2024 Anderson County

Hazard Mitigation Action Plan

"Under the Federal Disaster Mitigation Act of 2000 (DMA 2000 or "the Act"), Anderson 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 2024 Anderson County Hazard Mitigation Action Plan (HMAP) is an update of the County's most recent 2018 plan that expired in December 2023. This 2024 Plan Update includes four participating jurisdictions: Anderson County, the City of Elkhart, the City of Frankston, and the City of Palestine.

2) Hazards to be Addressed

Previously, the expired 2018 HMAP identified 9 natural hazards facing the County: drought, hailstorm, flooding, tornados, windstorm, lightning, wildfire, severe winter storm, extreme cold, and dam failure.

The mitigation planning regulation of the Disaster Mitigation Act[1] requires that mitigation plans be reviewed and updated every five years to maintain eligibility for mitigation grant funding. As part of this plan, Anderson County will develop a schedule to ensure that its hazard mitigation plan is regularly updated.

The 2023 Anderson County Hazard Mitigation Action Plan update will address the following 10 natural hazards identified in the State of Texas' 2018 Hazard Mitigation Plan as threats throughout the state. Each participating jurisdiction 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			
	Anderson County	City of Elkhart	City of Frankston	City of Palestine
Flooding	X	X	X	X
Hurricanes, Tropical Storms, and Depressions				
Wildfire	X	X	X	X
Tornados	X	X	X	X
Drought	X	X	X	X
Extreme Cold	X	X	X	X
Extreme Heat				
Hailstorm	X	X	X	X
Winter Storm	X	X	X	X
Severe Winds	X	X	X	X
Lightning	X	X	X	X
Additional Optional Hazards				
Coastal Erosion				
Inland Erosion				
Land Subsidence				
Earthquakes				
Expansive Soils				
Dam / Levee Failure	X			

Omission Statements

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

2. Planning Process

The Anderson County Hazard Mitigation Action Plan is a multi-jurisdiction plan. Representatives for the local planning team were selected by each participating jurisdiction. Planning team members represented the following offices and departments:

Table 2: Local Planning Team Representatives

Title	Jurisdiction
County Judge	Anderson County
Emergency Management Coordinator	
Mayor	City of Elkhart
Assistant City Secretary	
Mayor	City of Frankston
City Secretary	
Mayor	City of Palestine
Chief of Police	
City Secretary	

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

The 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 efforts.
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													
Planning Tasks	**2023 - 2024**												**COMPLETED**
	Jan	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	
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 Plan Draft													
Submit Plan to State and FEMA													
Adopt Plan													2/26/2024
MEETINGS													
Planning Team		2/23/2023		4/6/2023									
Public Outreach – Online Surveys													
Stakeholder Outreach													

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
Anderson County Hazard Mitigation Action Plan, 2018-2023	Previous planning approach, hazards addressed, and mitigation actions	Previous planning team representatives, plan maintenance, hazard histories, and mitigation actions
State of Texas Hazard Mitigation Plan 2018 Update	Hazard Descriptions	Official descriptions of hazards and their potential impacts
Federal Emergency Management Agency (FEMA) Flood Zones	Flood Zones maps	GIS mapping of flood zones
Anderson County Appraisal District Data	Property values and parcel counts	Population counts, parcel data, and land use data
National Inventory of Dams	Dam information	Identity high-hazard or significant risk dams
Anderson County Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Elkhart Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Elkhart Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact
City of Frankston Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact
City of Palestine Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Palestine Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact

Additional information sources included: U.S. Census Data, 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	Y
First Resource Center	Chairman of the Board	Y
Stockpot	President	Y
Windermere at Cartmell Communities	Administrator	Y
Go Bus (ETCOG)	Administrator	Y
Palestine Regional Medical Center	Safety Officer/ Emergency Management Coordinator	Y
Palestine Fire Department	Fire Chief	Y
El Dorado Chemical	General Manager	Y
Elkhart ISD	Superintendent Secretary	Y
Henderson County	EMC	N
Houston County	EMC	N
Leon County	EMC	N
Navarro County	EMC	N
Meals on Wheels	Executive Director	N
Workforce Solution	Manager	N
Hope Station	Manager	N
Just Deb's (Local Business)	Owner	N
Crises Center of Anderson & Cherokee County	Administrator	N
St. Vincent De Paul Society	Administrator	N
Court Drive Church of Christ – Palestine Comm. Food pantry	Administrator	N
First Baptist Church of Elkhart	Assistant	N
Elkhart Oaks	Administrator	N
Palestine Health Care	Administrator	N
Green Briar	Administrator	N

Dogwood Trails Assisted Living	Administrator	N
TrueCare	Administrator	N
Legacy @ Town creek	Administrator	N
Rotary club	Administrator	N
Palestine-Crockett Resource Center for Independent Living	Administrator	N
Living Alternatives	Executive Director	N
Slocum ISD	Principle	N
Frankston ISD	Administrator	N
Frankston PD	Police Chief	N
Anderson County	Commissioner Administrator	N
Palestine - Texas Forest Service	Administrator	N
Elkhart Volunteer Fire Department	VFD Chief	N
City of Elkhart	Eagle Railcar Services	N
Anderson County Livestock	Administrator	N
Mother Frances Christus	Administrator	N
Texas A&M AgriLife Extension	Anderson County Extension Agent – Family & Community Health	N
Texas A&M AgriLife Extension	Anderson County Extension Agent – Agriculture & Natural Resources	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, First Resource Center, Stockpot local kitchen, Crises Center of Anderson and Cherokee County, Palestine Community Food Pantry, and others. 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, in particular 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 local planning team met on two separate occasions. Additional communication was regularly carried out via email and over the phone.

The first local planning team meeting was held virtually on February 23, 2023. 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; court orders and regulations; identifying critical facilities; and providing a status update on previous mitigation actions.

The second planning team meeting was held virtually on April 6, 2023. To stay on schedule, the planning team needed to meet the following objectives: Finalize the hazards list, collect relevant ordinances and plans, review and refine the critical facilities list, and identify area stakeholders, as well as 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 2023.

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, both comment periods were held virtually. The first public comment period took place at the end of March 2023. A Microsoft Form survey was posted to the County website for a period of two weeks for members of the public to fill out. A newspaper ad was placed to announce to the public 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, on their own websites, and social media. 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. The survey received 30 anonymous responses.

<u>The survey asked nine questions</u>:

1. Where do you live?
2. Do you own or rent?
3. Anderson 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. What is the best means of communication for you? Please select all that apply (multiple choice answer).
8. 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).
9. Do you have any other thoughts or concerns relating to the Hazard Mitigation Plan? (Open-ended question).

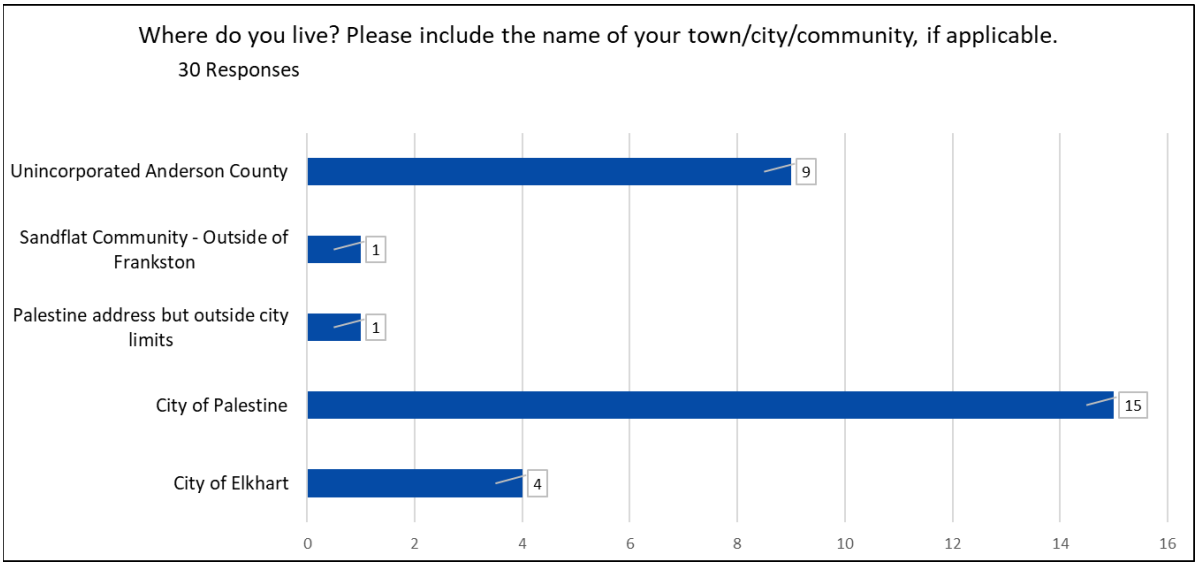


Figure 1: Survey Responses for Question 1

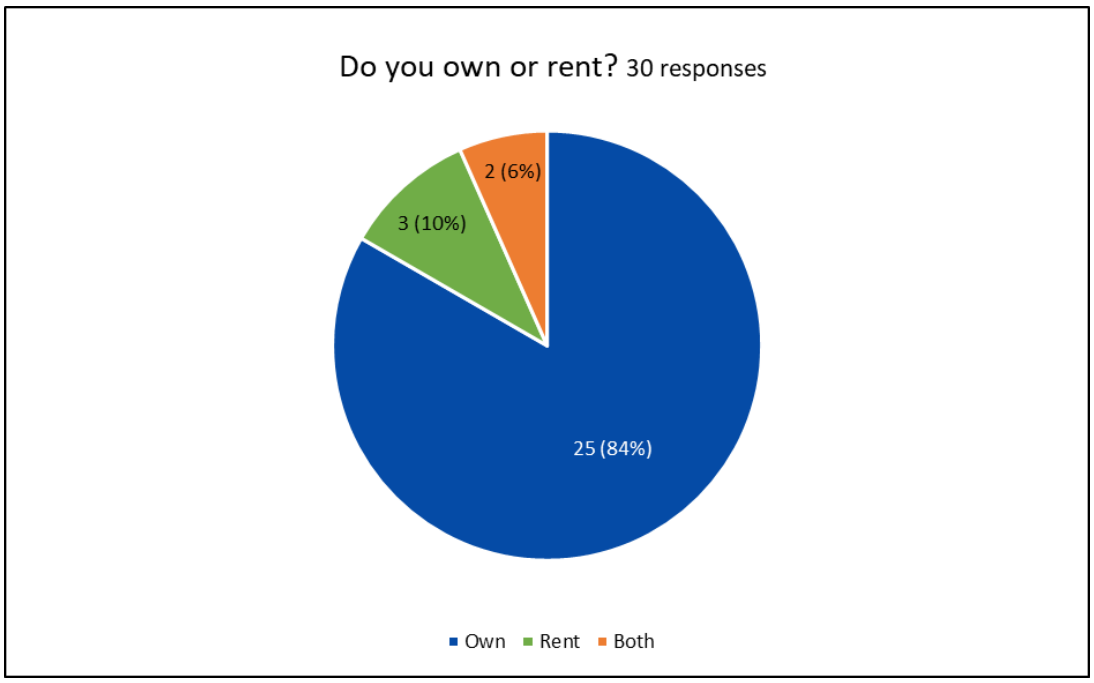


Figure 2: Survey Responses for Question 2

As Figure 1 above shows, the majority of the respondents live in the City of Palestine. About 84% of respondents own their home as shown in Figure 2.

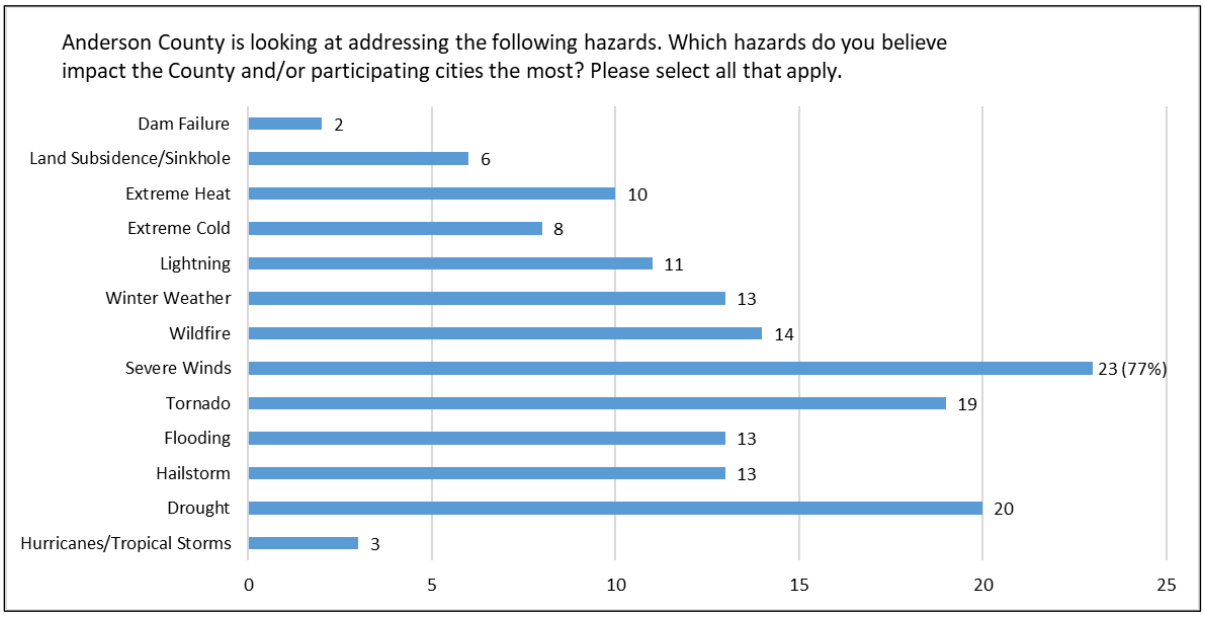


Figure 3: Survey Response for Question 3

The chart in Figure 3 above shows the breakdown of responses for survey question three. The answer choices included Hurricanes/Tropical Storms/Depressions, Drought, Hailstorm, Flooding, Tornado, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme

Heat, Land Subsidence/Sinkholes, Expansive Soils, and Dam Failure.
Of the 13 hazards addressed, Severe Winds, Drought, and Tornado ranked the highest out of all the hazards addressed in the plan, with each choice getting more than or about 50% of the votes.

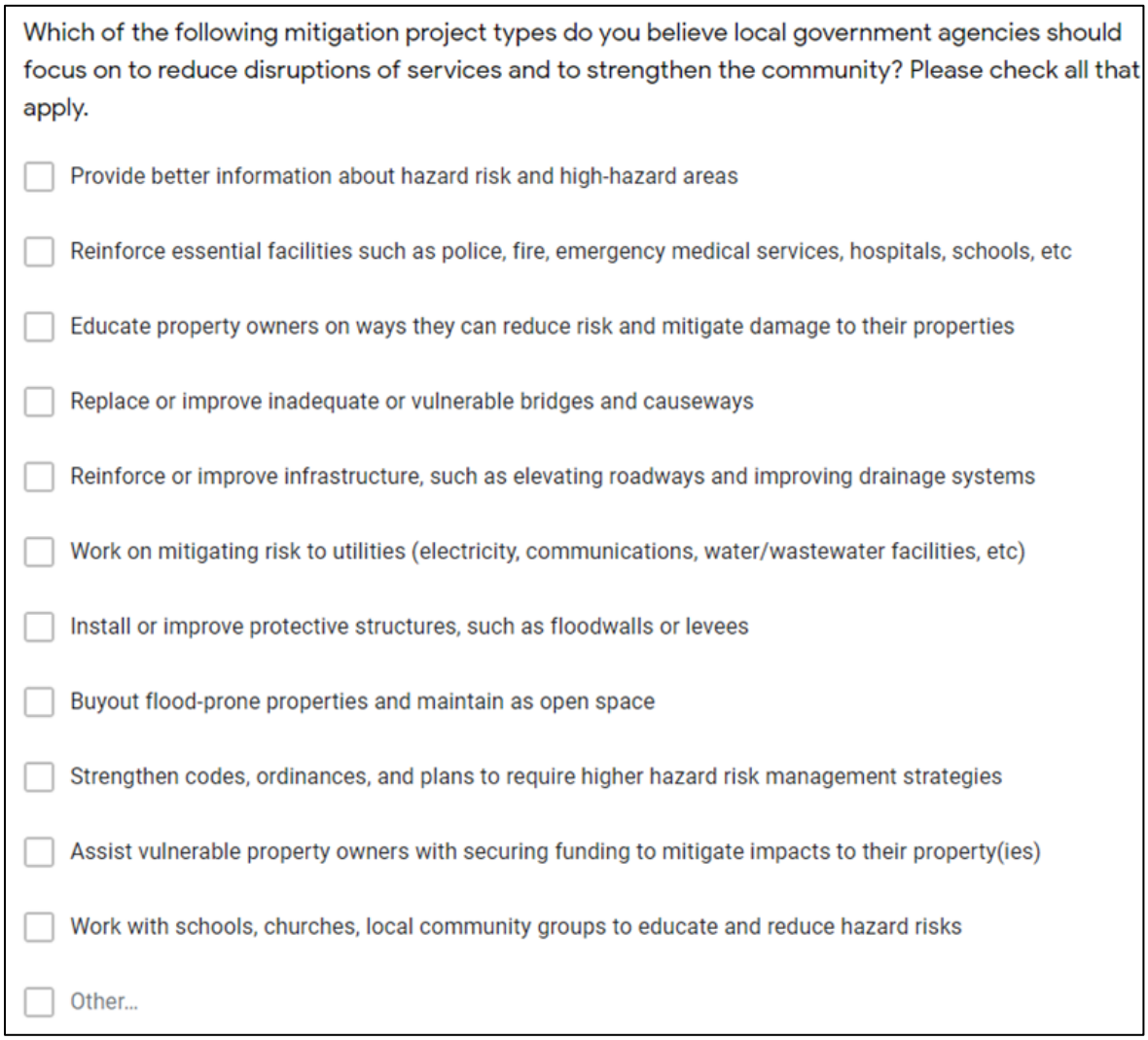


Figure 4: Survey Choices for Question 8

Figure 4 shows the choices for Question 8: 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.

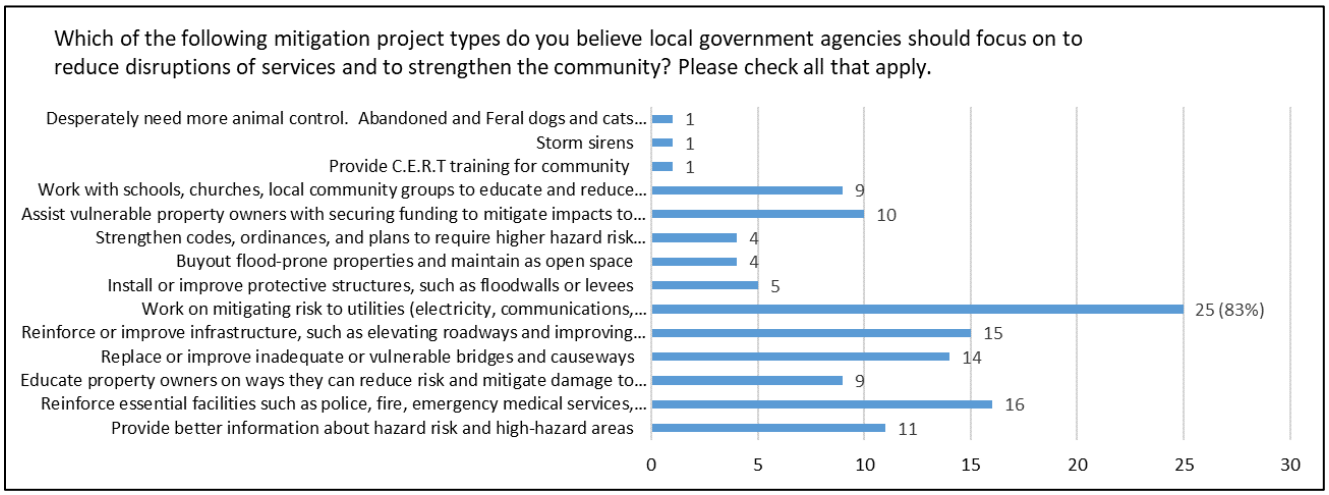


Figure 5: Response Breakdown for Question 8

Figure 5 shows the breakdown of responses to Question 8. The most popular answer was "Work on mitigating risk to utilities (electricity, communications, water/wastewater facilities, etc.)," with 83% of respondents voting for it. Other suggestions that respondents shared in the survey include the need for community wide C.E.R.T. training, storm sirens, and animal control.

The second public comment period took place in October 2023. 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. One respondent reviewed the plan but offered no additional input.

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	Anderson County	County Judge's Office
Emergency Management Coordinator		Office of Emergency Management
Assistant City Secretary	Elkhart	City Administration
Mayor	Frankston	City Council
Mayor	Palestine	City Council
Chief of Police		Police Department

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 delays or obstacles to completing the plan's mitigation actions, along with recommended strategies to overcome any deficiencies.

Any significant change to the plan, including but not limited to changing mitigation actions, abandoning mitigation actions, or pursuing new mitigation actions, will require the County and participating jurisdictions to provide opportunities for the public to make its views and concerns known. Anderson 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 and each participant's website and/or social media accounts.

5) Plan Monitoring

The Anderson 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.

Vulnerability risk of each hazard has risen as population fluctuates in conjunction with new development and growth in the County. Since the 2018 HMAP, the population in Anderson County and the Cities of Elkhart, Frankston, and Palestine has steadily increased along with local development and growth. Anderson County has partnered with the Texas Commission of Environmental Quality to support the County's On Site Septic Facilities. Since 2019, the County permitted 460 residential septic systems, of which 75% are new homes. Subdivision regulations were updated in 2019 to include RV Parks and manufactured rental communities; since the previous HMAP, 4 RV parks and 11 subdivisions were approved for homes/manufactured rental home communities. The City of Elkhart established a new RV park, along with a newly built gas station and new restaurant businesses. The City of Frankston has experienced a slow, yet steady, local development with a new RV park. The City of Palestine has seen an increase in local business growth, along with new apartment complexes and community improvements.

The overall increase in local development increases the local vulnerability of the County and its participation jurisdictions to the natural hazards addressed in this Plan update. Furthermore, the effects of climate change have increased the frequency and intensity of hazard events. Since the previous plan, Andreson County has experienced multiple winter weather and extreme cold events. The worst winter storm event (2011) caused more than $24 million in property damage (adjusted to $2023) within the County.

Climate change is expected to exacerbate hazard events in the future, which may affect population migration, land use development, and the habitability of certain areas in the future. However, it is not certain how these climatic effects will intersect with population migration patterns and land use changes. In the case of Anderson County and its participating jurisdictions, the increase in winter weather events may prompt construction of appropriate

infrastructure to address these threats as well as related land use changes. Additionally, the population may consider relocation if appropriate measures are not taken.

Major Disaster Declarations

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

Table 7: Disaster Declarations in Anderson County

Anderson County Major Disaster Declarations		
Disaster	Incident Period	Declaration Date
DR-4705 Texas Severe Winter Storm	January 30, 2023 – February 2, 2023	April 21, 2023
DR-4586 Texas Severe Winter Storm	February 11, 2021 – February 21, 2021	February 19, 2021
DR-4485 Texas Covid-19 Pandemic	January 20, 2020 – May 11, 2023	March 25, 2020

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

Table 8: Estimated Values by Location[2]

Category	Anderson County[3]	City of Elkhart	City of Frankston	City of Palestine
Total Housing Units	20,125	554	550	7,510
Housing Unit Density (per square mile[4])	18.67 units/sq. mi	359.74 units/sq. mi	220.88 units/sq. mi	383.36 units/sq. mi
Median Housing Value[5]	$119,700	$87,500	$79,700	$110,300
Estimated Value of Housing Unit[6]	$2.40 billion	$48.47 million	$43.83 million	$828.35 million

[2] Source: U.S. Census 2020 American Community Survey 5-Year Estimates.
[3] Table B25001 2021 5-Year ACS Housing unit information for Anderson County includes totals for cities and unincorporated areas.
[4] Area in square mile respective to each jurisdiction
[5] Table B25077 2021 5-Year ACS
[6] Total value of housing units derived from median value multiplied by number of units.

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.

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 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 Jurisdiction[7]

Demographic Category	Anderson County	City of Elkhart	City of Frankston	City of Palestine	Texas	U.S.
Total Population	58,133	1,411	1,399	18,532	28,862,581	329,725,481
Population Under Age 5[8]	5.2%	6.4%	10.2%	7.2%	6.8%	5.9%
Population Over Age 65	14.5%	12.7%	20.5%	14.4%	12.5%	16%
Disability Status[9]	17.1%	20.0%	25.7%	15.3%	11.4%	12.6%
Individuals Below Poverty Level[10]	15.3%	15.2%	8.1%	18.8%	14.0%	12.6%

Distribution of Vulnerable Populations

The following vulnerable populations maps is 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.

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.

[7] Source: U.S. Census 2021 American Community Survey 5-Year Estimates
[8] Table S0101, Age and Sex, 2021 ACS 5-Year Estimates
[9] 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.
[10] Table DP03, Selected Economic Characteristics, 2021 ACS 5-Year Estimates

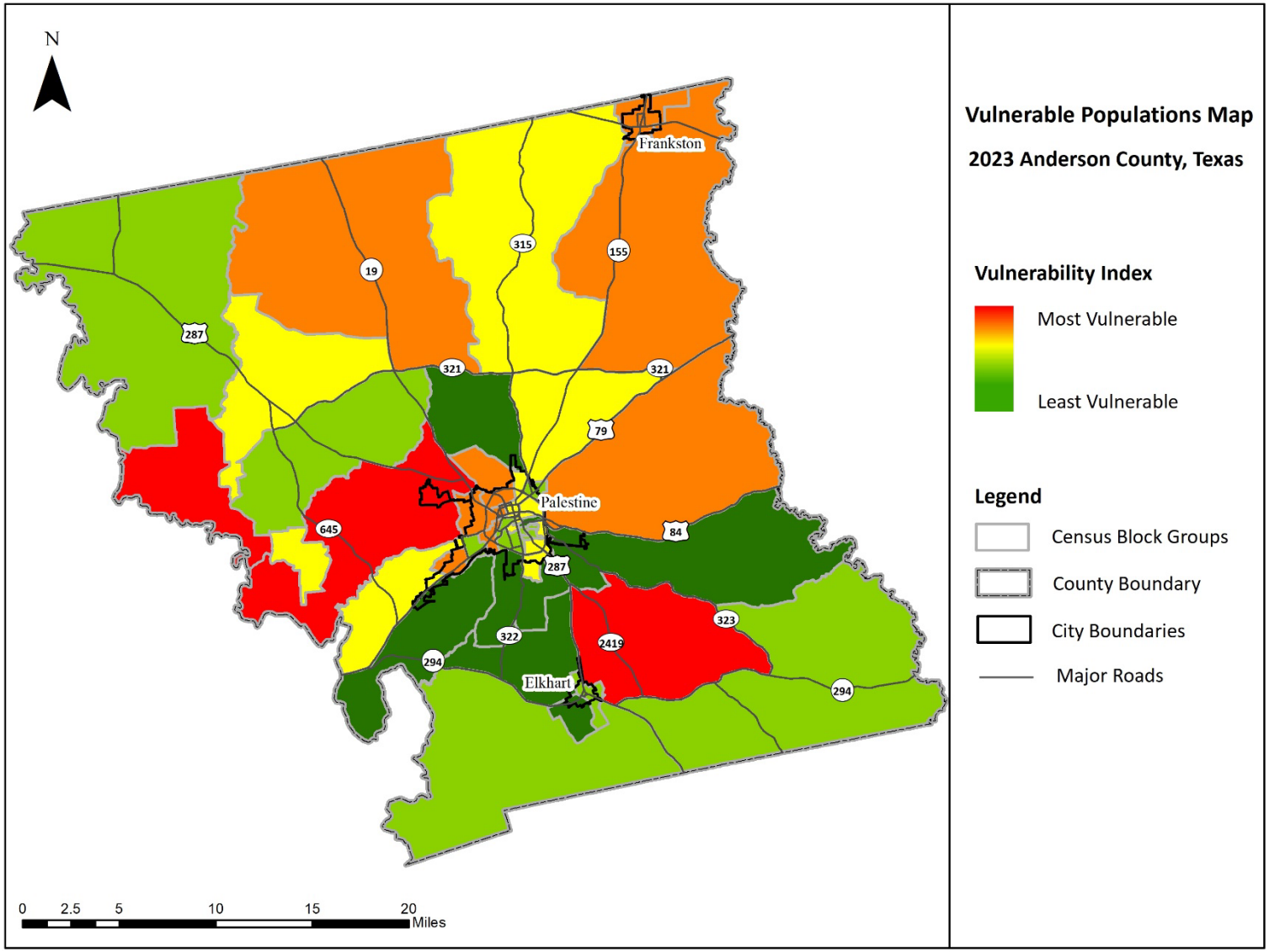


Figure 6: Anderson County Social Vulnerability Index

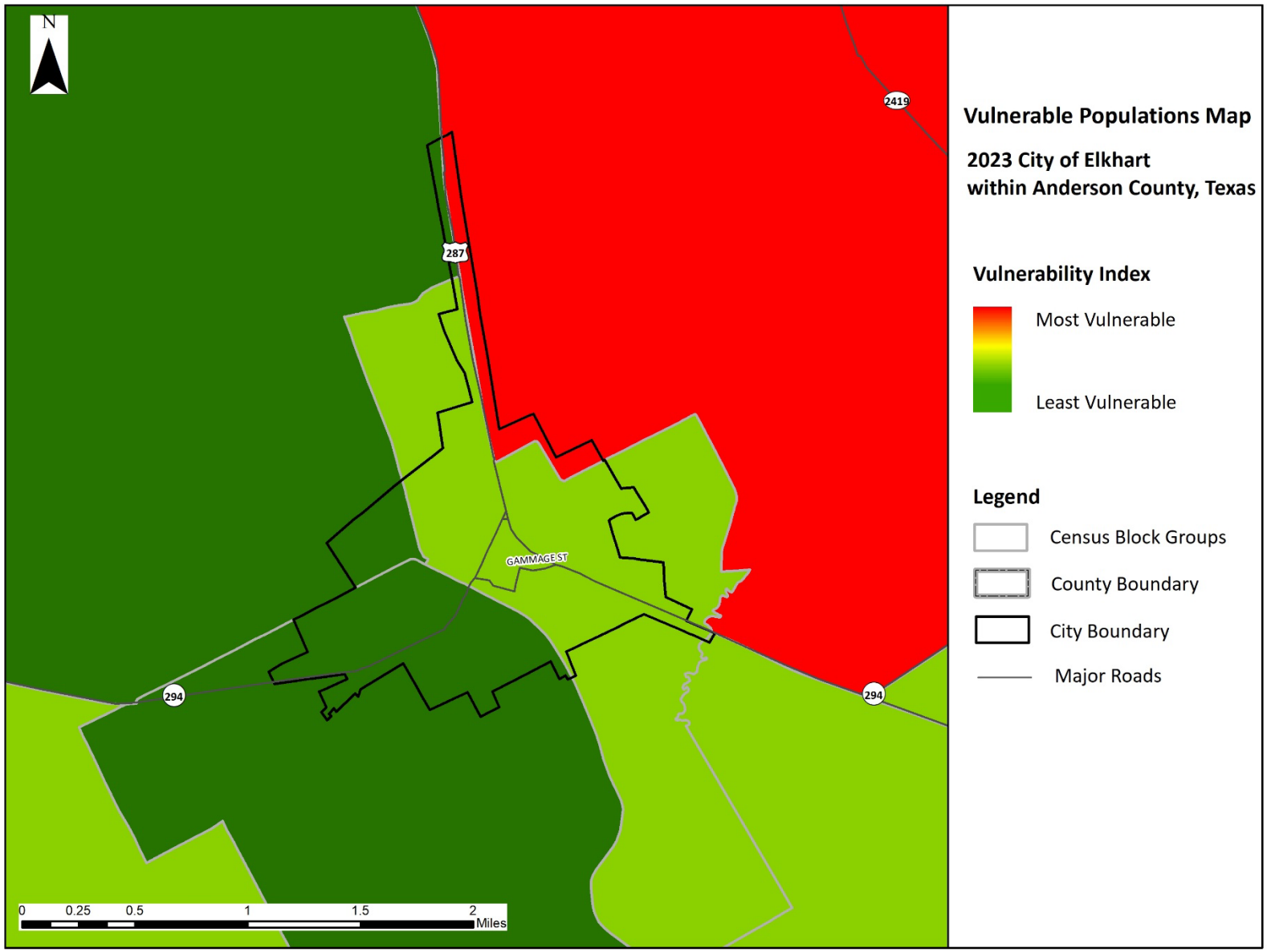


Figure 7: City of Elkhart Social Vulnerability Index

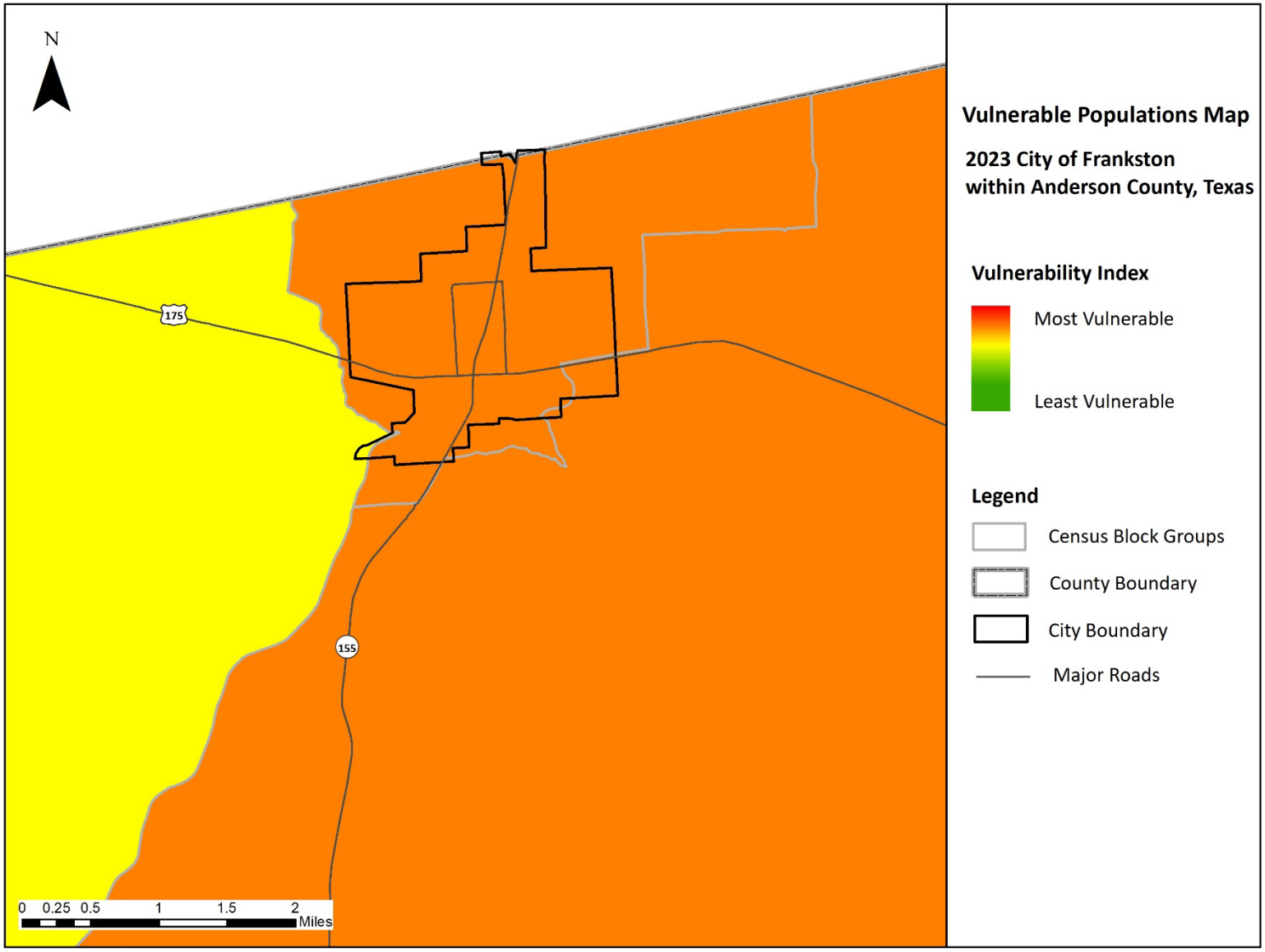


Figure 8: City of Frankston Social Vulnerability Index

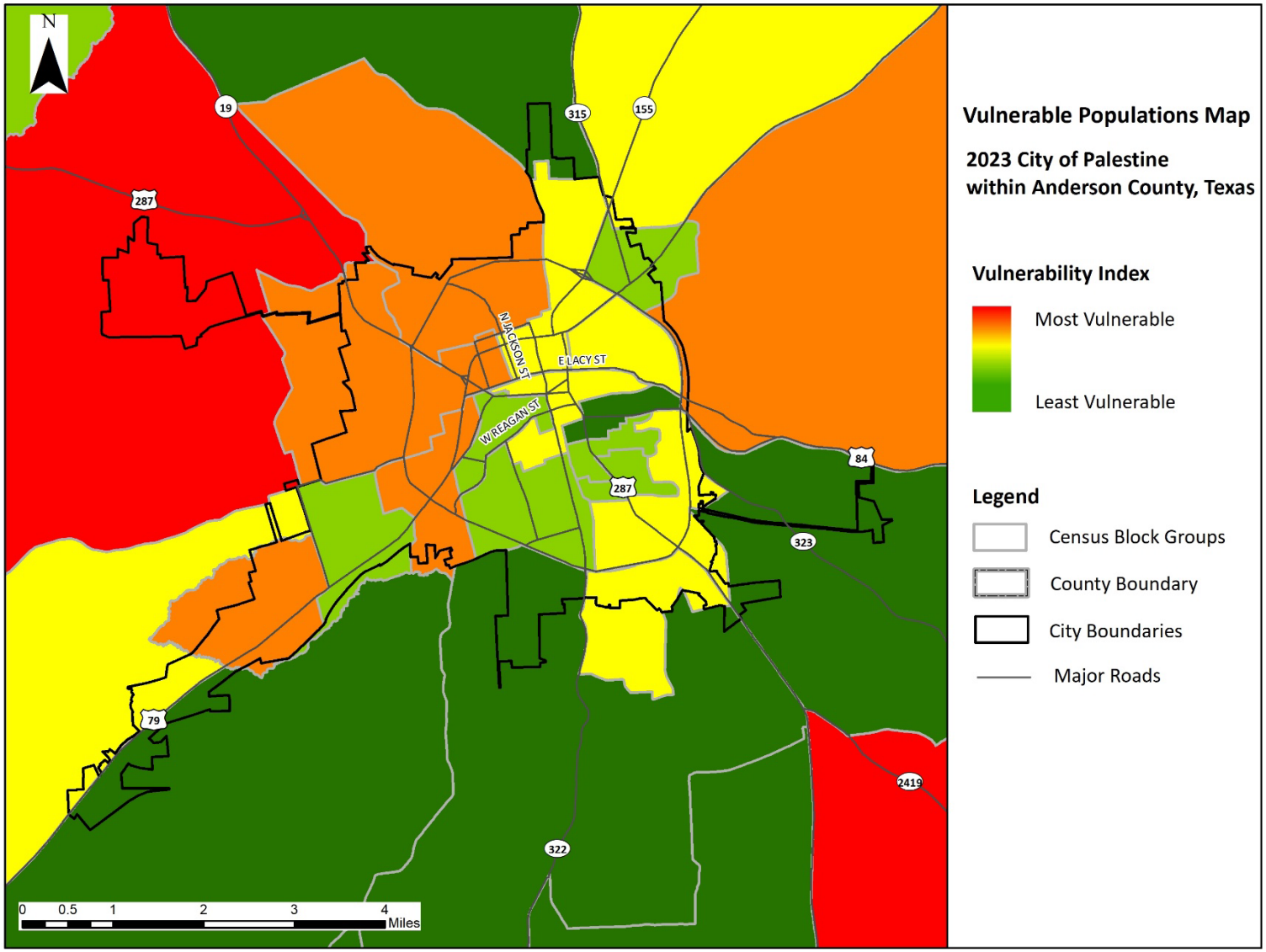


Figure 9: City of Palestine Social Vulnerability Index

Low Income and Subsidized Housing

Low-income residents in Anderson County are primarily served through rental assistance programs and low-income housing. The Anderson County Housing Authority is the primary operator of low-income housing in the County[11]. There are sixteen affordable apartment communities offering 1,043 units in Anderson County, the majority of which are within the City of Palestine while 2 are within the City of Elkhart and 2 are within the City of Frankston. Furthermore, there are 523 low-income apartments that do not offer direct rental assistance but are still considered affordable for low-income families[12].

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.

Housing Type and Condition

The participating jurisdictions have used housing types 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 Anderson 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 10 below.

[11] Affordable Housing Online, 2021. https://affordablehousingonline.com/housing-authorities/Texas
[12] Affordable Housing Online, 2021. https://affordablehousingonline.com/housing-search/Texas/Anderson-County?page=1#summary

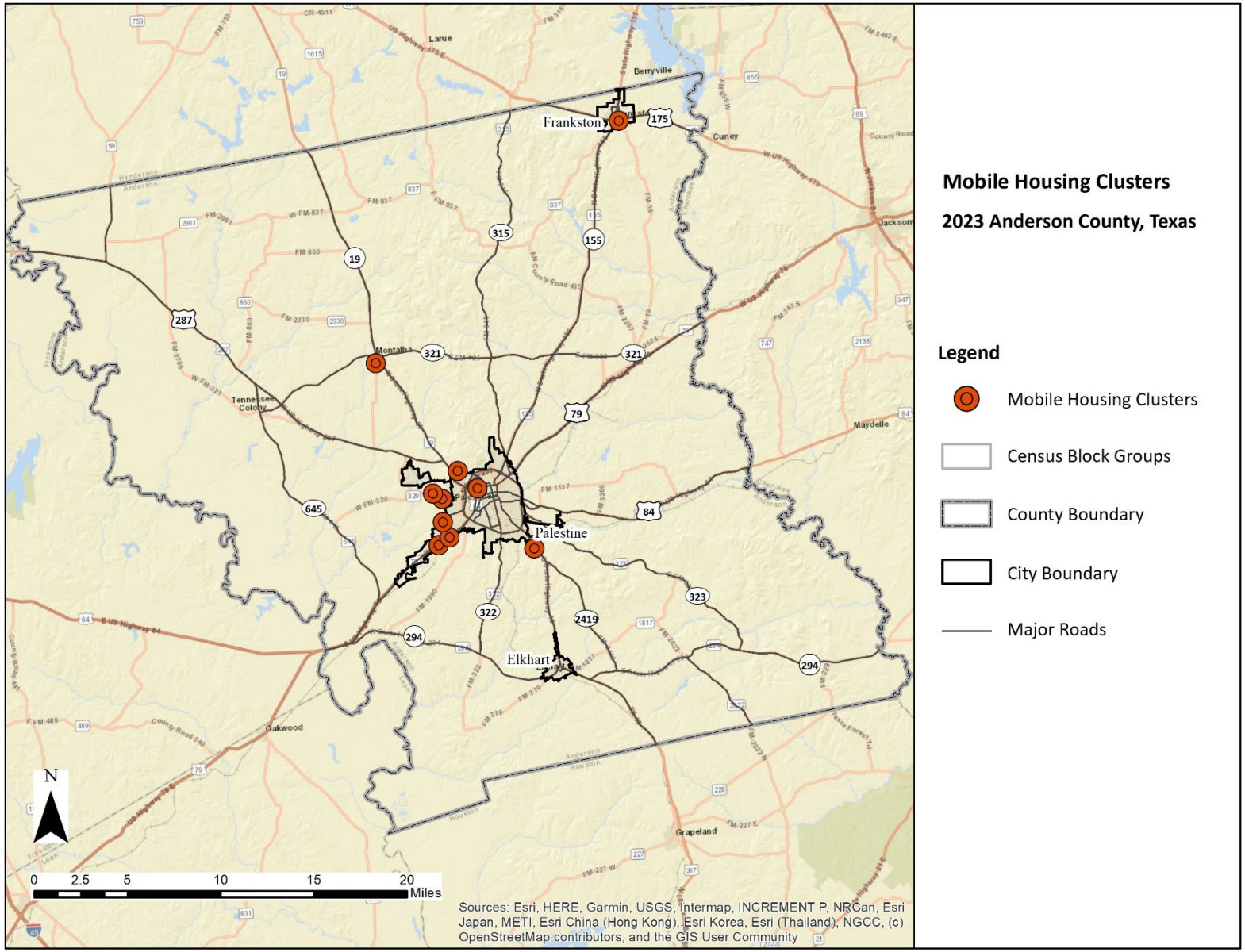


Figure 10: Mobile and Manufacturing Clusters in Anderson County and the Participating Jurisdiction

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. 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[13].

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 Anderson County's 2018 hazard mitigation action plan (HMAP), the County and jurisdictions addressing the hazard recorded 41 flood events between 1997 and 2017. The 2018 plan recorded about $4.07 million in property damages during that time period, adjusted to $2023. Flood events during 2016 reported seven deaths. The 2018 plan found that the frequency of flood occurrences is high.

The following tables identify the most comprehensive list available of flood events and associated damages in the participating jurisdictions from 2017 to present. There have been no recorded events since the 2018 HMAP for the Cities of Elkhart and Palestine. No participating jurisdiction has recorded a flood event more recently than May 2021.

[13]https://www.weather.gov/mrx/flood_and_flash

Table 10: Anderson County Recent Flood History

Location	Date Range	Number of Flood Events	Flood Types	Local Fatalities	Local Injuries	Local Property Damage $2023	Local Crop Damage $2023
Countywide	7/7/2020 – 5/31/2021	2	Flood	0	0	$0	0

Table 11: City of Frankston Recent Flood History

Location	Date Range	Number of Flood Events	Flood Types	Local Fatalities	Local Injuries	Local Property Damage $2023	Local Crop Damage $2023
Citywide	2/20/2020	1	Flood	0	0	$0	0

A) National Flood Insurance Program

The National Flood Insurance Program (NFIP) is administered by FEMA to provide flood insurance coverage to the nation. Anderson County and the Cities of Elkhart and Palestine are listed as participating NFIP communities in the FEMA Community Status Book Report. The City of Frankston does not participate in NFIP as the risk of severe flooding is low and mostly located within undeveloped land.

Anderson County has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 2/3/2010. Anderson County's Flood Damage Prevention Ordinance designates the Emergency Management Coordinator 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 Elkhart has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 2/3/2010. The City of Elkhart's Flood Damage Prevention Ordinance designates the Code Enforcement Official 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 Palestine has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 2/3/2010. The City of Palestine's Flood Damage Prevention Ordinance designates the Building Official 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 14 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 are two RL properties in unincorporated Anderson County and are single family residences.

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 throughout the County.

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 Anderson 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 Anderson County and the participating jurisdictions, the worst flood events have been associated with flooding due to combinations of heavy rainfall, flash flooding, and riverine flooding. The flood event in 2021 produced flooded city streets and highway intersections with damaged tree debris[14]. Another flood event in 2016 involved about 7.5" of heavy rainfall, with many residents reporting up to 12 feet of flood water[15]. Multiple events have caused vehicular and infrastructure damage since then. Furthermore, the worst flooding events in Anderson County and the participating jurisdictions have inflicted as high as $2.28 million in property damages, adjusted to $2023[16].

Future worst-case flood events in Anderson County and the participating jurisdictions may meet or exceed previous worst-case 12' flood depths.

4) Location and Impact

The maps below were developed to demonstrate potential risk areas (Zones A and Zones X). Roughly 18% (123,708 acres out of 690,052) of Anderson County is in the FEMA 100-year floodplain. In contrast, about 86% (565,688 acres out of 690,052) of Anderson County is in the FEMA 500-year floodplain.

[14] Incident date: 5/31/2021 NOAA Data
[15] Incident date: 4/29/2016-4/30/2016 NOAA Data
[16] Incident date: 4/29/2016-4/30/2016 NOAA Data

A) Location

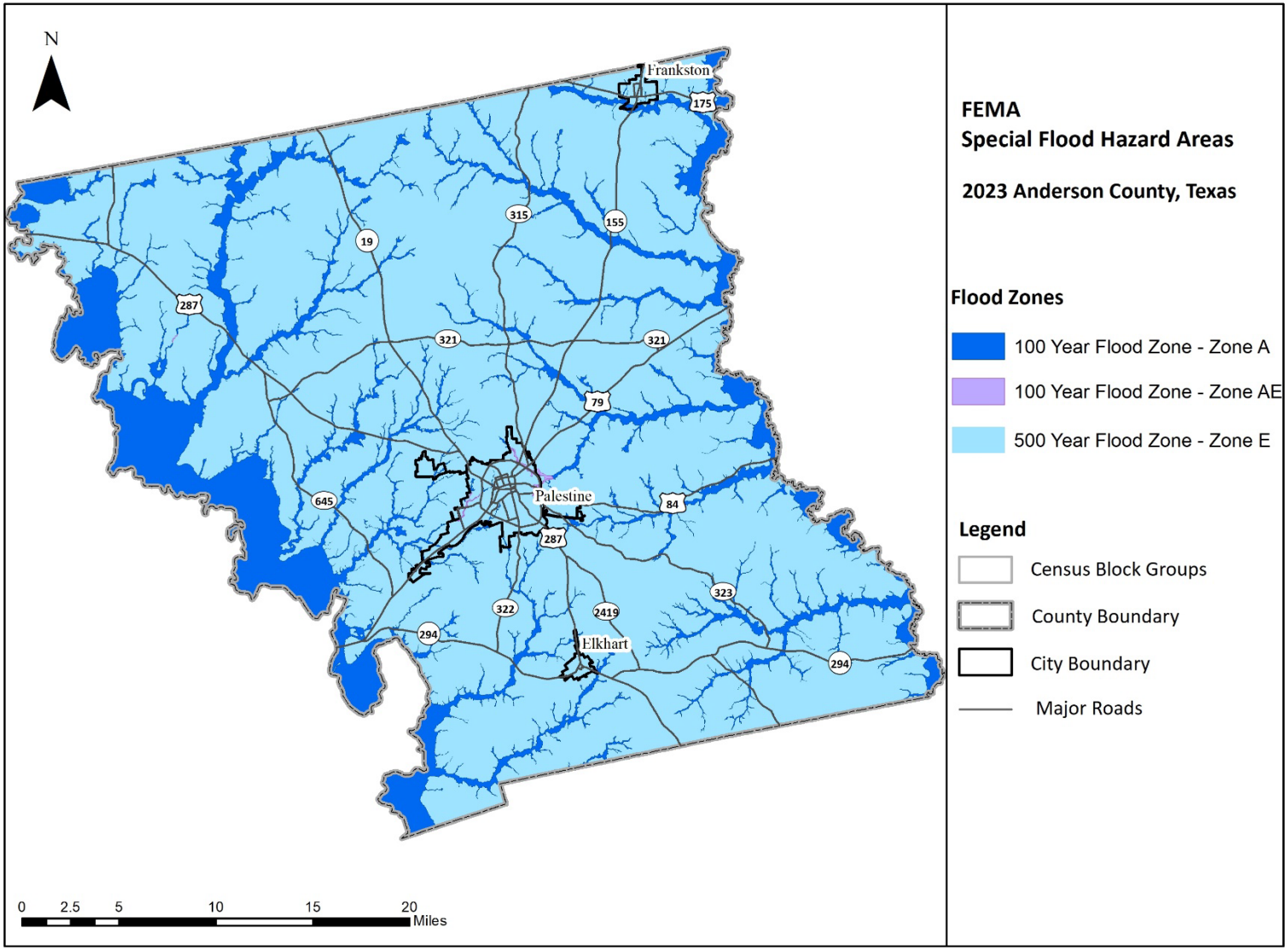


Figure 11: Anderson County FEMA Special Flood Hazard Areas (SFHA)

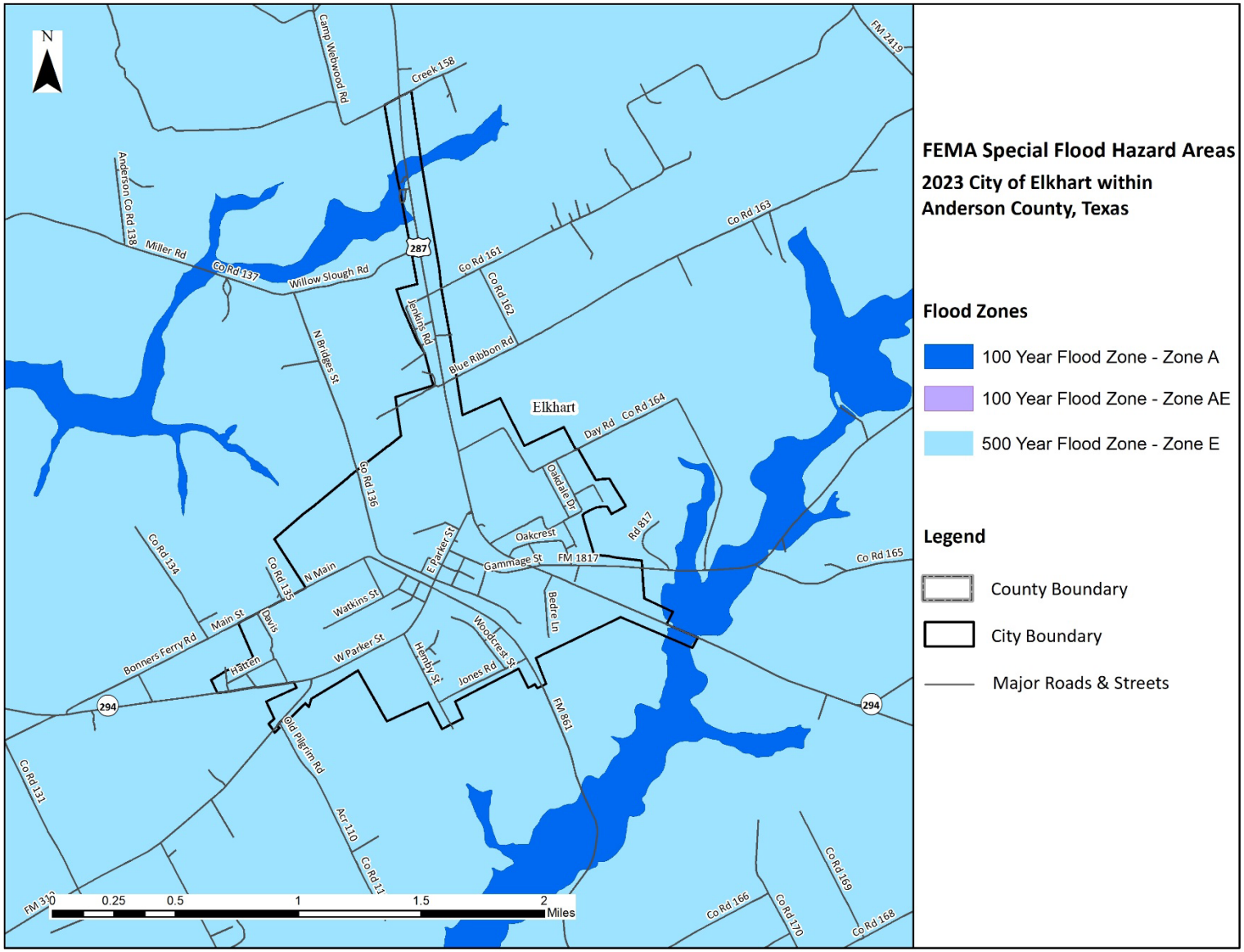


Figure 12: City of Elkhart FEMA SFHA

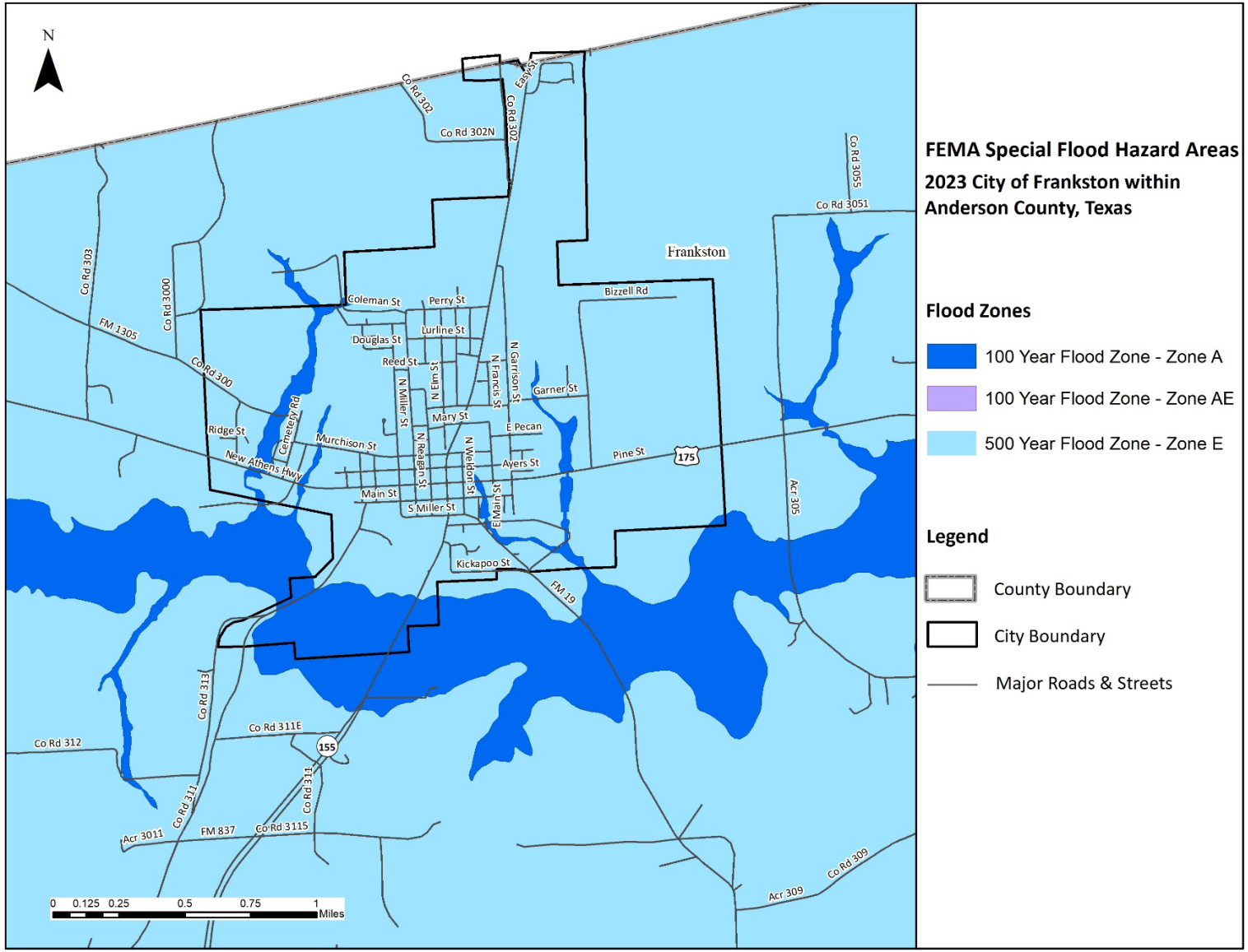


Figure 13: City of Frankston FEMA SFHA

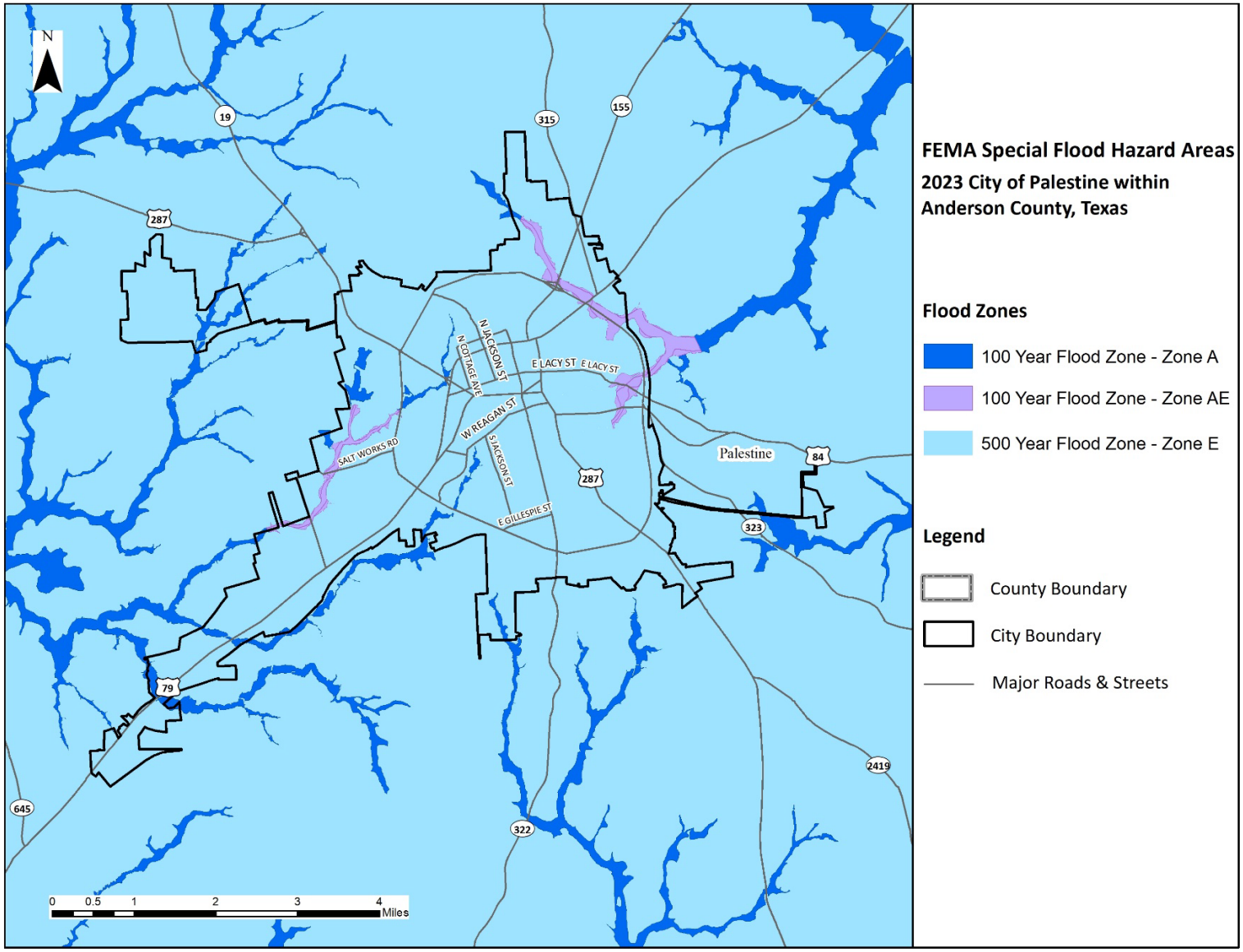


Figure 14: City of Palestine FEMA SFHA

B) Impact

Flood impact in Anderson County and the participating jurisdictions will vary depending on the location, size of the affected area, and number of structures affected. Although the likelihood of a FEMA 100-year flood event remains occasional, 1% in any given year, the floodplain crosses all of Anderson County's major thoroughfares, potentially limiting travel across, within, and around the County.

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. Estimated damage totals to vulnerable parcels affected during a 100-year flood event may meet the totals outlined in Tables 12 through 15.

Despite the unlikely probability of a so-called 500-year flood, 0.02% in any given year, the danger is not negligible. Moreover, the relatively limited information on the 500-year flood zone should not be interpreted to mean that a 500-year flood will only occur in the areas depicted within the 500-year flood zones. 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. Estimated damage totals to vulnerable parcels affected during a 500-year flood event may meet the totals outlined in Tables 12 - 15.

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, Anderson 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 damage, 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 damage, injuries, or loss of life.

B) Critical Facilities

The planning team identified 102 critical facilities spread across the County and participating jurisdictions. All 102 critical facilities were located in a known FEMA Special Flood Hazard Area (SFHA); therefore, all critical facilities are considered vulnerable to flooding and have been listed below.

Table 12: Anderson County & Jurisdictions Critical Facilities Vulnerable to Flooding

Jurisdiction	Critical Facilities
Anderson County	Anderson County Sheriff's Office
	Anderson County Jail
	Anderson County Extension
	Anderson County Appraisal District
	Anderson County Auto Dept.
	Anderson County Barn Pct. 1
	Anderson County Barn Pct. 2
	Anderson County Barn Pct. 4
	Anderson County Constable Pct. 1; Justice of the Peace
	Anderson County Constable Pct 2; Justice of the Peace
	Anderson County Constable Pct 3
	Anderson County Constable Pct 4
	Anderson County Courthouse Annex
	Anderson County Our Place
	Cayuga Independent School District
	Neches Independent School District
	Slocum Independent School District
	Anderson County Justice of Peace Pct 3
	Anderson Co Courthouse
	Anderson Co Barn Pct 3
	Anderson Co Veterans Services
	Anderson Co Pct 4 Justice of Peace
	Anderson Co Tax Collector
	Anderson Co Agricultural Building
	Civic Center
	84 East VFD
	Bethel-Cayuga VFD
	Bradford VFD
	Elkhart VFD
	Elmwood VFD

	Frankston VFD
	Montalba VFD
	Neches VFD
	Slocum VFD
	Palestine-Southside VFD
	Tennessee Colony VFD
	Tucker VFD
	Westside VFD
Elkhart	Elkhart Oaks Nursing Homes
	Elkhart City Office
	Elkhart Independent School District
	Elkhart Head-start East Texas
	Water Building
	Public Works
	Lift Station at Jones Road
	Lift Station/Pump Station/Water Well at Day Road
	Lift Station/Pump Station at Reliable
	Lift Station at Hemby Street
	Wastewater Treatment Plant
	Water Well at School Street
	Newsome Well
	Elkhart High School
	CHRISTUS Health Clinic
	Elkhart Dental Office
Frankston	Frankston Police Department
	Frankston City Hall
	Public Works
	Frankston Independent School District
	Little Kid's Preschool
	Precious Angels Daycare
	First Baptist Church - Frankston
	Water Treatment Plant
	North Well Station
	Well Station at Garner Street
	Methodist Family Life Center
	Pump Station at HWY 75 W

	Northwood Pump Station
	Scarborough Pump Station
	Pump Station at Pecan Street
	Pump House at Regan/Perry
Palestine	Palestine City Hall
	WIC Clinic
	Public Works
	Fire Station #1
	Fire Station #2
	Brookdale Nursing Home
	The Legacy at Town Creek
	Dogwood Trails
	Greenbriar Nursing Home
	Palestine Healthcare
	TRU Care
	Windermere Assisted Living Cartmell
	Palestine Independent School District
	Westwood Independent School District
	University of Texas Innovation Academy
	ABC Learning Academy
	Candy Cane Corner Childcare
	Evangelistic Temple Church Daycare Center
	Family Outreach & Resources
	First Presbyterian Preschool
	First United Methodist Church Preschool
	Gingerbread House Daycare
	Jack & Jill Early Learning
	Palestine YMCA
	Crisis Center of Anderson and Cherokee Counties
	Southside Baptist Childcare
	Sunshine Preschool and Daycare
	Freedom Fellowship Church
	Palestine Senior Activity Center & Meals On Wheels of Palestine

C) Vulnerable Parcels[17]

The planning team developed a parcel inventory estimate to identify potential damage values during a flood event. Parcels vulnerable to flooding have been identified by their complete or partial location within the FEMA 100-year floodplain and the FEMA 500-year floodplain. Actual damages will vary based on the location and extent of flooding.

Table 13: Vulnerable Parcels by Flood Zone in Anderson County

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Countywide	**2,031**	**$1,079,530,768**
FEMA 500-Year Flood Zone X		
Countywide	**39,372**	**$6,160,701,506**

Table 14: Vulnerable Parcels by Flood Zone in the City of Elkhart

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Citywide	**10**	**$1,046,055**
FEMA 500-Year Flood Zone X		
Citywide	**969**	**$87,431,724**

Table 15: Vulnerable Parcel by Flood Zone for the City of Frankston

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Citywide	**37**	**$2,583,414**
FEMA 500-Year Flood Zone X		
Citywide	**1,488**	**$210,000,131**

[17] County Parcel Count Includes All Parcels in Anderson County

Table 16: Vulnerable Parcels by Flood Zone for the City of Palestine

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Citywide	**81**	**$9,314,671**
FEMA 500-Year Flood Zone X		
Citywide	**13,421**	**$1,651,324,479**

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."[18]

[18] https://www.epa.gov/climate-indicators/climate-change-indicators-river-flooding

5. 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. [19]

1) Wildfire History

The Texas A&M Forest Service Wildfire Risk Assessment Portal provides wildfire data on fires that occurred as recently as 2020. Additional data came from local planning team members.

The 2018 Anderson County HMAP utilized Texas A&M Forest Service Wildfire Risk Assessment Portal data to identify 4,477 wildfire ignitions throughout the County between 2008 and 2017. The 2018 plan also reported 7 wildfire events from 2011 and 2015.

According to the NOAA, there were two reports of wildfire events in January 2018, there were no reports of deaths, injuries, nor property or crop damages. There were no wildfire events reported within the City of Frankston since the previous 2018 Plan. None of the participating jurisdictions have data available on fires past 2020, though it is likely that some small fires have gone unreported.

The following tables show the wildfire history of each participant as recorded by the Texas A&M Forest Service from 2010 to present. There have been no recorded events since the 2018 HMAP for the City of Frankston. No participating jurisdiction has recorded a damaging flood more recently than 2020.

Table 17: Anderson County Recent Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned
Countywide	1/01/2018 – 12/22/2021	181	.01 - 143	1,299.78

[19] 2018 State of Texas Hazard Mitigation Plan

Table 18: City of Elkhart Recent Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned
Elkhart	1/20/2019 – 8/21/2019	6	.25 - 6	14.77

Table 19: City of Palestine Recent Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned
Palestine	04/17/2018 – 12/15/2020	4	.02 - 1	2.27

Furthermore, the NOAA reported one wildfire event on January 22, 2018 within Anderson County. This wildfire event occurred four mile southeast of the City of Palestine and burned about 35 acres.

2) Likelihood of Future Events

Although the County and participating jurisdictions have not recorded a wildfire since 2020, given the prior frequency of wildfire events, a wildfire event in any of the jurisdictions addressing the hazard is likely, meaning an event is probable within the next three years.

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, Anderson County and the participating jurisdictions are rated between Class 1 and Class 3.

Table 20: Characteristic Fire Intensity Scale[20]

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.

[20] https://www.texaswildfirerisk.com

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 Anderson County and the participating jurisdictions is a Class D event.

Table 21: National Wildfire Coordinating Group Size Class of Fire[21]

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 Anderson County and the participating jurisdictions may meet previous worst-case Class D (NWCGSCF) and Class 3 (FIS) wildfires in terms of intensity, acreage burned, and inflicted damage.

4) Location and Impact

A) Location

Due to wildfire's ability to inflict damage 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 Texas WRAP's Wildland Urban Interface boundaries.

[21] http://www.nwcg.gov/term/glossary/size-class-of-fire

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

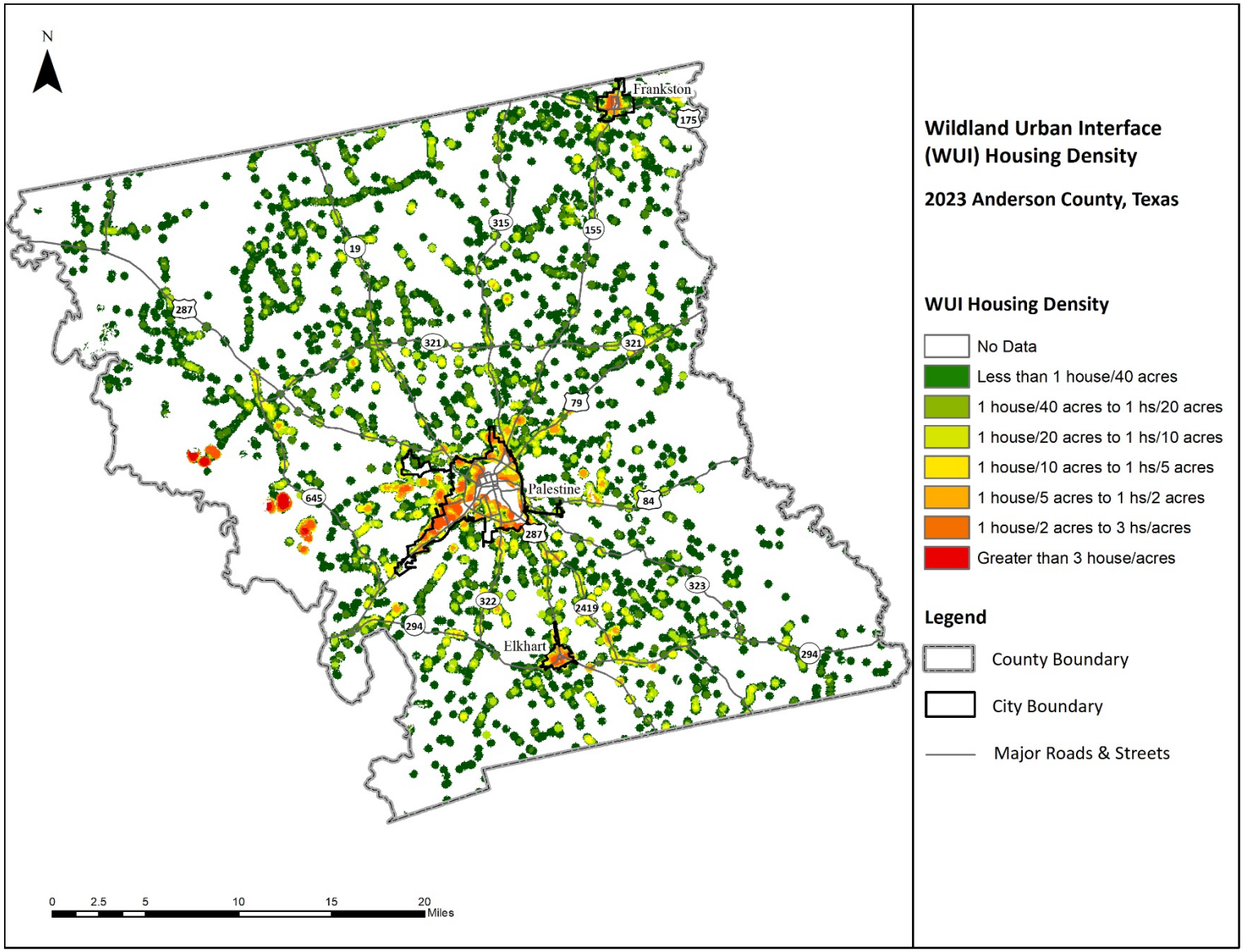


Figure 15: Anderson County Wildland Urban Interface

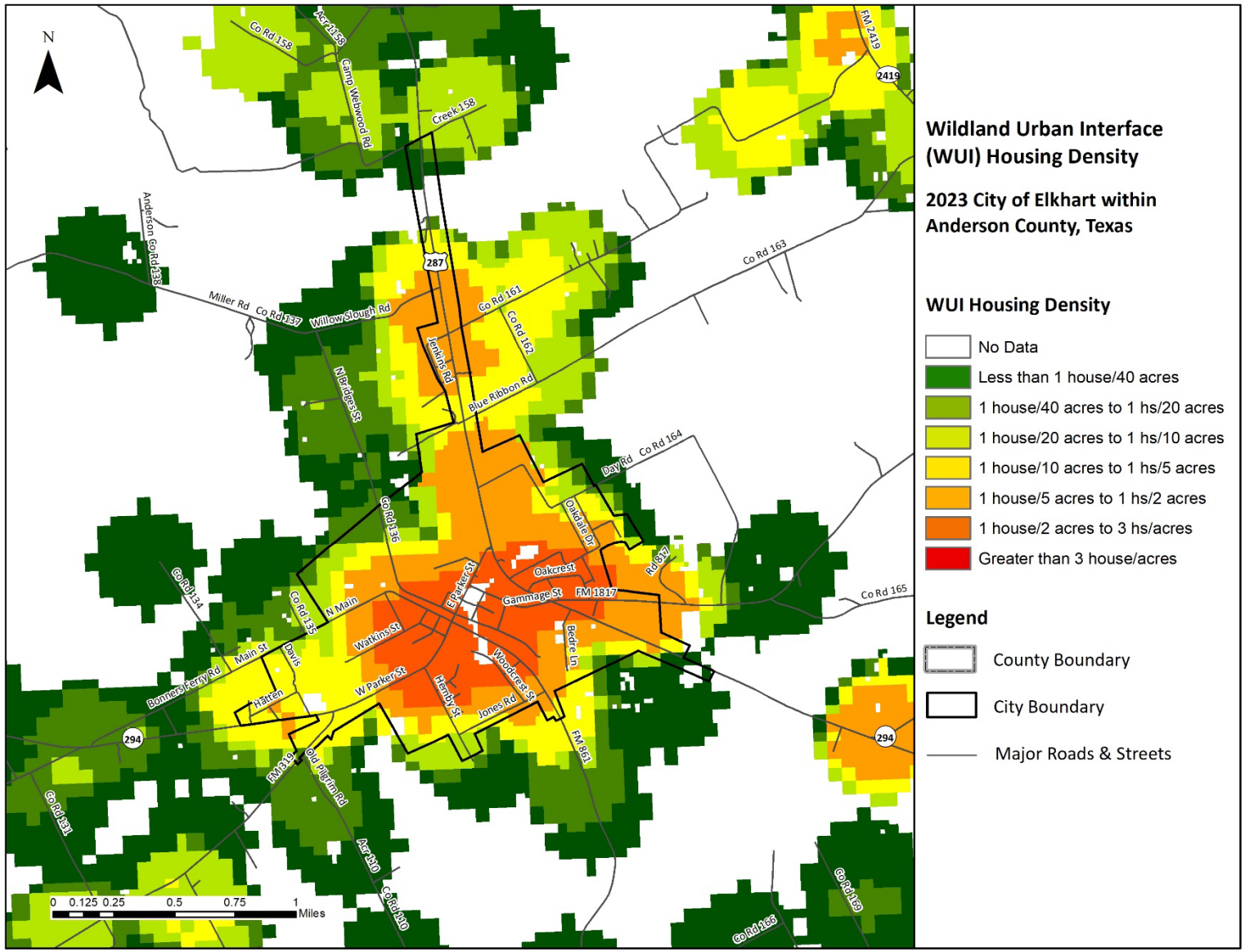


Figure 16: City of Elkhart Wildland Urban Interface (WUI)

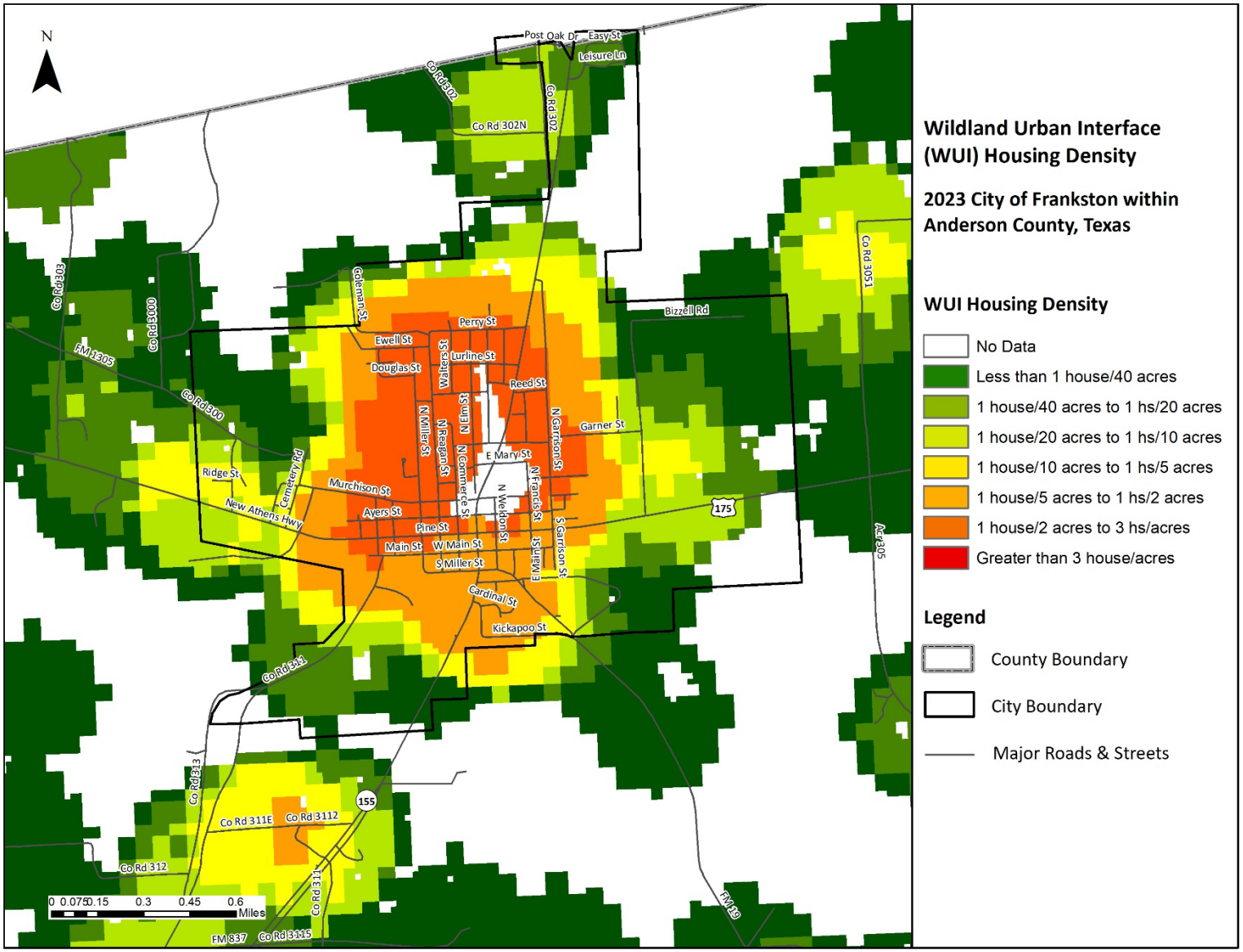


Figure 17: City of Frankston Wildland Urban Interface (WUI)

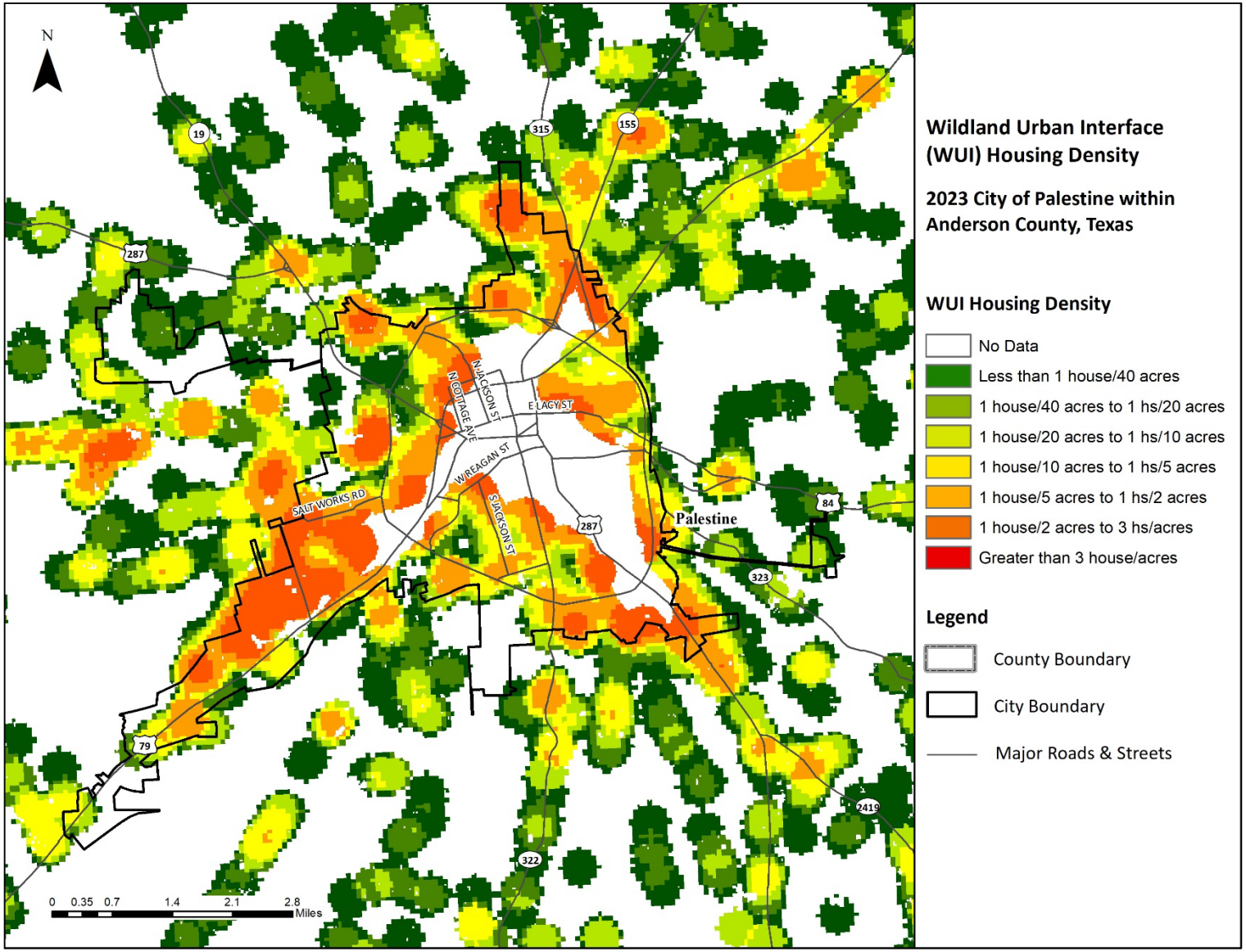


Figure 18: City of Palestine Wildland Urban Interface (WUI)

B) Impact

Impacts from a wildfire in Anderson 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, Anderson 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 concern[22]. 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 damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a wildfire than structures in standard condition. Exterior damages 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.

[22] https://www.usfa.fema.gov/downloads/pdf/statistics/rural.pdf

B) Critical Facilities

There are 102 critical facilities located throughout the County and participating jurisdictions. 65 of the 102 critical facilities are located within 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 22: Critical Facilities Vulnerable to Wildfire and Potential Impacts

Jurisdiction	Critical Facilities	Potential Wildfire Impacts				
		Destruction	Partial Destruction	Heat Damage	Smoke Damage	Water Damage
Anderson County	Anderson Co Sherrif's Office/County Jail	X	X	X	X	X
	Anderson County Extension	X	X	X	X	X
	Anderson County Barn Pct. 1	X	X	X	X	X
	Anderson County Barn Pct. 4	X	X	X	X	X
	Anderson County Constable Pct. 1; Justice of the Peace	X	X	X	X	X
	Cayuga ISD	X	X	X	X	X
	Neches ISD	X	X	X	X	X
	Slocum ISD	X	X	X	X	X
	Anderson Co Barn Pct 3	X	X	X	X	X
	Anderson Co Tax Collector	X	X	X	X	X
	Civic Center	X	X	X	X	X
	84 East VFD	X	X	X	X	X
	Bradford VFD	X	X	X	X	X
	Elkhart VFD	X	X	X	X	X
	Elmwood VFD	X	X	X	X	X
	Frankston VFD	X	X	X	X	X
	Montalba VFD	X	X	X	X	X
	Neches VFD	X	X	X	X	X
	Slocum VFD	X	X	X	X	X
	Tennessee Colony VFD	X	X	X	X	X
	Westside VFD	X	X	X	X	X

Elkhart	Elkhart Oaks Nursing Homes	X	X	X	X	X
	Elkhart City Office	X	X	X	X	X
	Elkhart ISD	X	X	X	X	X
	Elkhart Head-start East Texas	X	X	X	X	X
	Water Building	X	X	X	X	X
	Public Works	X	X	X	X	X
	Lift Station at Jones	X	X	X		X
	Lift Station/Pump Station/Water Well at Day Road	X	X	X		X
	Lift Station/Pump Station at Reliable	X	X	X		X
	Lift Station at Hemby Street	X	X	X		X
	Wastewater Treatment Plant	X	X	X		X
	Water Well at School Street	X	X	X		X
	Elkhart HS	X	X	X	X	X
	CHRISTUS Trinity Clinic	X	X	X	X	X
	Elkhart Dental Office	X	X	X	X	X
Frankston	Frankston Police Department	X	X	X	X	X
	Frankston City Hall	X	X	X	X	X
	Public Works	X	X	X	X	X
	Frankston ISD	X	X	X	X	X
	Precious Angels Daycare	X	X	X	X	X
	First Baptist Church - Frankston	X	X	X	X	X
	Water Treatment Plant	X	X	X	X	X
	North Well Station	X	X	X		X
	Well Station at Garner Street	X	X	X		X
	Methodist Family Life Center	X	X	X	X	X
	Northwood Pump Station	X	X	X		X
	Scarborough Pump Station	X	X	X		X

	Pump Station at Pecan Street	X	X	X		X
	Pump House at Regan/Perry	X	X	X	X	X
Palestine	Brookdale Nursing Home	X	X	X	X	X
	The Legacy at Town Creek	X	X	X	X	X
	Dogwood Trails	X	X	X	X	X
	Greenbriar Nursing Home	X	X	X	X	X
	TRU Care	X	X	X	X	X
	Windermere Assisted Living Cartmell	X	X	X	X	X
	Palestine ISD	X	X	X	X	X
	Westwood ISD	X	X	X	X	X
	University of Texas Innovation Academy	X	X	X	X	X
	ABC Learning Academy	X	X	X	X	X
	Evangelistic Temple Church Daycare Center	X	X	X	X	X
	Jack & Jill Early Learning	X	X	X	X	X

C) Vulnerable Parcels

Table 23: Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Anderson County	**26,140**	**$ 3,550,459,010**
City of Elkhart	970	$87,026,774
City of Frankston	1,464	$198,737,162
City of Palestine	7,303	$1,062,707,981

6) Climate Change

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%.[23]

[23] 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.

6. Tornado

A tornado is defined as a rapidly rotating vortex or funnel of air extending ground-ward from a cumulonimbus cloud. 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

In the 2018 HMAP, Anderson County and the participating jurisdictions reported 34 tornados between 1953 and 2008.

The following tables identify tornado events and associated damages in Anderson County and the participating jurisdictions from 2000 to present, as reported in the NCEI database. According to the best information available, there have been no tornado events recorded in Anderson County or either participating jurisdiction since the previous plan.

Table 24: Tornado History (2000 – 2023)

Location	Date Range	Number of Tornados	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Countywide	12/29/2006, 10/6/2008	2	EF0 - F0	0	0	$96,458.58	$0

Table 25: Tornado History (2000 – 2023)

Location	Date Range	Number of Tornados	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Elkhart	3/30/2002	1	EF0	0	0	$0	$0

Table 26: Anderson County Tornado History (2000 – 2023)

Location	Date Range	Number of Tornados	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Palestine	12/29/2006	2	F1	0	0	$341,314.98	$0

2) Likelihood of Future Events

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

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 27: Fujita Scale

Fujita Scale			
Fujita Category	Wind Speed (MPH)	Character	Potential Damage
F1	40-72	Weak	Light Damage. Some damage to chimneys; branches broken off trees, shallow-rooted trees uprooted, sign boards damaged.
F1	73-112	Weak	Moderate damage. Roof surfaces peeled off; mobile homes pushed foundations or overturned; moving autos pushed off road.
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.
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.
F4	207-260	Violent	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
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 28: Enhanced Fujita Scale[24]

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 Anderson County and the participating jurisdictions have been classified as EF1 on the Enhanced Fujita Scale. Anderson County sits within Zone IV (250 mph winds) according to the IIBEC's wind speed map[25]. Future tornados in the 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] Texas State Hazard Mitigation Plan, 2018 Update.
[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, Anderson 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 and Infrastructure

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 may 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 29: Critical Facilities Vulnerable to Tornados and Potential Impacts

Jurisdiction	Critical Facilities	Potential Tornado Impacts									
		Loss of Power	Flying Debris	Uprooted Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Anderson County	Anderson County Sheriff's Office	X	X	X	X	X	X	X	X	X	X
	Anderson County Jail	X	X	X	X	X	X	X	X	X	X
	Anderson County Extension	X	X	X	X	X	X	X	X	X	X
	Anderson County Appraisal District	X	X	X	X	X	X	X	X	X	X
	Anderson County Auto Dept.	X	X	X	X	X	X	X	X	X	X
	Anderson County Barn Pct. 1	X	X	X	X	X	X	X	X	X	X
	Anderson County Barn Pct. 2	X	X	X	X	X	X	X	X	X	X
	Anderson County Barn Pct. 4	X	X	X	X	X	X	X	X	X	X
	Anderson County Constable Pct. 1; Justice of the Peace	X	X	X	X	X	X	X	X	X	X
	Anderson County Constable Pct 2; Justice of the Peace	X	X	X	X	X	X	X	X	X	X
	Anderson County Constable Pct 3	X	X	X	X	X	X	X	X	X	X
	Anderson County Constable Pct 4	X	X	X	X	X	X	X	X	X	X
	Anderson County Courthouse Annex	X	X	X	X	X	X	X	X	X	X
	Anderson County Our Place	X	X	X	X	X	X	X	X	X	X
	Cayuga Independent School District	X	X	X	X	X	X	X	X	X	X
	Neches Independent School District	X	X	X	X	X	X	X	X	X	X
	Slocum Independent School District	X	X	X	X	X	X	X	X	X	X
	Anderson County Justice of Peace Pct 3	X	X	X	X	X	X	X	X	X	X
	Anderson Co Courthouse	X	X	X	X	X	X	X	X	X	X
	Anderson Co Barn Pct 3	X	X	X	X	X	X	X	X	X	X
	Anderson Co Veterans Services	X	X	X	X	X	X	X	X	X	X
	Anderson Co Pct 4 Justice of Peace	X	X	X	X	X	X	X	X	X	X
	Anderson Co Tax Collector	X	X	X	X	X	X	X	X	X	X
	Anderson Co Agricultural Building	X	X	X	X	X	X	X	X	X	X

	Civic Center	X	X	X	X	X	X	X	X	X	X
	84 East VFD	X	X	X	X	X	X	X	X	X	X
	Bethel-Cayuga VFD	X	X	X	X	X	X	X	X	X	X
	Bradford VFD	X	X	X	X	X	X	X	X	X	X
	Elkhart VFD	X	X	X	X	X	X	X	X	X	X
	Elmwood VFD	X	X	X	X	X	X	X	X	X	X
	Frankston VFD	X	X	X	X	X	X	X	X	X	X
	Montalba VFD	X	X	X	X	X	X	X	X	X	X
	Neches VFD	X	X	X	X	X	X	X	X	X	X
	Slocum VFD	X	X	X	X	X	X	X	X	X	X
	Palestine-Southside VFD	X	X	X	X	X	X	X	X	X	X
	Tennessee Colony VFD	X	X	X	X	X	X	X	X	X	X
	Tucker VFD	X	X	X	X	X	X	X	X	X	X
	Westside VFD	X	X	X	X	X	X	X	X	X	X
Elkhart	Elkhart Oaks Nursing Homes	X	X	X	X	X	X	X	X	X	X
	Elkhart City Office	X	X	X	X	X	X	X	X	X	X
	Elkhart Independent School District	X	X	X	X	X	X	X	X	X	X
	Elkhart Head-start East Texas	X	X	X	X	X	X	X	X	X	X
	Water Building	X	X	X	X	X	X	X	X	X	X
	Public Works	X	X	X	X	X	X	X	X	X	X
	Lift Station at Jones Road	X	X						X		
	Lift Station/Pump Station/Water Well at Day Road	X	X						X		
	Lift Station/Pump Station at Reliable	X	X						X		
	Lift Station at Hemby Street	X	X	X	X	X	X	X	X	X	X
	Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X	X
	Water Well at School Street	X	X						X		
	Newsome Well	X	X						X		
	Elkhart High School	X	X	X	X	X	X	X	X	X	X
	CHRISTUS Health Clinic	X	X	X	X	X	X	X	X	X	X
	Elkhart Dental Office	X	X	X	X	X	X	X	X	X	X

	Frankston Police Department	X	X	X	X	X	X	X	X	X	X
	Frankston City Hall	X	X	X	X	X	X	X	X	X	X
	Public Works	X	X	X	X	X	X	X	X	X	X
	Frankston Independent School District	X	X	X	X	X	X	X	X	X	X
	Little Kid's Preschool	X	X	X	X	X	X	X	X	X	X
	Precious Angels Daycare	X	X	X	X	X	X	X	X	X	X
	First Baptist Church - Frankston	X	X	X	X	X	X	X	X	X	X
	Water Treatment Plant	X	X	X	X	X	X	X	X	X	X
	North Well Station	X	X						X		
	Well Station at Garner Street	X	X						X		
	Methodist Family Life Center	X	X	X	X	X	X	X	X	X	X
	Pump Station at HWY 75 W	X	X						X		
	Northwood Pump Station	X	X						X		
	Scarborough Pump Station	X	X						X		
	Pump Station at Pecan Street	X	X						X		
Frankston	Pump House at Regan/Perry	X	X						X		
	Palestine City Hall	X	X	X	X	X	X	X	X	X	X
	WIC Clinic	X	X	X	X	X	X	X	X	X	X
	Public Works	X	X	X	X	X	X	X	X	X	X
	Fire Station #1	X	X	X	X	X	X	X	X	X	X
	Fire Station #2	X	X	X	X	X	X	X	X	X	X
	Brookdale Nursing Home	X	X	X	X	X	X	X	X	X	X
	The Legacy at Town Creek	X	X	X	X	X	X	X	X	X	X
Palestine	Dogwood Trails	X	X	X	X	X	X	X	X	X	X
	Greenbriar Nursing Home	X	X	X	X	X	X	X	X	X	X
	Palestine Healthcare	X	X	X	X	X	X	X	X	X	X
	TRU Care	X	X	X	X	X	X	X	X	X	X
	Windermere Assisted Living Cartmell	X	X	X	X	X	X	X	X	X	X
	Palestine Independent School District	X	X	X	X	X	X	X	X	X	X
	Westwood Independent School District	X	X	X	X	X	X	X	X	X	X
	University of Texas Innovation Academy	X	X	X	X	X	X	X	X	X	X

	ABC Learning Academy	X	X	X	X	X	X	X	X	X	X
	Candy Cane Corner Childcare	X	X	X	X	X	X	X	X	X	X
	Evangelistic Temple Church Daycare Center	X	X	X	X	X	X	X	X	X	X
	Family Outreach & Resources	X	X	X	X	X	X	X	X	X	X
	First Presbyterian Preschool	X	X	X	X	X	X	X	X	X	X
	First United Methodist Church Preschool	X	X	X	X	X	X	X	X	X	X
	Gingerbread House Daycare	X	X	X	X	X	X	X	X	X	X
	Jack & Jill Early Learning	X	X	X	X	X	X	X	X	X	X
	Palestine YMCA	X	X	X	X	X	X	X	X	X	X
	Crisis Center of Anderson and Cherokee Counties	X	X	X	X	X	X	X	X	X	X
	Southside Baptist Childcare	X	X	X	X	X	X	X	X	X	X
	Sunshine Preschool and Daycare	X	X	X	X	X	X	X	X	X	X
	Freedom Fellowship Church	X	X	X	X	X	X	X	X	X	X
	Palestine Senior Activity Center & Meals On Wheels of Palestine	X	X	X	X	X	X	X	X	X	X

C) Vulnerable Parcels

Table 30: Parcels Vulnerable to Tornados

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Anderson County	**45,877**	**$9,196,009,739**
City of Elkhart	1,059	$95,824,776
City of Frankston	1,655	$225,907,502
City of Palestine	14,130	$ 1,788,378,777

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 since only about 20 percent of supercell thunderstorms produce tornadoes."[26]

[26] https://education.nationalgeographic.org/resource/tornadoes-and-climate-change/

7. 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 31: 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

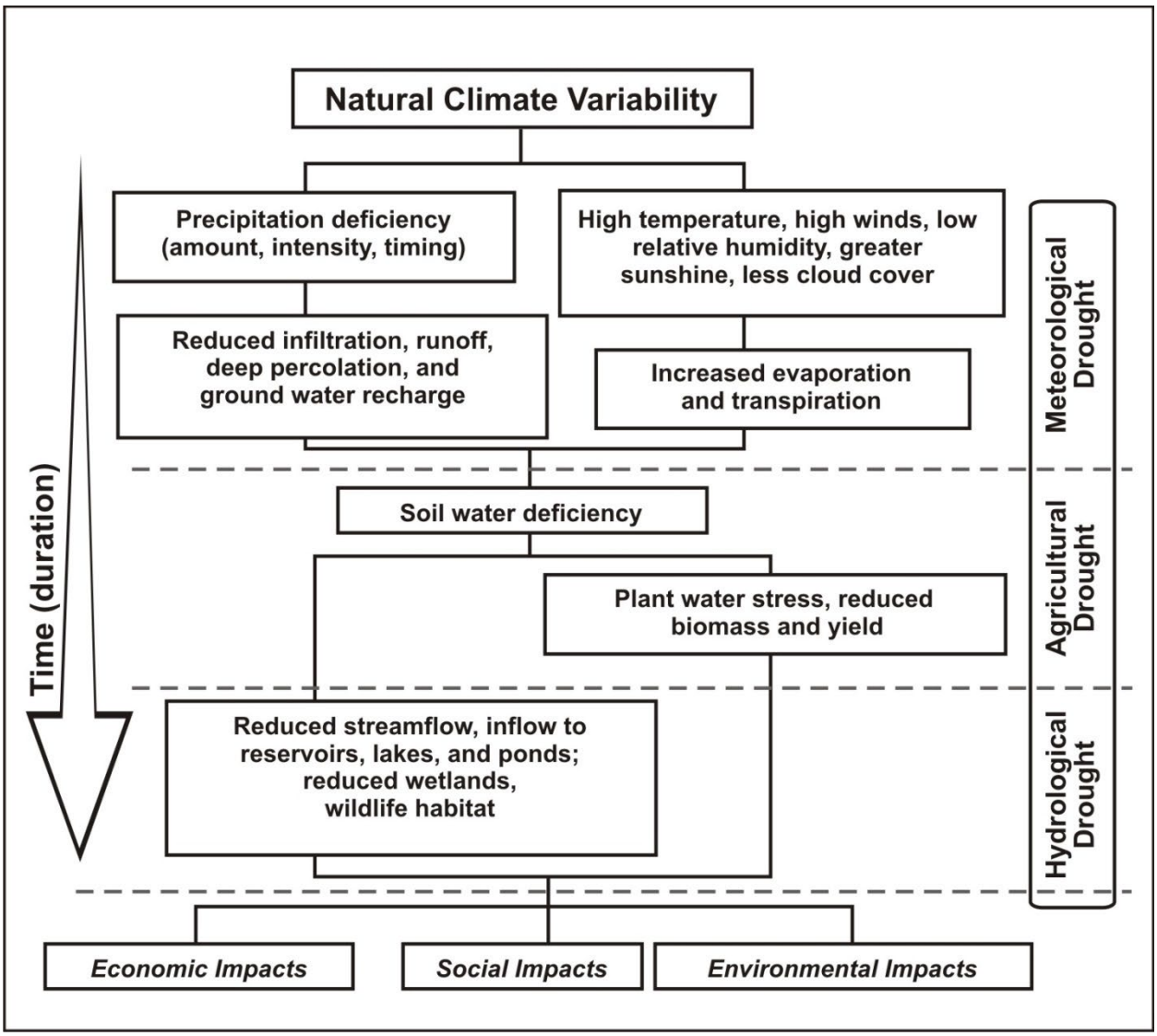


Figure 19: Sequence of Drought Occurrence and Impacts for Commonly Accepted Drought Types[28]

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

1) Drought History[29]

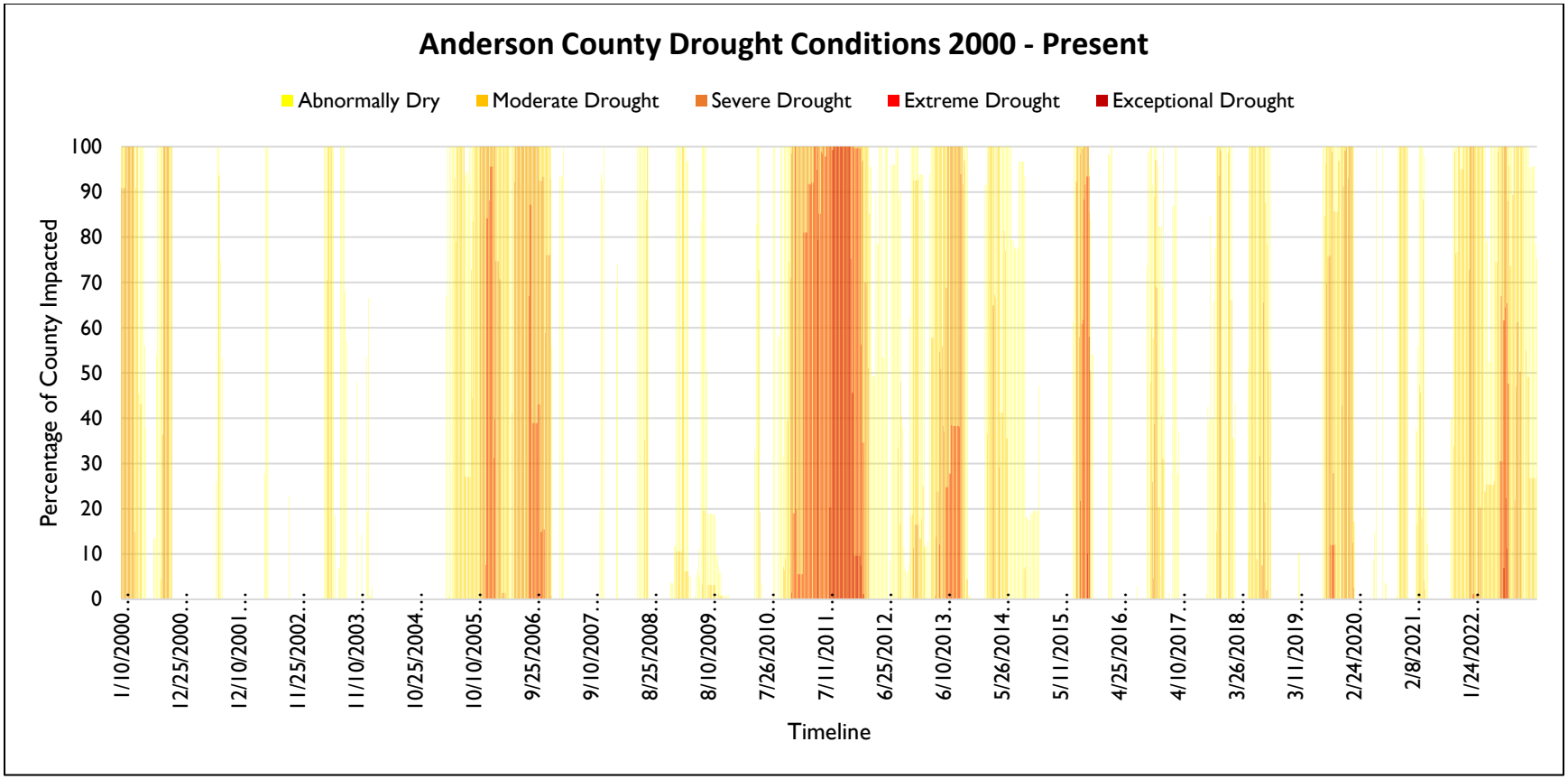


Figure 20: Anderson County Drought History

[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 individual cities is available, it's possible to use the data in Figure 20 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, Anderson County and the participating jurisdictions have regularly experienced drought conditions since 2000.

The 2018 Anderson County HMAP previously noted 34 drought occurrences from 1996 to 2016.

The following table identifies drought events and associated damages in Anderson County and the participating jurisdictions since the previous plan, as reported in the NCEI database.

Table 32: Anderson County Drought History

Location	Date Range	Number of Drought Events	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Countywide	12/01/2017 – 11/01/2022	14	0	0	$0	$8,262.90

2) Likelihood of Future Events

Based on historical drought in Texas and Anderson County, it is highly likely that a future drought will affect Anderson 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, Anderson County has regularly experienced county-wide droughts classified as periods ranging from abnormal dryness to exceptional drought. Between 2010 and 2012, 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 33: 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 34: Palmer Drought Category Descriptions[30]

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, Anderson 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 on the low end of the Index but will intensify with duration and

[30] www.droughtmonitor.unl.edu

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.

Anderson County does not have a drought contingency plan.

The City of Elkhart adopted its current Drought Contingency Plan in August 2000. The plan describes four stages of water restrictions ranging from voluntary conservation to prohibition of activities and water allocation. Each stage is triggered by changes in the level of water demand relative to the safe operating capacity of the City's water supply facilities or the occurrence of a water supply emergency.

The City of Frankston adopted its current Drought Contingency Plan in December 2021. The plan describes three stages of water restrictions ranging from voluntary conservation to prohibition of activities and water allocation. Each stage is triggered by changes in the level of water demand relative to the safe operating capacity of the City's water supply facilities or the occurrence of a water supply emergency.

The City of Palestine adopted its current Drought Contingency Plan in February 2007. The plan describes three stages of water restrictions ranging from voluntary conservation to prohibition of activities and water allocation. Each stage is triggered by changes in the level of water demand relative to the safe operating capacity of the City's water supply facilities or the occurrence of a water supply emergency.

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, Anderson 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 35: Critical Facilities Vulnerable to Drought and Potential Impacts

Jurisdiction	Critical Facilities	Potential Drought Impacts	
		Increased Demand for Services	Economic Damages
Anderson County	Anderson County Sheriff's Office	X	X
	Anderson County Jail	X	X
	Anderson County Extension	X	X
	Anderson County Appraisal District	X	X
	Anderson County Auto Dept.	X	X
	Anderson County Barn Pct. 1	X	X
	Anderson County Barn Pct. 2	X	X
	Anderson County Barn Pct. 4	X	X
	Anderson County Constable Pct. 1; Justice of the Peace	X	X
	Anderson County Constable Pct 2; Justice of the Peace	X	X
	Anderson County Constable Pct 3	X	X
	Anderson County Constable Pct 4	X	X
	Anderson County Courthouse Annex	X	X
	Anderson County Our Place	X	X
	Cayuga Independent School District	X	X
	Neches Independent School District	X	X
	Slocum Independent School District	X	X
	Anderson County Justice of Peace Pct 3	X	X
	Anderson Co Courthouse	X	X
	Anderson Co Barn Pct 3	X	X
	Anderson Co Veterans Services	X	X
	Anderson Co Pct 4 Justice of Peace	X	X
	Anderson Co Tax Collector	X	X
	Anderson Co Agricultural Building	X	X
	Civic Center	X	X
	84 East VFD	X	X

	Bethel-Cayuga VFD	X	X
	Bradford VFD	X	X
	Elkhart VFD	X	X
	Elmwood VFD	X	X
	Frankston VFD	X	X
	Montalba VFD	X	X
	Neches VFD	X	X
	Slocum VFD	X	X
	Palestine-Southside VFD	X	X
	Tennessee Colony VFD	X	X
	Tucker VFD	X	X
	Westside VFD	X	X
Elkhart	Elkhart Oaks Nursing Homes	X	X
	Elkhart City Office	X	X
	Elkhart Independent School District	X	X
	Elkhart Head-start East Texas	X	X
	Water Building	X	X
	Public Works	X	X
	Lift Station at Jones Road	X	X
	Lift Station/Pump Station/Water Well at Day Road	X	X
	Lift Station/Pump Station at Reliable	X	X
	Lift Station at Hemby Street	X	X
	Wastewater Treatment Plant	X	X
	Water Well at School Street	X	X
	Newsome Well	X	X
	Elkhart High School	X	X
	CHRISTUS Health Clinic	X	X
	Elkhart Dental Office	X	X

Frankston	Frankston Police Department	X	X
	Frankston City Hall	X	X
	Public Works	X	X
	Frankston Independent School District	X	X
	Little Kid's Preschool	X	X
	Precious Angels Daycare	X	X
	First Baptist Church - Frankston	X	X
	Water Treatment Plant	X	X
	North Well Station	X	X
	Well Station at Garner Street	X	X
	Methodist Family Life Center	X	X
	Pump Station at HWY 75 W	X	X
	Northwood Pump Station	X	X
	Scarborough Pump Station	X	X
	Pump Station at Pecan Street	X	X
	Pump House at Regan/Perry	X	X
Palestine	Palestine City Hall	X	X
	WIC Clinic	X	X
	Public Works	X	X
	Fire Station #1	X	X
	Fire Station #2	X	X
	Brookdale Nursing Home	X	X
	The Legacy at Town Creek	X	X
	Dogwood Trails	X	X
	Greenbriar Nursing Home	X	X
	Palestine Healthcare	X	X
	TRU Care	X	X
	Windermere Assisted Living Cartmell	X	X

	Palestine Independent School District	X	X
	Westwood Independent School District	X	X
	University of Texas Innovation Academy	X	X
	ABC Learning Academy	X	X
	Candy Cane Corner Childcare	X	X
	Evangelistic Temple Church Daycare Center	X	X
	Family Outreach & Resources	X	X
	First Presbyterian Preschool	X	X
	First United Methodist Church Preschool	X	X
	Gingerbread House Daycare	X	X
	Jack & Jill Early Learning	X	X
	Palestine YMCA	X	X
	Crisis Center of Anderson and Cherokee Counties	X	X
	Southside Baptist Childcare	X	X
	Sunshine Preschool and Daycare	X	X
	Freedom Fellowship Church	X	X
	Palestine Senior Activity Center & Meals On Wheels of Palestine	X	X

C) Vulnerable Parcels

Given drought's geographic reach, all parcels within the participating jurisdictions are equally vulnerable to the hazard. However, given the limited damage inflicted by previous droughts, future damages are expected to be similarly limited.

Table 36: Parcels Vulnerable to Drought

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Anderson County	**45,877**	**$9,196,009,739**
City of Elkhart	1,059	$95,824,776
City of Frankston	1,655	$225,907,502
City of Palestine	14,130	$ 1,788,378,777

I. Agricultural Production

According to the USDA 2017 Census of Agriculture[31], the total market value of agricultural products sold, including direct sales, in Anderson County was $92,943,000. About $6,603,659 in indemnities was paid to farmers in Anderson County between 1995 and 2021[32]. That is roughly $253,987 per year. Although the proportion of indemnities paid to cover losses due to drought isn't identifiable, given Anderson County's recent drought history, it is likely that at least some of the dollars paid were related to drought-caused damages.

Given agriculture's role in the County, drought-caused losses will have impacts beyond any individual and may lead to contraction in the wider economy. However, because the data is recorded at the county level, there is no specific information regarding agricultural losses to due drought for the individual participating jurisdictions.

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

[31]https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Texas/st48_2_0001_0001.pdf
[32] https://farm.ewg.org/cropinsurance.php?fips=48000&summpage=IN_REGPAGE

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."[33]

[33] https://www.epa.gov/climate-indicators/climate-change-indicators-drought

8. 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.[34] 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

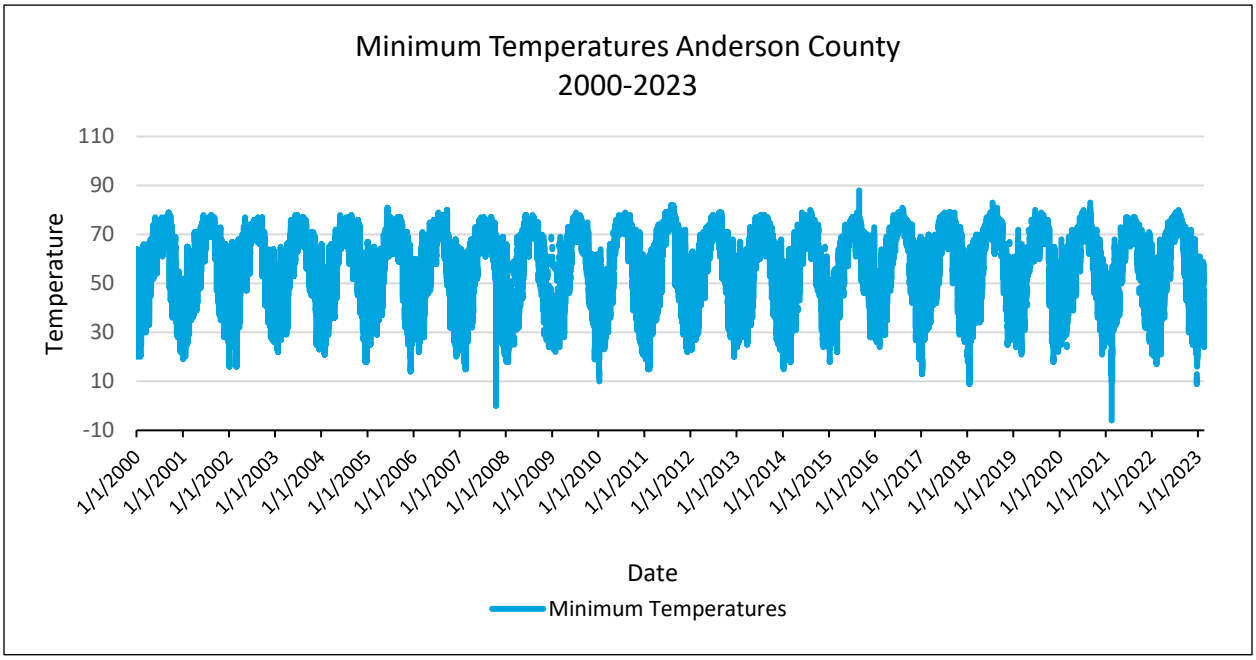


Figure 21: Minimum Recorded Daily Temperature 2000-2022[35]

Anderson 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 of the State of Texas mitigation plan, extreme cold was considered part of the severe winter storm hazard.

Between 2000 and 2021, Anderson County experienced 2,548 days with a minimum temperature of 32˚F or colder. At least 85 of those days had a maximum temperature of 32˚F or below. During the same timeframe, the coldest temperature recorded was -6˚F on February 16, 2021. Temperature data is recorded at the county level. However, given the nature of extreme cold and the proximity of all jurisdictions to each other, the jurisdictions addressing the hazard

[34] 2018 State of Texas Hazard Mitigation Plan
[35] Source: National Centers for Environmental Information, https://www.ncdc.noaa.gov/cdo-web/datasets

experienced the same extreme cold events. The following table show the only events recorded in the NCEI database from 2000 – 2023, although it is likely that more events have gone unreported.

Table 37: Anderson County Extreme Cold History

Location	Date Range	Number of Extreme Cold Events	Fatalities	Injuries	Property Damage $2022	Crop Damage $2022
Countywide	10/31/2019 – 2/15/2021	2	0	0	$938,149.98	0

During these extreme cold events, the County and participating jurisdictions experienced freezing temperatures with long durations of cold spells leading to power outages and issues with water pressures. The risk of frozen pipe bursts is high for homes and critical facilities.

2) Likelihood of Future Occurrence

Based on historic weather data, extreme cold in Anderson County and the participating jurisdictions is occasional, meaning an event affecting any or all the participating jurisdictions is probable in the next five 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.

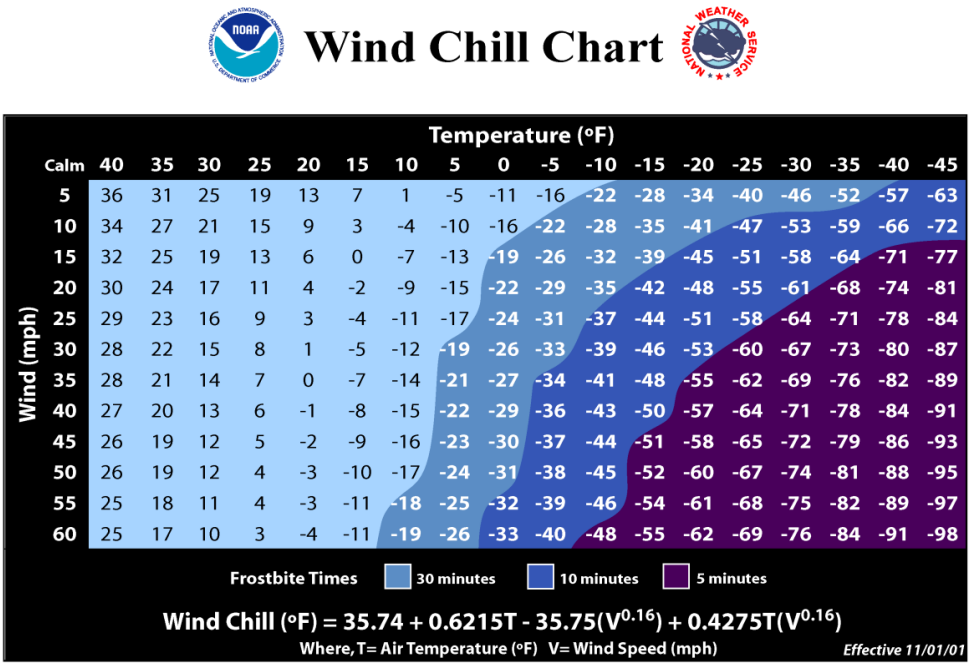


Figure 22: NOAA's NWS Wind Chill Index

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 Anderson County and the participating jurisdictions may meet the current record temperature of -6˚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 property or crop damage specifically tied to extreme cold events has been recorded in any of the participating jurisdictions. No deaths related to extreme cold have ever been reported in the participating jurisdictions. However, 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 even 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, Anderson 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 are not considered vulnerable to damages significant enough to interrupt or stop normal operations. However, damage to existing buildings and infrastructure, caused by winter weather and extreme cold in recent years, has shown exceptions to long held assumptions about the threat of these hazards. Therefore, all critical facilities are potentially vulnerable to the impacts noted in Section 4B of this chapter.

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.[36] 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 infrequency, while weaker Arctic polar vortex conditions and stretching disruptions are increased in frequency for October through February." [37]

[36] https://cpo.noaa.gov/Divisions-Programs/Earth-System-Science-and-Modeling/MAPP

[37] 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

9. 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 water vapor is mostly 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.[38]

1) Hailstorm History

The 2018 plan reported that Anderson County and the participating jurisdictions experienced 182 hail events between 1955 and 2017, with hail size ranging from .75 to 4.5 inches in diameter. The 2018 plan recorded over $ 102,947.33 in property damages during that time adjusted to $2023. Historically, the County reported a high probability of hailstorms, particularly in association with seasonal patterns during the spring and early fall.

The following tables identify the most comprehensive list available of hailstorm events and associated damages in Anderson County and the participating jurisdictions from 2017 to present. No participating jurisdiction has recorded a hailstorm more recently than what is listed below.

[38] 2018 State of Texas Hazard Mitigation Plan

Table 38: Anderson County Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Countywide	4/06/2019 – 4/30/2022	13	.88 – 1.75	0	0	$15,716.33	$0

Table 39: City of Elkhart Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Citywide	4/30/2022	1	1	0	0	$0	$0

Table 40: City of Palestine Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Citywide	4/06/2019 – 4/30/2022	10	.75 – 1.5	0	0	$0	$0

According to the best information available, there have been no hail events within the City of Frankston since the 2018 HMAP.

2) Likelihood of Future Events

Based on the history of hailstorms, a hailstorm in Anderson County and each of the participating jurisdictions is highly likely, meaning that an event is probable within the next year.

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 damage per year. The scale showing intensity categories in Table 40 was developed by combining data from National Climatic Data Center (NCDC) and the Tornado and Storm Research Organization (TORRO).

Table 41: Hailstorm Intensity[39,40]

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	Severe35F40F[41]	0.80-1.20	Nickel – Half dollar	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
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 Anderson County and the participating jurisdictions have produced hail up to 1.75” in diameter, H5 on the Hailstorm Intensity Scale.

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

[39] http://www1.ncdc.noaa.gov/pub/data/cmb/extremes/scec/reports/SCEC-Hail-Guide.pdf
[40] http://www.torro.org.uk/hscale.php
[41] Hail must be 1” or larger to be classified as severe.

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, Anderson 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 42: 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
Anderson County	Anderson County Sheriff's Office	X	X	X
	Anderson County Jail	X	X	X
	Anderson County Extension	X	X	X
	Anderson County Appraisal District	X	X	X
	Anderson County Auto Dept.	X	X	X
	Anderson County Barn Pct. 1	X	X	X
	Anderson County Barn Pct. 2	X	X	X
	Anderson County Barn Pct. 4	X	X	X
	Anderson County Constable Pct. 1; Justice of the Peace	X	X	X
	Anderson County Constable Pct 2; Justice of the Peace	X	X	X
	Anderson County Constable Pct 3	X	X	X
	Anderson County Constable Pct 4	X	X	X
	Anderson County Courthouse Annex	X	X	X
	Anderson County Our Place	X	X	X
	Cayuga Independent School District	X	X	X
	Neches Independent School District	X	X	X
	Slocum Independent School District	X	X	X
	Anderson County Justice of Peace Pct 3	X	X	X
	Anderson Co Courthouse	X	X	X
	Anderson Co Barn Pct 3	X	X	X
	Anderson Co Veterans Services	X	X	X
	Anderson Co Pct 4 Justice of Peace	X	X	X
	Anderson Co Tax Collector	X	X	X
	Anderson Co Agricultural Building	X	X	X
	Civic Center	X	X	X
	84 East VFD	X	X	X
	Bethel-Cayuga VFD	X	X	X
	Bradford VFD	X	X	X
	Elkhart VFD	X	X	X
	Elmwood VFD	X	X	X
	Frankston VFD	X	X	X
	Montalba VFD	X	X	X
	Neches VFD	X	X	X

	Slocum VFD	X	X	X
	Palestine-Southside VFD	X	X	X
	Tennessee Colony VFD	X	X	X
	Tucker VFD	X	X	X
	Westside VFD	X	X	X
Elkhart	Elkhart Oaks Nursing Homes	X	X	X
	Elkhart City Office	X	X	X
	Elkhart Independent School District	X	X	X
	Elkhart Head-start East Texas	X	X	X
	Water Building	X	X	X
	Public Works	X	X	X
	Lift Station at Jones Road			X
	Lift Station/Pump Station/Water Well at Day Road			X
	Lift Station/Pump Station at Reliable			X
	Lift Station at Hemby Street			X
	Wastewater Treatment Plant			X
	Water Well at School Street			X
	Newsome Well	X	X	X
	Elkhart High School	X	X	X
	CHRISTUS Health Clinic	X	X	X
	Elkhart Dental Office	X	X	X
Frankston	Frankston Police Department	X	X	X
	Frankston City Hall	X	X	X
	Public Works	X	X	X
	Frankston Independent School District	X	X	X
	Little Kid's Preschool	X	X	X
	Precious Angels Daycare	X	X	X
	First Baptist Church - Frankston	X	X	X
	Water Treatment Plant	X	X	X
	North Well Station			X
	Well Station at Garner Street			X
	Methodist Family Life Center	X	X	X
	Pump Station at HWY 75 W			X
	Northwood Pump Station			X
	Scarborough Pump Station			X
	Pump Station at Pecan Street			X
	Pump House at Regan/Perry			X
Palestine	Palestine City Hall	X	X	X
	WIC Clinic	X	X	X

	Public Works	X	X	X
	Fire Station #1	X	X	X
	Fire Station #2	X	X	X
	Brookdale Nursing Home	X	X	X
	The Legacy at Town Creek	X	X	X
	Dogwood Trails	X	X	X
	Greenbriar Nursing Home	X	X	X
	Palestine Healthcare	X	X	X
	TRU Care	X	X	X
	Windermere Assisted Living Cartmell	X	X	X
	Palestine Independent School District	X	X	X
	Westwood Independent School District	X	X	X
	University of Texas Innovation Academy	X	X	X
	ABC Learning Academy	X	X	X
	Candy Cane Corner Childcare	X	X	X
	Evangelistic Temple Church Daycare Center	X	X	X
	Family Outreach & Resources	X	X	X
	First Presbyterian Preschool	X	X	X
	First United Methodist Church Preschool	X	X	X
	Gingerbread House Daycare	X	X	X
	Jack & Jill Early Learning	X	X	X
	Palestine YMCA	X	X	X
	Crisis Center of Anderson and Cherokee Counties	X	X	X
	Southside Baptist Childcare	X	X	X
	Sunshine Preschool and Daycare	X	X	X
	Freedom Fellowship Church	X	X	X
	Palestine Senior Activity Center & Meals On Wheels of Palestine	X	X	X

C) Vulnerable Commercial Structures

Every structure is vulnerable to damage from hail. However, commercial structures with large and/or flat roofs are especially vulnerable due to the increased exposure that large and/or flat roofs create. According to the Texas State Comptroller's 2021 Appraisal District Ratio Study, Anderson County has commercial real property valued at $377,179,567.[42]

D) Vulnerable Parcels

Table 43: All Parcels Vulnerable to Hailstorms

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Anderson County	**45,877**	**$9,196,009,739**
City of Elkhart	1,059	$95,824,776
City of Frankston	1,655	$225,907,502
City of Palestine	14,130	$ 1,788,378,777

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."[43]

[42] https://comptroller.texas.gov/data/property-tax/ratio-study/2021/
[43] https://www.nature.com/articles/s43017-020-00133-9

10. Winter Storm

Winter storms are defined by extreme winter weather through heavy concentrations 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 of more than 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.[44]

1) Winter Storm History

In the 2018 HMAP, Anderson County and the participating jurisdictions reported 19 severe winter storm events between 1994 and 2017; however, the 2018 HMAP reported five major winter storm events, which caused more than $25 million in damages throughout the county adjusted to $2023. The 2018 plan found that the frequency of occurrences of severe winter storms is likely, with an event probable in the next three years.

NCEI data shows that Anderson County experienced four winter storm events between February 2018 and February 2023. None are reported to have caused any injuries, fatalities, nor crop or property damage. The most recent historic winter storm event was Winter Storm Uri which occurred in February 2021. During this event, Anderson County and surrounding areas received between five to nine inches of snow and sleet, along with a period of freezing rain with up to about a half an inch of ice accretion. During such events, water supply, tree limbs, transportation, and power lines are potentially impacted due to the weight of accumulated snow and ice.

[44] 2018 State of Texas Hazard Mitigation Plan

Table 44: Anderson County Severe Winter Storm History

Location	Date Range	Number of Severe Winter Storms	Winter Storm Types	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Countywide	2/11/2018 – 2/01/2023	4	Winter Weather, Heavy Snow, Ice Storm	0	0	$0	$0

2) Likelihood of Future Events

Future winter storms in Anderson County and the participating jurisdictions are considered likely due to the significant impacts of the historic winter weather, meaning an event affecting any or all participating jurisdictions is probable in the next three years.

3) Extent

The table below displays the magnitude of severe winter storms.

Table 45: Winter Weather Extent Scale[45]

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. *A Freeze Watch is issued when these conditions may be met 12 to 48 hours in the future.*
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.

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

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. 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 Advisory38F45F[46]	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 Warning39F46F[47]	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. *A Winter Storm Watch is issued when these conditions may be met 12 to 48 hours in the future.*
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. *A Blizzard Watch is issued when these conditions may be met 12 to 48 hours in the future.*

* - Non-precipitation watch / warning / advisory

Based on previous winter storm events, future storms in Anderson County and the participating jurisdictions may see snow accumulation of up to 9” and see ice accumulation of up to .5”.

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.

[46] https://www.osha.gov/dts/weather/winter_weather/windchill.html
[47] https://www.osha.gov/dts/weather/winter_weather/windchill.html

B) Impact

The potential impact of a severe winter storm 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, severe winter weather has 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 severe winter storms have been reported in the participating jurisdictions, in the worst cases, the hazard has the potential to be deadly.

Severe 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, a severe winter storm may damage or destroy crops.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Anderson 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 severe winter weather 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 severe winter weather 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 severe winter weather 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 46: Critical Facilities Vulnerable to Winter Storms

Jurisdiction	Critical Facilities	Potential Severe Winter Storm Impacts
		Falling Tree Limbs
Anderson County	Anderson County Sheriff's Office	X
	Anderson County Jail	X
	Anderson County Extension	X
	Anderson County Appraisal District	X
	Anderson County Auto Dept.	X
	Anderson County Barn Pct. 1	X
	Anderson County Barn Pct. 2	X
	Anderson County Barn Pct. 4	X
	Anderson County Constable Pct. 1; Justice of the Peace	X
	Anderson County Constable Pct 2; Justice of the Peace	X
	Anderson County Constable Pct 3	X
	Anderson County Constable Pct 4	X
	Anderson County Courthouse Annex	X
	Anderson County Our Place	X
	Cayuga Independent School District	X
	Neches Independent School District	X
	Slocum Independent School District	X
	Anderson County Justice of Peace Pct 3	X
	Anderson Co Courthouse	X
	Anderson Co Barn Pct 3	X
	Anderson Co Veterans Services	X
	Anderson Co Pct 4 Justice of Peace	X
	Anderson Co Tax Collector	X
	Anderson Co Agricultural Building	X
	Civic Center	X
	84 East VFD	X
	Bethel-Cayuga VFD	X
	Bradford VFD	X
	Elkhart VFD	X
	Elmwood VFD	X
	Frankston VFD	X
	Montalba VFD	X
	Neches VFD	X
	Slocum VFD	X
	Palestine-Southside VFD	X
	Tennessee Colony VFD	X
	Tucker VFD	X
	Westside VFD	X
Elkhart	Elkhart Oaks Nursing Homes	X

	Elkhart City Office	X
	Elkhart Independent School District	X
	Elkhart Head-start East Texas	X
	Water Building	X
	Public Works	X
	Lift Station at Jones Road	X
	Lift Station/Pump Station/Water Well at Day Road	X
	Lift Station/Pump Station at Reliable	X
	Lift Station at Hemby Street	X
	Wastewater Treatment Plant	X
	Water Well at School Street	X
	Newsome Well	X
	Elkhart High School	X
	CHRISTUS Health Clinic	X
	Elkhart Dental Office	X
Frankston	Frankston Police Department	X
	Frankston City Hall	X
	Public Works	X
	Frankston Independent School District	X
	Little Kid's Preschool	X
	Precious Angels Daycare	X
	First Baptist Church - Frankston	X
	Water Treatment Plant	X
	North Well Station	X
	Well Station at Garner Street	X
	Methodist Family Life Center	X
	Pump Station at HWY 75 W	X
	Northwood Pump Station	X
	Scarborough Pump Station	X
	Pump Station at Pecan Street	X
	Pump House at Regan/Perry	X
Palestine	Palestine City Hall	X
	WIC Clinic	X
	Public Works	X
	Fire Station #1	X
	Fire Station #2	X
	Brookdale Nursing Home	X
	The Legacy at Town Creek	X
	Dogwood Trails	X
	Greenbriar Nursing Home	X
	Palestine Healthcare	X
	TRU Care	X
	Windermere Assisted Living Cartmell	X

	Palestine Independent School District	X
	Westwood Independent School District	X
	University of Texas Innovation Academy	X
	ABC Learning Academy	X
	Candy Cane Corner Childcare	X
	Evangelistic Temple Church Daycare Center	X
	Family Outreach & Resources	X
	First Presbyterian Preschool	X
	First United Methodist Church Preschool	X
	Gingerbread House Daycare	X
	Jack & Jill Early Learning	X
	Palestine YMCA	X
	Crisis Center of Anderson and Cherokee Counties	X
	Southside Baptist Childcare	X
	Sunshine Preschool and Daycare	X
	Freedom Fellowship Church	X
	Palestine Senior Activity Center & Meals On Wheels of Palestine	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 snow[48]. The worst snowstorm in any participating jurisdiction dropped up to a maximum of 9". Although it's not impossible[49] 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 .5", it's unlikely, but not 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.

[48] https://disastersafety.org/freezing-weather/prevent-roof-collapse-homes/

[49] 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.

D) Vulnerable Parcels

Table 47: All Parcels Vulnerable to Winter Storms

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Anderson County	**45,877**	**$9,196,009,739**
City of Elkhart	1,059	$95,824,776
City of Frankston	1,655	$225,907,502
City of Palestine	14,130	$ 1,788,378,777

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."[50]

[50] https://www.epa.gov/climate-indicators/climate-change-indicators-snowfall

11. 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 can cause widespread damage and landscape devastation.[51]

1) Windstorm History

In the 2018 plan, Anderson County and participating jurisdictions recorded 206 windstorm events from 1959 and 2017. There were two injuries associated with a windstorm even in 1983. The 2018 plan recorded about $2.75 million in property damages during that time adjusted to $2023. Historically, the County reported high probability of damaging windstorms within the next year.

The following tables identify the most comprehensive list available of severe wind events and associated damages in Anderson County and the participating jurisdictions from 2018 to present. No participating jurisdiction has recorded a severe wind event more recently than 2021.

Table 48: Anderson County Severe Wind History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Countywide	4/13/2019 – 5/21/2022	7	50 - 61	0	0	$57,549.19	$0

[51] https://www.britannica.com/science/windstorm

Table 49: City of Elkhart Windstorm History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Citywide	10/31/2018 – 4/22/2020	3	48 - 55	0	0	$5,957.02	$0

Table 50: City of Palestine Windstorm History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage $2023	Crop Damage $2023
Citywide	4/18/2019 – 10/24/2022	8	39 - 61	0	0	$27,423.33	$0

There have been no recorded events for the City of Frankston since the 2018 Plan, but some events may have gone unreported.

2) Likelihood of Future Events

Given the frequency of past events in all jurisdictions, a damaging severe wind event in the future is highly likely, meaning that an event is probable in the next year.

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 51: Beaufort Wind Scale[52]

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

[52] Source: www.spc.noaa.gov/faq/tornado/beaufort.html

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	
12	64+	Hurricane	Air filled with foam, waves over 45 feet, sea completely white with driving spray, visibility greatly reduced	

The worst severe wind events in Anderson County and the participating jurisdictions have ranged up to 11 on the Beaufort Wind Scale. No recent severe wind events in any of the participating jurisdictions have caused any injuries or deaths. Future severe wind events may meet previous worst-case Force 11 events in terms of strength and intensity of wind speed.

4) Location and Impact

A) Location

Severe winds 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 damage 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, Anderson 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 damage, 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 severe wind 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 52: Critical Facilities Vulnerable to Severe Winds and Potential Impacts

Jurisdiction	Critical Facilities	Potential Severe Wind Impacts									
		Loss of Power	Flying Debris	Uprooted Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Anderson County	Anderson County Sheriff's Office	X	X	X	X	X	X	X	X	X	X
	Anderson County Jail	X	X	X	X	X	X	X	X	X	X
	Anderson County Extension	X	X	X	X	X	X	X	X	X	X
	Anderson County Appraisal District	X	X	X	X	X	X	X	X	X	X
	Anderson County Auto Dept.	X	X	X	X	X	X	X	X	X	X
	Anderson County Barn Pct. 1	X	X	X	X	X	X	X	X	X	X
	Anderson County Barn Pct. 2	X	X	X	X	X	X	X	X	X	X
	Anderson County Barn Pct. 4	X	X	X	X	X	X	X	X	X	X
	Anderson County Constable Pct. 1; Justice of the Peace	X	X	X	X	X	X	X	X	X	X
	Anderson County Constable Pct 2; Justice of the Peace	X	X	X	X	X	X	X	X	X	X
	Anderson County Constable Pct 3	X	X	X	X	X	X	X	X	X	X
	Anderson County Constable Pct 4	X	X	X	X	X	X	X	X	X	X
	Anderson County Courthouse Annex	X	X	X	X	X	X	X	X	X	X
	Anderson County Our Place	X	X	X	X	X	X	X	X	X	X
	Cayuga Independent School District	X	X	X	X	X	X	X	X	X	X
	Neches Independent School District	X	X	X	X	X	X	X	X	X	X
	Slocum Independent School District	X	X	X	X	X	X	X	X	X	X
	Anderson County Justice of Peace Pct 3	X	X	X	X	X	X	X	X	X	X
	Anderson Co Courthouse	X	X	X	X	X	X	X	X	X	X
	Anderson Co Barn Pct 3	X	X	X	X	X	X	X	X	X	X
	Anderson Co Veterans Services	X	X	X	X	X	X	X	X	X	X
	Anderson Co Pct 4 Justice of Peace	X	X	X	X	X	X	X	X	X	X
	Anderson Co Tax Collector	X	X	X	X	X	X	X	X	X	X
	Anderson Co Agricultural Building	X	X	X	X	X	X	X	X	X	X

	Civic Center	X	X	X	X	X	X	X	X	X	X
	84 East VFD	X	X	X	X	X	X	X	X	X	X
	Bethel-Cayuga VFD	X	X	X	X	X	X	X	X	X	X
	Bradford VFD	X	X	X	X	X	X	X	X	X	X
	Elkhart VFD	X	X	X	X	X	X	X	X	X	X
	Elmwood VFD	X	X	X	X	X	X	X	X	X	X
	Frankston VFD	X	X	X	X	X	X	X	X	X	X
	Montalba VFD	X	X	X	X	X	X	X	X	X	X
	Neches VFD	X	X	X	X	X	X	X	X	X	X
	Slocum VFD	X	X	X	X	X	X	X	X	X	X
	Palestine-Southside VFD	X	X	X	X	X	X	X	X	X	X
	Tennessee Colony VFD	X	X	X	X	X	X	X	X	X	X
	Tucker VFD	X	X	X	X	X	X	X	X	X	X
	Westside VFD	X	X	X	X	X	X	X	X	X	X
Elkhart	Elkhart Oaks Nursing Homes	X	X	X	X	X	X	X	X	X	X
	Elkhart City Office	X	X	X	X	X	X	X	X	X	X
	Elkhart Independent School District	X	X	X	X	X	X	X	X	X	X
	Elkhart Head-start East Texas	X	X	X	X	X	X	X	X	X	X
	Water Building	X	X	X	X	X	X	X	X	X	X
	Public Works	X	X	X	X	X	X	X	X	X	X
	Lift Station at Jones Road	X	X	X						X	
	Lift Station/Pump Station/Water Well at Day Road	X	X	X						X	
	Lift Station/Pump Station at Reliable	X	X	X						X	
	Lift Station at Hemby Street	X	X	X						X	
	Wastewater Treatment Plant										
	Water Well at School Street	X	X	X						X	
	Newsome Well	X	X	X						X	
	Elkhart High School	X	X	X	X	X	X	X	X	X	X
	CHRISTUS Health Clinic	X	X	X	X	X	X	X	X	X	X
	Elkhart Dental Office	X	X	X	X	X	X	X	X	X	X

Frankston	Frankston Police Department	X	X	X	X	X	X	X	X	X	X
	Frankston City Hall	X	X	X	X	X	X	X	X	X	X
	Public Works	X	X	X	X	X	X	X	X	X	X
	Frankston Independent School District	X	X	X	X	X	X	X	X	X	X
	Little Kid's Preschool	X	X	X	X	X	X	X	X	X	X
	Precious Angels Daycare	X	X	X	X	X	X	X	X	X	X
	First Baptist Church - Frankston	X	X	X	X	X	X	X	X	X	X
	Water Treatment Plant	X	X	X	X	X	X	X	X	X	X
	North Well Station	X	X	X						X	
	Well Station at Garner Street	X	X	X						X	
	Methodist Family Life Center										
	Pump Station at HWY 75 W	X	X	X						X	
	Northwood Pump Station	X	X	X						X	
	Scarborough Pump Station	X	X	X						X	
	Pump Station at Pecan Street	X	X	X						X	
	Pump House at Regan/Perry	X	X	X						X	
Palestine	Palestine City Hall	X	X	X	X	X	X	X	X	X	X
	WIC Clinic	X	X	X	X	X	X	X	X	X	X
	Public Works	X	X	X	X	X	X	X	X	X	X
	Fire Station #1	X	X	X	X	X	X	X	X	X	X
	Fire Station #2	X	X	X	X	X	X	X	X	X	X
	Brookdale Nursing Home	X	X	X	X	X	X	X	X	X	X
	The Legacy at Town Creek	X	X	X	X	X	X	X	X	X	X
	Dogwood Trails	X	X	X	X	X	X	X	X	X	X
	Greenbriar Nursing Home	X	X	X	X	X	X	X	X	X	X
	Palestine Healthcare	X	X	X	X	X	X	X	X	X	X
	TRU Care	X	X	X	X	X	X	X	X	X	X
	Windermere Assisted Living Cartmell	X	X	X	X	X	X	X	X	X	X
	Palestine Independent School District	X	X	X	X	X	X	X	X	X	X
	Westwood Independent School District	X	X	X	X	X	X	X	X	X	X
	University of Texas Innovation Academy	X	X	X	X	X	X	X	X	X	X

	ABC Learning Academy	X	X	X	X	X	X	X	X	X	X
	Candy Cane Corner Childcare	X	X	X	X	X	X	X	X	X	X
	Evangelistic Temple Church Daycare Center	X	X	X	X	X	X	X	X	X	X
	Family Outreach & Resources	X	X	X	X	X	X	X	X	X	X
	First Presbyterian Preschool	X	X	X	X	X	X	X	X	X	X
	First United Methodist Church Preschool	X	X	X	X	X	X	X	X	X	X
	Gingerbread House Daycare	X	X	X	X	X	X	X	X	X	X
	Jack & Jill Early Learning	X	X	X	X	X	X	X	X	X	X
	Palestine YMCA	X	X	X	X	X	X	X	X	X	X
	Crisis Center of Anderson and Cherokee Counties	X	X	X	X	X	X	X	X	X	X
	Southside Baptist Childcare	X	X	X	X	X	X	X	X	X	X
	Sunshine Preschool and Daycare	X	X	X	X	X	X	X	X	X	X
	Freedom Fellowship Church	X	X	X	X	X	X	X	X	X	X
	Palestine Senior Activity Center & Meals On Wheels of Palestine	X	X	X	X	X	X	X	X	X	X

C) Vulnerable Parcels

Table 53: Parcels Vulnerable to Windstorms

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Anderson County	**45,877**	**$9,196,009,739**
City of Elkhart	1,059	$95,824,776
City of Frankston	1,655	$225,907,502
City of Palestine	14,130	$ 1,788,378,777

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."[53]

"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."[54]

[53] https://ugc.berkeley.edu/background-content/wind/#:~:text=The%20global%20atmospheric%20circulation%20pattern,by%20transporting%20heat%20and%20water.
[54] 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.

12. Lightning

Lightning is a massive electrostatic discharge between electrically charged regions within clouds, or between a cloud and the Earth's surface.[55]

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 about 20 people[56] each year in the United States.

1) Lightning History

According to NCEI data, Anderson County and the participating jurisdictions have not experienced any lightning events since the 2018 HMAP. However, lightning events often go unreported, so it is likely that events have occurred since the last plan. There is no data documenting a lightning event more recent than 2012. Anderson County and the participating jurisdictions reported 10 lightning events from 1969 to 2012.

2) Likelihood of Future Events

Lightning is especially associated with thunderstorms. Despite the lack of officially reported instances of lightning-caused damages, a lightning event is highly likely, meaning an event affecting any or all of the participating jurisdictions is probable in the next year. According to information from VAISALA[57], most of Anderson County can expect about 12 to 20 lightning flashes per square miles 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 Anderson County and all participating jurisdictions may experience lightning events between LAL 1 and LAL 5. Dry thunderstorms, LAL 6, are not expected.

[55] 2018 State of Texas Hazard Mitigation Plan
[56] https://www.weather.gov/safety/lightning-victims
[57] https://www.vaisala.com/sites/default/files/documents/WEA-MET-Annual-Lightning-Report-2020-B212260EN-A.pdf; Pg. 15

Table 54: Lightning Activity Levels[58]

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 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 myth[59] that lightning always strikes the tallest objects. Given lightning's indiscriminate nature, it is impossible to identify buildings that

[58] Source: http://www.prh.noaa.gov/hnl/pages/LAL.php
[59] http://lightning.org/wp-content/uploads/2015/06/LPI_lightning_infographic_2015.jpg

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 55: Critical Facilities Vulnerable to Lightning and Potential Impacts

Jurisdiction	Critical Facilities	Potential Lightning Impacts			
		Physical Damage	Electrical Damage	Data Damage or Loss	Fire
Anderson County	Anderson County Sheriff's Office	X	X	X	X
	Anderson County Jail	X	X	X	X
	Anderson County Extension	X	X	X	X
	Anderson County Appraisal District	X	X	X	X
	Anderson County Auto Dept.	X	X	X	X
	Anderson County Barn Pct. 1	X	X	X	X
	Anderson County Barn Pct. 2	X	X	X	X
	Anderson County Barn Pct. 4	X	X	X	X
	Anderson County Constable Pct. 1; Justice of the Peace	X	X	X	X
	Anderson County Constable Pct 2; Justice of the Peace	X	X	X	X
	Anderson County Constable Pct 3	X	X	X	X
	Anderson County Constable Pct 4	X	X	X	X
	Anderson County Courthouse Annex	X	X	X	X
	Anderson County Our Place	X	X	X	X
	Cayuga Independent School District	X	X	X	X
	Neches Independent School District	X	X	X	X
	Slocum Independent School District	X	X	X	X
	Anderson County Justice of Peace Pct 3	X	X	X	X
	Anderson Co Courthouse	X	X	X	X
	Anderson Co Barn Pct 3	X	X	X	X
	Anderson Co Veterans Services	X	X	X	X
	Anderson Co Pct 4 Justice of Peace	X	X	X	X
	Anderson Co Tax Collector	X	X	X	X
	Anderson Co Agricultural Building	X	X	X	X
	Civic Center	X	X	X	X
	84 East VFD	X	X	X	X
	Bethel-Cayuga VFD	X	X	X	X
	Bradford VFD	X	X	X	X
	Elkhart VFD	X	X	X	X
	Elmwood VFD	X	X	X	X

	Frankston VFD	X	X	X	X
	Montalba VFD	X	X	X	X
	Neches VFD	X	X	X	X
	Slocum VFD	X	X	X	X
	Palestine-Southside VFD	X	X	X	X
	Tennessee Colony VFD	X	X	X	X
	Tucker VFD	X	X	X	X
	Westside VFD	X	X	X	X
Elkhart	Elkhart Oaks Nursing Homes	X	X	X	X
	Elkhart City Office	X	X	X	X
	Elkhart Independent School District	X	X	X	X
	Elkhart Head-start East Texas	X	X	X	X
	Water Building	X	X	X	X
	Public Works	X	X	X	X
	Lift Station at Jones Road	X			X
	Lift Station/Pump Station/Water Well at Day Road	X			X
	Lift Station/Pump Station at Reliable	X			X
	Lift Station at Hemby Street	X			X
	Wastewater Treatment Plant				
	Water Well at School Street	X			X
	Newsome Well	X			X
	Elkhart High School	X	X	X	X
	CHRISTUS Health Clinic	X	X	X	X
	Elkhart Dental Office	X	X	X	X
Frankston	Frankston Police Department	X	X	X	X
	Frankston City Hall	X	X	X	X
	Public Works	X	X	X	X
	Frankston Independent School District	X	X	X	X
	Little Kid's Preschool	X	X	X	X
	Precious Angels Daycare	X	X	X	X
	First Baptist Church - Frankston	X	X	X	X
	Water Treatment Plant	X	X	X	X
	North Well Station	X			X
	Well Station at Garner Street	X			X
	Methodist Family Life Center				
	Pump Station at HWY 75 W	X			X
	Northwood Pump Station	X			X
	Scarborough Pump Station	X			X
	Pump Station at Pecan Street	X			X
	Pump House at Regan/Perry	X			X
Palestine	Palestine City Hall	X	X	X	X
	WIC Clinic	X	X	X	X
	Public Works	X	X	X	X

	Fire Station #1	X	X	X	X
	Fire Station #2	X	X	X	X
	Brookdale Nursing Home	X	X	X	X
	The Legacy at Town Creek	X	X	X	X
	Dogwood Trails	X	X	X	X
	Greenbriar Nursing Home	X	X	X	X
	Palestine Healthcare	X	X	X	X
	TRU Care	X	X	X	X
	Windermere Assisted Living Cartmell	X	X	X	X
	Palestine Independent School District	X	X	X	X
	Westwood Independent School District	X	X	X	X
	University of Texas Innovation Academy	X	X	X	X
	ABC Learning Academy	X	X	X	X
	Candy Cane Corner Childcare	X	X	X	X
	Evangelistic Temple Church Daycare Center	X	X	X	X
	Family Outreach & Resources	X	X	X	X
	First Presbyterian Preschool	X	X	X	X
	First United Methodist Church Preschool	X	X	X	X
	Gingerbread House Daycare	X	X	X	X
	Jack & Jill Early Learning	X	X	X	X
	Palestine YMCA	X	X	X	X
	Crisis Center of Anderson and Cherokee Counties	X	X	X	X
	Southside Baptist Childcare	X	X	X	X
	Sunshine Preschool and Daycare	X	X	X	X
	Freedom Fellowship Church	X	X	X	X
	Palestine Senior Activity Center & Meals On Wheels of Palestine	X	X	X	X

B) Vulnerable Parcels

Table 56: Parcels Vulnerable to Lightning

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Anderson County	**45,877**	**$9,196,009,739**
City of Elkhart	1,059	$95,824,776
City of Frankston	1,655	$225,907,502
City of Palestine	14,130	$ 1,788,378,777

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."[60]

[60] https://romps.berkeley.edu/papers/pubdata/2014/lightning/guardian.pdf

13. Dam 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

Anderson County does not have documented histories of damage caused by dam 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 failure, have no dams nearby, or no high hazard dams nearby and will not be profiling the hazard.

The dam of concern to Anderson County is known as the Blackburn Crossing Dam, which is located at the Neches River dividing Anderson and Cherokee counties. The Blackburn Crossing Dam is owned by the Upper Neches River Municipal Water Authority, creates the Lake Palestine, and has a maximum storage of 1,045,000 acre-feet, and is considered a water supply and recreational dam. The dam was built originally in 1962 and was last inspected in 2022.

2) Likelihood of Future Occurrences

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 failures 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 57: 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

According to the National Inventory of Dams, there are 68 dams within Anderson County, the vast majority are less than 10,000 acre-feet.

The majority of dams in Anderson County are considered low hazard and will not be profiled. They hold less than 10,000 acre-feet of water, and no loss of life is expected should any fail. However, the Blackburn Crossing Dam, is identified as a high hazard dam. Although the Blackburn Crossing Dam is high hazard, the County will not be including HHPD requirements, as the dam is owned by Upper Neches River MWA. The Blackburn Crossing dam's storage capacity is 1,045,000 acre-feet. If a failure of the Blackburn Crossing Dam were to occur, approximately 41,800 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 of concern within the County.

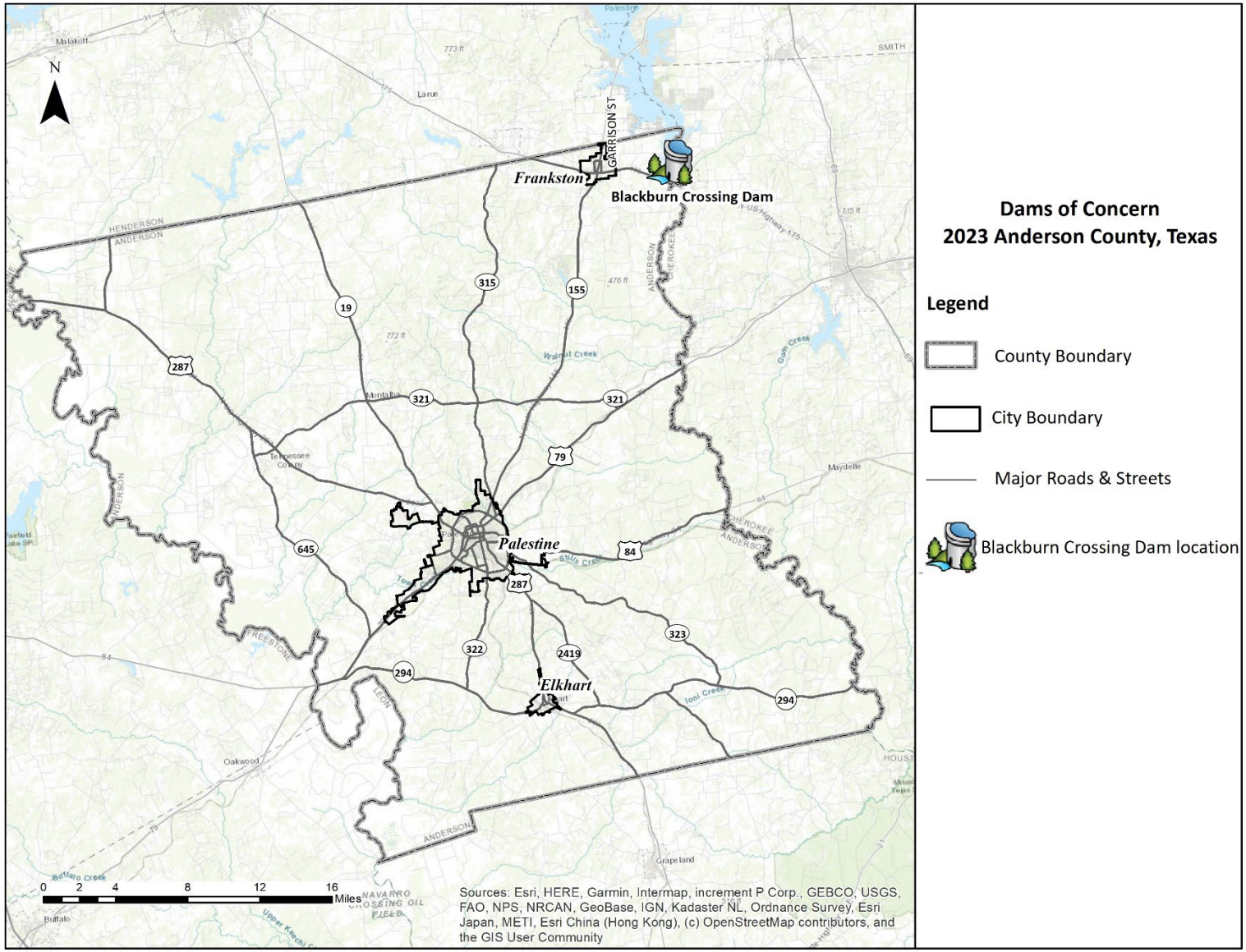


Figure 23: Dams of Concern in Anderson County

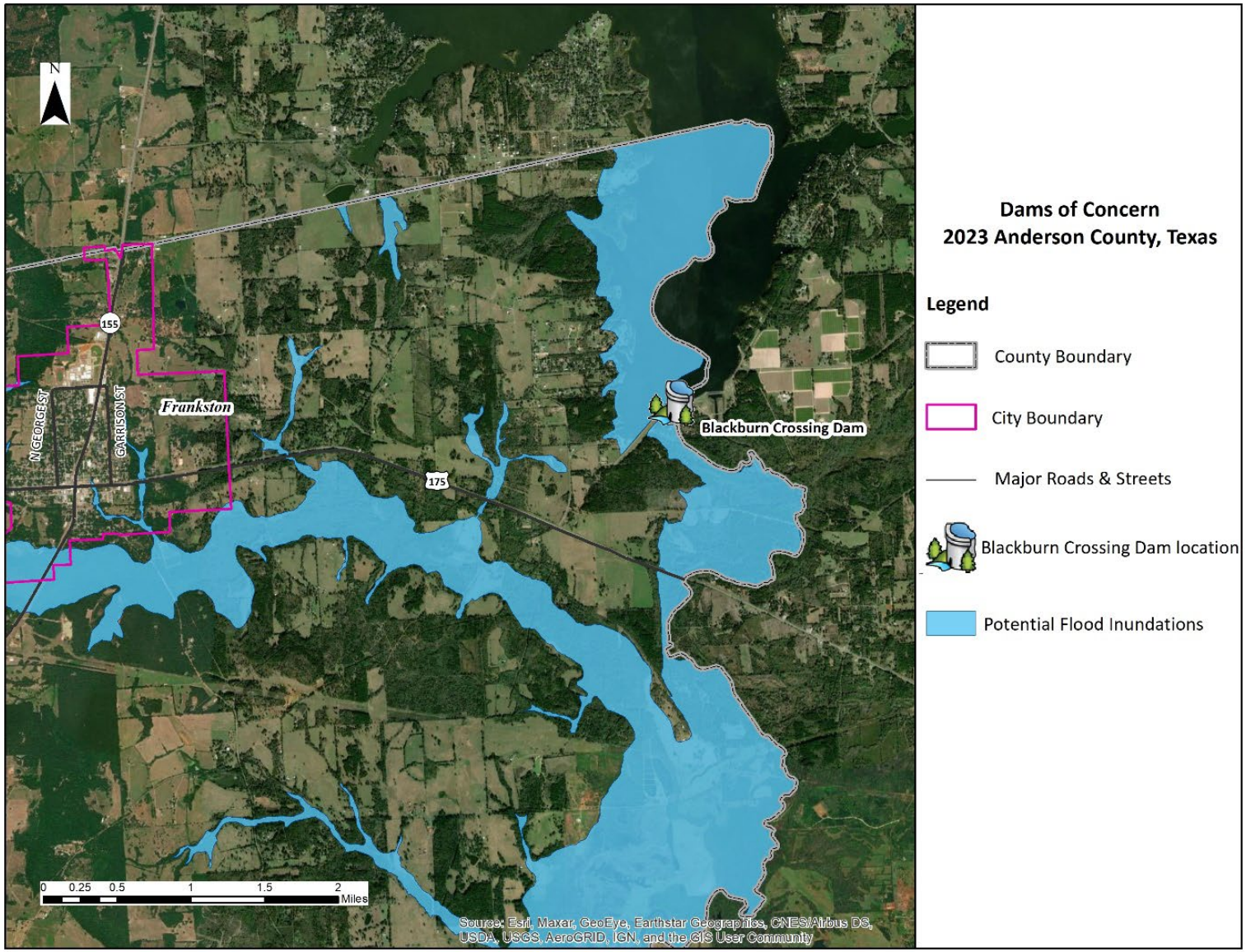


Figure 24: Potential Flood Inundations for Dams of Concern

B) Impact

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

5) Vulnerability

A) Population

While the Blackburn Crossing Dam is considered a high hazard dam, meaning that property damage and loss of life could occur if the dam were to fail, the expected inundation zone is located in a primarily rural and sparsely populated area of Anderson County. Inundations would flow towards the creeks of the Neches River. Therefore, negative impacts on the population are unlikely.

B) Critical Facilities

Out of the 102 critical facilities identified in the County and participating jurisdictions, none are within a potential inundation zone.

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.

14. Mitigation Strategy

1) Capability Assessment

Anderson County and the participating jurisdictions have shown themselves to be highly capable, especially in terms of implementing hazard mitigation actions. All four jurisdictions participated in the 2018 HMAP. Each of these jurisdictions completed, or is in the process of completing, many of the actions recommended in the 2018 HMAP.

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 58: Capability Assessment by Jurisdiction

Anderson County Administrative, Financial, Regulatory, and Technical Abilities
Floodplain Management
Emergency Management
Subdivision
Road and Bridge Management
Grant Writing
General Budgeting
CDBG Funding
State and Federal Grant Funding

City of Elkhart Administrative, Financial, Regulatory, and Technical Abilities
Floodplain management
Emergency Management
Subdivision
Zoning
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning

Road and Bridge Management
Drought Contingency Planning
Comprehensive Planning
Economic Development
Grant Writing
General Budgeting
CDBG Funding
State and Federal Grant Funding

City of Frankston Administrative, Financial, Regulatory, and Technical Abilities
Emergency Management
Subdivision
Zoning
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning
Road and Bridge Management
Drought Contingency Planning
Comprehensive Planning
Economic Development
Grant Writing
General Budgeting
CDBG Funding
State and Federal Grant Funding

City of Palestine Administrative, Financial, Regulatory, and Technical Abilities
Floodplain Management
Emergency Management
Drought Contingency Planning
Subdivision
Zoning
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Water Conservation Planning
Road and Bridge Management
Drought Contingency Planning

Comprehensive Planning
Economic Development
Grant Writing
General Budgeting
CDBG Funding
State and Federal Grant Funding

A) Building Codes

Table 59: Building Codes Per Jurisdictions

Jurisdiction	Codes	Description
Anderson County	ICC – International Building Codes	The County defers to the State of Texas, which recommends the International Building Codes. The County has no enforcement in place.
Elkhart	ICC – International Building Codes	The City of Elkhart defers to the County and State of Texas, which recommends the International Building Codes. The City of Elkhart has no enforcement in place.
Frankston	ICC – International Building Codes	The City of Frankston defers to the County and State of Texas, which recommends the International Building Codes. The City of Frankston has no enforcement in place.
Palestine	ICC – International Building Codes	The City of Palestine has adopted the 2018 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fuel Gas Code, Energy Code, and Electrical Code.

2) Incorporation and Integration of Existing Capabilities and Hazard Mitigation

As previously outlined, the planning team reviewed a range of codes, ordinances, and planning studies 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 identify opportunities for future integration.

Table 60: 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, Administrative Office	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							
Anderson County	X	X		X	X	X	X
City of Elkhart	X	X		X	X	X	X
City of Frankston	X	X	X	X	X	X	
City of Palestine	X	X	X	X	X	X	X

Each new mitigation action below 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.

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 61 below.

Table 61: Integration Process

Jurisdiction	Integration Process
Anderson County	After considering integrating mitigation actions with the activities outlined in Table 60 above, mitigation actions will be presented, considered, and formally adopted by the County Commissioners' Court and County Judge. Anderson County will also use the Anderson 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 Elkhart	After considering integrating mitigation actions with the activities outlined in Table 60 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Elkhart will also use the Anderson 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 Frankston	After considering integrating mitigation actions with the activities outlined in Table 60 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Frankston will also use the Anderson 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 Palestine	After considering integrating mitigation actions with the activities outlined in Table 60 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Palestine will also use the Anderson 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 2018 HMAP was integrated into the County's annual budgets and public involvement activities. No other integration is known to have taken place from the remaining jurisdictions. 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.

3) Goals and Objectives Overview

The hazard analysis has shown that Anderson 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 2018 HMAP. 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 two mitigation actions per natural hazard. The previous plan had a prioritization process utilizing the STAPLEE criteria and benefit-cost review, their prioritization considered cost effectiveness; technical feasibility; and environmental soundness of each action; project implementation; and administrative barriers. 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 – 2018 HMAP

In addition to reviewing existing codes, ordinances, and planning studies, the planning team also examined the status of each mitigation action identified in the 2018 HMAP.

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 14, Section 6C.

Table 62: Previous Mitigation Actions – All Jurisdictions

Anderson County Mitigation Actions Status		
Hazards Addressed	**Mitigation Actions**	**Status**
Tornado, Windstorm, Severe Winter Storm, Flood & Dam Failure	Plan and implement a new publicity campaign to expand enrollment in CODE RED notification system; use CODE RED to warn of impending hazard events.	*In progress*
Tornado, Windstorm, Hailstorm & Severe Winter Storm	Hold annual Storm Spotter's classes to educate the public about the danger of storms and to inform residents of mitigation actions to reduce risk to citizens, public infrastructure, private property owners, businesses, and schools.	*In progress*

Tornado, Windstorm, Hailstorm, Severe Winter Storm, Drought, Flood, Dam Failure & Lightning	Develop, enhance and implement education programs to increase awareness of natural hazards and to inform residents of mitigation actions to reduce risk to citizens, public infrastructure, private property owners, businesses and schools.	*In progress*
Tornado & Windstorm	Establish program to assist local residents by paying half the cost of residential storm shelters.	*Deferred to Plan Update*
Drought	Develop and implement a plan to install low-flow fixtures in all county facilities.	*Abandoned – No Longer Deemed Relevant*
Wildfire	Develop and implement a program to mow vacant land and trim brush or trees as needed to reduce risk of fire in wildland-urban interface areas owned by the county.	*In progress*
Wildfire	Develop and implement new procedures to better use media to publicize burn bans throughout the county. Increase visibility on county websites, Facebook and twitter.	*In progress*
Wildfire	Work with the VFD's and Texas Forest Service to educate the public in all rural communities to increase awareness about the hazard of wildfire around the homes and to inform residents of mitigation actions to reduce risk.	*In progress*
Flood	Widen culverts to mitigate against future drainage issues that lead to flooding.	*Completed*
Flood	Educate homeowners to increase awareness about the hazard of flooding and to inform residents of mitigation actions to reduce risk.	*In progress*
Flood	Ensure that structures are not built in flood zone areas.	*In progress*
Lightning	Install lightning arrestors on public buildings and other critical infrastructure.	*Deferred to Plan Update*
Dam Failure	Work with dam owners to keep dams in excellent condition by visiting dam locations and doing inspections with owners to ensure that dams are properly maintained, and failure possibilities are greatly reduced.	*Deferred to Plan Update*

Severe Winter Storm	Develop and implement a program to mitigate winter storm damage by removing trees and brush from county right-of-way.	*In Progress*
Hailstorm	Review and update existing subdivision rules and regulations to mitigate hailstorm damage.	*Deferred to Plan Update*

City of Elkhart Mitigation Actions Status		
Hazards Addressed	**Mitigation Actions**	**Status**
Tornado, Windstorm, Severe Winter Storm & Flood	Plan and implement a new publicity campaign to expand enrollment in CODE RED notification system; use CODE RED to warn of impending hazard events.	*In Progress*
Tornado, Windstorm, Hailstorm, Severe Winter Storm, Drought & Flood	Develop, enhance, and implement education programs to increase awareness of natural hazards and to inform residents of mitigation actions to reduce risk to citizens, public infrastructure, private property owners, businesses and schools.	*In Progress*
Tornado & Windstorm	Establish program to assist local residents by paying half the cost of residential storm shelters.	*Abandoned – No Longer Deemed Relevant*
Wildfire	Develop and implement a program to mow vacant lots and trim brush or trees as needed to reduce risk of fire.	*In Progress*
Wildfire	The City of Elkhart will increase outreach efforts to mitigate against wildfires by posting “Burn Ban in Effect” signs to inform residents when Anderson County is under a Burn Ban.	*In Progress*
Flood	Enlarge drainage culverts.	*In Progress*
Flood	Participate in the “Turn Around, Don’t Drown” campaign.	*In Progress*
Drought	Update and implement City Emergency Plan for Drought Response and use as needed when drought conditions appear	*In Progress*
Drought	Update and implement city ordinance on water rationing and controlled usage during a drought.	*Completed*

Severe Winter Storm	Develop and implement a program to mitigate winter storm damage by removing trees and brush from county right-of-way.	*Completed*
Hailstorm	Update building codes and ordinances to reflect latest improvements to increase resilience to hailstorms.	*In Progress*

City of Frankston Mitigation Actions Status		
Hazards Addressed	**Mitigation Actions**	**Status**
Tornado, Windstorm, Severe Winter Storm & Flood	Plan and implement a new publicity campaign to expand enrollment in CODE RED notification system; use CODE RED to warn of impending hazard events.	*In progress*
Tornado & Windstorm	Educate residents about tornadoes and windstorms and how to prepare for them.	*Deferred to Plan Update*
Tornado & Windstorm	Establish program to assist local residents by paying half the cost of residential storm shelters.	*Deferred to Plan Update*
Wildfire	The City of Frankston will increase enforcement of its city ordinance that regulates against debris in yards inside the city limits. Develop and implement a program to mow vacant lots and trim brush or trees as needed to reduce risk of fire.	*In Progress*
Wildfire	The City will post “Burn Ban in Effect” signs to inform residents when Anderson County is under a Burn Ban.	*Completed*
Wildfire	Educate the community to increase awareness about the hazard of wildfire around the homes and to inform residents of mitigation actions to reduce risk and what individuals can do to prevent wildfires.	*In progress*
Flood	Enlarge drainage culverts.	*Completed*
Flood	The City will provide public education on the dangers of flash flooding, and to inform residents of mitigation actions to reduce risk to citizens, public infrastructure, private property owners, businesses and schools	*Deferred to Plan Update*

	including participation in the "Turn Around, Don't Drown" campaign.	
Drought	Work with the county on educating the public about the dangers associated with drought and to inform residents of mitigation actions to reduce risk to citizens, public infrastructure, private property owners, businesses and schools.	*Completed*
Drought	Update City Emergency Plan for Drought Response and use as needed when drought conditions appear.	*Completed*
Drought	Update city ordinance on water rationing and controlled usage during a drought; enforce as needed when drought conditions appear.	*Completed*
Severe Winter Storm	Work with the County EMC to educate the community on the danger of severe winter storms and to inform residents of mitigation actions to reduce risk to citizens, public infrastructure, private property owners, businesses and schools. Encourage all residents to sign up for CODE RED notifications.	*Deferred to Plan Update*
Severe Winter Storm	Develop and implement a program to mitigate winter storm damage by removing trees and brush from county right-of-way.	*In Progress*
Hailstorm	Conduct public outreach to educate homeowners on hail mitigation measures for their homes.	*Deferred to Plan Update*
Hailstorm	Update building codes and ordinances to reflect latest improvements to increase resilience to hailstorms.	*Deferred to Plan Update*

City of Palestine Mitigation Actions Status		
Hazards Addressed	**Mitigation Actions**	**Status**
Tornado, Windstorm, Severe Winter Storm & Flood	Plan and implement a new publicity campaign to expand enrollment in CODE RED notification system; use CODE RED to warn of impending hazard events.	*Completed*

Tornado, Windstorm, Severe Winter Storm, Flood, Drought, Wildfire & Lightning	Develop and implement a public education campaign to increase awareness of natural hazards, including Tornado, Windstorm, Severe Winter Storm, Flood, Drought, Wildfire & Lightning, to inform residents of mitigation actions which can be taken to reduce risk to citizens, public infrastructure, private property owners, businesses and schools.	*Completed*
Tornado & Windstorm	Establish program to assist local residents by paying half the cost of residential storm shelters.	*Abandoned: Limited City Funding Available*
Flood	Increase drainage capacity where needed.	*In Progress*
Lightning	Install back-up power sources, generators and lightning arrestors in public buildings and other critical infrastructure. Ensure that entities with such equipment have a routine maintenance and testing plan.	*Completed*
Wildfire	Increase enforcement of city ordinance that regulates against debris in yards inside the city limits. Develop and implement a program to mow vacant lots and trim brush or trees as needed to mitigate damage due to wildfire.	*Completed*
Drought	Update City Emergency Plan for Drought Response and use as needed when drought conditions appear.	*In Progress*
Severe Winter Storm	Educate the public to increase awareness about the hazard of severe winter storms and to inform residents of mitigation actions to reduce risk and be ready for winter storms.	*Completed*
Severe Winter Storm	Develop and implement a program to mitigate winter storm damage by removing trees and brush from county right-of-way.	*In Progress*

C) Mitigation Actions by Jurisdiction and by Hazard

Each jurisdiction has selected actions that were identified as high or medium 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, thus 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.

i. Anderson County

The following mitigation action items may indicate an asterisk (*****) in the case the new actions reflect actions that were deferred from the previous 2018 HMAP. Actions marked with a grey heading are not mitigation actions but are included in the HMAP for the County to reference in future planning endeavors.

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, new publicity campaign to expand enrollment in CODE RED notification system, and new procedures to better use media to publicize burn bans.
Hazard	Flood, Wildfire, Tornado, Drought, Hailstorm, Extreme Cold, Winter Storm, Windstorms, Lightning, Dam Failure
Priority	Medium
Estimated Cost	Less than $10,000 per hazard
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, GLO
Responsible Department	Emergency Management
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, Hailstorm, Winter Storms, Windstorms
Priority	High
Estimated Cost	$10,000 - $500,0000
Potential Funding Source(s)	County, FEMA PDM, FEMA BRIC, FEMA HMGP
Responsible Department	Precinct Office
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	**Set up Warming/Heating Centers**
Objective	The action's goal is to increase resilience by limiting vulnerable populations' exposure to extreme weather by creating new or opening existing facilities as cooling centers or warming centers.
Hazard	Extreme Cold & Winter Storms
Priority	High
Estimated Cost	$10,000 to $100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA PDM, FEMA HMGP
Responsible Department	Precinct Office
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Install and/or 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, Hailstorm, Extreme Cold, Winter Storms, Windstorms, Lightning, Dam 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)	County, FEMA PDM, FEMA HMGP, FEMA BRIC
Responsible Department	Commissioners' Court & Emergency Management
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Construct/Establish Community Safe Rooms or Shelters
Objective	The action's goal is to provide a place of temporary refuge and or supply distribution location for the vulnerable public before and after events. This action proposes constructing new or retrofit existing structures to serve as a safe room.
Hazard	Tornado, Windstorm, Winter Storms
Priority	Medium
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court, Emergency Management
Implementation Schedule	Short Term: 1 - 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 increasing thermal insulation, upgrading and/or adding shatter-resistant films to all glazing, installing impact and wind-resistant windows and doors, installing shutters, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment.
Hazard	Tornado, Hailstorm, Windstorm, Winter Storm
Priority	Low
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	County, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Commissioners' Court & Emergency Management
Implementation Schedule	Greater than 5 Years
Target	Existing infrastructure

Mitigation Action	Create a Program to Assist with Residential Storm Shelter *
Objective	This action will develop and implement a program to assist local residents by paying half the cost of residential storm shelters.
Hazard	Tornado & Windstorms
Priority	Low
Estimated Cost	More than $100,000
Potential Funding Source(s)	County, FEMA PDM, FEMA HMGP
Responsible Department(s)	Commissioners' Court & Emergency Management

Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Single Hazard Actions

Mitigation Action	Construct/Upgrade Storm Drainage Infrastructure
Objective	This action proposes constructing new and/or widening storm drainage infrastructure to reduce the potential impacts of future flood events. Including but not limited to increasing capacity of ditches, culverts, detention ponds.
Hazard	Flooding
Priority	Medium
Estimated Cost	More than $1,000,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Commissioner's Court & Precinct Office
Implementation Schedule	2 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Install Lightning Arresters*
Objective	This action will install lightning arresters at all County facilities to shield power lines and structures from power surges, essentially to safeguard against lightning.
Hazard	Lightning
Priority	Low
Estimated Cost	$1,000 - $50,000
Potential Funding Source (s)	County, FEMA PDM, FEMA HMGP, FEMA BRIC
Responsible Department	Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

Mitigation Action	Restrict Development in High Hazard Areas
Objective	This action proposes restricting development in dam failure inundation zones to reduce potential impacts.
Hazard	Dam Failure
Priority	Low
Estimated Cost	Less than $10,000

Potential Funding Source(s)	County, FEMA BRIC, FEMA FMA, FEMA HMGP, TWDB
Responsible Department(s)	Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Update and/or Implement Subdivision Regulations***
Objective	This action will update and/or implement subdivision regulations, requirements, and/or ordinances to include techniques and materials that mitigate against lightning.
Hazard	Lightning
Priority	Low
Estimated Cost	Less than $10,000
Potential Funding Source(s)	County, FEMA PDM, FEMA HMGP
Responsible Department(s)	Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Restrict Development in Flood Zone Prone Areas ***
Objective	This action proposes restricting development in flood zones to reduce potential impacts.
Hazard	Flood
Priority	Low
Estimated Cost	Less than $10,000
Potential Funding Source(s)	County, FEMA BRIC, FEMA FMA, FEMA HMGP, TWDB
Responsible Department(s)	Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Develop Collaboration with Dam Owners ***
Objective	Work with dam owners to keep dams in excellent condition by visiting dam locations and doing inspections with owners to ensure that dams are properly maintained, and failure possibilities are greatly reduced.
Hazard	Dam Failure
Priority	Low
Estimated Cost	Less than $10,000
Potential Funding Source(s)	County, FEMA BRIC, FEMA HMGP

Responsible Department(s)	Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

ii. City of Elkhart

The following mitigation action items may indicate an asterisk (*) in the case the new actions reflect actions that were deferred from the previous 2018 HMAP. Actions marked with a grey heading are not mitigation actions but are included in the HMAP for reference in future planning endeavors.

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, new publicity campaign to expand enrollment in CODE RED notification system, and new procedures to better use media to publicize burn bans throughout the county. Increase visibility on county websites, Facebook and twitter.
Hazard	Flood, Wildfire, Tornado, Drought, Hailstorm, Extreme Cold, Winter Storm, Windstorms, Lightning
Priority	Medium
Estimated Cost	Less than $10,000 per hazard
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, GLO
Responsible Department	Emergency Management
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, Hailstorm, Winter Storms, Windstorms
Priority	Medium
Estimated Cost	$10,000 - $500,0000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Public Works

Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Construct/Establish Community Safe Rooms or Shelters
Objective	The action's goal is to provide a place of temporary refuge and or supply distribution location for the vulnerable public before and after events. This action proposes constructing new or retrofit existing structures to serve as a safe room.
Hazard	Tornado, Windstorm, Winter Storms
Priority	High
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor and Council
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Install Impact and Wind-resistant Windows and Doors at Public Facilities
Objective	This action proposes hardening facilities. Hardening will include adding impact and wind-resistant doors and windows at critical and public facilities.
Hazard	Tornados, Hailstorm, Severe Winds
Priority	Medium
Estimated Cost	$100,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

Mitigation Action	Install Protective Window Shutters on Public Facilities
Objective	This action proposes adding protective shutters to public facilities. Doing so will help limit exposure to hailstorm damages.
Hazard	Tornados, Hailstorm, Windstorms
Priority	Medium
Estimated Cost	Less than $100,000

Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	3 - 5 Years
Target	Existing infrastructure

Mitigation Action	Harden Facilities
Objective	This action proposes hardening facilities. Hardening will include but is not limited to increasing thermal insulation, upgrading and/or adding shatter-resistant films to all glazing, installing impact and wind-resistant windows and doors, installing shutters, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment.
Hazard	Tornado, Hailstorm, Windstorm, Winter Storm
Priority	Medium
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Public Works
Implementation Schedule	Greater than 5 Years
Target	Existing infrastructure

Mitigation Action	Set up Warming/Heating Centers
Objective	The action's goal is to increase resilience by limiting vulnerable populations' exposure to extreme weather by creating new or opening existing facilities as cooling centers or warming centers.
Hazard	Extreme Cold & Winter Storms
Priority	High
Estimated Cost	$10,000 to $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA PDM, FEMA HMGP
Responsible Department	Fire Department
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Install and/or 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, Hailstorm, Extreme Cold, Winter Storms, Windstorms, 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 PDM, FEMA HMGP
Responsible Department	Mayor and Council
Implementation Schedule	5 Years
Target	Existing infrastructure

Single Hazard Actions

Mitigation Action	Construct/Upgrade Storm Drainage Infrastructure *
Objective	This action proposes constructing new and/or widening storm drainage infrastructure to reduce the potential impacts of future flood events. Including but not limited to increasing capacity of ditches, culverts, detention ponds.
Hazard	Flooding
Priority	Medium
Estimated Cost	More than $1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Public Works
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Purchase Portable or Permanent Pumps
Objective	This action proposes purchasing portable or permanent pumps that can be deployed as needed to reduce the potential impacts of future flood events.
Hazard	Flooding
Priority	High
Estimated Cost	$10,000 to $100,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP, FEMA FMA, TWDB

Responsible Department	Public Works
Implementation Schedule	0 - 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	Medium
Estimated Cost	Less than $100,000
Potential Funding Source (s)	City, County, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Public Works
Implementation Schedule	5 Years
Target	Existing and future infrastructure

Mitigation Action	Wildfire Fuels Reduction in Wildland Urban Interface
Objective	This action will develop and implement a program to identify and prioritize lands in the Wildland Urban Interface (WUI) in need of fuels reduction and then reduce or remove wildfire fuels through various methods as appropriate.
Hazard	Wildfire
Priority	Medium
Estimated Cost	$10,000 - $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Fire Department
Implementation Schedule	1 - 5 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	Medium
Estimated Cost	Less than $100,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department(s)	Emergency Management, Public Works
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Develop and Implement a New Water Conservation Ordinance**
Objective	Jurisdiction 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 $100,000
Potential Funding Source (s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Replace Water Fixtures with Low Flow Units**
Objective	This action's goal is to limit water consumption at City-owned and maintained facilities by replacing traditional water fixtures with low flow units.
Hazard	Drought
Priority	Low
Estimated Cost	$10,000 - $100,000
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 - $50,000
Potential Funding Source (s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Mayor & Council
Implementation Schedule	0 - 2 Years
Target	Existing infrastructure

Mitigation Action	**Update and/or Implement City Emergency Plan ***
Objective	This action will update and implement City Emergency Plan for Drought Response and use as needed when drought conditions appear.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department(s)	Emergency Management & Public Works
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Update and/or Implement Building Code Requirements and Ordinances ***
Objective	This action will update and/or implement building code requirements and/or ordinances to include techniques and materials that mitigate against Hailstorms.
Hazard	Hailstorm
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department(s)	Public Works
Implementation Schedule	1 - 5 Years

Target	Existing and future population and infrastructure

iii. City of Frankston

The following mitigation action items may indicate an asterisk (*****) in the case the new actions reflect actions that were deferred from the previous 2018 HMAP. Actions marked with a grey heading are not mitigation actions but are included in the HMAP for reference in future planning endeavors.

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, new publicity campaign to expand enrollment in CODE RED notification system, and new procedures to better use media to publicize burn bans throughout the county. Increase visibility on county websites, Facebook and twitter.
Hazard	Flood, Wildfire, Tornado, Drought, Hailstorm, Extreme Cold, Winter Storm, Windstorms, Lightning
Priority	Medium
Estimated Cost	Less than $10,000 per hazard
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, GLO
Responsible Department	Mayor & Council, Emergency Management, City Administrator
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, Hailstorm, Winter Storms, Windstorms
Priority	Low
Estimated Cost	$10,000 - $500,0000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Mayor & Council, Public Works, Emergency Management
Implementation Schedule	1 - 5 Years

Mitigation Action	Construct/Establish Community Safe Rooms or Shelters
Objective	The action's goal is to provide a place of temporary refuge and or supply distribution location for the vulnerable public before and after events. This action proposes constructing new or retrofit existing structures to serve as a safe room.
Hazard	Tornado, Windstorm, Winter Storms
Priority	Low
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor & Council, Emergency Management
Implementation Schedule	1 - 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 increasing thermal insulation, upgrading and/or adding shatter-resistant films to all glazing, installing impact and wind-resistant windows and doors, installing shutters, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment.
Hazard	Tornado, Hailstorm, Windstorm, Winter Storm
Priority	Low
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Mayor & Council, Public Works, Emergency Management
Implementation Schedule	Greater than 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, Hailstorm, Extreme Cold, Winter Storms, Windstorms, 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 PDM, FEMA HMGP
Responsible Department	Mayor and Council, Public Works, Emergency Management
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	**Create a Program to Assist with Residential Storm Shelter ***
Objective	This action will develop and implement a program to assist local residents by paying half the cost of residential storm shelters.
Hazard	Tornado & Windstorms
Priority	Low
Estimated Cost	More than $100,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department(s)	Mayor & Council, Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Single Hazard Actions

Mitigation Action	**Construct/Upgrade Storm Drainage Infrastructure ***
Objective	This action proposes constructing new and/or widening storm drainage infrastructure to reduce the potential impacts of future flood events. Including but not limited to increasing capacity of ditches, culverts, detention ponds.
Hazard	Flooding
Priority	Medium
Estimated Cost	More than $1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor & Council, Public Works, Emergency Management
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Purchase Portable or Permanent Pumps
Objective	This action proposes purchasing portable or permanent pumps that can be deployed as needed to reduce the potential impacts of future flood events.
Hazard	Flooding
Priority	High
Estimated Cost	$10,000 to $100,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor & Council, Public Works, Emergency Management
Implementation Schedule	0 - 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	The City will re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.
Hazard	Severe Winds
Priority	Low
Estimated Cost	Less than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Mayor & Council, Emergency Management, City Administrator
Implementation Schedule	0 – 2 Years
Target	Existing and future population and 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 - $50,000

Potential Funding Source (s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Mayor & Council, Public Works, Emergency Management, City Administrator
Implementation Schedule	0 - 2 Years
Target	Existing infrastructure

Mitigation Action	**Update and/or Implement Building Code Requirements and Ordinances ***
Objective	This action will update and/or implement building code requirements and/or ordinances to include techniques and materials that mitigate against Hailstorms.
Hazard	Hailstorm
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department(s)	Public Works
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

iv. City of Palestine

The following mitigation action items may indicate an asterisk (*) in the case the new actions reflect actions that were deferred from the previous 2018 HMAP. Actions marked with a grey heading are not mitigation actions but are included in the HMAP for reference in future planning endeavors.

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, new publicity campaign to expand enrollment in CODE RED notification system, and new procedures to better use media to publicize burn bans throughout the county. Increase visibility on county websites, Facebook and twitter.
Hazard	Flood, Wildfire, Tornado, Drought, Hailstorm, Extreme Cold, Winter Storm, Windstorms, Lightning
Priority	Medium
Estimated Cost	Less than $10,000 per hazard
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, GLO
Responsible Department	Emergency Management
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, Hailstorm, Winter Storms, Windstorms
Priority	Medium
Estimated Cost	$10,000 - $500,0000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Harden Facilities
Objective	This action proposes hardening facilities. Hardening will include but is not limited to increasing thermal insulation, upgrading and/or adding shatter-resistant films to all glazing, installing impact and wind-resistant windows and doors, installing shutters, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment.
Hazard	Tornado, Hailstorm, Windstorm, Winter Storm
Priority	Low
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP, CDBG MIT
Responsible Department	Emergency Management
Implementation Schedule	Greater than 5 Years
Target	Existing infrastructure

Mitigation Action	Set up Warming/Heating Centers
Objective	The action's goal is to increase resilience by limiting vulnerable populations' exposure to extreme weather by creating new or opening existing facilities as cooling centers or warming centers.
Hazard	Extreme Cold & Winter Storms
Priority	Medium
Estimated Cost	$10,000 to $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA PDM, FEMA HMGP
Responsible Department	Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Install and/or 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, Hailstorm, Extreme Cold, Winter Storms, Windstorms, 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 PDM, FEMA HMGP
Responsible Department	Emergency Management
Implementation Schedule	5 Years
Target	Existing infrastructure

Single Hazard Actions

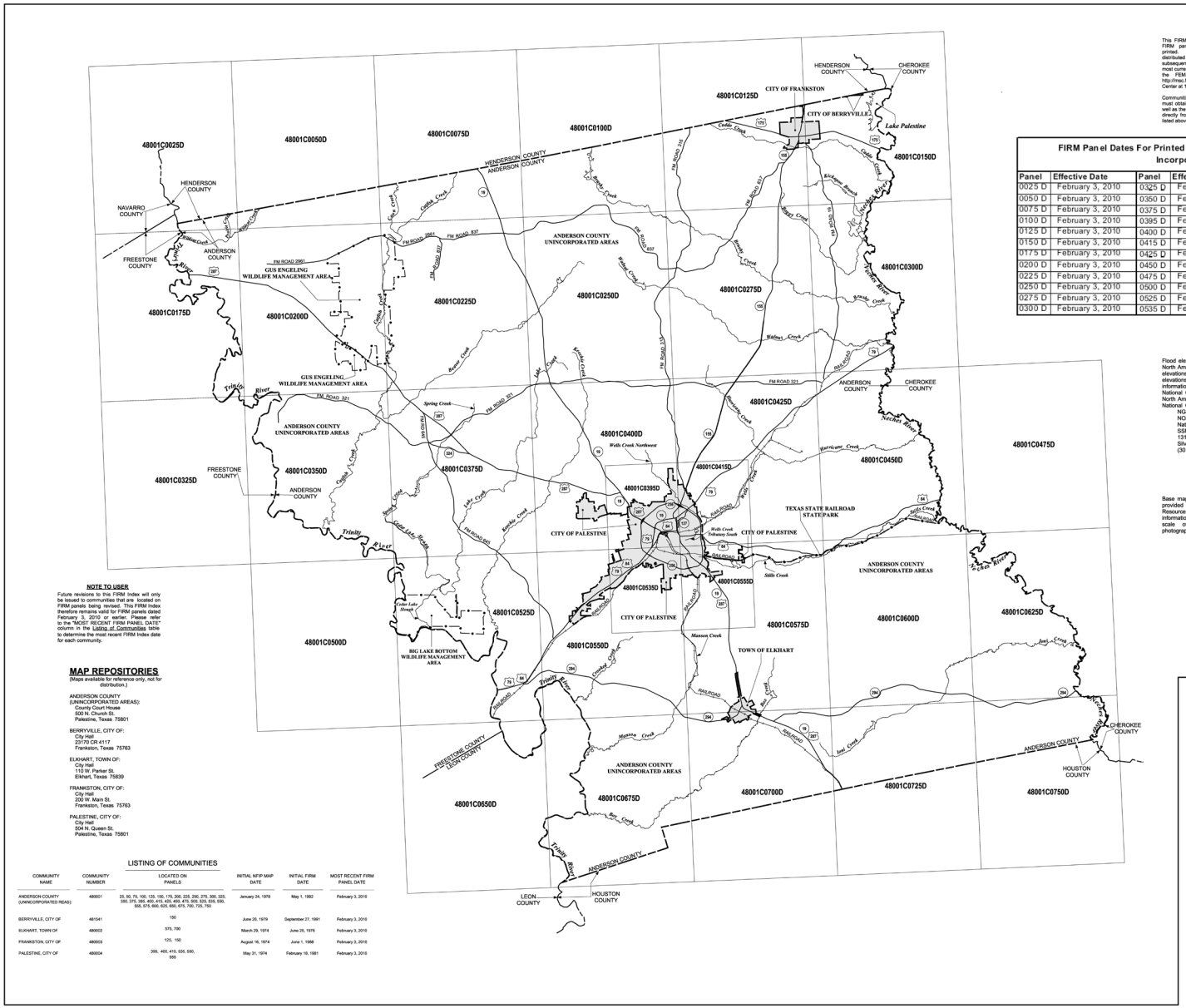
Mitigation Action	Construct/Upgrade Storm Drainage Infrastructure *
Objective	This action proposes constructing new and/or widening storm drainage infrastructure to reduce the potential impacts of future flood events. Including but not limited to increasing capacity of ditches, culverts, detention ponds.
Hazard	Flooding
Priority	High
Estimated Cost	More than $1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Public Works
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Develop and Implement a New Water Conservation Ordinance
Objective	Jurisdiction 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 $100,000
Potential Funding Source (s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Public Works and Ordinance
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Update and/or Implement City Emergency Plan *
Objective	This action will update and implement City Emergency Plan for Drought Response and use as needed when drought conditions appear.
Hazard	Drought
Priority	Low
Estimated Cost	Less than $10,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department(s)	Emergency Management & Public Works
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Appendix A – FIRM Maps

Below are the most recent FIRM maps for Anderson County.



MAP DATES

This FIRM Index displays the map dates for each FIRM panel at the time that this Index was printed. Because this Index may not be distributed to unaffected communities in subsequent revisions, users may determine the most current map date for each FIRM panel by visiting the FEMA Map Service Center website at http://msc.fema.gov or by calling the Map Service Center at 1-800-358-9616.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

FIRM Panel Dates For Printed Panels of Anderson County, TX And Incorporated Areas

Panel	Effective Date	Panel	Effective Date	Panel	Effective Date
0025 D	February 3, 2010	0325 D	February 3, 2010	0550 D	February 3, 2010
0050 D	February 3, 2010	0350 D	February 3, 2010	0555 D	February 3, 2010
0075 D	February 3, 2010	0375 D	February 3, 2010	0575 D	February 3, 2010
0100 D	February 3, 2010	0395 D	February 3, 2010	0600 D	February 3, 2010
0125 D	February 3, 2010	0400 D	February 3, 2010	0625 D	February 3, 2010
0150 D	February 3, 2010	0415 D	February 3, 2010	0650 D	February 3, 2010
0175 D	February 3, 2010	0425 D	February 3, 2010	0675 D	February 3, 2010
0200 D	February 3, 2010	0450 D	February 3, 2010	0700 D	February 3, 2010
0225 D	February 3, 2010	0475 D	February 3, 2010	0725 D	February 3, 2010
0250 D	February 3, 2010	0500 D	February 3, 2010	0750 D	February 3, 2010
0275 D	February 3, 2010	0525 D	February 3, 2010		
0300 D	February 3, 2010	0535 D	February 3, 2010		

ELEVATION DATUM

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #6202
1315 East-West Highway
Silver Spring, MD 20910-3282
(301) 713-3242

BASE MAP SOURCE

Base map information shown on this FIRM was provided in digital format by the Texas Natural Resource Information System (TNRIS). This information was photogrammetrically compiled at a scale of at least 1:24,000 from aerial photography dated 2004.

NOTE TO USER

Future revisions to this FIRM Index will only be issued to communities that are located on FIRM panels being revised. This FIRM Index therefore remains valid for FIRM panels dated February 3, 2010 or earlier. Please refer to the "MOST RECENT FIRM PANEL DATE" column in the Listing of Communities table to determine the most recent FIRM Index date for each community.

MAP REPOSITORIES

(Maps available for reference only, not for distribution.)

ANDERSON COUNTY (UNINCORPORATED AREAS):
County Court House
500 N. Church St.
Palestine, Texas 75801

BERRYVILLE, CITY OF:
City Hall
2319 CR 4117
Frankston, Texas 75763

ELKHART, TOWN OF:
City Hall
110 W. Parker St.
Elkhart, Texas 75839

FRANKSTON, CITY OF:
City Hall
200 W. Main St.
Frankston, Texas 75763

PALESTINE, CITY OF:
City Hall
504 N. Queen St.
Palestine, Texas 75801

LISTING OF COMMUNITIES

COMMUNITY NAME	COMMUNITY NUMBER	LOCATED ON PANELS	INITIAL NFIP MAP DATE	INITIAL FIRM DATE	MOST RECENT FIRM PANEL DATE
ANDERSON COUNTY (UNINCORPORATED AREAS)	480001	25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, 350, 375, 395, 400, 415, 425, 450, 475, 500, 525, 535, 550, 555, 575, 600, 625, 650, 675, 700, 725, 750	January 24, 1978	May 1, 1992	February 3, 2010
BERRYVILLE, CITY OF	481041	150	June 26, 1979	September 27, 1991	February 3, 2010
ELKHART, TOWN OF	480002	575, 700	March 29, 1974	June 25, 1976	February 3, 2010
FRANKSTON, CITY OF	480003	125, 150	August 16, 1974	June 1, 1988	February 3, 2010
PALESTINE, CITY OF	480004	395, 400, 415, 535, 550, 555	May 31, 1974	February 18, 1981	February 3, 2010

MAP INDEX

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

ANDERSON COUNTY, TEXAS

AND INCORPORATED AREAS

(SEE LISTING OF COMMUNITIES TABLE)

MAP INDEX

PANELS PRINTED: 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, 350, 375, 395, 400, 415, 425, 450, 475, 500, 525, 535, 550, 555, 575, 600, 625, 650, 675, 700, 725, 750

MAP NUMBER
48001CIND0A

EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

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 possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations 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 only 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 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table 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 **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood 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 (FIPSZONE 4203). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC–3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

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 Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Texas Natural Resource Information System (TNRIS). This information was photogrammetrically compiled at a scale of at least 1:24,000 from aerial photography dated 2004.

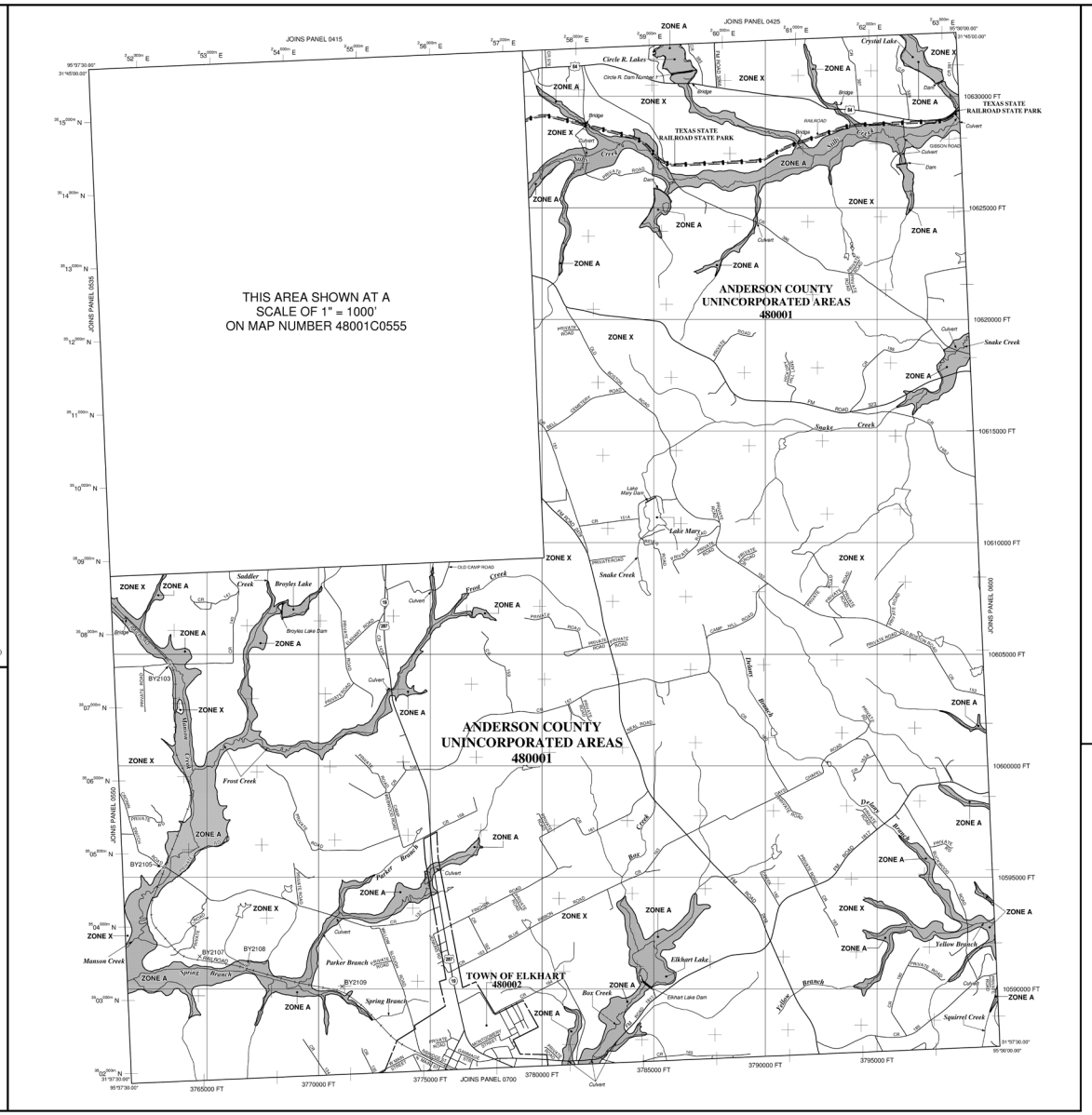
This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report* (which contains authoritative *hydraulic* data) may reflect stream channel distances that differ from what is shown on this map.

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.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a *Flood Insurance Study* report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1–877–FEMA MAP** (1–877–336–2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

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

The 1% annual chance 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, ARS, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°30'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4279000mN — 1000-meter Universal Transverse Mercator grid , zone 15
- 6000000 FT — 5000-foot grid : Texas State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide 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 1–800–638–6620.

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
300 0 600 1200 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0575D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 575 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0575	D
ELKHART, TOWN OF	480002	0575	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48001C0575D
EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table 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 **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood 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 (FIPSZONE 4203). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910–3282

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 Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Texas Natural Resource Information System (TNRIS). This information was photogrammetrically compiled at a scale of at least 1:24,000 from aerial photography dated 2004.

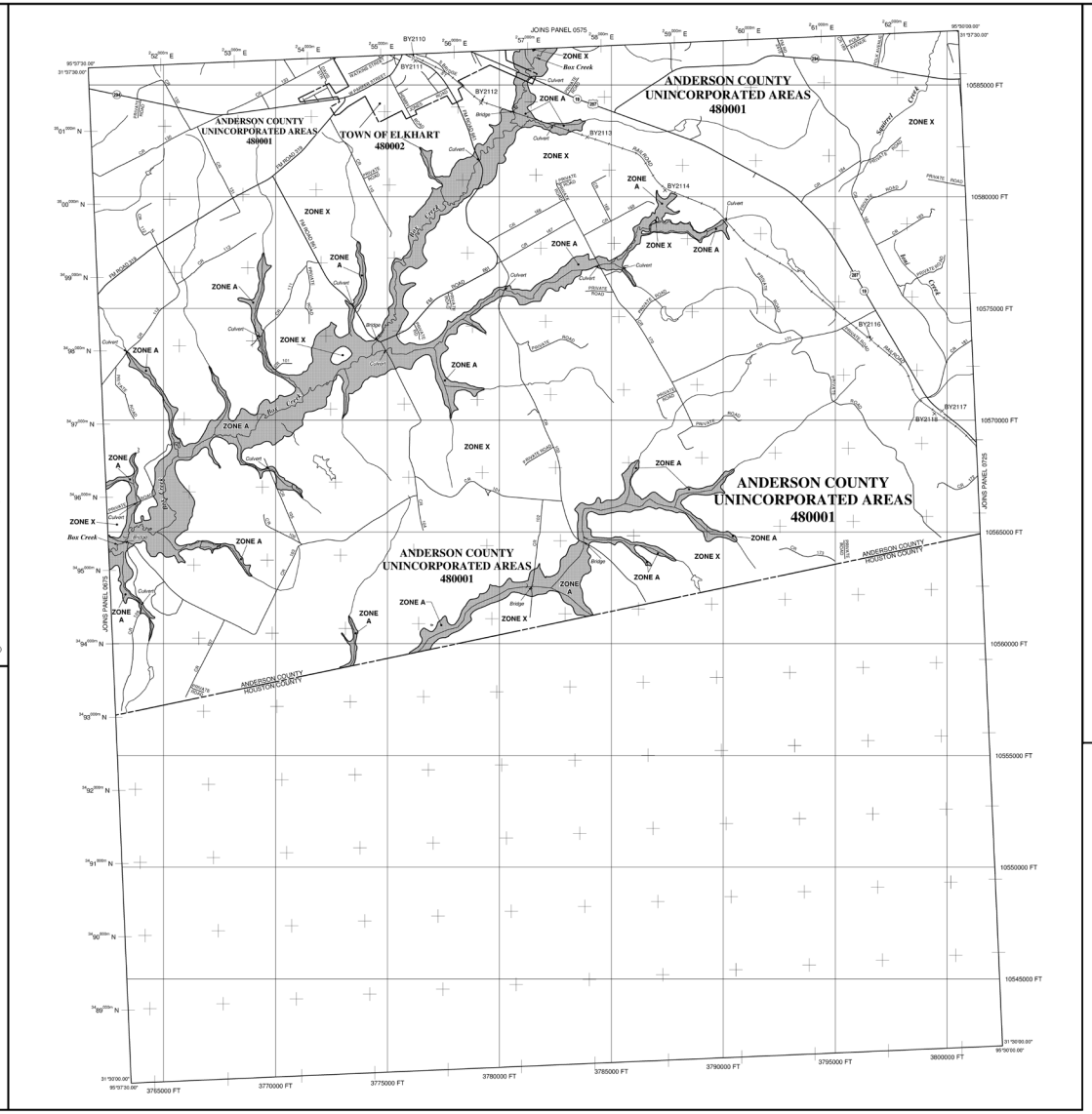
This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

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.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1–877–FEMA MAP** (1–877–336–2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

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

The 1% annual chance 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	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 (EL 987)	Base Flood Elevation line and value; elevation in feet*
	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referred to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 — 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000 mN	1000-meter Universal Transverse Mercator grid , zone 15
6000000 FT	5000-foot grid : Texas State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
DX5510	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
300 0 600 1200 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0700D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 700 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0700	D
ELKHART, TOWN OF	480002	0700	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48001C0700D

EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

NOTES TO USERS

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

Certain areas not in Special Flood Hazard Areas may be protected by **flood 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 (FIPSZONE 4203). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

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SSMC-3, #9202
1315 East-West Highway
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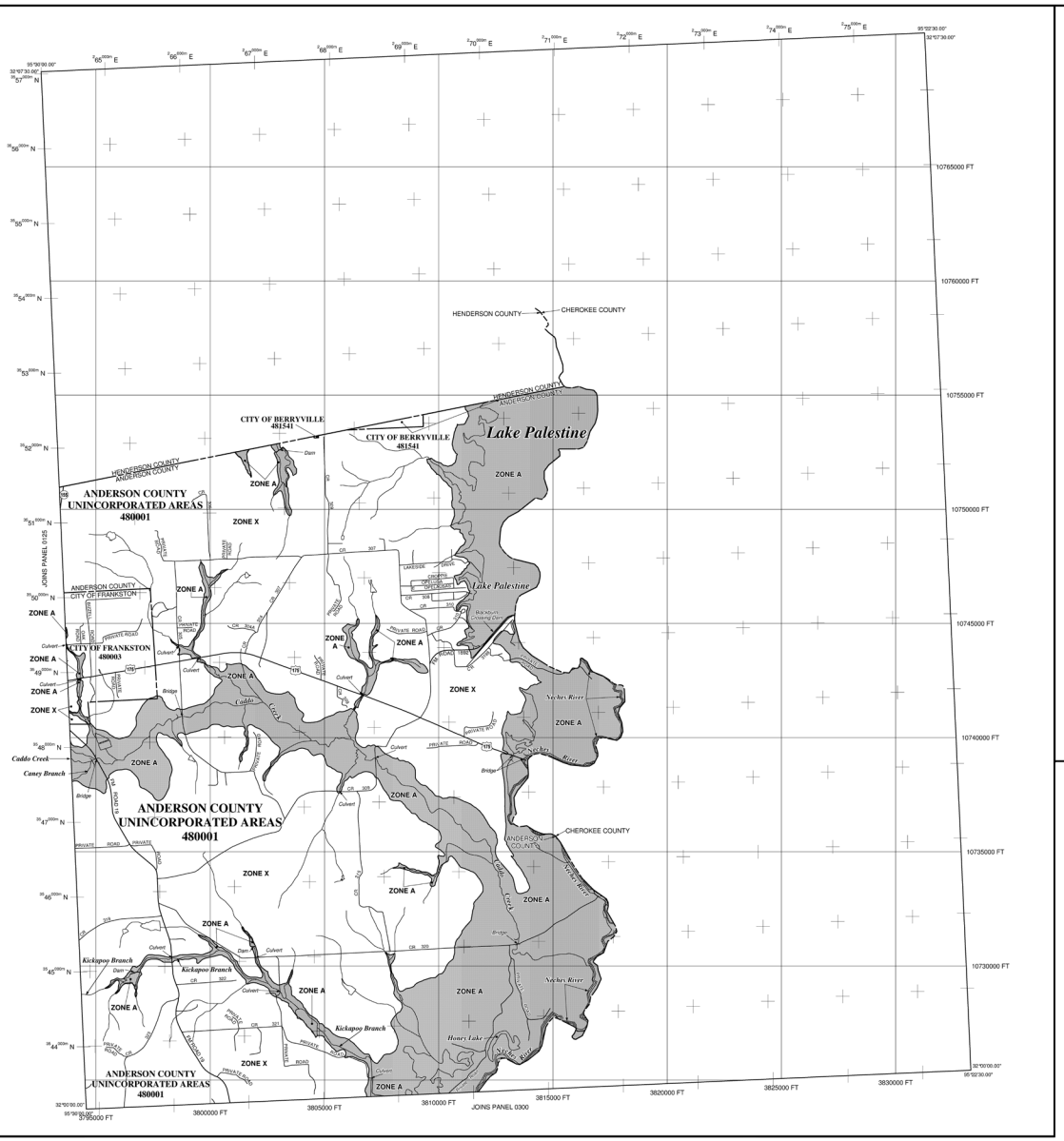

LEGEND

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

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ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 Base Flood Elevation line and value; elevation in feet*
- (EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A Cross section line
- 23 — 23 Transect line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4273000mN 1000-meter Universal Transverse Mercator grid , zone 15
- 6000000 FT 5000-foot grid : Texas State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
- DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 600 1200 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0150D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 150 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0150	D
BERRYVILLE, CITY OF	481541	0150	D
FRANKSTON, CITY OF	480003	0150	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48001C0150D
EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

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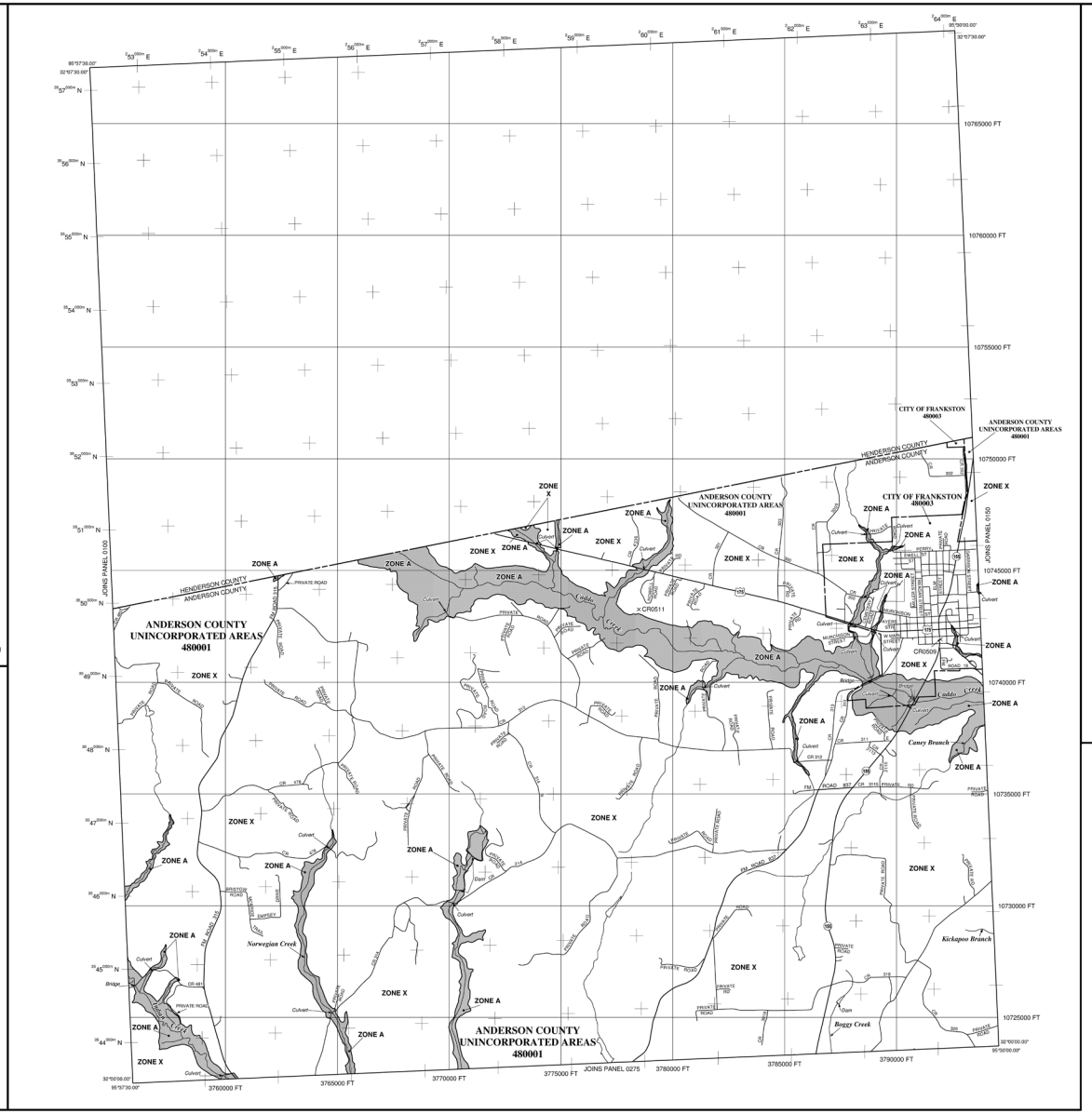

LEGEND

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

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ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
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ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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Floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 Base Flood Elevation line and value; elevation in feet*
(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A–A Cross section line
23–23 Transect line
97°07'30", 32°37'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4329000mN 1000-meter Universal Transverse Mercator grid , zone 15
6000000 FT 5000-foot grid : Texas State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 600 1200 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0125D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 125 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0125	D
FRANKSTON, CITY OF	480003	0125	D

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MAP NUMBER
48001C0125D
EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

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

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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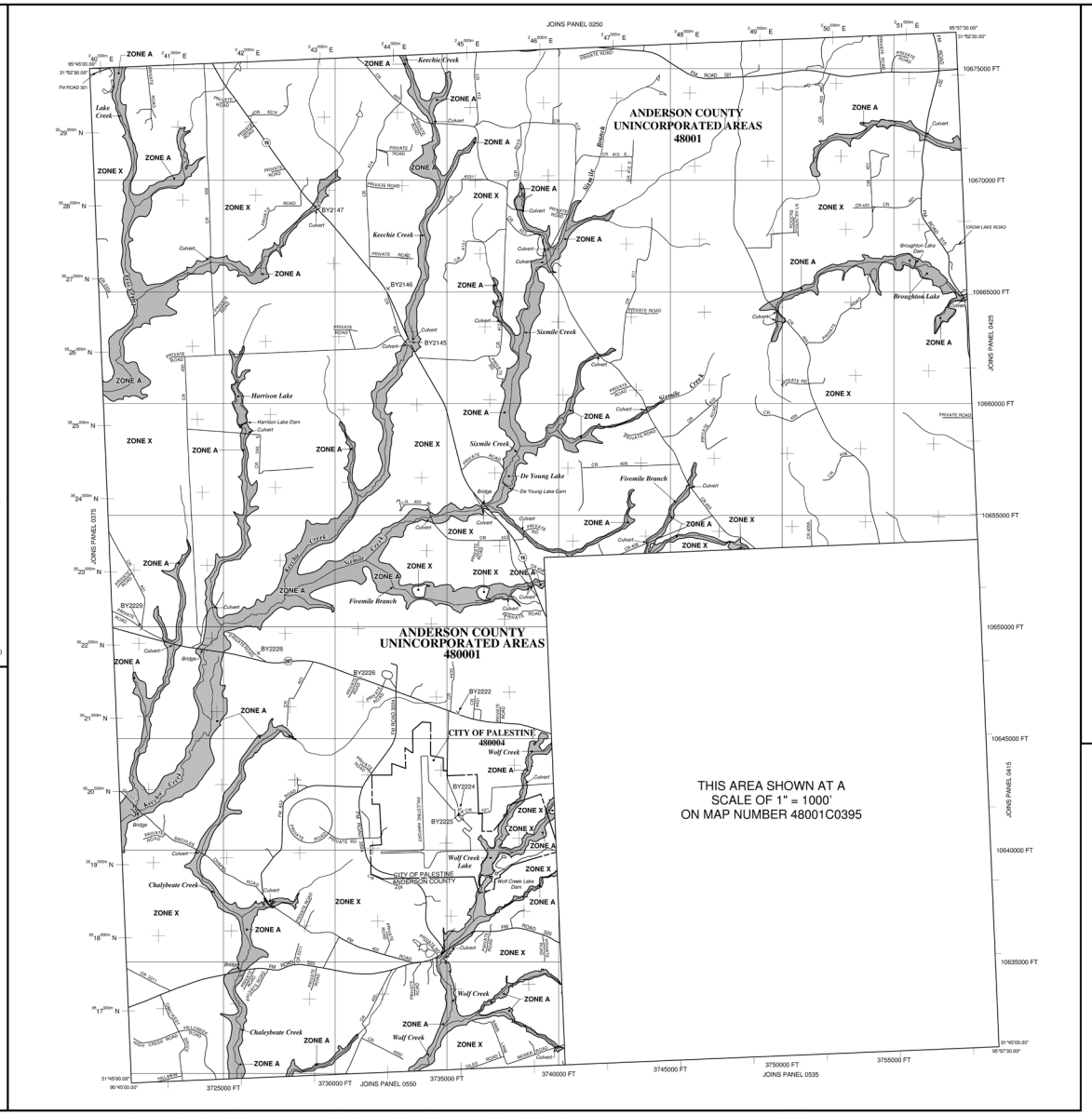

LEGEND

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

The 1% annual chance 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** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 Base Flood Elevation line and value; elevation in feet*
- (EL. 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A Cross section line
- 23 — 23 Transect line
- 97°07'30", 32°07'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4779 000mN 1000-meter Universal Transverse Mercator grid , zone 15
- 6000000 FT 5000-foot grid : Texas State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
- DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide 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 1-800-638-6620.

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
300 0 600 1200 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0400D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 400 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0400	D
PALESTINE, CITY OF	480004	0400	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48001C0400D
EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

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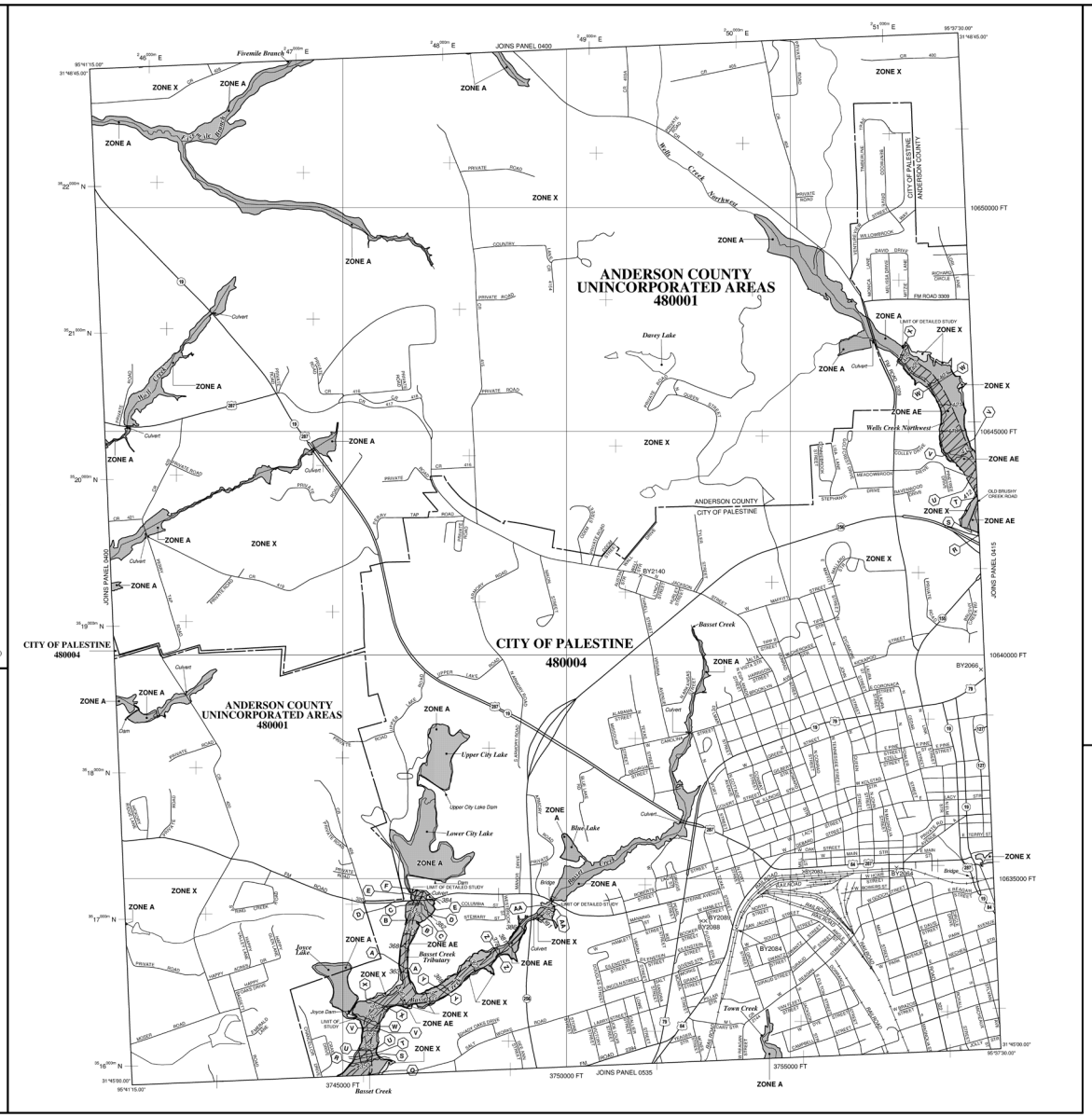

LEGEND

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

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FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

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- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 Base Flood Elevation line and value; elevation in feet*
- (EL. 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A–A Cross section line
- 23–23 Transect line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
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- M1.5 River Mile

MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0395D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 395 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0395	D
PALESTINE, CITY OF	480004	0395	D

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MAP NUMBER
48001C0395D

EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

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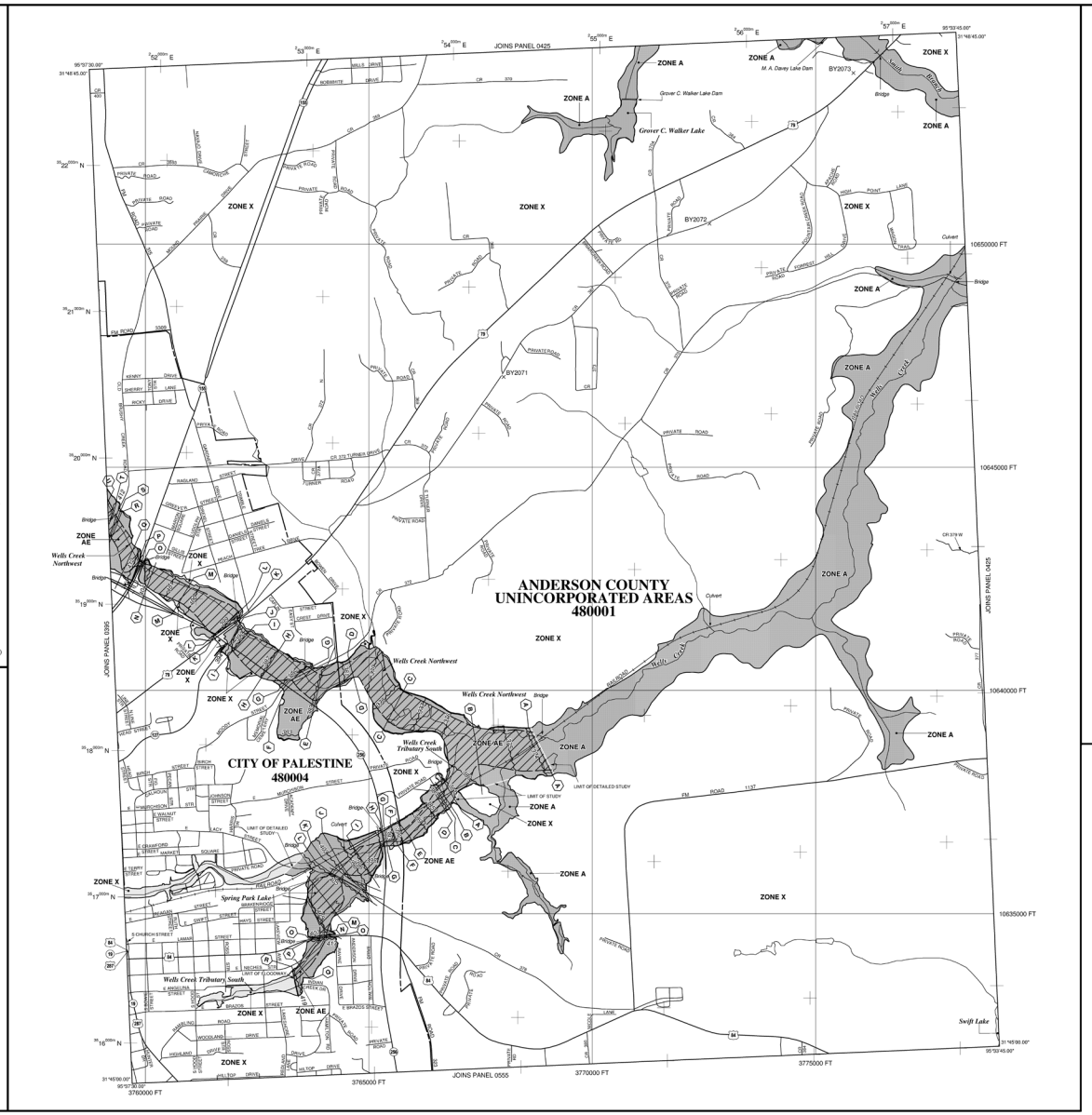

LEGEND

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ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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500 0 1000 2000 FEET
300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0415D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 415 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0415	D
PALESTINE, CITY OF	480004	0415	D

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MAP NUMBER
48001C0415D

EFFECTIVE DATE
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Federal Emergency Management Agency

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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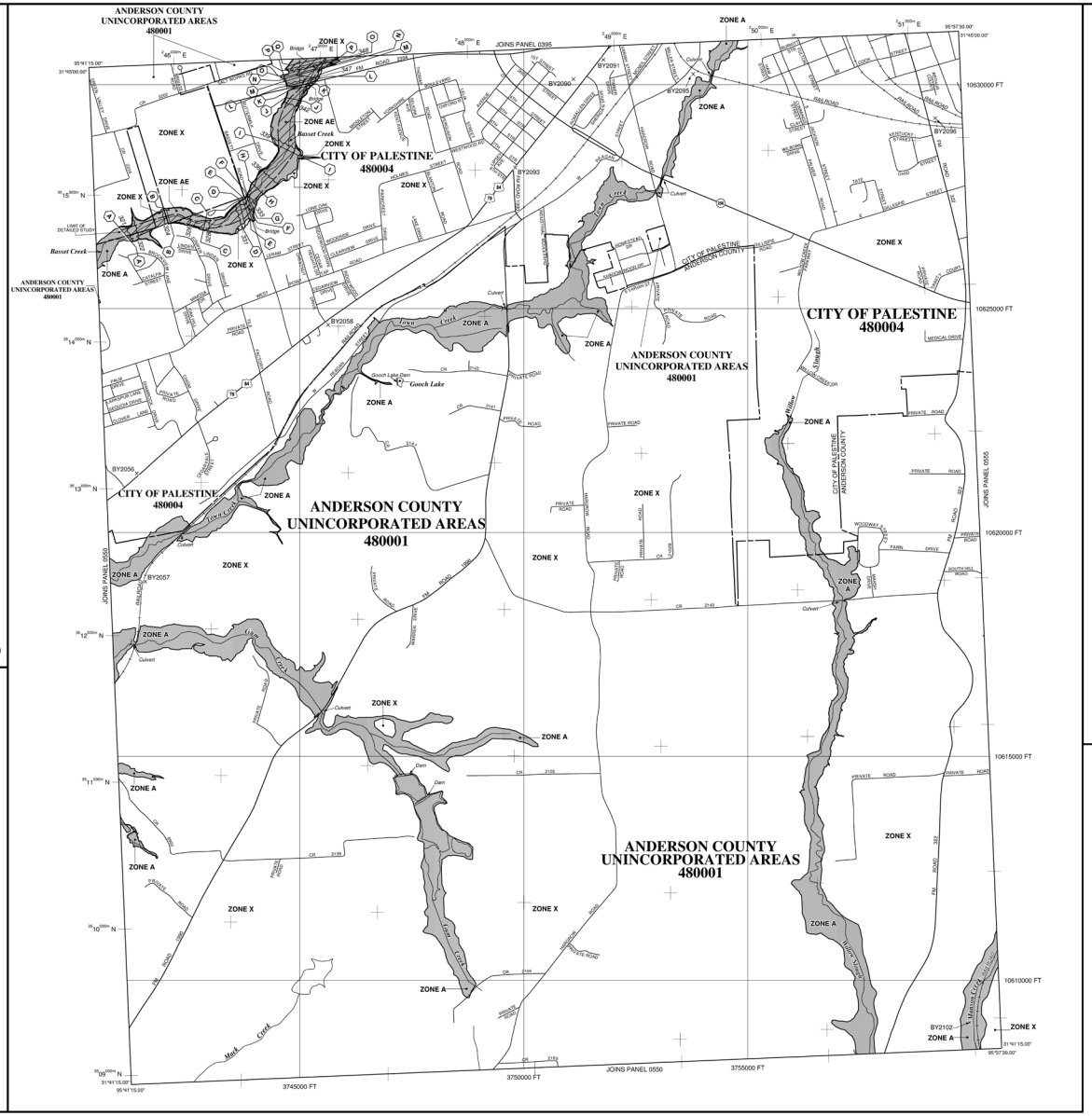
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

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

The 1% annual chance 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 No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 Base Flood Elevation line and value; elevation in feet*
- (EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A-A Cross section line
- 23-23 Transect line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4472000mN 1000-meter Universal Transverse Mercator grid , zone 15
- 6000000 FT 5000-foot grid : Texas State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
- DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide 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 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0535D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 535 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0535	D
PALESTINE, CITY OF	480004	0535	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48001C0535D

EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

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 possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations 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 only 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 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table 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 **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood 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.

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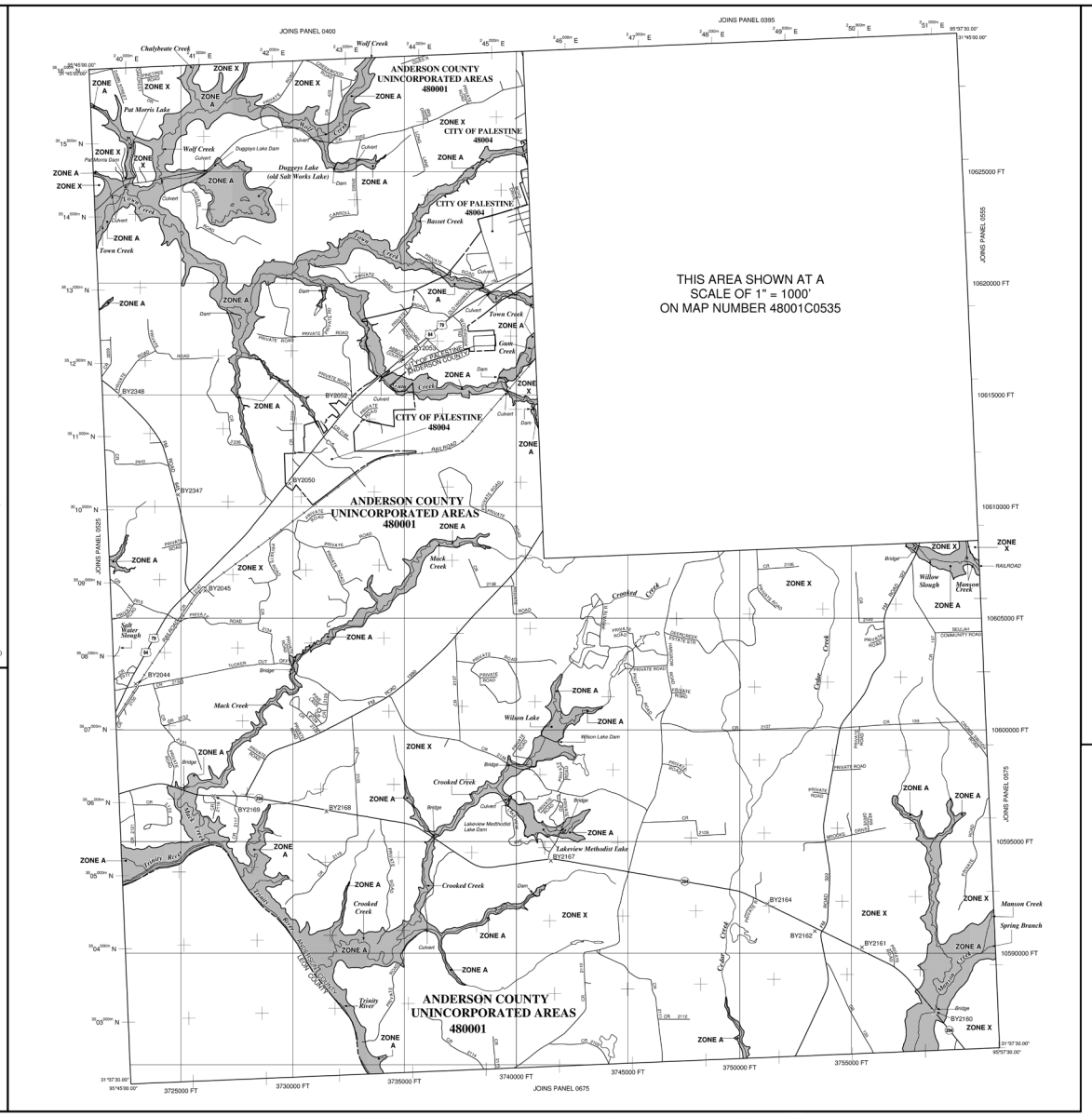

LEGEND

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

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ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 Base Flood Elevation line and value; elevation in feet*
(EL. 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A Cross section line
23 Transect line
97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4273 000m N 1000-meter Universal Transverse Mercator grid , zone 15
6000000 FT 5000-foot grid : Texas State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
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February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
300 0 600 1200 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0550D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 550 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0550	D
PALESTINE, CITY OF	480004	0550	D

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MAP NUMBER 48001C0550D
EFFECTIVE DATE FEBRUARY 3, 2010

Federal Emergency Management Agency

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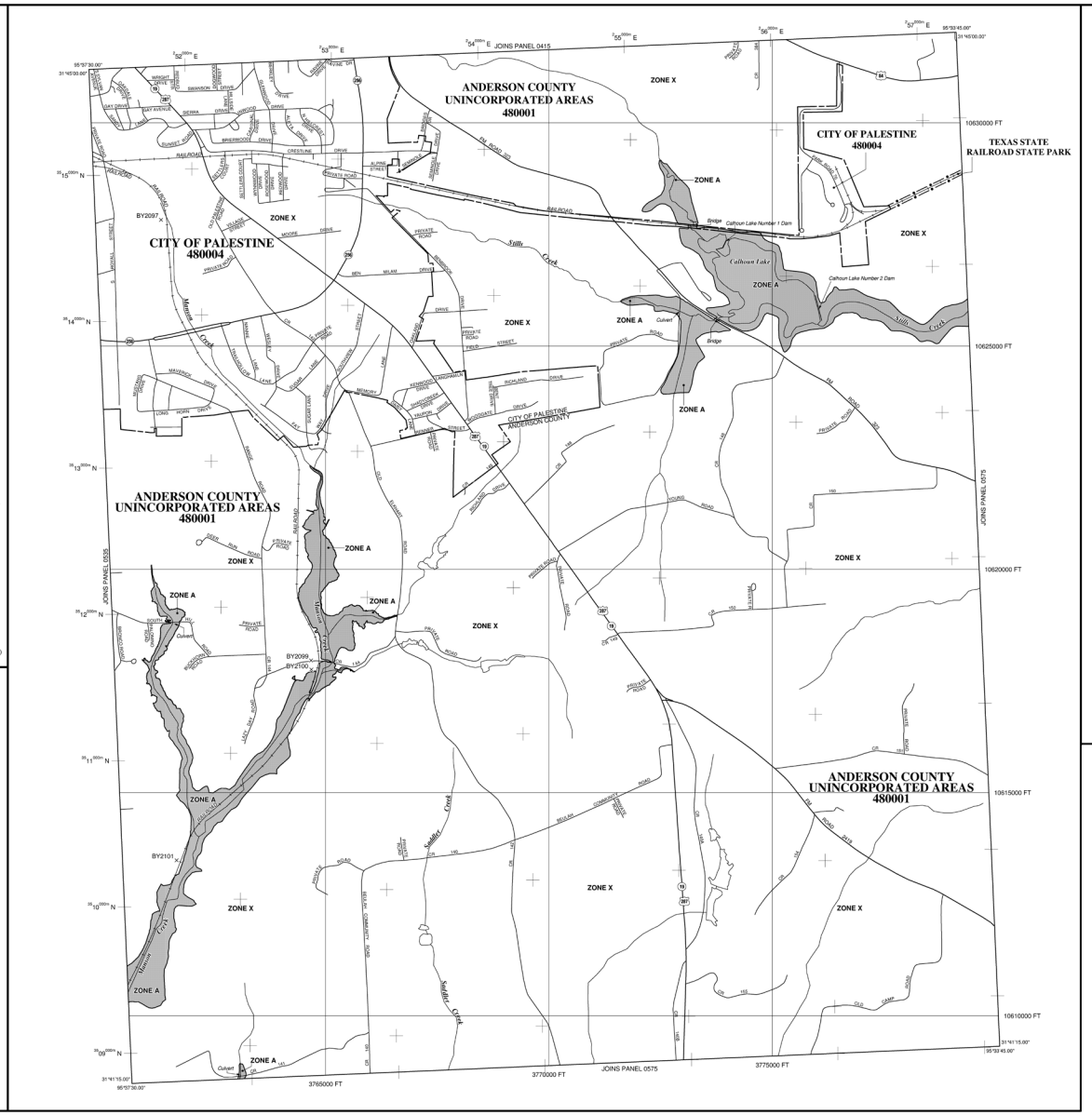

LEGEND

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- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
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- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 Base Flood Elevation line and value; elevation in feet*
- (EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A Cross section line
- 23 — 23 Transect line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000mN 1000-meter Universal Transverse Mercator grid , zone 15
- 6000000 FT 5000-foot grid ticks: Texas State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
- DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide 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 1–800–638–6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
200 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0555D

FIRM
FLOOD INSURANCE RATE MAP
ANDERSON COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 555 OF 750
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANDERSON COUNTY	480001	0555	D
PALESTINE, CITY OF	480004	0555	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48001C0555D

EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

Appendix B – Adoption Resolutions

RESOLUTION R-03-2024

A RESOLUTION OF ANDERSON COUNTY TEXAS, ADOPTING THE FEMA APPROVED ANDERSON COUNTY, TEXAS MULTI-JURISDICTION HAZARD MITIGATION PLAN AND APPOINTING THE COUNTY JUDGE AS THE CHIEF EXECUTIVE OFFICER AND AUTHORIZED REPRESENTATIVE TO ACT IN ALL MATTERS IN CONNECTION WITH THEIR PORTION OF THE HAZARD MITIGATION PLAN.

WHEREAS, Anderson County recognizes the threat that natural hazards pose to people and property within the County; and

WHEREAS, Anderson County has created a county-wide Hazard Mitigation Plan for itself and its participants which is in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the Anderson County, Texas Multi-Jurisdiction Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the plan from impacts of future hazards and disasters; and

WHEREAS, adoption by the Commissioners Court demonstrates our commitment to hazard mitigation and achieving the goals outlined in the Plan; and

WHEREAS, the adoption of this plan will make Anderson County eligible to apply for current open and future Hazard Mitigation Grants; and

NOW, THEREFORE, BE IT RESOLVED BY THE COMMISSIONERS COURT OF ANDERSON COUNTY:

Section 1. That Anderson County adopt the FEMA approved Anderson County, Texas Multi-Jurisdiction Hazard Mitigation Plan.

Section 2. That the County Judge be appointed the Chief Executive Officer and Authorized Representative to act on behalf of Anderson County in all matters in connection with their portion of the Anderson County Multi-Jurisdiction Hazard Mitigation Plan.

PASSED AND APPROVED ON February 26, 2024.

Carey G. McKinney
County Judge

Greg Chapin
Commissioner, Precinct One

Kenneth Dickson
Commissioner, Precinct Three

Rashad Mims
Commissioner, Precinct Two

Joey Hill
Commissioner, Precinct Four

COMMISSIONERS COURT ANDERSON COUNTY TEXAS

ATTEST:

Mark Staples, County Clerk

FILED FOR RECORD
at 1:33 o'clock P M.

FEB 26 2024

MARK STAPLES
County Clerk, Anderson County, Texas
By _____ Clerk

RESOLUTION 2024-02

A RESOLUTION OF THE CITY OF ELKHART TEXAS, ADOPTING THE FEMA APPROVED ANDERSON COUNTY, TEXAS MULTI-JURISDICTION HAZARD MITIGATION PLAN AND APPOINTING THE MAYOR AS THE CHIEF EXECUTIVE OFFICER AND AUTHORIZED REPRESENTATIVE TO ACT IN ALL MATTERS IN CONNECTION WITH THEIR PORTION OF THE HAZARD MITIGATION PLAN.

WHEREAS, the City of Elkhart recognizes the threat that natural hazards pose to people and property within the City; and

WHEREAS, the City of Elkhart has participated in the Anderson County Hazard Mitigation Plan which is in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the Anderson County Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Elkhart from impacts of future hazards and disasters; and

WHEREAS, adoption by the City Council demonstrates our commitment to hazard mitigation and achieving the goals outlined in the Anderson County Hazard Mitigation Plan; and

WHERAS, the adoption of this plan will make City of Elkhart eligible to apply for current and future Hazard Mitigation Grants; and

WHEREAS, Hazard Mitigation Action Plans are required to appoint an official to act as the Authorized Representative in all matters in connection with their portion of Anderson County Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF CITY OF Elkhart:

Section 1. That the City of Elkhart adopt the FEMA approved Anderson County, Texas Multi-Jurisdiction Hazard Mitigation Plan.

Section 2. That the Mayor be appointed the Chief Executive Officer and Authorized Representative to act on behalf of the City of Elkhart in all matters in connection with their portion of the Anderson County Multi-Jurisdiction Hazard Mitigation Plan.

PASSED AND APPROVED ON February 13, 2024.

ATTEST:

Jennifer McCoy, Mayor

Jan Stuteville, Interim City Secretary
Sunshine Alcorta

RESOLUTION
02132024

A RESOLUTION OF THE CITY OF FRANKSTON, TEXAS, ADOPTING THE FEMA APPROVED ANDERSON COUNTY, TEXAS MULTI-JURISDICTION HAZARD MITIGATION PLAN AND APPOINTING THE MAYOR AS THE CHIEF EXECUTIVE OFFICER AND AUTHORIZED REPRESENTATIVE TO ACT IN ALL MATTERS IN CONNECTION WITH THEIR PORTION OF THE HAZARD MITIGATION PLAN.

WHEREAS, the City of Frankston recognizes the threat that natural hazards pose to people and property within the City; and

WHEREAS, the City of Frankston has participated in the Anderson County Hazard Mitigation Plan which is in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the Anderson County Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Frankston from impacts of future hazards and disasters; and

WHEREAS, adoption by the City Council demonstrates our commitment to hazard mitigation and achieving the goals outlined in the Anderson County Hazard Mitigation Plan; and

WHERAS, the adoption of this plan will make City of Frankston eligible to apply for current and future Hazard Mitigation Grants; and

WHEREAS, Hazard Mitigation Action Plans are required to appoint an official to act as the Authorized Representative in all matters in connection with their portion of Anderson County Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF CITY OF FRANKSTON:

Section 1. That the City of Frankston adopt the FEMA approved Anderson County, Texas Multi-Jurisdiction Hazard Mitigation Plan.

Section 2. That the Mayor be appointed the Chief Executive Officer and Authorized Representative to act on behalf of the City of Frankston in all matters in connection with their portion of the Anderson County Multi-Jurisdiction Hazard Mitigation Plan.

PASSED AND APPROVED ON February 13, 2024

ATTEST:

T Carr
TOMMY CARR, MAYOR

Kelli D. Casey
KELLI D. CASEY, CITY SECRETARY

RESOLUTION NO. R-04-24

A RESOLUTION OF THE CITY OF PALESTINE TEXAS, ADOPTING THE FEMA APPROVED ANDERSON COUNTY, TEXAS MULTI-JURISDICTION HAZARD MITIGATION PLAN AND APPOINTING THE MAYOR AS THE CHIEF EXECUTIVE OFFICER AND AUTHORIZED REPRESENTATIVE TO ACT IN ALL MATTERS IN CONNECTION WITH THEIR PORTION OF THE HAZARD MITIGATION PLAN.

WHEREAS, the City of Palestine recognizes the threat that natural hazards pose to people and property within the City; and

WHEREAS, the City of Palestine has participated in the Anderson County Hazard Mitigation Plan, which is in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the Anderson County Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Palestine from impacts of future hazards and disasters; and

WHEREAS, adoption by the City Council demonstrates our commitment to hazard mitigation and achieving the goals outlined in the Anderson County Hazard Mitigation Plan; and

WHEREAS, the adoption of this plan will make the City of Palestine eligible to apply for current and future Hazard Mitigation Grants; and

WHEREAS, Hazard Mitigation Action Plans are required to appoint an official to act as the Authorized Representative in all matters in connection with their portion of the Anderson County Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF PALESTINE, TEXAS:

SECTION 1. That the City of Palestine adopt the FEMA approved Anderson County, Texas Multi-Jurisdiction Hazard Mitigation Plan.

SECTION 2. That the Mayor be appointed the Chief Executive Officer and Authorized Representative to act on behalf of the City of Palestine in all matters in connection with their portion of the Anderson County Multi-Jurisdiction Hazard Mitigation Plan.

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PASSED, APPROVED, and ADOPTED by the City Council of the City of Palestine, Texas, in its meeting held on the 12th day of February 2024.

MITCHELL JORDAN
MAYOR

ATTEST:

APRIL JACKSON
CITY SECRETARY

CITY OF PALESTINE TEXAS

APPROVED AS TO FORM:

REZZIN PULLUM
CITY ATTORNEY