s)	Mayor's Office
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs*
Objective	Re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.
Hazard	Windstorm, Tornado, Hurricanes/Tropical Storm
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	1 - 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Implement a Tree Trimming Program*
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Winter Storm, Windstorm
Priority	High
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Purchase Back Up Power Generators*
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Single Hazard Actions

Mitigation Action	Construct New Drainage Pump Station and/or Purchase Portable Pumps*
Objective	This action proposes constructing new drainage pump stations and/or purchasing portable pumps to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Medium
Estimated Cost	More than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan*
Objective	City will re-evaluate drought contingency plan to identify strengths and weaknesses in order to develop and enforce a new plan.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$50,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 4 Years
Target	Existing and planned infrastructure

Mitigation Action	Install Surge Protection and Grounding Systems to Protect Electronic Assets*
Objective	This action will install surge protection at all City facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	\$1,000 - \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Mandate Freeboard on Structures to Reduce Flooding Damage*
Objective	This action proposes a re-evaluation of all existing floodplain construction restrictions to identify strengths and weaknesses in order to reduce future damages during flood events. Changes will include the addition of a freeboard requirement.
Hazard	Dam/Levee Failure
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

viii. City of Oakwood

Multi-Hazard Actions

Mitigation Action	Educational Outreach*
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Community Safe Rooms*
Objective	The action's goal is to minimize local population vulnerability to hazards by providing public safe rooms.
Hazard	Hurricane/Tropical Storm, Tornado, Hail, Winter Storm, Extreme Heat, Extreme Cold
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Harden Facilities*
Objective	This action proposes hardening facilities. Hardening will include but is not limited to adding impact and wind-resistant doors, windows; reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Flood, Hurricane/Tropical Storms, Hailstorms, Winter Weather, Windstorm, Tornadoes, Lightning
Priority	High
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Mayor's Office
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program *
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Winter Storm, Windstorm
Priority	High
Estimated Cost	\$10,000 - \$500,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Acquire Homes in Identified Flood Hazard Area *
Objective	The City would like to acquire homes in the flood plain located on College Street and Whitt Street. Removal of these structures would reduce property damage and potential harm and loss of life during hazards.
Hazard	Flood, Hurricane/Tropical Storm
Priority	Medium
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor's Office
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Single Hazard Actions

Mitigation Action	Construct New Drainage Pump Station and/or Purchase Portable Pumps
Objective	This action proposes constructing new drainage pump stations and/or purchasing portable pumps to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Medium
Estimated Cost	More than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Planning Dept., City Council
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Install Surge Protection and Grounding Systems to Protect Electronic Assets*
Objective	This action will install surge protection at all City facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	\$1,000 - \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works, Emergency Management, City Council
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

ix. **Concord Robbins WSC**

Multi-Hazard Actions

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood, Hurricane/Tropical Storm
Priority	Medium
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Winter Storm, Windstorm
Priority	High
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Executive Board
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Purchase Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning, Dam/Levee Failure
Priority	Medium
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	District, FEMA BRIC, FEMA HMGP
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Harden Facilities
Objective	This action proposes hardening facilities. Hardening will include but is not limited to adding impact and wind-resistant doors, windows; reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Flood, Hurricane/Tropical Storms, Hailstorms, Winter Weather, Windstorm, Tornadoes, Lightning, Dam/Levee Failure
Priority	Low
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	District, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Single Hazard Actions

Mitigation Action	Construct New Drainage Pump Station and/or Purchase Portable Pumps
Objective	This action proposes constructing new drainage pump stations and/or purchasing portable pumps to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	High
Estimated Cost	More than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Install Surge Protection to Protect Electronic Assets
Objective	This action will install surge protection at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	Medium
Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Install Grounding System to Protect Electronic Assets
Objective	This action will install grounding systems including but not limited to: lightning arresters, grounding rods, and grounding electrodes at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	Medium
Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP
Responsible Department	Executive Board
Implementation Schedule	1 - 2 Years
Target	Existing and future infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, TWDB
Responsible Department	Executive Board
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

x. Flo Community WSC

Multi-Hazard Actions

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Flood, Wildfire, Tornado, Drought, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	Less than \$10,000 per hazard
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Storm Drainage Infrastructure*
Objective	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood, Hurricane/Tropical Storm
Priority	Medium
Estimated Cost	More than \$1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Implement a Tree Trimming Program
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Winter Storm, Windstorm
Priority	High
Estimated Cost	\$10,000 - \$500,0000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Executive Board
Implementation Schedule	3 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Purchase Back Up Power Generators
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Flood, Wildfire, Tornado, Extreme Heat, Extreme Cold, Hailstorm, Hurricane/Tropical Storm, Winter Storm, Windstorm, Lightning, Dam/Levee Failure
Priority	Medium
Estimated Cost	More than \$100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than \$100,000 Each for Portable Generators
Potential Funding Source (s)	District, FEMA BRIC, FEMA HMGP
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Harden Facilities
Objective	This action proposes hardening facilities. Hardening will include but is not limited to adding impact and wind-resistant doors, windows; reinforcing building foundations, elevating low-lying structures, upgrading and/or adding shatter-resistant films to all glazing, upgrading thermal insulation, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazard	Flood, Hurricane/Tropical Storms, Hailstorms, Winter Weather, Windstorm, Tornadoes, Lightning, Dam/Levee Failure
Priority	Low
Estimated Cost	Greater than \$100,000
Potential Funding Source (s)	District, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Single Hazard Actions

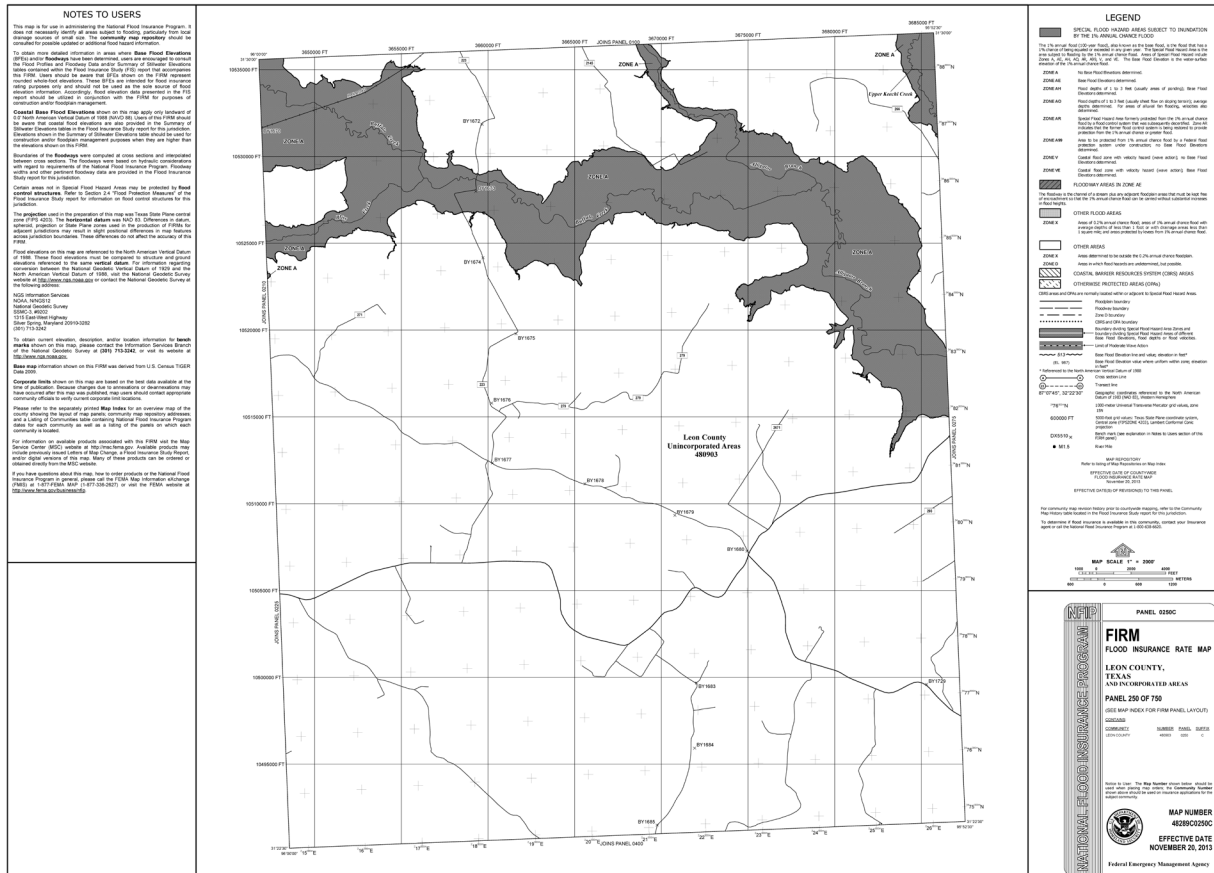
Mitigation Action	Construct New Drainage Pump Station and/or Purchase Portable Pumps
Objective	This action proposes constructing new drainage pump stations and/or purchasing portable pumps to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	High
Estimated Cost	More than \$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

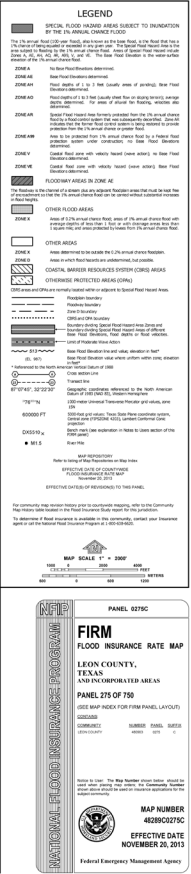
Mitigation Action	Install Surge Protection to Protect Electronic Assets
Objective	This action will install surge protection at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	Medium
Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Executive Board
Implementation Schedule	2 - 5 Years
Target	Existing and future population

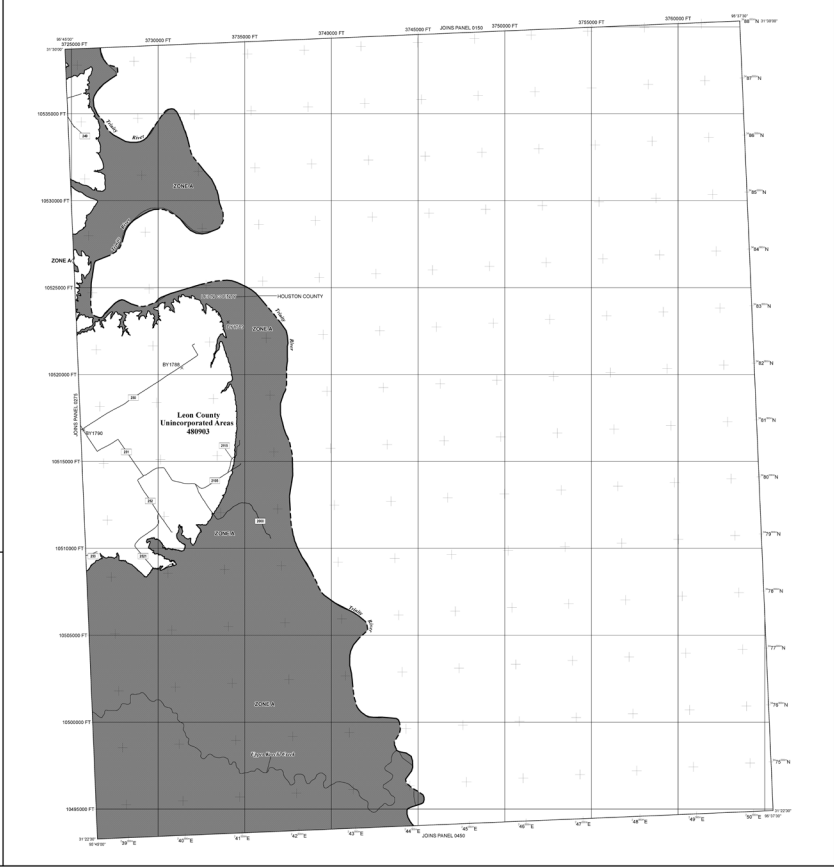
Mitigation Action	Install Grounding System to Protect Electronic Assets
Objective	This action will install grounding systems including but not limited to: lightning arresters, grounding rods, and grounding electrodes at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	Medium
Estimated Cost	Greater than \$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP
Responsible Department	Executive Board
Implementation Schedule	1 - 2 Years
Target	Existing and future infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High
Estimated Cost	Less than \$10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, TWDB
Responsible Department	Executive Board
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Appendix A – FIRM Maps



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NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for more information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **roadways** have been determined, users are encouraged to consult the **Flood Profiles and Floodway Data and/or Summary of Stillwater Elevation** tables contained within the **Flood Insurance Study (FIS)** report that accompanies this **FIRM**. Users should be aware that **BFEs** shown on the **FIRM** represent rounded whole-foot elevations. These **BFEs** are intended for flood insurance rating purposes and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the **FIS** report should be utilized in conjunction with the **FIRM** for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **Foodways** were computed at cross sections and interpolated between cross sections. The foodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Foodway widths and other pertinent foodway data are provided in the Flood Insurance Study report for this jurisdiction.

control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Texas State Plane central zone (FIPS 4203). The horizontal datum was NAD 83. Differences in datum, spheroid, projection, or State Plane zones used in the production of FIPMs for adjacent jurisdictions may result in small, nonuniform differences in area, boundary, and elevation.

Flood elevations on this map are referenced to the North American Vertical Datum of 1955. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geospatial Vertical Datum of 1929 and the North American Vertical Datum of 1955, visit the National Geospatial Survey website at <http://www.ngs.noaa.gov/vertical/>.

website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

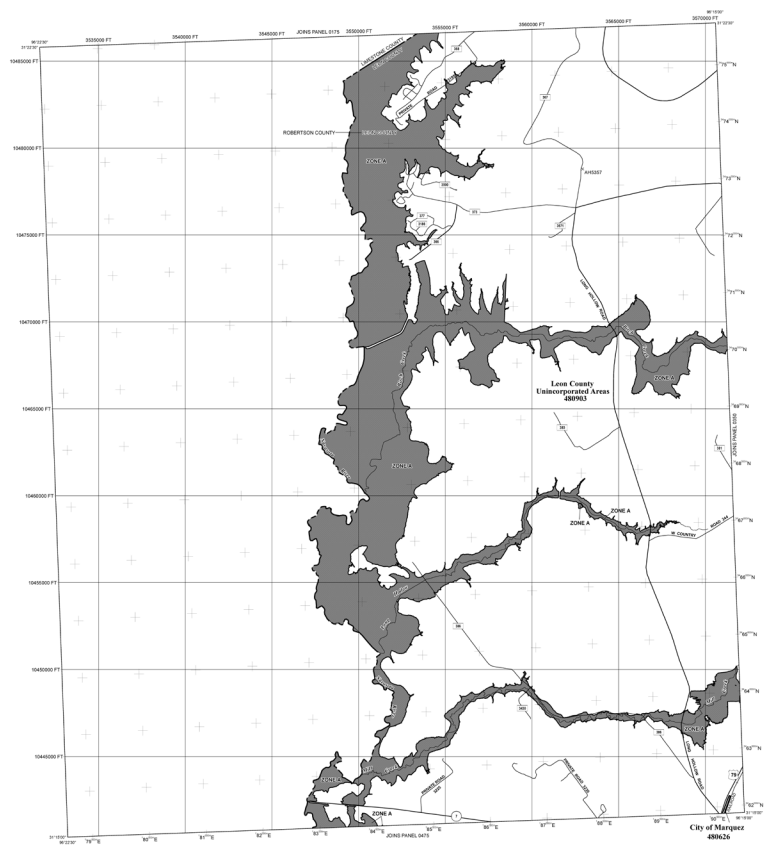
NGS Information Services
NCH&A, NNGS12
National Geodetic Survey
55MC-3, #9002
Silver Spring, MD 20910-2902

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geographic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Service Center (MSC) website at <http://natchesshema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

<http://www.fema.gov/businessinfo>



LEGEND

 SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

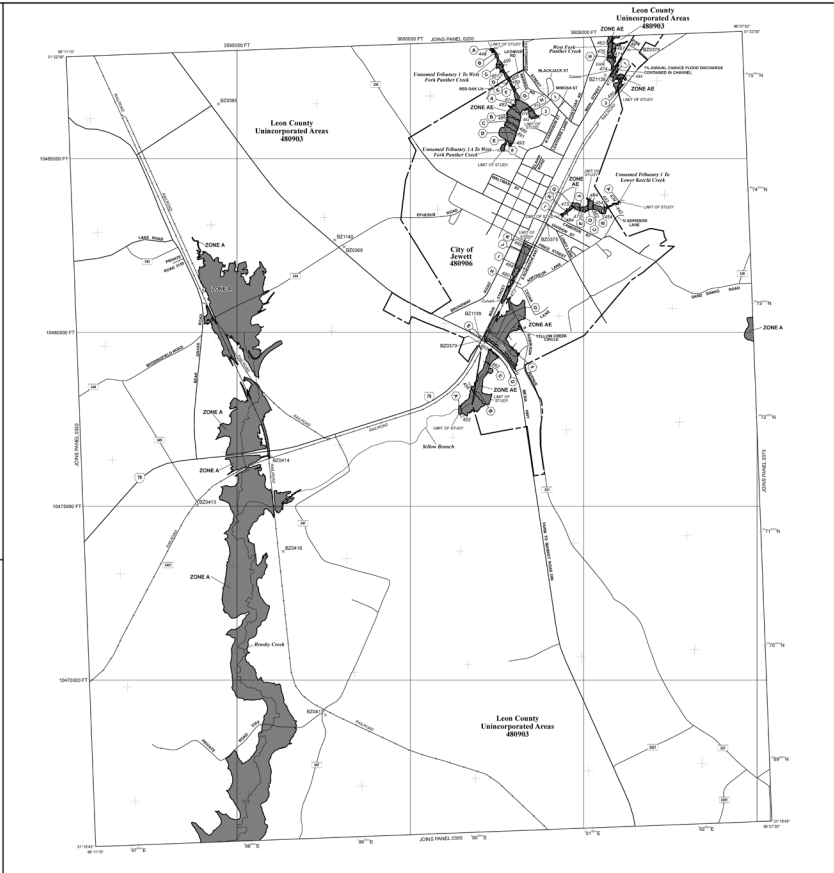
ZONE A	Area Flood Elevation determined.
ZONE AE	Base Flood Elevation determined.

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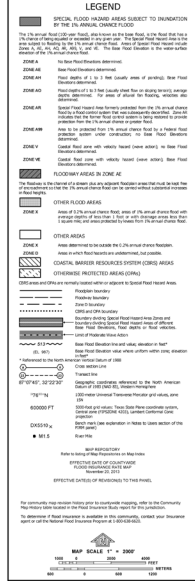
To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-438-6625.



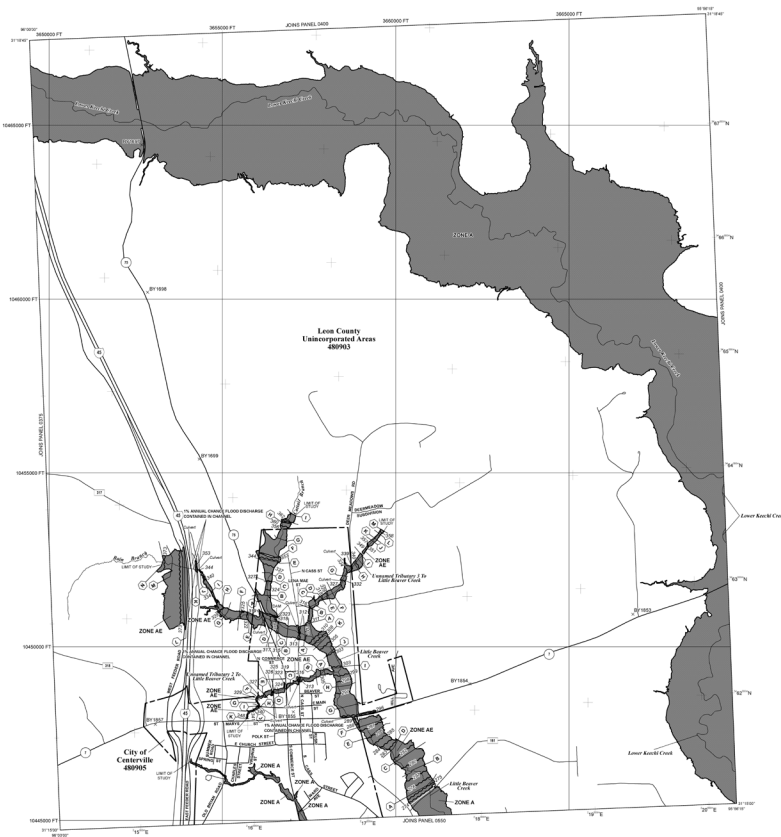
NATIONAL FLOOD INSURANCE PROGRAM	NFIP	PANEL 032SC
	FIRM	
	FLOOD INSURANCE RATE MAP	
	LEON COUNTY, TEXAS AND INCORPORATED AREAS	
	PANEL 125 OF 750	
	(SEE MAP INDEX FOR FIRM PANEL LAYOUT)	
	SUBMITTER:	DRAWN BY:
	DATE OF STUDY:	DATE:
	Note: In Order To Map Number shown above, all areas situated as shown on map are subject to the Community Rating System.	
	 MAP NUMBER A620001C3SC EFFECTIVE DATE NOVEMBER 20, 2013 Federal Emergency Management Agency	

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NATIONAL FLOOD INSURANCE PROGRAM 	PANEL 0339C			
	FIRM FLOOD INSURANCE RATE MAP			
	LEON COUNTY, TEXAS AND INCORPORATED AREAS			
	PANEL 335 OF 750 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)			
	COMMUNITY LEON COUNTY, TEXAS			
	COMMUNITY LEON COUNTY, TEXAS	SURFNO 00000	STATUS 000	SUFFIX 000
	Notice to Reader: This "Map Number" should always be used in conjunction with the community name shown above. The community name is the primary key to the Flood Insurance Rate Map. The community name should be used in all correspondence with the Federal Emergency Management Agency.			
	MAP NUMBER 462800339C			
	EFFECTIVE DATE NOVEMBER 26, 2013			
	Federal Emergency Management Agency			

[illegible]

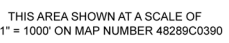
NATIONAL FLOOD INSURANCE PROGRAM	PANEL 0379C	
	FIRM	
	FLOOD INSURANCE RATE MAP	
	LEON COUNTY, TEXAS AND INCORPORATED AREAS	
	PANEL 375 OF 750	
	(SEE MAP INDEX FOR FIRM PANEL LAYOUT)	
	COMMUNITY:	
	SUBMIT DATE:	DATE:
	Notice to User: This Map Number/Zone Index should be used when ordering maps and Community Rating System information should be used for insurance applications to the National Flood Insurance Program.	
	 MAP NUMBER 48209C0379C EFFECTIVE DATE NOVEMBER 20, 2013	
Federal Emergency Management Agency		

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NATIONAL FLOOD INSURANCE PROGRAM 	PANEL 9390C	
	FIRM FLOOD INSURANCE RATE MAP	
	LEON COUNTY, TEXAS AND INCORPORATED AREAS	
	PANEL 399 OF 750 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)	
	COMMUNITY LEON COUNTY, TEXAS COMMUNITY ID# 0000000000	
	SURFACE LEON COUNTY, TEXAS SURFACE ID# 0000000000	SECTOR LEON COUNTY, TEXAS SECTOR ID# 0000000000
	Notes: This map is part of the "Firm Number" series, which is used to identify the community, surface, and sector. The community number is the first three digits of the firm number. The surface number is the next three digits. The sector number is the last three digits. The firm number is the sum of the community, surface, and sector numbers.	
		
	MAP NUMBER 48289C0390C	
	EFFECTIVE DATE NOVEMBER 20, 2013	

Federal Emergency Management Agency

[illegible]

- For community map revision history prior to courthouse mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.
- To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-426-6055.
- 

MAP SCALE 1" = 200'

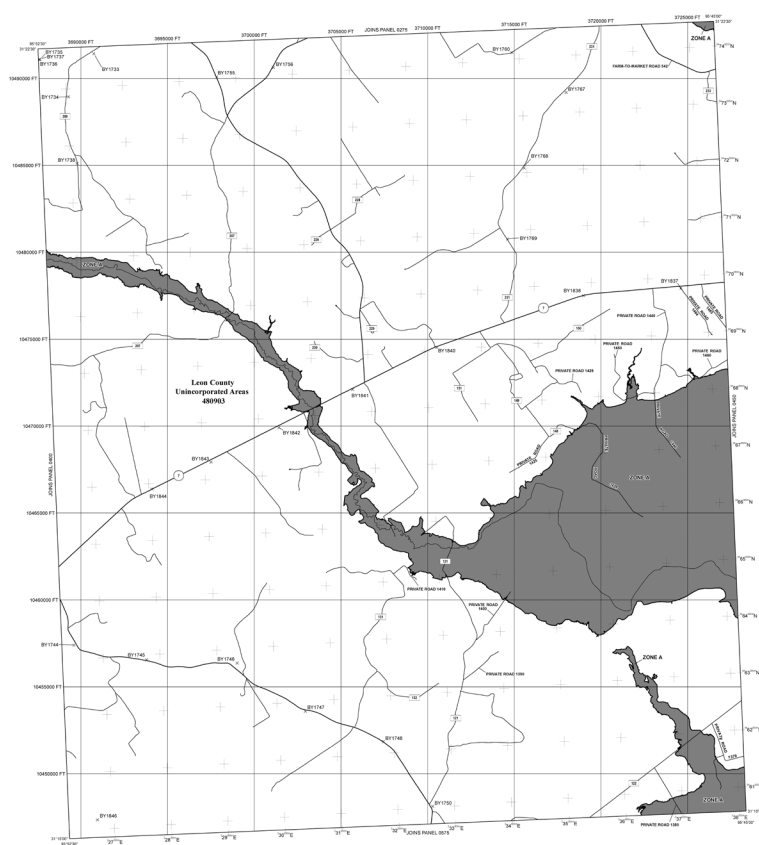
500	0	500	1000	1500
FOOT				
800	0	800	1200	
FEET				

NATIONAL FLOOD INSURANCE PROGRAM	FIRM			
	FLOOD INSURANCE RATE MA			
	LEON COUNTY,			
	TEXAS			
	AND INCORPORATED AREAS			
	LEON, 400 OF 750			
	(SEE MAP INDEX FOR FIRM PLAN LAYOUT)			
	SCHEDULE			
	COMMERCIAL	SUBJECT	DATE	
	INDUSTRY	ADDRESS	28C	

Note to Owner: The Map Number shown above should be used when placing your order for Commercial Flood Insurance. Please refer to the Map Number shown above when placing your order for Flood Insurance.

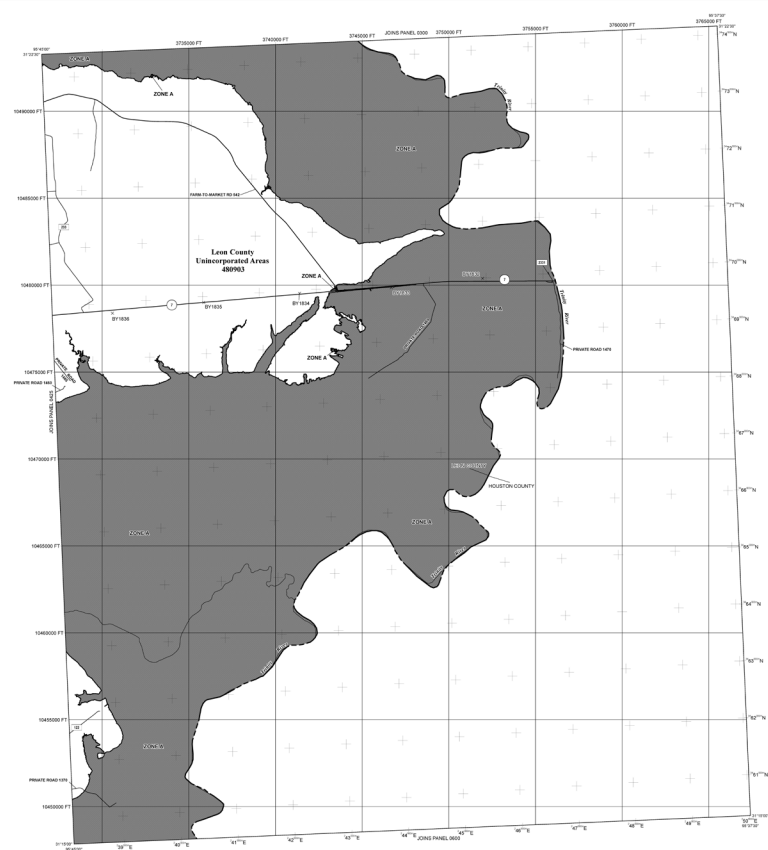
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	48289C400
	EFFECTIVE DATE
	NOVEMBER 20, 2011

Federal Emergency Management Agency

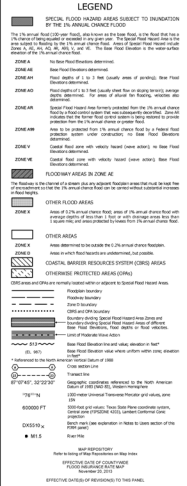
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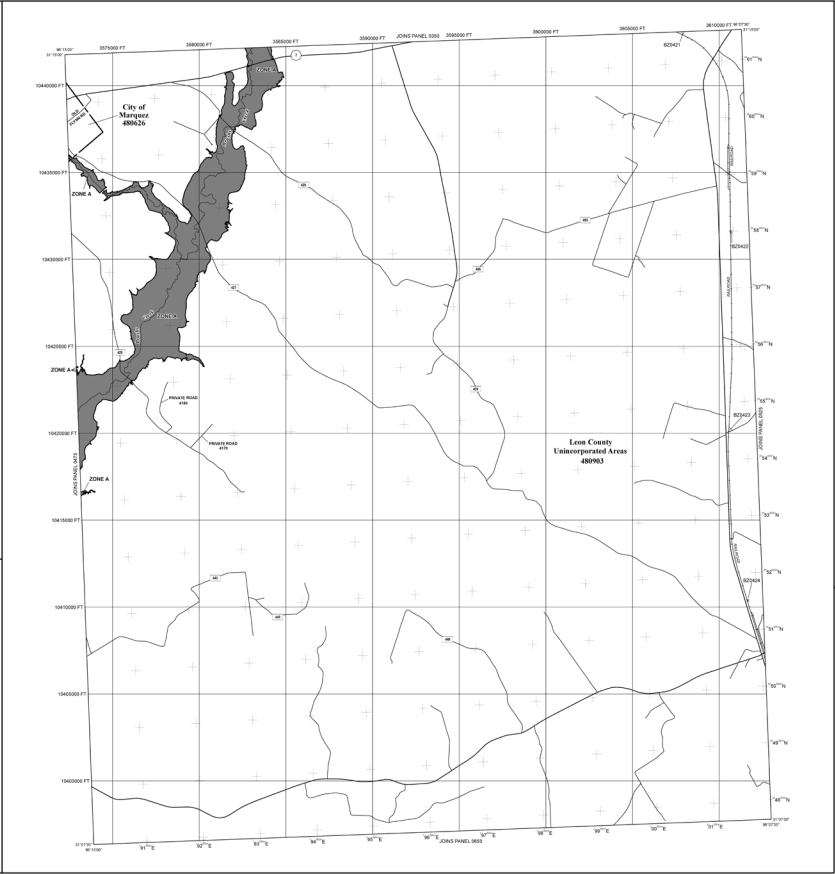
NFIP NATIONAL FLOOD INSURANCE PROGRAM	PANEL 0423C			
	FIRM FLOOD INSURANCE RATE MAP			
	LEON COUNTY, TEXAS AND INCORPORATED AREAS			
	PANEL 425 OF 750			
	(SEE MAP INDEX FOR FIRM PANEL LAYOUT)			
	SUBMITTER LEON COUNTY		DRAWN BY AECOM	
	DATE 08/02		STATUS 0000	
	Note to User: This Map Number (shown above) should be used to identify the Flood Insurance Rate Map (FIRM) panel shown on this map. The map number is not to be used for any other purpose.			
	 MAP NUMBER 0423C0423C EFFECTIVE DATE NOVEMBER 20, 2013			
	Federal Emergency Management Agency			

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NATIONAL FLOOD INSURANCE PROGRAM	PANEL 0450C	
	FIRM	
	FLOOD INSURANCE RATE MAP	
	LEON COUNTY, TEXAS AND INCORPORATED AREAS	
	PANEL 450 OF 750	
	(SEE MAP INDEX FOR FIRM PANEL SUFFIX)	
	COMMUNITY	SURFACE DRAIN DATES
	DISCONTINUITY	GROUP II
	Notice to User: This Map Number shown before should be used in conjunction with the Community Number shown after should be used in insurance applications for the National Flood Insurance Program.	
	 MAP NUMBER 4829C0450C EFFECTIVE DATE NOVEMBER 20, 2013	
Federal Emergency Management Agency		

[illegible]

NATIONAL FLOOD INSURANCE PROGRAM	PANEL 0479C			
	FIRM			
	FLOOD INSURANCE RATE MAP			
	LEON COUNTY, TEXAS AND INCORPORATED AREAS			
	PANEL 475 OF 750			
	(SEE MAP INDEX FOR FIRM PANEL LAYOUT)			
	COMMUNITY			
	COMMUNITY	SURFNO	PANEL	SURFNO
	COMMUNITY	NO. 1	NO. 2	NO. 3
	Notice to User: This Map Number shown below should be used when ordering maps and Community Number shown above should be used on insurance applications to the Federal Emergency Management Agency.			
		MAP NUMBER 4826900479C		
		EFFECTIVE DATE NOVEMBER 20, 2013		
Federal Emergency Management Agency				

[illegible]

LEGEND	
	SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION OF 1% TO 10% ANNUAL CHANCE FLOOD
The 1% annual flood (100-year flood) also known as the 100-year flood, is the flood that has a 1 percent chance of being equaled or exceeded in any given year. The 10% annual flood (10-year flood) is the flood that has a 10 percent chance of being equaled or exceeded in any given year. The flood elevation is the water surface elevation.	
	Zone A Special Flood Hazard Areas
	Zone B Special Flood Hazard Areas
	Zone C Special Flood Hazard Areas
	Zone D Special Flood Hazard Areas
	Zone E Special Flood Hazard Areas
	Zone F Special Flood Hazard Areas
	Zone G Special Flood Hazard Areas
	Zone H Special Flood Hazard Areas
	Zone I Special Flood Hazard Areas
	Zone J Special Flood Hazard Areas
	Zone K Special Flood Hazard Areas
	Zone L Special Flood Hazard Areas
	Zone M Special Flood Hazard Areas
	Zone N Special Flood Hazard Areas
	Zone O Special Flood Hazard Areas
	Zone P Special Flood Hazard Areas
	Zone Q Special Flood Hazard Areas
	Zone R Special Flood Hazard Areas
	Zone S Special Flood Hazard Areas
	Zone T Special Flood Hazard Areas
	Zone U Special Flood Hazard Areas
	Zone V Special Flood Hazard Areas
	Zone W Special Flood Hazard Areas
	Zone X Special Flood Hazard Areas
	Zone Y Special Flood Hazard Areas
	Zone Z Special Flood Hazard Areas
	Zone AA Special Flood Hazard Areas
	Zone AB Special Flood Hazard Areas
	Zone AC Special Flood Hazard Areas
	Zone AD Special Flood Hazard Areas
	Zone AE Special Flood Hazard Areas
	Zone AF Special Flood Hazard Areas
	Zone AG Special Flood Hazard Areas
	Zone AH Special Flood Hazard Areas
	Zone AI Special Flood Hazard Areas
	Zone AJ Special Flood Hazard Areas
	Zone AK Special Flood Hazard Areas
	Zone AL Special Flood Hazard Areas
	Zone AM Special Flood Hazard Areas
	Zone AN Special Flood Hazard Areas
	Zone AO Special Flood Hazard Areas
	Zone AP Special Flood Hazard Areas
	Zone AQ Special Flood Hazard Areas
	Zone AR Special Flood Hazard Areas
	Zone AS Special Flood Hazard Areas
	Zone AT Special Flood Hazard Areas
	Zone AU Special Flood Hazard Areas
	Zone AV Special Flood Hazard Areas
	Zone AW Special Flood Hazard Areas
	Zone AX Special Flood Hazard Areas
	Zone AY Special Flood Hazard Areas
	Zone AZ Special Flood Hazard Areas
	Zone BA Special Flood Hazard Areas
	Zone BB Special Flood Hazard Areas
	Zone BC Special Flood Hazard Areas
	Zone BD Special Flood Hazard Areas
	Zone BE Special Flood Hazard Areas
	Zone BF Special Flood Hazard Areas
	Zone BG Special Flood Hazard Areas
	Zone BH Special Flood Hazard Areas
	Zone BI Special Flood Hazard Areas
	Zone BJ Special Flood Hazard Areas
	Zone BK Special Flood Hazard Areas
	Zone BL Special Flood Hazard Areas
	Zone BM Special Flood Hazard Areas
	Zone BN Special Flood Hazard Areas
	Zone BO Special Flood Hazard Areas
	Zone BP Special Flood Hazard Areas
	Zone BQ Special Flood Hazard Areas
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	Zone BW Special Flood Hazard Areas
	Zone BX Special Flood Hazard Areas
	Zone BY Special Flood Hazard Areas
	Zone BZ Special Flood Hazard Areas
	Zone CA Special Flood Hazard Areas
	Zone CB Special Flood Hazard Areas
	Zone CC Special Flood Hazard Areas
	Zone CD Special Flood Hazard Areas
	Zone CE Special Flood Hazard Areas
	Zone CF Special Flood Hazard Areas
	Zone CG Special Flood Hazard Areas
	Zone CH Special Flood Hazard Areas
	Zone CI Special Flood Hazard Areas
	Zone CJ Special Flood Hazard Areas
	Zone CK Special Flood Hazard Areas
	Zone CL Special Flood Hazard Areas
	Zone CM Special Flood Hazard Areas
	Zone CN Special Flood Hazard Areas
	Zone CO Special Flood Hazard Areas
	Zone CP Special Flood Hazard Areas
	Zone CQ Special Flood Hazard Areas
	Zone CR Special Flood Hazard Areas
	Zone CS Special Flood Hazard Areas
	Zone CT Special Flood Hazard Areas
	Zone CU Special Flood Hazard Areas
	Zone CV Special Flood Hazard Areas
	Zone CW Special Flood Hazard Areas
	Zone CX Special Flood Hazard Areas
	Zone CY Special Flood Hazard Areas
	Zone CZ Special Flood Hazard Areas
	Zone DA Special Flood Hazard Areas
	Zone DB Special Flood Hazard Areas
	Zone DC Special Flood Hazard Areas
	Zone DD Special Flood Hazard Areas
	Zone DE Special Flood Hazard Areas
	Zone DF Special Flood Hazard Areas
	Zone DG Special Flood Hazard Areas
	Zone DH Special Flood Hazard Areas
	Zone DI Special Flood Hazard Areas
	Zone DJ Special Flood Hazard Areas
	Zone DK Special Flood Hazard Areas
	Zone DL Special Flood Hazard Areas
	Zone DM Special Flood Hazard Areas
	Zone DN Special Flood Hazard Areas
	Zone DO Special Flood Hazard Areas
	Zone DP Special Flood Hazard Areas

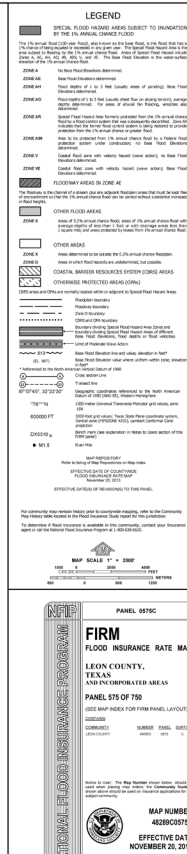
[illegible][illegible]

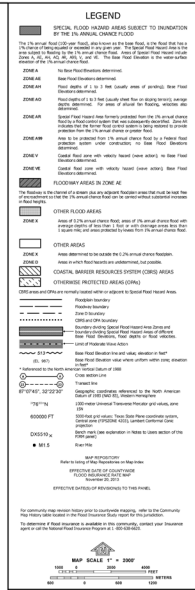
NATIONAL FLOOD INSURANCE PROGRAM	PANEL 0825C			
	FIRM			
	FLOOD INSURANCE RATE MAP			
	LEON COUNTY, TEXAS AND INCORPORATED AREAS			
	MAP 525 OF 750			
	COMMUNITY INDEX FOR FIRM PANEL LAYOUT			
	COMMUNITY			
	NUMBER		SUFFIX	
	IDENTIFICATION		AREA	
	MAP NUMBER 48229C0825C			
EFFECTIVE DATE NOVEMBER 26, 2013				
Federal Emergency Management Agency				

[illegible]

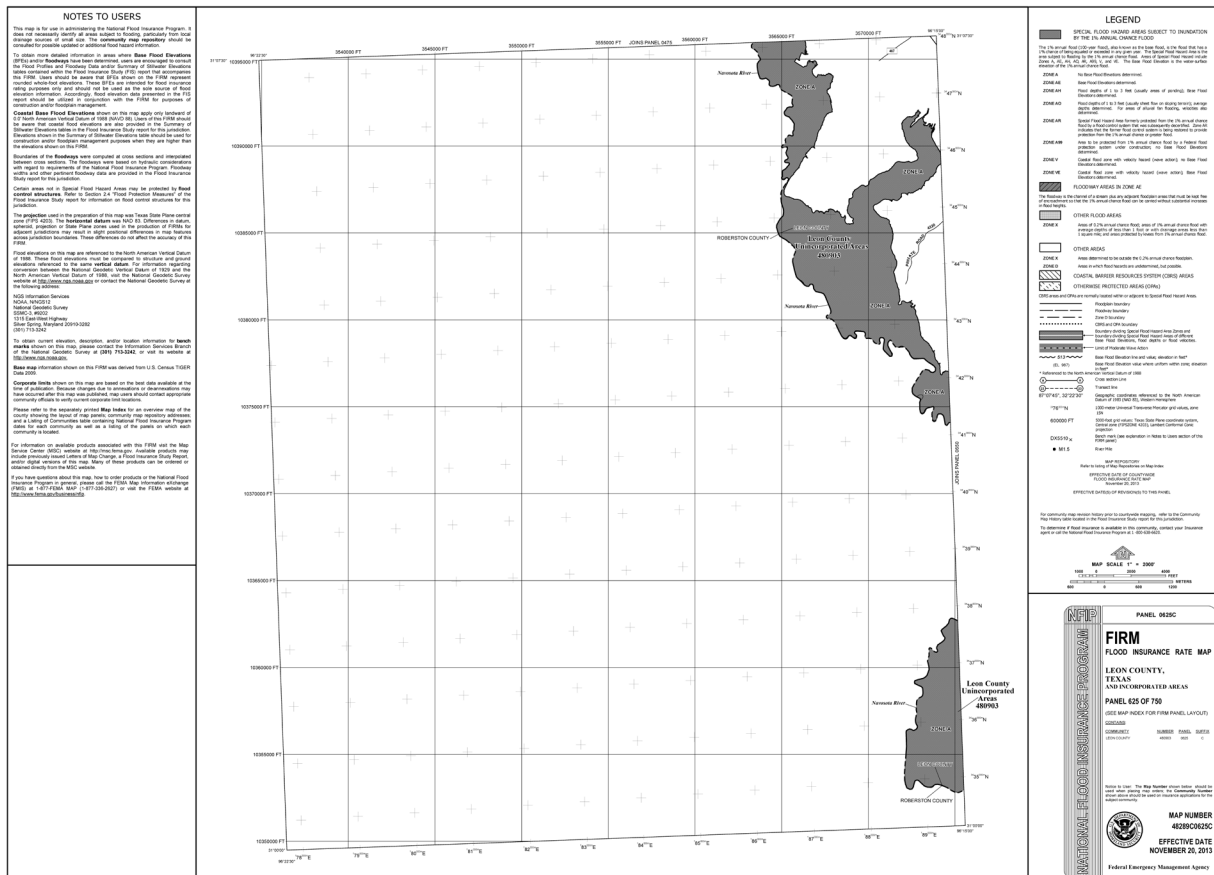
- [illegible]

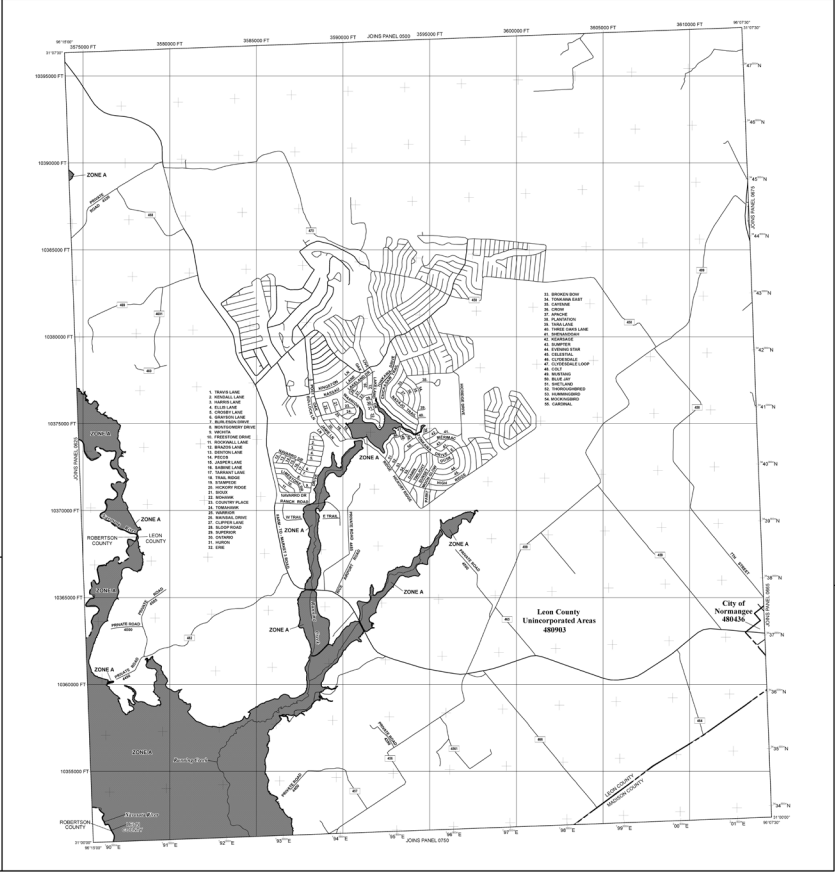
NATIONAL FLOOD INSURANCE PROGRAM	PANEL 0540C			
	FIRM			
	FLOOD INSURANCE RATE MAP			
	LEON COUNTY, TEXAS AND INCORPORATED AREAS			
	PANEL 540 OF 750			
	(SEE MAP INDEX FOR FIRM PANEL LAYOUT)			
	COORDINATES			
	COUNTY		NORTHER	PANEL
	LEON COUNTY		0540	0540C
	SECTION		SUFFIX	
Notice to User: The Map Number shown below should be used to obtain the Flood Insurance Rate Map for the community shown on this map. The community shown on this map is not necessarily the community shown on the insurance application. For the community shown on the insurance application, the community shown on the insurance application should be used.				
		MAP NUMBER 42B90C0540C		
		EFFECTIVE DATE NOVEMBER 20, 2013		

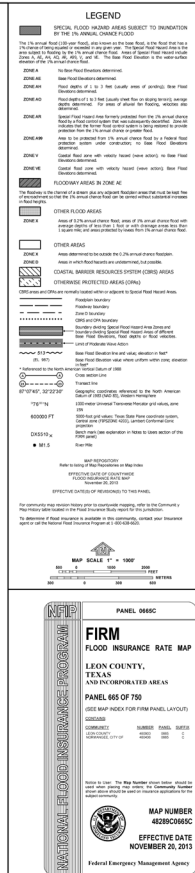
[illegible]

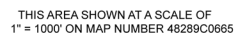
[illegible]

292



[illegible][illegible]

[illegible]

[illegible]

- NFP**

PANEL 0679C

FIRM

FLOOD INSURANCE RATE MA
LEON COUNTY,
TEXAS
AND INCORPORATED AREAS

PANEL 675 OF 750

SEE MAP INDEX FOR FIRM PANEL LAYOUT

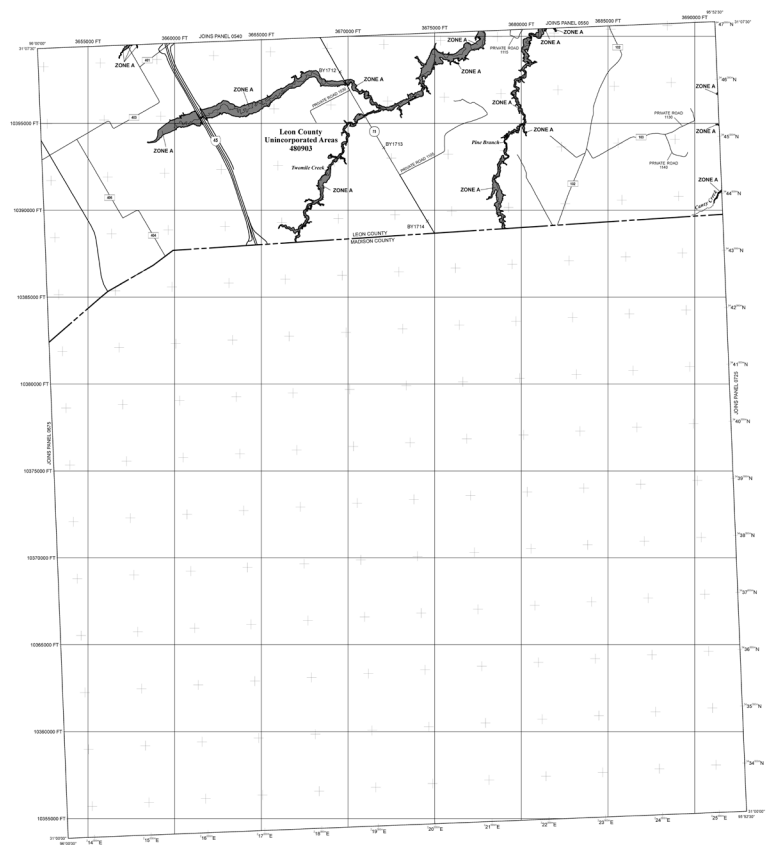
COMMUNITY		SUBMITAL	DATES
COUNTY	CITY/TOWN	MONTH	DATE

Note: In 2007, The Map Number column labels were changed from "Panel" to "Community".
 Note: In 2007, the Flood Insurance Rate Panel numbers were changed from "FIRM" to "Community".
 See legend for more information.

MAP NUMBER
48289C675

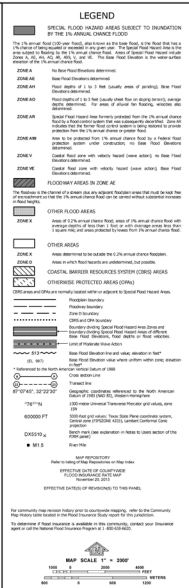
EFFECTIVE DATE
NOVEMBER 20, 2011

Federal Emergency Management Agency

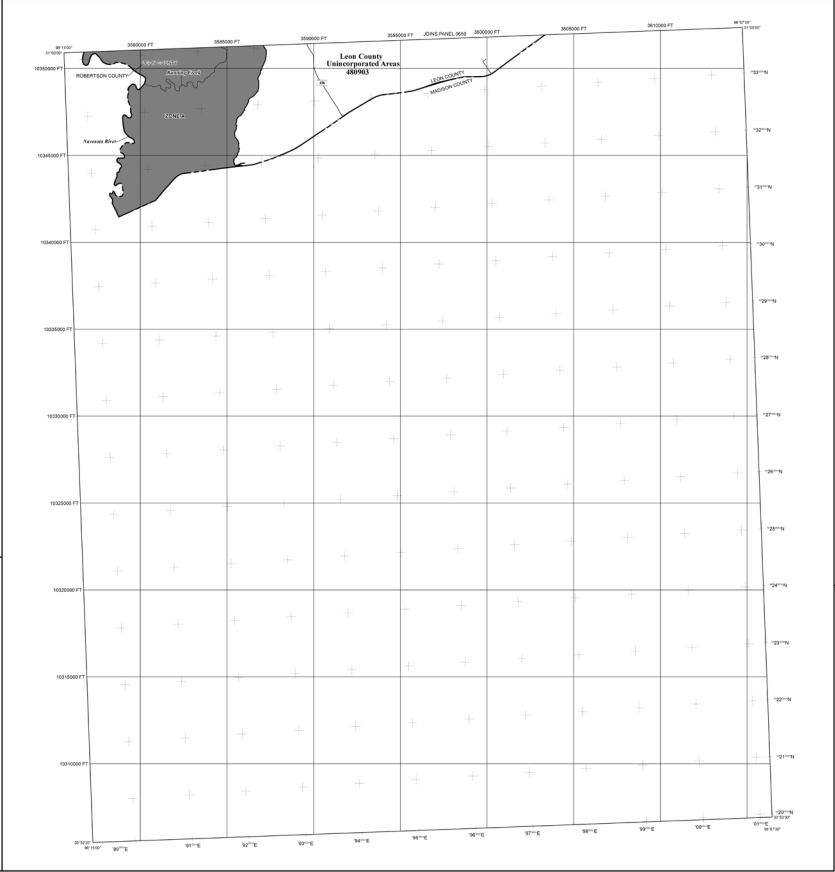
[illegible]

- [illegible]

NATIONAL FLOOD INSURANCE PROGRAM	PANEL 0700C	
	FIRM	
	FLOOD INSURANCE RATE MAP	
	LEON COUNTY, TEXAS AND INCORPORATED AREAS	
	PANEL 700 OF 750	
	(SEE MAP INDEX FOR FIRM PANEL LAYOUT)	
	COMMUNITY	SUBMIT PANEL, SHEET
	COMMUNITY	DATE
	Notice to User: This Map Number/Sheet Index should be used when ordering maps and Community Rating System information should be used in conjunction with the map number/panel index to obtain the information applicable to the community.	
		MAP NUMBER 48269C0700C EFFECTIVE DATE NOVEMBER 20, 2013
Federal Emergency Management Agency		

[illegible]

298

[illegible]

LEGEND	
SPECIAL RISKS INSUREE ARE SUBJECT TO DEDUCTION OF THE FOLLOWING COINSURE FUND	
The 10% amount (20% for RISK) also can be used to fund the RISK. The RISK fund is the water column of the RISK. The RISK fund is the water column of the RISK. The RISK fund is the water column of the RISK.	
2000A	10% RISK INSUREE FUND
2000B	10% RISK INSUREE FUND
2000C	10% RISK INSUREE FUND
2000D	10% RISK INSUREE FUND
2000E	10% RISK INSUREE FUND
2000F	10% RISK INSUREE FUND
2000G	10% RISK INSUREE FUND
2000H	10% RISK INSUREE FUND
2000I	10% RISK INSUREE FUND
2000J	10% RISK INSUREE FUND
2000K	10% RISK INSUREE FUND
2000L	10% RISK INSUREE FUND
2000M	10% RISK INSUREE FUND
2000N	10% RISK INSUREE FUND
2000O	10% RISK INSUREE FUND
2000P	10% RISK INSUREE FUND
2000Q	10% RISK INSUREE FUND
2000R	10% RISK INSUREE FUND
2000S	10% RISK INSUREE FUND
2000T	10% RISK INSUREE FUND
2000U	10% RISK INSUREE FUND
2000V	10% RISK INSUREE FUND
2000W	10% RISK INSUREE FUND
2000X	10% RISK INSUREE FUND
2000Y	10% RISK INSUREE FUND
2000Z	10% RISK INSUREE FUND
2000AA	10% RISK INSUREE FUND
2000AB	10% RISK INSUREE FUND
2000AC	10% RISK INSUREE FUND
2000AD	10% RISK INSUREE FUND
2000AE	10% RISK INSUREE FUND
2000AF	10% RISK INSUREE FUND
2000AG	10% RISK INSUREE FUND
2000AH	10% RISK INSUREE FUND
2000AI	10% RISK INSUREE FUND
2000AJ	10% RISK INSUREE FUND
2000AK	10% RISK INSUREE FUND
2000AL	10% RISK INSUREE FUND
2000AM	10% RISK INSUREE FUND
2000AN	10% RISK INSUREE FUND
2000AO	10% RISK INSUREE FUND
2000AP	10% RISK INSUREE FUND
2000AQ	10% RISK INSUREE FUND
2000AR	10% RISK INSUREE FUND
2000AS	10% RISK INSUREE FUND
2000AT	10% RISK INSUREE FUND
2000AU	10% RISK INSUREE FUND
2000AV	10% RISK INSUREE FUND
2000AW	10% RISK INSUREE FUND
2000AX	10% RISK INSUREE FUND
2000AY	10% RISK INSUREE FUND
2000AZ	10% RISK INSUREE FUND
2000BA	10% RISK INSUREE FUND
2000BB	10% RISK INSUREE FUND
2000BC	10% RISK INSUREE FUND
2000BD	10% RISK INSUREE FUND
2000BE	10% RISK INSUREE FUND
2000BF	10% RISK INSUREE FUND
2000BG	10% RISK INSUREE FUND
2000BH	10% RISK INSUREE FUND
2000BI	10% RISK INSUREE FUND
2000BJ	10% RISK INSUREE FUND
2000BK	10% RISK INSUREE FUND
2000BL	10% RISK INSUREE FUND
2000BM	10% RISK INSUREE FUND
2000BN	10% RISK INSUREE FUND
2000BO	10% RISK INSUREE FUND
2000BP	10% RISK INSUREE FUND
2000BQ	10% RISK INSUREE FUND
2000BR	10% RISK INSUREE FUND
2000BS	10% RISK INSUREE FUND
2000BT	10% RISK INSUREE FUND
2000BU	10% RISK INSUREE FUND
2000BV	10% RISK INSUREE FUND
2000BW	10% RISK INSUREE FUND
2000BX	10% RISK INSUREE FUND
2000BY	10% RISK INSUREE FUND
2000BZ	10% RISK INSUREE FUND
2000CA	10% RISK INSUREE FUND
2000CB	10% RISK INSUREE FUND
2000CC	10% RISK INSUREE FUND
2000CD	10% RISK INSUREE FUND
2000CE	10% RISK INSUREE FUND
2000CF	10% RISK INSUREE FUND
2000CG	10% RISK INSUREE FUND
2000CH	10% RISK INSUREE FUND
2000CI	10% RISK INSUREE FUND
2000CJ	10% RISK INSUREE FUND
2000CK	10% RISK INSUREE FUND
2000CL	10% RISK INSUREE FUND
2000CM	10% RISK INSUREE FUND
2000CN	10% RISK INSUREE FUND
2000CO	10% RISK INSUREE FUND
2000CP	10% RISK INSUREE FUND
2000CQ	10% RISK INSUREE FUND
2000CR	10% RISK INSUREE FUND
2000CS	10% RISK INSUREE FUND
2000CT	10% RISK INSUREE FUND
2000CU	10% RISK INSUREE FUND
2000CV	10% RISK INSUREE FUND
2000CW	10% RISK INSUREE FUND
2000CX	10% RISK INSUREE FUND
2000CY	10% RISK INSUREE FUND
2000CZ	10% RISK INSUREE FUND
2000DA	10% RISK INSUREE FUND
2000DB	10% RISK INSUREE FUND
2000DC	10% RISK INSUREE FUND
2000DD	10% RISK INSUREE FUND
2000DE	10% RISK INSUREE FUND
2000DF	10% RISK INSUREE FUND
2000DG	10% RISK INSUREE FUND
2000DH	10% RISK INSUREE FUND
2000DI	10% RISK INSUREE FUND
2000DJ	10% RISK INSUREE FUND
2000DK	10% RISK INSUREE FUND

[illegible]

- NFIP**

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0020C

FIRM

FLOOD INSURANCE RATE MAP

**LEON COUNTY,
TEXAS
AND INCORPORATED AREAS**

PANEL 25 OF 750

(SEE MAP INDEX FOR FIRM PANEL, LAYOUT)

COMMUNITY	NUMBER	FEED	REDA
1200000000	0000	0000	0

Notes to Users: This Map Number and Panel should be used in conjunction with the Flood Insurance Rate Map (FIRM) to determine the flood insurance requirements for the community. For more information, see the Flood Insurance Manual, 1993 Edition, published by the Federal Emergency Management Agency.

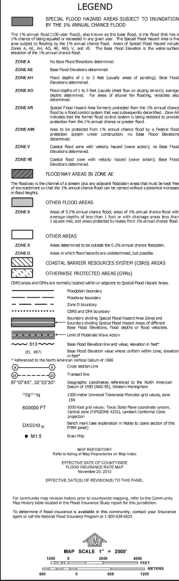


MAP NUMBER
4820C0020C

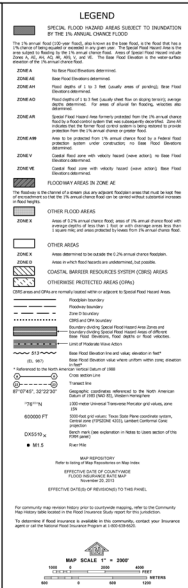
EFFECTIVE DATE
NOVEMBER 20, 2013

Federal Emergency Management Agency

[illegible][illegible]

[illegible]

NATIONAL FLOOD INSURANCE PROGRAM	PANEL 00795C	
	FIRM	
	FLOOD INSURANCE RATE MAP	
	LEON COUNTY,	
	TEXAS	
	AND INCORPORATED AREAS	
	PANEL 75 OF 750	
	(SEE MAP INDEX FOR FIRM PANEL LAYOUT)	
	COMMUNITY:	
	COUNTY: NUMBER PANEL SURFET	
ALTERNATE: AREA: 0		
Notice to User: This Map Number shown below should be used when ordering maps from the Government Printing Office. This number should be used on insurance applications to the National Flood Insurance Program.		
		
MAP NUMBER		
48209000795C		
EFFECTIVE DATE		
NOVEMBER 20, 2013		
Federal Emergency Management Agency		

[illegible]

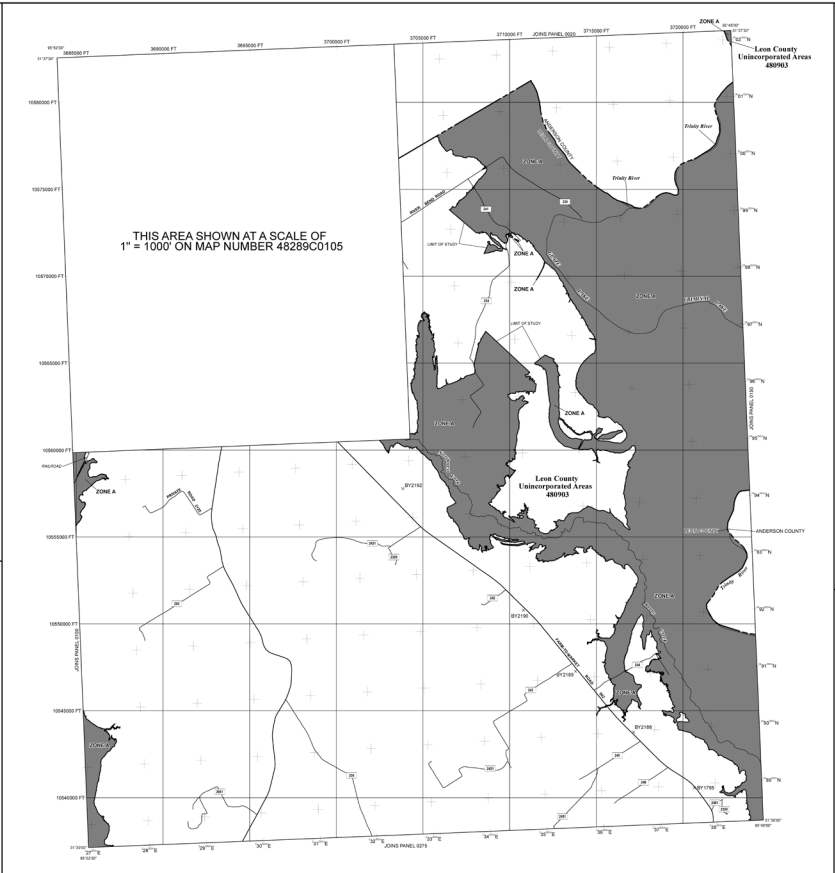
304

[illegible]

-
- A map of the study area showing the location of Oakwood (480-437) and the intersection of Oak Street and Jones Creek. The map includes a dashed line for Oak Street, a solid line for Jones Creek, and a solid line for Oakwood. A north arrow is present in the upper right corner.

[illegible]

NATIONAL FLOOD INSURANCE PROGRAM	PANEL 01050C			
	FIRM			
	FLOOD INSURANCE RATE MAP			
	LEON COUNTY,			
	TEXAS			
	AND INCORPORATED AREAS			
	PANEL 105 OF 750			
	(SEE MAP KEY FOR FIRM PANEL LAYOUT)			
	COVERAGE			
	CURRENT	SURFACE	WATER	SEWER
100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	100% 100% 100% 100%	
Notice to User: The Map Number shown above should be used to identify the map for the National Flood Insurance Program. The map number shown above should be used on insurance applications.				
		MAP NUMBER 42B05C105C		
		EFFECTIVE DATE NOVEMBER 20, 2013		
Federal Emergency Management Agency				

[illegible][illegible]

[illegible]

- | | | |
|--|--|---------------|
| NFIP
NATIONAL FLOOD INSURANCE PROGRAM | PANEL C1500C | |
| | FIRM
FLOOD INSURANCE RATE MAP | |
| LEON COUNTY,
TEXAS
AND INCORPORATED AREAS | | |
| PANEL 150 OF 750 | | |
| SEE MAP INDEX FOR FIRM PANEL LAYOUT | | |
| COMMUNITY: | | |
| 4200-000007 | NUMBER: | PAGES: |
| | | |

Before a Flood: The Map Number shown below applies for areas when planning flood insurance. The Community Number above shows additional panels in insurance applications for the subject community.

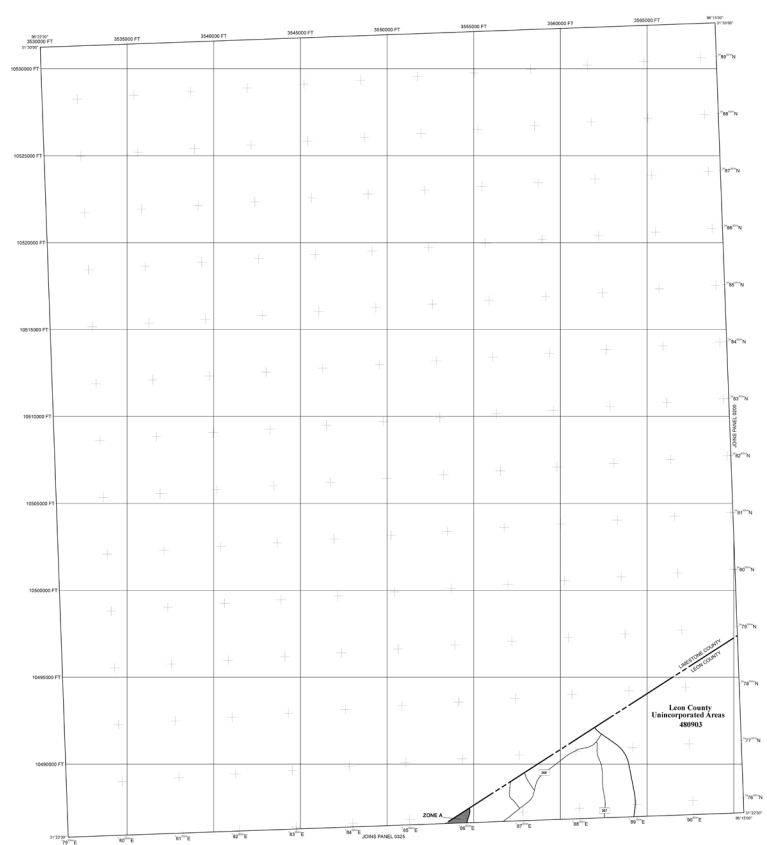


MAP NUMBER

42690C1500C

EFFECTIVE DATE

NOVEMBER 20, 2013

[illegible]

- LEGEND**

SECTION 1: GENERAL INFORMATION

1. PROJECT NAME: _____

2. PROJECT LOCATION: _____

3. PROJECT DESCRIPTION: _____

4. PROJECT OWNER: _____

5. PROJECT MANAGER: _____

6. PROJECT BUDGET: _____

7. PROJECT RISK: _____

8. PROJECT STATUS: _____

9. PROJECT PHASE: _____

10. PROJECT START DATE: _____

11. PROJECT END DATE: _____

12. PROJECT COMPLETION DATE: _____

13. PROJECT DELIVERABLES: _____

14. PROJECT RISKS: _____

15. PROJECT CHANGES: _____

16. PROJECT ISSUES: _____

17. PROJECT COMMENTS: _____

18. PROJECT SIGNATURE: _____

19. PROJECT DATE: _____

20. PROJECT VERSION: _____

21. PROJECT REVISIONS: _____

22. PROJECT APPROVAL: _____

23. PROJECT REVIEW: _____

24. PROJECT AUDIT: _____

25. PROJECT EVALUATION: _____

26. PROJECT IMPROVEMENT: _____

27. PROJECT LESSONS LEARNED: _____

28. PROJECT BEST PRACTICES: _____

29. PROJECT CASE STUDY: _____

30. PROJECT REFERENCE: _____

31. PROJECT CONTACT: _____

32. PROJECT WEBSITE: _____

33. PROJECT SOCIAL MEDIA: _____

34. PROJECT BLOG: _____

35. PROJECT NEWSLETTER: _____

36. PROJECT JOURNAL: _____

37. PROJECT DIARY: _____

38. PROJECT MEMO: _____

39. PROJECT REPORT: _____

40. PROJECT STUDY: _____

41. PROJECT ANALYSIS: _____

42. PROJECT RESEARCH: _____

43. PROJECT DEVELOPMENT: _____

44. PROJECT TESTING: _____

45. PROJECT DEPLOYMENT: _____

46. PROJECT MAINTENANCE: _____

47. PROJECT SUPPORT: _____

48. PROJECT TRAINING: _____

49. PROJECT DOCUMENTATION: _____

50. PROJECT ARCHIVE: _____

51. PROJECT BACKUP: _____

52. PROJECT RESTORE: _____

53. PROJECT MIGRATION: _____

54. PROJECT UPGRADE: _____

55. PROJECT DOWNGRADE: _____

56. PROJECT ROLLBACK: _____

57. PROJECT CANCEL: _____

58. PROJECT SUSPEND: _____

59. PROJECT RESUME: _____

60. PROJECT RESTART: _____

61. PROJECT REBUILD: _____

62. PROJECT REPAIR: _____

63. PROJECT REPLACE: _____

64. PROJECT REMOVE: _____

65. PROJECT ADD: _____

66. PROJECT UPDATE: _____

67. PROJECT DELETE: _____

68. PROJECT INSERT: _____

69. PROJECT MOVE: _____

70. PROJECT COPY: _____

71. PROJECT PASTE: _____

72. PROJECT CUT: _____

73. PROJECT DRAG: _____

74. PROJECT DROP: _____

75. PROJECT ZOOM: _____

76. PROJECT PAN: _____

77. PROJECT ROTATE: _____

78. PROJECT SCALE: _____

79. PROJECT TRANSLATE: _____

80. PROJECT REFLECT: _____

81. PROJECT SKETCH: _____

82. PROJECT ERASE: _____

83. PROJECT LAYER: _____

84. PROJECT GROUP: _____

85. PROJECT UNGROUP: _____

86. PROJECT LOCK: _____

87. PROJECT UNLOCK: _____

88. PROJECT HIDE: _____

89. PROJECT UNHIDE: _____

90. PROJECT SELECT: _____

91. PROJECT Deselect: _____

92. PROJECT Zoom In: _____

93. PROJECT Zoom Out: _____

94. PROJECT Fit: _____

95. PROJECT Full Screen: _____

96. PROJECT Exit: _____

97. PROJECT Help: _____

98. PROJECT About: _____

99. PROJECT Settings: _____

100. PROJECT Preferences: _____

101. PROJECT Options: _____

102. PROJECT Tools: _____

103. PROJECT Palettes: _____

104. PROJECT Panels: _____

105. PROJECT Windows: _____

106. PROJECT Menus: _____

107. PROJECT Buttons: _____

108. PROJECT Icons: _____

109. PROJECT Cursors: _____

110. PROJECT Shortcuts: _____

111. PROJECT Keyboard: _____

112. PROJECT Mouse: _____

113. PROJECT Touch: _____

114. PROJECT Voice: _____

115. PROJECT Gesture: _____

116. PROJECT Command: _____

117. PROJECT Action: _____

118. PROJECT Event: _____

119. PROJECT Trigger: _____

120. PROJECT Condition: _____

121. PROJECT Loop: _____

122. PROJECT Branch: _____

123. PROJECT Merge: _____

124. PROJECT Join: _____

125. PROJECT Split: _____

126. PROJECT Fork: _____

127. PROJECT Join: _____

128. PROJECT End: _____

129. PROJECT Start: _____

130. PROJECT Run: _____

131. PROJECT Stop: _____

132. PROJECT Pause: _____

133. PROJECT Play: _____

134. PROJECT Reset: _____

135. PROJECT Reload: _____

136. PROJECT Save: _____

137. PROJECT Load: _____

138. PROJECT Open: _____

139. PROJECT Close: _____

140. PROJECT Print: _____

141. PROJECT Export: _____

142. PROJECT Import: _____

143. PROJECT Copy: _____

144. PROJECT Paste: _____

145. PROJECT Cut: _____

146. PROJECT Undo: _____

147. PROJECT Redo: _____

148. PROJECT Undo: _____

149. PROJECT Redo: _____

150. PROJECT Undo: _____

151. PROJECT Redo: _____

152. PROJECT Undo: _____

153. PROJECT Redo: _____

154. PROJECT Undo: _____

155. PROJECT Redo: _____

156. PROJECT Undo: _____

157. PROJECT Redo: _____

158. PROJECT Undo: _____

159. PROJECT Redo: _____

160. PROJECT Undo: _____

161. PROJECT Redo: _____

162. PROJECT Undo: _____

163. PROJECT Redo: _____

164. PROJECT Undo: _____

165. PROJECT Redo: _____

166. PROJECT Undo: _____

167. PROJECT Redo: _____

168. PROJECT Undo: _____

169. PROJECT Redo: _____

170. PROJECT Undo: _____

171. PROJECT Redo: _____

172. PROJECT Undo: _____

173. PROJECT Redo: _____

174. PROJECT Undo: _____

175. PROJECT Redo: _____

176. PROJECT Undo: _____

177. PROJECT Redo: _____

178. PROJECT Undo: _____

179. PROJECT Redo: _____

180. PROJECT Undo: _____

181. PROJECT Redo: _____

182. PROJECT Undo: _____

183. PROJECT Redo: _____

184. PROJECT Undo: _____

185. PROJECT Redo: _____

186. PROJECT Undo: _____

187. PROJECT Redo: _____

188. PROJECT Undo: _____

189. PROJECT Redo: _____

190. PROJECT Undo: _____

191. PROJECT Redo: _____

192. PROJECT Undo: _____

193. PROJECT Redo: _____

194. PROJECT Undo: _____

195. PROJECT Redo: _____

196. PROJECT Undo: _____

197. PROJECT Redo: _____

198. PROJECT Undo: _____

199. PROJECT Redo: _____

200. PROJECT Undo: _____

201. PROJECT Redo: _____

202. PROJECT Undo: _____

203. PROJECT Redo: _____

204. PROJECT Undo: _____

205. PROJECT Redo: _____

206. PROJECT Undo: _____

207. PROJECT Redo: _____

208. PROJECT Undo: _____

209. PROJECT Redo: _____

210. PROJECT Undo: _____

211. PROJECT Redo: _____

212. PROJECT Undo: _____

213. PROJECT Redo: _____

214. PROJECT Undo: _____

215. PROJECT Redo: _____

216. PROJECT Undo: _____

217. PROJECT Redo: _____

218. PROJECT Undo: _____

219. PROJECT Redo: _____

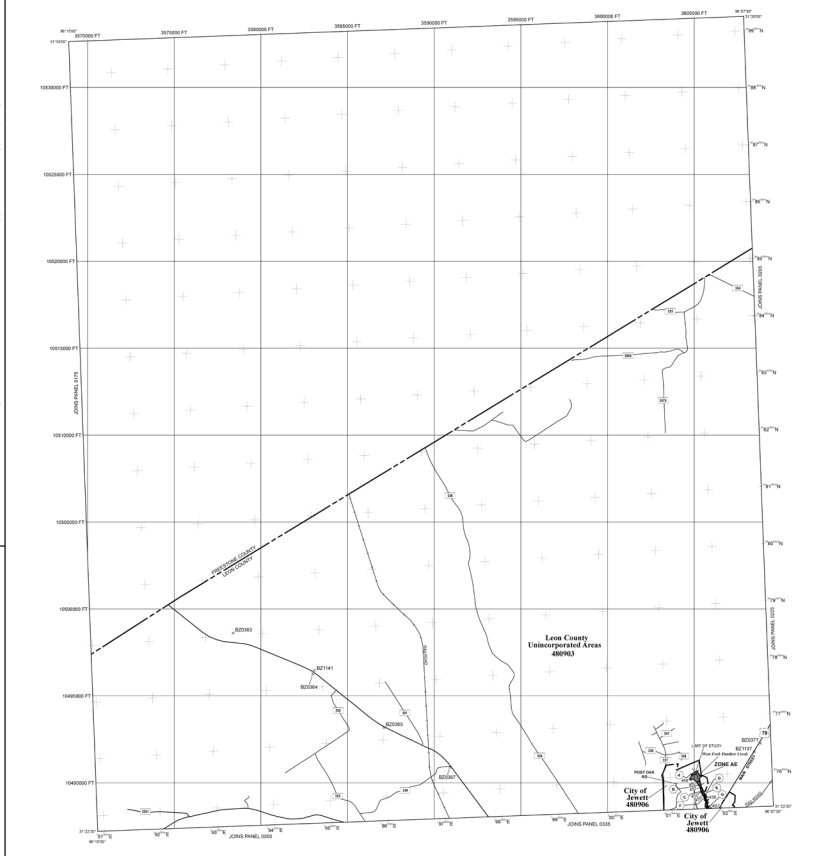
220. PROJECT Undo: _____

221. PROJECT Redo: _____

222. PROJECT Undo: _____

223. PROJECT Redo:

[illegible]

[illegible]

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION
 The 100-year flood plain boundaries are shown on this map. The 100-year flood plain is the area of land that has a 1% chance of being inundated by flood water in any given year. The 500-year flood plain is the area of land that has a 0.2% chance of being inundated by flood water in any given year. The 100-year flood plain is the area of land that has a 1% chance of being inundated by flood water in any given year. The 500-year flood plain is the area of land that has a 0.2% chance of being inundated by flood water in any given year.

ZONE A
 No flood hazard

ZONE B
 Flood hazard depth of 1' to 3' (local areas of flooding); No flood hazard

ZONE C
 Flood hazard depth of 3' to 6' (local areas of flooding); No flood hazard

ZONE D
 Flood hazard depth of 6' to 12' (local areas of flooding); No flood hazard

ZONE E
 Flood hazard depth of 12' to 24' (local areas of flooding); No flood hazard

ZONE F
 Flood hazard depth of 24' to 36' (local areas of flooding); No flood hazard

ZONE G
 Flood hazard depth of 36' to 48' (local areas of flooding); No flood hazard

ZONE H
 Flood hazard depth of 48' to 60' (local areas of flooding); No flood hazard

ZONE I
 Flood hazard depth of 60' to 72' (local areas of flooding); No flood hazard

ZONE J
 Flood hazard depth of 72' to 84' (local areas of flooding); No flood hazard

ZONE K
 Flood hazard depth of 84' to 96' (local areas of flooding); No flood hazard

ZONE L
 Flood hazard depth of 96' to 108' (local areas of flooding); No flood hazard

ZONE M
 Flood hazard depth of 108' to 120' (local areas of flooding); No flood hazard

ZONE N
 Flood hazard depth of 120' to 132' (local areas of flooding); No flood hazard

ZONE O
 Flood hazard depth of 132' to 144' (local areas of flooding); No flood hazard

ZONE P
 Flood hazard depth of 144' to 156' (local areas of flooding); No flood hazard

ZONE Q
 Flood hazard depth of 156' to 168' (local areas of flooding); No flood hazard

ZONE R
 Flood hazard depth of 168' to 180' (local areas of flooding); No flood hazard

ZONE S
 Flood hazard depth of 180' to 192' (local areas of flooding); No flood hazard

ZONE T
 Flood hazard depth of 192' to 204' (local areas of flooding); No flood hazard

ZONE U
 Flood hazard depth of 204' to 216' (local areas of flooding); No flood hazard

ZONE V
 Flood hazard depth of 216' to 228' (local areas of flooding); No flood hazard

ZONE W
 Flood hazard depth of 228' to 240' (local areas of flooding); No flood hazard

ZONE X
 Flood hazard depth of 240' to 252' (local areas of flooding); No flood hazard

ZONE Y
 Flood hazard depth of 252' to 264' (local areas of flooding); No flood hazard

ZONE Z
 Flood hazard depth of 264' to 276' (local areas of flooding); No flood hazard

ZONE AA
 Flood hazard depth of 276' to 288' (local areas of flooding); No flood hazard

ZONE AB
 Flood hazard depth of 288' to 300' (local areas of flooding); No flood hazard

ZONE AC
 Flood hazard depth of 300' to 312' (local areas of flooding); No flood hazard

ZONE AD
 Flood hazard depth of 312' to 324' (local areas of flooding); No flood hazard

ZONE AE
 Flood hazard depth of 324' to 336' (local areas of flooding); No flood hazard

ZONE AF
 Flood hazard depth of 336' to 348' (local areas of flooding); No flood hazard

ZONE AG
 Flood hazard depth of 348' to 360' (local areas of flooding); No flood hazard

ZONE AH
 Flood hazard depth of 360' to 372' (local areas of flooding); No flood hazard

ZONE AI
 Flood hazard depth of 372' to 384' (local areas of flooding); No flood hazard

ZONE AJ
 Flood hazard depth of 384' to 396' (local areas of flooding); No flood hazard

ZONE AK
 Flood hazard depth of 396' to 408' (local areas of flooding); No flood hazard

ZONE AL
 Flood hazard depth of 408' to 420' (local areas of flooding); No flood hazard

ZONE AM
 Flood hazard depth of 420' to 432' (local areas of flooding); No flood hazard

ZONE AN
 Flood hazard depth of 432' to 444' (local areas of flooding); No flood hazard

ZONE AO
 Flood hazard depth of 444' to 456' (local areas of flooding); No flood hazard

ZONE AP
 Flood hazard depth of 456' to 468' (local areas of flooding); No flood hazard

ZONE AQ
 Flood hazard depth of 468' to 480' (local areas of flooding); No flood hazard

ZONE AR
 Flood hazard depth of 480' to 492' (local areas of flooding); No flood hazard

ZONE AS
 Flood hazard depth of 492' to 504' (local areas of flooding); No flood hazard

ZONE AT
 Flood hazard depth of 504' to 516' (local areas of flooding); No flood hazard

ZONE AU
 Flood hazard depth of 516' to 528' (local areas of flooding); No flood hazard

ZONE AV
 Flood hazard depth of 528' to 540' (local areas of flooding); No flood hazard

ZONE AW
 Flood hazard depth of 540' to 552' (local areas of flooding); No flood hazard

ZONE AX
 Flood hazard depth of 552' to 564' (local areas of flooding); No flood hazard

ZONE AY
 Flood hazard depth of 564' to 576' (local areas of flooding); No flood hazard

ZONE AZ
 Flood hazard depth of 576' to 588' (local areas of flooding); No flood hazard

ZONE BA
 Flood hazard depth of 588' to 600' (local areas of flooding); No flood hazard

ZONE BB
 Flood hazard depth of 600' to 612' (local areas of flooding); No flood hazard

ZONE BC
 Flood hazard depth of 612' to 624' (local areas of flooding); No flood hazard

ZONE BD
 Flood hazard depth of 624' to 636' (local areas of flooding); No flood hazard

ZONE BE
 Flood hazard depth of 636' to 648' (local areas of flooding); No flood hazard

ZONE BF
 Flood hazard depth of 648' to 660' (local areas of flooding); No flood hazard

ZONE BG
 Flood hazard depth of 660' to 672' (local areas of flooding); No flood hazard

ZONE BH
 Flood hazard depth of 672' to 684' (local areas of flooding); No flood hazard

ZONE BI
 Flood hazard depth of 684' to 696' (local areas of flooding); No flood hazard

ZONE BJ
 Flood hazard depth of 696' to 708' (local areas of flooding); No flood hazard

ZONE BK
 Flood hazard depth of 708' to 720' (local areas of flooding); No flood hazard

ZONE BL
 Flood hazard depth of 720' to 732' (local areas of flooding); No flood hazard

ZONE BM
 Flood hazard depth of 732' to 744' (local areas of flooding); No flood hazard

ZONE BN
 Flood hazard depth of 744' to 756' (local areas of flooding); No flood hazard

ZONE BO
 Flood hazard depth of 756' to 768' (local areas of flooding); No flood hazard

ZONE BP
 Flood hazard depth of 768' to 780' (local areas of flooding); No flood hazard

ZONE BQ
 Flood hazard depth of 780' to 792' (local areas of flooding); No flood hazard

ZONE BR
 Flood hazard depth of 792' to 804' (local areas of flooding); No flood hazard

ZONE BS
 Flood hazard depth of 804' to 816' (local areas of flooding); No flood hazard

ZONE BT
 Flood hazard depth of 816' to 828' (local areas of flooding); No flood hazard

ZONE BU
 Flood hazard depth of 828' to 840' (local areas of flooding); No flood hazard

ZONE BV
 Flood

NOTES TO USERS

This map is for use in determining the National Flood Insurance Program's flood risk and insurance eligibility of areas subject to flooding. It is not intended to be used for any other purpose. The information on this map is for informational purposes only and should not be used for any other purpose.

Base Flood Elevation

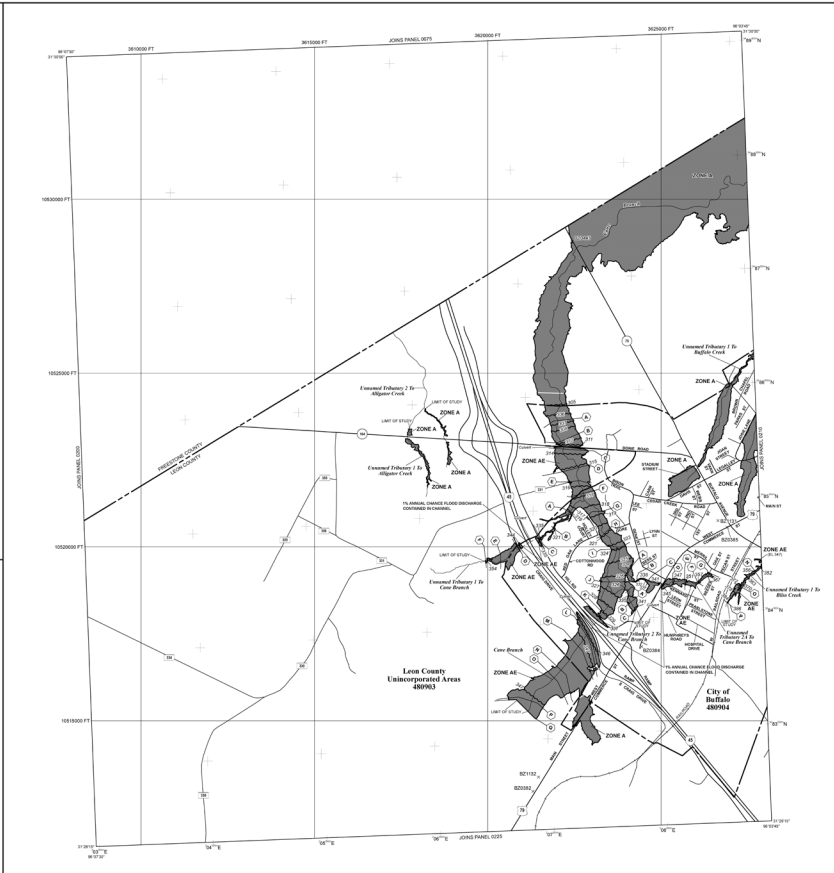
The Base Flood Elevation (BFE) is the elevation of the flood water surface during a 1% annual chance flood. The BFE is the minimum elevation to which structures must be elevated to avoid flood damage. The BFE is the minimum elevation to which structures must be elevated to avoid flood damage.

Special Flood Hazard Areas

Special Flood Hazard Areas (SFHAs) are areas that are subject to flooding. The SFHAs are divided into three categories: Zone A, Zone AE, and Zone X. Zone A is the area of the flood plain that is subject to flooding. Zone AE is the area of the flood plain that is subject to flooding. Zone X is the area of the flood plain that is subject to flooding.

Map Scale

The map scale is 1" = 100'. The map scale is 1" = 100'. The map scale is 1" = 100'.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INSURANCE

Zone A - Areas of flood plain subject to flooding.

Zone AE - Areas of flood plain subject to flooding.

Zone X - Areas of flood plain subject to flooding.

OTHER FLOOD AREAS

Zone A - Areas of flood plain subject to flooding.

Zone AE - Areas of flood plain subject to flooding.

Zone X - Areas of flood plain subject to flooding.

Map Scale

1" = 100'

Map Number

480000C

Effective Date

NOVEMBER 20, 2013

Federal Emergency Management Agency

[illegible]

- NATIONAL FLOOD INSURANCE PROGRAM**
- PANEL 8229C
- FIRM**
FLOOD INSURANCE RATE MAP
LEON COUNTY,
TEXAS
AND INCORPORATED AREAS
- PANEL 225 OF 750
- (SEE MAP INDEX FOR FIRM PANEL LOCATION)
- | | | |
|------------|--------|------|
| COMMUNITY | SURBER | DATE |
| 0000000000 | 0000 | 00 |
- Note to User: The Map Number shown below should be used when ordering this map unless the Government Printing Office advises that the map has been reissued. This map number should be used on requests for copies of the map.
- 
- MAP NUMBER
4289000229C
- EFFECTIVE DATE
NOVEMBER 20, 2013
- Federal Emergency Management Agency

Appendix B – Adoption Resolutions