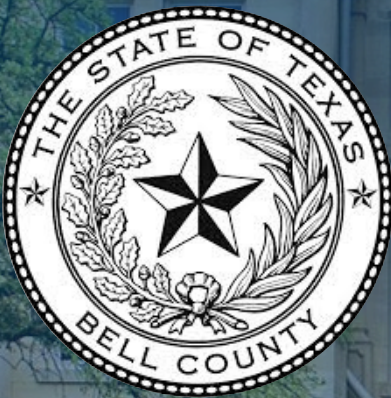


BELL COUNTY HAZARD MITIGATION ACTION PLAN UPDATE

2025 UPDATE

Mitigating Risk for a Safe, Secure, Sustainable Future



For more information, visit our website at:

<https://www.bellcountytexas.com/>

Written comments should be forwarded to:

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SECTION 1 – INTRODUCTION

Background.....	1
Scope and Participation	2
Purpose	2
Authority.....	3
Summary of Sections.....	3

SECTION 2 – PLANNING PROCESS

Plan Preparation and Development.....	1
Review and Incorporation of Existing Plans	12
Timeline for Implementing Mitigation Actions	16
Public and Stakeholder Involvement	16

SECTION 3 – COUNTY PROFILE

Overview.....	1
Population and Demographics	4
Population Growth	7
Economic Impact	8
Natural, Cultural, and Historic Resources.....	9
Existing Land Use and Development Trends	11
Changes in Vulnerability	13
Future Growth and Development	14

SECTION 4 – RISK OVERVIEW

Hazard Description	1
Disaster Declaration History	4
Natural Hazards and Climate Change	6
Overview of Hazard Analysis	8
Hazard Ranking	10

SECTION 5 – DAM FAILURE

Hazard Description	1
Location	3
Extent	5
Historical Occurrences	18

Probability of Future Events	19
Vulnerability and Impact	19
Climate Change Considerations	22

SECTION 6 – DROUGHT

Hazard Description	1
Location	1
Extent	4
Historical Occurrences	6
Probability of Future Events	10
Vulnerability and Impact	10
Climate Change Considerations	15

SECTION 7 – EARTHQUAKE

Hazard Description	1
Location	2
Extent	4
Historical Occurrences	7
Probability of Future Events	7
Vulnerability and Impact	7
Climate Change Considerations	8

SECTION 8 – EXPANSIVE SOILS

Hazard Description	1
Location	1
Extent	4
Historical Occurrences	5
Probability of Future Events	5
Vulnerability and Impact	6
Climate Change Considerations	9

SECTION 9 – EXTREME HEAT

Hazard Description	1
Location	1
Extent	1

Historical Occurrences	4
Probability of Future Events	7
Vulnerability and Impact	7
Climate Change Consideration	11

SECTION 10 – FLOOD

Hazard Description	1
Location	1
Extent	16
Historical Occurrences	18
Probability of Future Events	23
Vulnerability and Impact	23
Climate Change Considerations	28
NFIP Participation	29
NFIP Compliance and Maintenance	30
Repetitive Loss	31

SECTION 11 – HAIL

Hazard Description	1
Location	1
Extent	2
Historical Occurrences	3
Probability of Future Events	7
Vulnerability and Impact	7
Climate Change Considerations	12

SECTION 12 – HURRICANE / TROPICAL STORM

Hazard Description	1
Location	1
Extent	2
Historical Occurrences	2
Probability of Future Events	5
Vulnerability and Impact	6
Climate Change Considerations	10

SECTION 13 – LIGHTNING

Hazard Description	1
Location	1
Extent	1
Historical Occurrences	2
Probability of Future Events	4
Vulnerability and Impact	5
Climate Change Considerations	9

SECTION 14 – THUNDERSTORM WIND

Hazard Description	1
Location	1
Extent	2
Historical Occurrences	3
Probability of Future Events	12
Vulnerability and Impact	12
Climate Change Considerations	18

SECTION 15 – TORNADO

Hazard Description	1
Location	1
Extent	2
Historical Occurrences	4
Probability of Future Events	8
Vulnerability and Impact	9
Climate Change Considerations	15

SECTION 16 – WILDFIRE

Hazard Description	1
Location	2
Extent	16
Historical Occurrences	33
Probability of Future Events	37
Vulnerability and Impact	37

Climate Change Considerations	60
-------------------------------------	----

SECTION 17 – WINTER STORM

Hazard Description	1
Location	3
Extent	3
Historical Occurrences	5
Probability of Future Events	7
Vulnerability and Impact	8
Climate Change Considerations	12

SECTION 18 – CYBER ATTACK

Hazard Description	1
Location	3
Extent	3
Historical Occurrences	4
Probability of Future Events	5
Vulnerability and Impact	7
Climate Change Considerations	8

SECTION 19 – HAZARDOUS MATERIALS

Hazard Description	1
Location	2
Extent	5
Historical Occurrences	6
Probability of Future Events	6
Vulnerability and Impact	7
Climate Change Considerations	9

SECTION 20 – TERRORISM

Hazard Description	1
Location	1
Extent	2
Historical Occurrences	3
Probability of Future Events	4

Vulnerability and Impact	5
Climate Change Considerations	5

SECTION 21 – MITIGATION STRATEGY

Mitigation Goals	1
Goal 1	1
Goal 2	1
Goal 3	2
Goal 4	2
Goal 5	2
Goal 6	2
Goal 7	3

SECTION 22 – PREVIOUS ACTIONS

Summary	1
Bell County	2
City of Bartlett	20
City of Belton	31
City of Harker Heights	33
City of Holland.....	44
City of Killeen	51
City of Little River Academy	61
City of Nolanville	68
City of Rogers	78
Village of Salado	90
City of Temple.....	104
City of Troy	109
Central Texas Council of Governments (CTCOG).....	116

SECTION 23 – MITIGATION ACTIONS

Summary	1
Bell County	4
City of Bartlett	21
City of Belton	37

City of Harker Heights	49
City of Holland.....	68
City of Killeen	81
City of Little River Academy	131
City of Morgan's Point Resort.....	145
City of Nolanville	154
City of Rogers	172
Village of Salado	196
City of Temple.....	213
City of Troy	226
Central Texas Council of Governments (CTCOG).....	234

SECTION 24 – PLAN MAINTENANCE

Plan Maintenance Procedures	1
Incorporation	1
Monitoring and Evaluation	5
Updating	7
Continued Public Involvement	8

APPENDIX A – PLANNING TEAM

APPENDIX B – PUBLIC SURVEY RESULTS

APPENDIX C – CRITICAL FACILITIES

APPENDIX D – DAM LOCATIONS

APPENDIX E – MEETING DOCUMENTATION

APPENDIX F – CAPABILITY ASSESSMENT

APPENDIX G – STATE AND FEDERAL FUNDING OPPORTUNITIES

ADOPTION – RESOLUTIONS



SECTION 1

INTRODUCTION

SECTION 1: INTRODUCTION

Background.....	1
Scope.....	2
Purpose.....	2
Authority.....	3
Summary of Sections.....	3

BACKGROUND

Bell County is located in eastern Central Texas roughly 45 miles north of the city of Austin. The Balcones Escarpment runs through the approximate center of the county from southeast to northwest, dividing the county into regions. The eastern portion is Blackland Prairie, consisting of relatively level prairieland and gently rolling hills. The western half of the county falls in the Grand Prairie region and is characterized by undulating to rolling uplands, deeply cut with stream valleys which have stony slopes and steep bluffs. Major highways within Bell County include Interstate Highways 35 and 190 as well as State Highways 195, 95, 317, and 36. Bell County is bordered by Coryell, McLennan, and Falls counties to the north; Falls and Milam counties to the east; Milam and Williamson counties to the south; and Lampasas and Burnet counties to the west.

Texas is prone to extremely heavy rains and flooding with half of the world record rainfall rates (48 hours or less).¹ While flooding is a well-known risk, Bell County is susceptible to a wide range of natural hazards, including but not limited to wildfire, extreme heat, lightning, and drought. These life-threatening hazards can destroy property, disrupt the economy, and lower the overall quality of life for individuals.

While it is impossible to prevent an event from occurring, the impacts from many hazards on people and property can be lessened through mitigation. The Federal Emergency Management Agency (FEMA) defines mitigation as *sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects*.² Communities participate in hazard mitigation by developing hazard mitigation plans. The Texas Division of Emergency Management (TDEM) is required to review the plan and FEMA has the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000.

The Disaster Mitigation Act requires that hazard mitigation plans be reviewed and revised every five years to maintain eligibility for Hazard Mitigation Assistance (HMA) grant funding. FEMA approved the 2018 Bell County Hazard Mitigation Action Plan (HMAP) Update, which expired in 2023, therefore the County began the process of developing a Hazard Mitigation Action Plan Update, along with incorporated jurisdictions from that plan in order to regain eligibility for grant funding. The HMAP Update planning process provided an opportunity for Bell County and participating jurisdictions to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss. The Central Texas Council of Governments (CTCOG) coordinated among Bell County, Mills County, Hamilton County, and Lampasas County to update each of their HMAPs and selected H2O Partners, Inc. to write and develop the 2025 CTCOG Regional HMAP Updates, hereinafter titled: “Bell County Hazard Mitigation Action Plan Update 2025: Maintaining a Safe, Secure, and Sustainable Community” (Plan or Plan Update).

¹ Source: <http://www.floodsafety.com/texas/regional-info/san-antonio-flooding/>

² Source: <http://www.fema.gov/hazard-mitigation-planning-resources>

SECTION 1: INTRODUCTION

This is a multi-jurisdictional plan; the participating jurisdictions include: Bell County, City of Bartlett, City of Belton, City of Harker Heights, City of Holland, City of Killeen, City of Little River Academy, City of Morgan's Point Resort, City of Nolanville, City of Rogers, Village of Salado, City of Temple, City of Troy, and Central Texas Council of Governments (CTCOG).

Hazard mitigation activities are an investment in a community's safety and sustainability. It is widely accepted that the most effective hazard mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive review of a hazard mitigation plan addresses vulnerabilities to hazards that exist today and in the foreseeable future. Therefore, it is essential that a plan identify projected patterns of how future development will increase or decrease a community's overall hazard vulnerability.

SCOPE

The focus of the Plan Update is to identify activities to mitigate hazards classified as "high" or "moderate" risk, as determined through a detailed hazard risk assessment conducted for Bell County and the participating jurisdictions. The hazard classification enables the participating jurisdictions to prioritize mitigation actions based on hazards which can present the greatest risk to lives and property in the geographic scope.

PURPOSE

The Plan Update was prepared by Bell County, participating jurisdictions, and H2O Partners, Inc. The purpose of the Plan Update is to protect people and structures and to minimize the costs of disaster response and recovery. The goal of the Plan Update is to minimize or eliminate long-term risks to human life, property, operations, and the environment from known hazards by identifying risks and implementing cost-effective hazard mitigation actions. The planning process is an opportunity for participating jurisdictions within Bell County, stakeholders, and the general public to evaluate and develop successful hazard mitigation actions to reduce future risk of loss of life and damage to property resulting from a disaster in Bell County.

The Mission Statement of the Plan Update is, *"Maintaining a secure and sustainable future through the revision and development of targeted hazard mitigation actions to protect life and property."*

Participating jurisdictions within Bell County, and planning participants identified 13 natural hazards and 3 human-caused hazards to be addressed by the Plan Update. The specific goals of the Plan Update are to:

- Provide a comprehensive update to the 2018 HMAP;
- Minimize disruption to participating jurisdictions within Bell County following a disaster;
- Streamline disaster recovery by articulating actions to be taken before a disaster strikes to reduce or eliminate future damage;
- Demonstrate a firm local commitment to hazard mitigation principles;
- Serve as a basis for future funding that may become available through grants and technical assistance programs offered by the State or Federal government. The Plan will enable participating jurisdictions within Bell County to take advantage of rapidly developing mitigation grant opportunities as they arise; and

SECTION 1: INTRODUCTION

- Ensure that participating jurisdictions within Bell County maintain eligibility for the full range of future federal disaster relief.

AUTHORITY



The Plan is tailored specifically for participating jurisdictions within Bell County and plan participants including Planning Team members, stakeholders, and the general public who participated in the Plan Update development process. The Plan complies with all requirements promulgated by the Texas Division of Emergency Management (TDEM) and all applicable provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390), and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Additionally, the Plan complies with the Interim Final Rules for the Hazard Mitigation Planning and Hazard Mitigation Grant Program (44 CFR, Part 201), which specify the criteria for approval of mitigation plans required in Section 322 of the DMA 2000 and standards found in FEMA’s “Local Mitigation Planning Policy Guide” (April 2023), and the “Local Mitigation Planning Handbook” (May 2023).

SUMMARY OF SECTIONS

Sections 1 and 2 of the Plan Update outline the Plan’s purpose and development, including how Planning Team members, stakeholders, and members of the general public were involved in the planning process. Section 3 profiles Bell County’s population and economy.

Sections 4 through 20 present a hazard overview and information on individual natural and human-caused hazards in the planning area. For each hazard, the Plan Update presents a description of the hazard, a list of historical hazard events, and the results of the vulnerability and risk assessment process.

Section 21 presents hazard mitigation goals and objectives. Section 22 gives an analysis for the previous actions and Section 23 presents hazard mitigation actions for Bell County and the participating jurisdictions. Section 24 identifies Plan maintenance mechanisms.

The list of planning team members and stakeholders is located in Appendix A. Public survey results are analyzed and presented in Appendix B. Appendix C contains a detailed list of critical facilities for the area. Appendix D contains information regarding dam locations within Bell County. Appendix E contains information regarding workshops and meeting documentation. Capability Assessment results for participating jurisdictions within Bell County are in Appendix F. Appendix G includes State and Federal Funding Opportunities.³

³ Information contained in some of these appendices are exempt from public release under the Freedom of Information Act (FOIA).



SECTION 2

PLANNING PROCESS

SECTION 2: PLANNING PROCESS

Plan Preparation and Development	1
Overview of the Plan	1
Planning Team	2
Planning Process	10
Kickoff Workshop	11
Hazard Identification.....	11
Risk Assessment	11
Mitigation Review and Development	12
Review and Incorporation of Existing Plans.....	12
Review.....	12
Incorporation of Existing Plans into the HMAP Process.....	13
Incorporation of the HMAP into Other Planning Mechanisms	13
Plan Review and Plan Update.....	16
Timeline for Implementing Mitigation Actions	16
Public and Stakeholder Involvement.....	16
Underserved Communities/Vulnerable Populations	17
Stakeholder Involvement.....	18
Public Meetings	23
Public Participation Survey	24

PLAN PREPARATION AND DEVELOPMENT

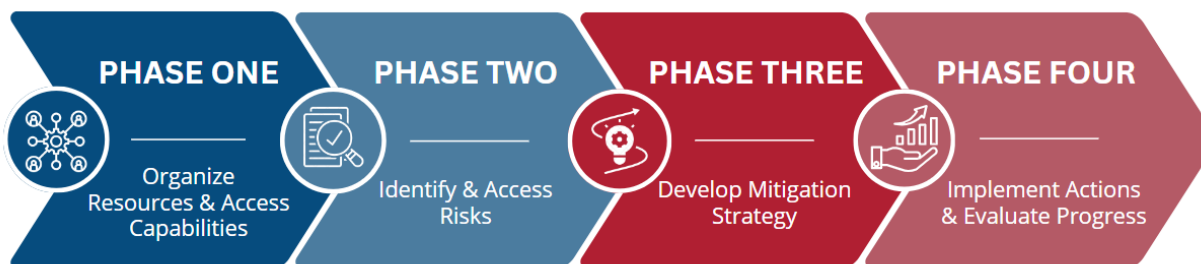
Hazard mitigation planning involves coordination with various constituents and stakeholders to develop a more disaster-resistant community. Section 2 provides an overview of the planning process including the identification of key steps and a detailed description of how stakeholders and the public were involved.

OVERVIEW OF THE PLAN

The Central Texas Council of Governments (CTCOG) hired H2O Partners, Inc. (Consultant Team), to provide technical support and oversee the development of the Bell County Hazard Mitigation Action Plan Update 2025. The Consultant Team used the FEMA “Local Mitigation Planning Policy Guide” (April 2023), and the “Local Mitigation Planning Handbook” (May 2023) to develop the Plan Update. The overall planning process is shown in Figure 2-1 below.

SECTION 2: PLANNING PROCESS

Figure 2-1. Mitigation Planning Process



Bell County, participating jurisdictions, and the Consultant Team met in June 2023 to begin organizing resources, identify Planning Team members, and conduct a Capability Assessment.

PLANNING TEAM

Key members of H2O Partners, Inc. developed the Plan Update in conjunction with the Planning Team. The Planning Team was established using a direct representation model. Some of the responsibilities of the Planning Team included: completing Capability Assessment surveys, providing input regarding the identification of hazards, identifying mitigation goals, and developing mitigation strategies. An Executive Planning Team consisting of key personnel involved in hazard mitigation activities from each of the participating jurisdictions within Bell County, shown in Table 2-1, was formed to coordinate planning efforts and request input and participation in the planning process. Participation in this planning process is defined as being engaged in the process through attending meetings, providing data and related information, providing updates on previous actions, and reviewing and commenting on draft versions of the plan.

Table 2-2 reflects the Advisory Planning Team, consisting of additional representatives from area organizations and departments from the participating jurisdictions within Bell County that participated throughout the planning process. All Executive and Advisory Planning Team members are involved in hazard mitigation activities; those with the authority to regulate development are identified with an asterisk next to their title.

Table 2-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Central Texas Council of Governments	Emergency Services Program Manager
Central Texas Council of Governments	Special Projects Coordinator
Bell County	Emergency Management Coordinator
City of Bartlett	City Manager*
City of Belton	Emergency Management Coordinator / Fire Chief
City of Harker Heights	Planning & Development Director/City Engineer*
City of Holland	City Secretary
City of Killeen	Emergency Management Coordinator

SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
City of Little River Academy	City Secretary
City of Morgan's Point Resort	Councilman*
City of Nolanville	City Manager*
City of Nolanville	Fire Chief
City of Rogers	City Administrator*
Village of Salado	Village Administrator *
City of Temple	Fire/Emergency Management Division Director
City of Troy	City Administrator*

Table 2-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Central Texas Council of Governments	Planning and Regional Service Director*
Bell County	Administrative Assistant for Bell County Emergency Management
Bell County	Communications Director
Bell County	County Judge
Bell County	Facilities Department Director
Bell County	Indigent Health Department Director
Bell County	Precinct 1 Commissioner*
Bell County	Precinct 2 Commissioner*
Bell County	Precinct 3 Commissioner*
Bell County	Precinct 4 Commissioner*
Bell County	Road and Bridge Supervising Foreman
Bell County	Sherriff's Office – Administrative Lieutenant
Bell County	Sherriff's Office - Lieutenant
Bell County	Sherriff's Office - Support Services Bureau
City of Bartlett	City Councilman*
City of Bartlett	Mayor*

SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
City of Bartlett	Mayor Pro-Tem*
City of Belton	Assistant to the Chief of Police
City of Belton	Assistant to the City Manager
City of Belton	Assistant Director of Parks and Recreation
City of Belton	Assistant Fire Chief
City of Belton	Chief of Police
City of Belton	City Manager*
City of Belton	Director of Planning*
City of Belton	Director of Public Works
City of Belton	Mayor*
City of Belton	Public Works Program Manager
City of Harker Heights	Assistant City Manager
City of Harker Heights	Chief of Police
City of Harker Heights	City Manager*
City of Harker Heights	Code Enforcement Officer I*
City of Harker Heights	Code Enforcement Officer II*
City of Harker Heights	Deputy Fire Marshal / Chief
City of Harker Heights	Director of Parks and Recreation
City of Harker Heights	Director of Public Works
City of Harker Heights	Fire Chief (Interim)
City of Harker Heights	Mayor*
City of Harker Heights	Police Lieutenant
City of Holland	Chief of Police
City of Holland	Contracted Engineer for City
City of Holland	Mayor Pro-Tem*
City of Killeen	Assistant Chief of Police
City of Killeen	Assistant City Attorney

SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
City of Killeen	Assistant to the Director of Development
City of Killeen	Assistant Fire Chief
City of Killeen	Assistant Fire Marshal / Chief
City of Killeen	Assistant Director of I.T.
City of Killeen	Assistant Human Resources Director
City of Killeen	Chief of Police
City of Killeen	City Engineer
City of Killeen	City Manager*
City of Killeen	Communications Coordinator
City of Killeen	Communications Officer
City of Killeen	Deputy Chief of EMS
City of Killeen	Deputy Chief of Training
City of Killeen	Director of Code Enforcement*
City of Killeen	Director of Water & Sewer
City of Killeen	Drainage Manager
City of Killeen	Emergency Response Coordinator
City of Killeen	Executive Assistant
City of Killeen	Executive Director of Communications
City of Killeen	Executive Director of Development Services*
City of Killeen	Executive Director of Public Works
City of Killeen	Deputy Chief of Fire Operations
City of Killeen	Finance Controller
City of Killeen	Finance Manager
City of Killeen	Financial Analyst
City of Killeen	Fire Chief
City of Killeen	Maintenance Supervisor
City of Killeen	Mayor*

SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
City of Killeen	Multi-Media Coordinator
City of Killeen	Office Administrator
City of Killeen	Senior Specialist – Planning
City of Killeen	Stormwater Project Manager
City of Killeen	Supervisor of Operations
City of Little River Academy	Chief of Police
City of Little River Academy	City Councilman*
City of Little River Academy	Mayor*
City of Morgan's Point Resort	City Manager (Interim)*
City of Morgan's Point Resort	Chief of Police
City of Morgan's Point Resort	City Secretary
City of Morgan's Point Resort	Code Enforcement Officer*
City of Morgan's Point Resort	Director of Finance
City of Morgan's Point Resort	Director of Utilities
City of Morgan's Point Resort	Fire Chief
City of Morgan's Point Resort	Maintenance Superintendent
City of Morgan's Point Resort	Marketing Communications Manager
City of Morgan's Point Resort	Mayor*
City of Nolanville	Battalion Chief
City of Nolanville	Chief of Police
City of Nolanville	City Secretary
City of Nolanville	Community Outreach and Public Affairs Coordinator
City of Nolanville	Director of Economic Development*
City of Nolanville	Director of Public Safety
City of Nolanville	Director of Public Works
City of Nolanville	Mayor*
City of Nolanville	Public Works Operations Specialist

SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
City of Rogers	Chief of Police
City of Rogers	Director of Public Works
City of Rogers	Fire Chief
City of Rogers	Mayor*
Village of Salado	Assistant Village Administrator*
Village of Salado	Chief of Police
Village of Salado	Fire Chief
Village of Salado	Mayor*
Village of Salado	Village Secretary
City of Temple	Assistant Director of Public Works
City of Temple	Assistant Director of Public Works Operations
City of Temple	Assistant Director of Transform Temple
City of Temple	Chief Information Officer
City of Temple	Chief of Police
City of Temple	Chief Technology Officer
City of Temple	Deputy Chief of Police – Field Services Bureau
City of Temple	Deputy Chief of Police – Investigation Bureau
City of Temple	Director of Transform Temple*
City of Temple	Director of Public Works
City of Temple	Executive Assistant
City of Temple	Executive Support Coordinator
City of Temple	Fire Chief
City of Temple	I.T. Infrastructure Manager
City of Temple	I.T. Security Administrator
City of Temple	Marketing Specialist
City of Temple	Mayor*

SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
City of Temple	Streets & Drainage Division Director
City of Temple	Transportation Director
City of Troy	Chief of Police
City of Troy	Fire Chief
City of Troy	Mayor*
City of Troy	Special Projects

Additionally, a Stakeholder Group was invited via email to participate in the planning process by attending meetings, commenting on draft versions of the plan, and/or by providing data to inform the planning process. The Consultant Team, Planning Teams, and Stakeholder Group coordinated to identify mitigation goals, and develop mitigation strategies and actions for the Plan. Appendix A provides a complete listing of all participating Planning Team members and stakeholders from participating jurisdictions within Bell County by organization, title, and stakeholder type. Stakeholder involvement is discussed further below.

Based on results of completed Capability Assessment, participating jurisdictions within Bell County described methods for achieving future hazard mitigation measures by expanding existing capabilities. For example, each jurisdiction has an opportunity to identify opportunities for cross-training or increasing the technical expertise of staff by attending free training available through FEMA and the Texas Division of Emergency Management (TDEM) by monitoring classes and availability through preparingtexas.org. In addition, each jurisdiction can identify Planning Team members with the authority to monitor the Plan and identify grant funding opportunities for expanding staff. Other options for improving capabilities for each jurisdiction include the following:

Table 2-3. Opportunities for Improving and Expanding Existing Capabilities by Jurisdiction

JURISDICTION	OPPORTUNITIES
Central Texas Council of Governments	<ul style="list-style-type: none"> Integrate information in the risk assessment and identified mitigation projects within the HMAP into the Continuity of Operations. Update existing GIS layers to integrate risk information from HMAP.
Bell County	<ul style="list-style-type: none"> Review current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Bartlett	<ul style="list-style-type: none"> Integrate risk information from HMAP into future updates to Comprehensive Plan. Review current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.

SECTION 2: PLANNING PROCESS

JURISDICTION	OPPORTUNITIES
City of Belton	<ul style="list-style-type: none"> • Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Harker Heights	<ul style="list-style-type: none"> • Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Holland	<ul style="list-style-type: none"> • Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Killeen	<ul style="list-style-type: none"> • Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Little River Academy	<ul style="list-style-type: none"> • Develop a Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Morgan's Point Resort	<ul style="list-style-type: none"> • Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Nolanville	<ul style="list-style-type: none"> • Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Rogers	<ul style="list-style-type: none"> • Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes.

SECTION 2: PLANNING PROCESS

JURISDICTION	OPPORTUNITIES
	<ul style="list-style-type: none">• Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
Village of Salado	<ul style="list-style-type: none">• Integrate risk information from HMAP into future updates to Comprehensive Plan.• Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes.• Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Temple	<ul style="list-style-type: none">• Integrate risk information from HMAP into future updates to Comprehensive Plan.• Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes.• Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Troy	<ul style="list-style-type: none">• Integrate risk information from HMAP into future updates to Comprehensive Plan.• Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes.• Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.

Sample hazard mitigation actions developed with similar hazard risk were shared at the meetings. These important discussions resulted in the development of multiple mitigation actions that are included in the Plan Update to further mitigate risk from natural hazards in the future.

The Planning Team developed hazard mitigation actions for mitigating risk from all of the identified hazards within this Plan Update, including potential wildfire, extreme heat, lightning, hail, and drought events. These actions include but are not limited to installing generators at critical facilities, developing a Community Wildfire Protection Plan (CWPP), and educating citizens to practice hazard mitigation techniques.

PLANNING PROCESS

The process used to prepare the Plan Update followed the four major steps included at Figure 2-1. After the Planning Team was organized, a capability assessment was developed and distributed at the Kick-Off Workshop. Hazards were identified and assessed, and results associated with each of the hazards were provided at the Risk Assessment Workshop. Based on Bell County's identified vulnerabilities, specific mitigation strategies were discussed and developed at the Mitigation Strategy Workshop. Finally, Plan maintenance and implementation procedures were developed and are included in Section 24. Participation of Planning Team members, stakeholders, and the public at each of the workshops is documented in Appendix E. The City of Holland was unable to attend workshops throughout the planning process. The Consultant Team followed up with the City of Holland to review information discussed and gather documents that were collected during the workshops.

At the Plan development workshops held throughout the planning process described herein, the following factors were taken into consideration:

- The nature and magnitude of risks currently affecting the community;

SECTION 2: PLANNING PROCESS

- Hazard mitigation goals to address current and expected conditions;
- Whether current resources will be sufficient for implementing the Plan Update;
- Implementation problems, such as technical, political, legal, and coordination issues that may hinder development;
- Anticipated outcomes; and
- How participating jurisdictions within Bell County, agencies, and partners will participate in implementing the Plan Update.

KICKOFF WORKSHOP

The Kickoff Workshop was held on July 25, 2023, at the CTCOG facility in the City of Belton. The initial workshop informed participating officials and key department personnel about how the planning process pertained to their distinct roles and responsibilities and engaged stakeholder groups that focus on vulnerable populations and underserved communities including, but not limited to utility providers, local medical partners, local ISDs, and surrounding counties. In addition to the kickoff presentation, participants received the following information:

- Project overview regarding the planning process;
- Public survey access information;
- Hazard Ranking form; and
- Capability Assessment survey for completion.

A risk ranking exercise was conducted at the Kickoff Workshop to get input from the Planning Team and stakeholders pertaining to various risks from a list of natural hazards affecting the planning area. Participants ranked hazards high to low in terms of perceived level of risk, frequency of occurrence, and potential impact. The assessments were also used to set priorities for hazard mitigation actions based on potential loss of lives and dollar losses. A hazard profile and vulnerability analysis for each of the hazards can be found in Sections 4 through 20.

HAZARD IDENTIFICATION

At the Kickoff Workshop, and through e-mail and phone correspondence, the Planning Team conducted preliminary hazard identification. The Planning Team in coordination with the Consultant Team reviewed and considered a full range of natural hazards. Once identified, the teams narrowed the list to significant hazards by reviewing hazards affecting the area, the 2023 State of Texas Hazard Mitigation Plan, and initial study results from reputable sources such as federal and state agencies. Based on this initial analysis, the teams identified a total of 13 natural hazards, and 3 human-caused hazards, which pose a significant threat to the planning area.

RISK ASSESSMENT

An initial risk assessment for participating jurisdictions within Bell County was completed in October 2023 and results were presented to Planning Team members at the Risk Assessment Workshop held on October 11, 2023, at the CTCOG facility in the City of Belton. At the workshop, the characteristics and consequences of each hazard were evaluated to determine the extent to which the planning area would be affected in terms of potential danger to property and citizens.

Property and crop damages were estimated by gathering data from the National Centers for Environmental Information (NCEI) and National Oceanic and Atmospheric Administration (NOAA). The assessment also examined the impact of various hazards on the built environment, including general building stock, critical facilities, lifelines, and infrastructure. The resulting risk assessment profiled hazard events provided information on previous occurrences, estimated

SECTION 2: PLANNING PROCESS

probability of future events, and detailed the spatial extent and magnitude of impact on people and property. Following the risk assessment workshop past event data from NCEI is provided to the planning team for their review and assistance in identifying significant events.

MITIGATION REVIEW AND DEVELOPMENT

Developing the Mitigation Strategy for the Plan involved identifying mitigation goals and new mitigation actions. A Mitigation Workshop was held on December 7, 2023, at City of Temple's Training Center. In addition to the Planning Team, stakeholder groups were invited to attend the workshop. The participating jurisdictions were proactive in identifying mitigation actions to lessen the risk of all the identified hazards included in the Plan Update.

An inclusive and structured process was used to develop and prioritize new hazard mitigation actions for the Plan Update. The prioritization method was based on FEMA's STAPLE+E criteria and included social, technical, administrative, political, legal, economic, and environmental considerations. As a result, each Planning Team Member assigned an overall priority to each hazard mitigation action. The overall priority of each action is reflected in the hazard mitigation actions found in Section 23.

Planning Team Members then developed action plans identifying proposed actions, costs and benefits, the responsible organization(s), effects on new and existing buildings, implementation schedules, priorities, and potential funding sources.

Specifically, the process involved:

- Listing optional hazard mitigation actions based on information collected from previous plan reviews, studies, and interviews with federal, state, and local officials. Workshop participants reviewed the optional mitigation actions and selected actions that were most applicable to their area of responsibility, cost-effective in reducing risk, easily implemented, and likely to receive institutional and community support.
- Workshop participants inventoried federal and state funding sources that could assist in implementing the proposed hazard mitigation actions. Information was collected, including the program name, authority, purpose of the program, types of assistance and eligible projects, conditions on funding, types of hazards covered, matching requirements, application deadlines, and a point of contact.
- Planning Team Members considered the benefits that would result from implementing the hazard mitigation actions compared to the cost of those projects. Although detailed cost-benefit analyses were beyond the scope of the Plan Update, Planning Team Members utilized economic evaluation as a determining factor between hazard mitigation actions.
- Planning Team Members then selected and prioritized mitigation actions.

Hazard mitigation actions identified in the process were made available to the Planning Team for review. The draft Plan Update was maintained on file by CTCOG, Bell County and participating jurisdictions and was made available to the general public for review.

REVIEW AND INCORPORATION OF EXISTING PLANS

REVIEW

Background information utilized during the planning process included various studies, plans, reports, and technical information from sources such as FEMA, the United States Army Corps of

SECTION 2: PLANNING PROCESS

Engineers (USACE), the U.S. Fire Administration, National Oceanic and Atmospheric Administration (NOAA), the Texas Water Development Board (TWDB), the Texas Commission on Environmental Quality (TCEQ), the Texas State Data Center, Texas Forest Service, the Texas Division of Emergency Management (TDEM), and local hazard assessments and plans. Section 4 and the hazard-specific sections of the Plan (Sections 5-20) summarize the relevant background information.

Specific background documents, including those from FEMA, provided information on hazard risk, hazard mitigation actions currently being implemented, and potential mitigation actions. Previous hazard events, occurrences, and descriptions were identified through NOAA's National Centers for Environmental Information (NCEI). Results of past hazard events were found through searching the NCEI. The USACE studies were reviewed for their assessment of risk and potential projects in the region. Information from the State Demographer was reviewed for population and other projections and included in Section 3 of the Plan. Data from the Texas Forest Service was used to appropriately rank the wildfire hazard, and to help identify potential grant opportunities. Materials from FEMA and TDEM were reviewed for guidance on Plan Update development requirements.

INCORPORATION OF EXISTING PLANS INTO THE HMAP PROCESS

A Capability Assessment was completed by key departments from the participating jurisdictions within Bell County which provided information pertaining to existing plans, policies, ordinances, and regulations to be integrated into the goals and objectives of the Plan Update. The relevant information was included in a master Capability Assessment, Appendix F.

Existing projects and studies were utilized as a starting point for discussing hazard mitigation actions among Planning Team members. For example, Bell County has completed a project identifying households in the floodplain and dam inundation zones to include them in the CodeRed notification system. The City of Bartlett has also completed several actions, including hardening critical facilities, adopting an ordinance to ensure regulations for tie-downs on installations of mobile homes, as well as implementing public education and awareness programs to educate citizens on hazards. Other completed or ongoing projects include a road and debris clearing program in the Village of Salado, installing drought-tolerant landscaping at public buildings in the City of Holland, and strengthening zoning ordinances to limit development in high hazard areas in the City of Troy. For a comprehensive list of actions from the previous 2018 HMAP, please refer to Section 22.

Additionally, policies and ordinances were reviewed by several of the participating jurisdictions. Other plans were reviewed, such as Capital Improvement Plans and Emergency Operations Plan, to identify any additional mitigation actions. Finally, the 2023 State of Texas Hazard Mitigation Plan, developed by TDEM, was discussed in the initial planning meeting in order to develop a specific group of hazards to address in the planning effort. The 2023 State Plan was also used as a guidance document, along with FEMA materials, in the development of the Bell County Hazard Mitigation Action Plan Update 2025.

INCORPORATION OF THE HMAP INTO OTHER PLANNING MECHANISMS

Planning Team members will integrate implementation of the Plan Update with other planning mechanisms for Bell County, such as the Emergency Operations Plan. Existing plans for participating jurisdictions will be reviewed and incorporated into the Plan Update, as appropriate.

SECTION 2: PLANNING PROCESS

This section discusses how the Plan will be implemented by the participating jurisdictions within Bell County. It also addresses how the Plan will be evaluated and improved over time, and how the public will continue to be involved in the hazard mitigation planning process.

Participating jurisdictions within Bell County will be responsible for implementing hazard mitigation actions contained in Section 23. Each hazard mitigation action has been assigned to a specific County, City, Village, or CTCOG department that is responsible for tracking and implementing the action.

A funding source has been listed for each identified hazard mitigation action and may be utilized to implement the action. An implementation time period has also been assigned to each hazard mitigation action as an incentive and to determine whether actions are implemented on a timely basis.

Participating jurisdictions within Bell County will integrate hazard mitigation actions contained in the Plan Update with existing planning mechanisms such as ordinances, Emergency Operations or Management Plans, and other local and area planning efforts. Bell County will work closely with area organizations to coordinate implementation of hazard mitigation actions that benefit the planning area in terms of financial and economic impact.

Upon formal adoption of the Plan Update, Planning Team members from the participating jurisdictions will review existing plans along with building codes to guide development and ensure that hazard mitigation actions are implemented. Each of the jurisdictions will be responsible for coordinating periodic review of the Plan Update with members of the Advisory Planning Team to ensure integration of hazard mitigation strategies into these planning mechanisms and codes. The Planning Team will also conduct periodic reviews of various existing planning mechanisms and analyze the need for any revisions or updates in light of the approved Plan Update. Participating jurisdictions within Bell County will ensure that future long-term planning objectives will contribute to the goals of the Plan to reduce the long-term risk to life and property from moderate and high-risk hazards. Within one year of formal adoption of the Plan, existing planning mechanisms will be reviewed and analyzed as they pertain to the Plan Update.

Planning Team members will review and revise, as necessary, the long-range goals and objectives in its strategic plan and budgets to ensure that they are consistent with the Plan Update.

Furthermore, Bell County will work with neighboring jurisdictions to advance the goals of the Plan Update as it applies to ongoing, long-range planning goals and actions for mitigating risk to natural hazards throughout the planning area.

Table 2-4 identifies types of planning mechanisms and examples of methods for incorporating the Plan into other planning efforts.

Table 2-4. Examples of Methods of Incorporation

Planning Mechanism	Incorporation of Plan
Annual Budget Review	Various departments and key personnel that participated in the planning process for participating jurisdictions within Bell County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in

SECTION 2: PLANNING PROCESS

Planning Mechanism	Incorporation of Plan
	accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.
Capital Improvement Plans	Several participating jurisdictions within Bell County have a Capital Improvement Plan (CIP) in place or under development. Prior to any revisions to the CIP, county, city, or village departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Comprehensive Plans	Several participating jurisdictions within Bell County have a Long-term Comprehensive Plan in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.
Floodplain Management Plans	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 10 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Bell County update their management plans or develops new plans.
Grant Applications	The Plan will be evaluated by participating jurisdictions within Bell County when grant funding is sought for mitigation projects. If a project is not in the Plan Update, a Plan Revision may be necessary to include the action in the Plan.
Regulatory Plans	Currently, several participating jurisdictions within Bell County have regulatory plans in place, such as Emergency Operations Plans, Continuity of Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when County, City, Village, or CTCOG departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.

Appendix F Capability Assessment provides an overview of Planning Team members' existing planning and regulatory capabilities. These existing capabilities provide the mechanisms to implement the mitigation strategy objectives. For example, the adoption of building codes and implementation of land use regulations have been demonstrated to help communities avoid

SECTION 2: PLANNING PROCESS

losses from natural hazard events. All participating jurisdictions besides Bell County and CTCOG currently have building codes in place. Please refer to Appendix F for a complete inventory of each participating jurisdiction's capabilities.

It should be noted for the purposes of the Plan Update that the HMAP has been used as a reference when reviewing and updating all plans and ordinances for the entire planning area, including all participating jurisdictions. The Emergency Management Plans developed for the participating jurisdictions are updated every 5 years and incorporate goals, objectives and actions identified in the mitigation plan.

PLAN REVIEW AND PLAN UPDATE

As with the development of Plan Update, participating jurisdictions within Bell County will oversee the review and update process for relevance and, if necessary, make adjustments. At the beginning of each fiscal year, Planning Team Members will meet to evaluate the Plan and review other planning mechanisms to ensure consistency with long-range planning efforts. In addition, planning participants will also meet once a year, by conference call or presentation, to re-evaluate prioritization of the hazard mitigation actions. The plan may be amended to include additional hazard mitigation actions as they are developed.

TIMELINE FOR IMPLEMENTING MITIGATION ACTIONS

Both the Executive Planning Team (Table 2-1 and Table A-1, Appendix A) and the Advisory Planning Team (Table 2-2 and Table A-2, Appendix A) will engage in discussions regarding a timeframe for how and when to implement each hazard mitigation action. Considerations include when the action will be started, how existing planning mechanisms' timelines affect implementation, and when the action should be fully implemented. Timeframes may be general, and there will be short, medium, and long-term goals for implementation based on prioritization of each action, as identified on individual Hazard Mitigation Action worksheets included in the Plan Update for participating jurisdictions within Bell County.

Both the Executive and Advisory Planning Team will evaluate and prioritize the most suitable hazard mitigation actions for the community to implement. The timeline for implementation of actions will partially be directed by participating jurisdictions' comprehensive planning process, budgetary constraints, and community needs. Participating jurisdictions within Bell County are committed to addressing and implementing hazard mitigation actions that may be aligned with and integrated into the Plan Update.

Overall, the Planning Team is in agreement that goals and actions of the Plan Update shall be aligned with the timeframe for implementation of hazard mitigation actions with respect to annual review and updates of existing plans and policies.

PUBLIC AND STAKEHOLDER INVOLVEMENT

An important component of hazard mitigation planning is public participation and stakeholder involvement. Input from individual citizens and the community as a whole provides the Planning Team with a greater understanding of local concerns and increases the likelihood of successfully implemented hazard mitigation actions. If citizens and stakeholders, such as local businesses, non-profits, hospitals, and schools are involved, they are more likely to gain a greater appreciation

SECTION 2: PLANNING PROCESS

of the risks that hazards may present in their community and take steps to reduce or mitigate their impact.

The public was involved in the development of the Bell County Hazard Mitigation Action Plan Update 2025 at different stages prior to official Plan approval and adoption. Public input was sought using three methods: (1) open public meetings; (2) survey instruments; and (3) making the draft Plan Update available for public review on participating jurisdictions' websites.

The draft Plan Update was made available to the general public for review and comment on participating jurisdictions' websites. The public was notified at the public meetings that the draft Plan Update would be available for review. No feedback was received on the draft Plan Update, although it was given on the public survey, and all relevant information was incorporated into the Plan Update. Public input was utilized to assist in identifying hazards that were of most concern to the citizens of the county and what actions they felt should be included and prioritized.

The Plan Update will be advertised and posted on Bell County and participating jurisdictions' websites upon approval from FEMA, and a copy will be kept at the CTCOG Office and Bell County Office of Emergency Management.

UNDERSERVED COMMUNITIES/VULNERABLE POPULATIONS

A goal of the Planning Team was building equity into the planning process. Including organizations that aid underserved communities and socially vulnerable populations to participate in the plan helps ensure equitable access to the planning process and the meaningful participation of all residents. In addition, these groups can make sure that the interests of vulnerable populations are accurately represented and act as a valuable resource to share information with those vulnerable populations.

The Planning Team worked to identify local agencies, organizations and community leaders that focus on reaching vulnerable populations and underserved communities. These organizations were included in the planning process as stakeholders and were invited to participate in the planning process via email. These agencies were encouraged to post public planning meetings as well as solicit feedback via the public survey.

The CTCOG Regional Plan Updates includes a four-county area including Mills County, Lampasas County, Bell County and Hamilton County. All stakeholders and planning team members were invited to participate in each of the four county plans developed during this process, including all public meetings, and surveys. All stakeholders are listed in Table 2-5. Some stakeholders have been detailed below along with the agency's mission, including:

- Central Texas Foodbank – works with food donors across the country, financial supporters and volunteers to fill unmet needs in Central Texas; to nourish hungry people and lead the community in the fight against hunger.
- Area Agency on Aging of Central Texas (AACT) - serving individuals 60 years of age and older and their families residing in Bell, Coryell, Hamilton, Lampasas, Milam, Mills, and San Saba counties. AACT helps seniors and their caregivers navigate through a variety of issues including income security, housing and care options, health care options, entitlements and benefits, and long-term care.
- American Veterans Mission – devoted to supporting veterans, military families, and select individuals in Bell County and neighboring areas.

SECTION 2: PLANNING PROCESS

- Bring Everyone In the Zone – provides peer support in a myriad of ways to Service Members, Veterans, and their Families (SMVF), especially those suffering from post-traumatic stress, traumatic brain injury, military sexual trauma and other traumatic events in their lives.
- Citizens for Progress (advocacy program for low income) – empowers citizens to move out of poverty and create opportunities for them to build a better life through advocacy for those without a voice, involvement in community programs, and projects that build a better community

In addition, public notices were posted on public bulletin boards at community facilities, websites and social media for participating jurisdictions, and several local community Facebook groups. For a sample of these postings, please see Appendix E. In addition to public meetings, the Planning and Consultant Teams developed a public survey designed to solicit public input during the planning process from citizens and stakeholders and to obtain input and feedback on the mitigation plan. For each form of engagement, all efforts were made to reach Bell County's underserved communities and vulnerable populations throughout the planning process. Additional survey information is provided at the end of this section.

STAKEHOLDER INVOLVEMENT

Stakeholder involvement is essential to hazard mitigation planning since a wide range of stakeholders can provide input on specific topics and from various points of view. Throughout the planning process, members of community groups, local businesses, neighboring jurisdictions, schools, and hospitals were invited to participate in development of the Plan Update. The Stakeholder Group (Table 2-5, below, and Table A-3 in Appendix A), included a broad range of representatives from both the public and private sector and served as a key component in Bell County's outreach efforts for development of the Plan Update. Documentation of stakeholder meetings is found in Appendix E. A list of organizations invited to attend via email is found in Table 2-5. Those that participated in the public meetings are identified with a plus symbol (+) next to their stakeholder type.

Table 2-5. Stakeholder Working Group

AGENCY	TITLE	STAKEHOLDER TYPE
Advent Health Central Texas	Bell County - Killeen	Health Care Facility
Advent Health Central Texas	Safety Officer	Health Care Facility
Amateru Radio Races	Radio Broadcaster	Community Organization+
American Red Cross	Community Preparedness	Non-Profit / Community Organization
American Veterans Mission	General Representative	Community Organization
Area Agency on Aging of Central Texas	Supervisor	Community Organization
Bartlett ISD	Superintendent	Academia
Baylor, Scott & White Hospital	Regional Director of Emergency Management	Health Care Facility

SECTION 2: PLANNING PROCESS

AGENCY	TITLE	STAKEHOLDER TYPE
Bell County Animal Shelter	General Representative	Community Organization
Bell County Public Health	Emergency Preparedness Representative	Community Organization
Bell County WCID #1	General Representative	Utility Provider
Bell County WCID #3	General Representative	Utility Provider
Bell County Storm Water Management	Engineering Tech	Utility Provider
Belton Economic Development	Executive Director	Community Organization
Belton Fire Corporation	Office Manager	Community Organization
Belton Fire Corporation	President	Community Organization
Belton ISD	Coordinator of Emergency Management	Academia
Bosque County	Emergency Management Coordinator	Neighboring Community
Bring Everyone in the Zone	Executive Director	Non-Profit / Community Organization
BSWH-Faith Community Health	Director	Health Care Facility
Burleson County	Emergency Management Coordinator	Neighboring Community
Burnet County	Emergency Management Coordinator	Neighboring Community
Carl R Darnall Army Medical Center	Bell County – Fort Cavazos	Health Care Facility
Central Texas 4C	Executive Director	Non-Profit / Community Organization
Central Texas College	Chancellor	Academia
Central Texas Food Bank	Communications Representative	Community Organization
Citizens for Progress	President	Community Organization
Clearwater Underground Water Conservation District	General Manager	Utility Provider
Comanche County	Emergency Management Coordinator	Neighboring Community
Communities in Schools – Greater Central Texas	CEO	Community Organizations

SECTION 2: PLANNING PROCESS

AGENCY	TITLE	STAKEHOLDER TYPE
Department of Homeland Security	Media Representative	Federal Agency
Eagle Waste Disposal – Salado	General Representative	Utility Provider
Environmental Protection Agency	General Representative	Federal Agency
Erath County	Emergency Management Coordinator	Neighboring Community
Falls County	Emergency Management Coordinator	Neighboring Community
Food Care Center	General Representative	Non-Profit / Community Organization
Fort Cavazos	Director, Public Affairs	Army Base
Fort Cavazos	Chief Community Relations	Army Base
Fort Cavazos	Chief Media Relations	Army Base
Gause ISD	Superintendent	Academia
Grand Central Texas	Economic Development – Belton	Regional Agency
Grand Central Texas	Economic Development - Temple	Regional Agency
Goldthwaite Eagle	Reporter	Community Organization
Goldthwaite Municipal Airport	General Representative	Community Organization
Hamilton County Hospital District	Director of EMS & Emergency Management	Health Care Facility
Hamilton Herald News	Editor	Community Organization+
Hamilton ISD	Superintendent	Academia
Hispanic American Chamber of Commerce of Central Texas	General Representative	Community Organization
Holland ISD	Superintendent	Academia
HOME / Community Development	Director	Community Organization
HOP/Hill Country Transit District	Chief Safety and Security Officer	Community Organization
Innovation Black Chamber of Commerce	General Representative	Community Organization
Kempner Family Community Development	Director	Community Organization

SECTION 2: PLANNING PROCESS

AGENCY	TITLE	STAKEHOLDER TYPE
Killeen-Fort Hood Regional Airport	General Representative	Community Organization
Killeen ISD	Superintendent	Academia
Killeen Water and Sewer	Director of Water and Sewer Facilities	Utility Provider
Lampasas County Chamber of Commerce	General Representative	Community Organization
Lampasas Dispatch Record	News Reporter	Community Organization+
Lampasas ISD	Superintendent	Academia
Lee County	Emergency Management Coordinator	Neighboring Community
Lometa ISD	Superintendent	Academia
McLennan County	Emergency Management Coordinator	Neighboring Community
Mills County Ministerial Association	Representative	Community Organization
Milam County	Emergency Management Coordinator/Homeland Security	Neighboring Community
NOAA	General Representative	Federal Agency
Rehab Warriors	President of Business Development & Government Affairs	Community Organization+
Robertson County	Emergency Management Coordinator	Neighboring Community
Rogers ISD	Superintendent	Academia
Office of Rural and Community Affairs	Executive Director	State Agency
Olin E. Teague Veteran's Medical Center	Office of Public Information	Health Care Facility
Salado ESD/VFD	Fire Chief	Community Organization
Salado ISD	Superintendent	Academia
Salado Water Supply Corporation	General Manager	Utility Provider
Salvation Army	Director of Social Services for Bell County	Non-Profit / Community Organization
Salvation Army	General Representative for Lampasas County	Non-Profit / Community Organization

SECTION 2: PLANNING PROCESS

AGENCY	TITLE	STAKEHOLDER TYPE
San Saba County	Emergency Management Coordinator	Neighboring Community
Seton Medical Center	Vice President Operations	Health Care Facility
Somervell County	Emergency Management Coordinator/County Judge	Neighboring Community
Sutron Environmental & Hydrological	General Representative	Private Organization
SVFD	Communications Representative	Community Organization+
Teex TAMU	Regional Training Manager	Community Organization+
Temple College	Associate Vice President / Chief of Operations	Academia
Temple College	University Police Department	Academia
Temple ISD	Superintendent	Academia
Texas A&M AgriLife Extension	Bell County Representative	State Agency
Texas A&M AgriLife Extension	Hamilton County Representative	State Agency
Texas A&M AgriLife Extension	Lampasas County Representative	State Agency
Texas A&M AgriLife Extension	Mills County Representative	State Agency
Texas A&M Central Texas	Safety & Risk Management Officer	Academia
Texas A&M Forest Service	City of Hamilton General Representative	State Agency
Texas A&M Forest Service	City of Temple General Representative	State Agency
Texas Department of Transportation	Safety Coordinator for Coryell, Bell and Miliam	State Agency
Texas Division of Emergency Management	District Coordinator	State Agency
Texas Division of Emergency Management	Regional Representative for Mills and Hamilton County	State Agency
Texas State Legislature	Representative District 59	State Agency
Texas State Legislature	Representative District 54	State Agency
Texas State Legislature	Representative District 55	State Agency
Texas State Senate	Senator District 24	State Agency

SECTION 2: PLANNING PROCESS

AGENCY	TITLE	STAKEHOLDER TYPE
Texas State Soil & Water	Field Representative	State Agency
Texas State Soil & Water	Field Representative for Hamilton-Coryell SWCID #506	State Agency
Texas State Soil & Water	Field Representative for Mills County SWCID #554	State Agency
Texas Water Development Board	Communications Representative	State Agency
Texas Windstorm Association	General Representative	State Agency
Troy ISD	Superintendent	Academia
University of Mary Hardin-Baylor	Senior Vice President of Administration & Chief Operating Officer	Academia
University of Mary Hardin-Baylor	University Police Department	Academia
University of Mary Hardin-Baylor	Vice President for Policy and Risk Management	Academia
U.S. Fish & Wildlife	Southwest Regional Representative	Federal Agency
U.S. Army Corps of Engineers	Southwest Regional Representative	Federal Agency
Veteran Services	Director of Bell County	Community Organization
Veteran Services	Lampasas County VSO	Community Organization
Veteran Services	Mills County VSO	Community Organization
Williamson County	Emergency Management Coordinator	Neighboring Community
Workforce Solutions of Central Texas	Supervisor	Community Organization

Stakeholders and participants from neighboring communities that attended the Planning Team and public meetings played a key role in the planning process. For example, communication and hazard preparedness were two of the biggest concerns to stakeholders, so participating jurisdictions included actions to promote early warning and communication, community education on mitigation efforts, and establishing partnerships to promote response efforts and extreme weather event.

PUBLIC MEETINGS

A series of public meetings were held throughout the four counties participating in the CTCOG Regional Hazard Mitigation Action Plan Updates to collect public and stakeholder input. Topics of discussion included the purpose of hazard mitigation, discussion of the planning process, and types of natural hazards. Each participating jurisdiction within Bell County released information

SECTION 2: PLANNING PROCESS

regarding the public meetings in their area to increase public participation in the Plan Update development process, through posting on their website, on social media sources including Facebook, Instagram, and X (formerly known as Twitter), through the local media, and/or posting the information on bulletin boards in public facilities. A sampling of these notices can be found in Appendix E, along with the documentation on the public meetings. Representatives from area neighborhood associations and area residents were invited to participate.

Public meetings were held on the following dates:

- September 27, 2023, Lampasas County Building, Office of Emergency Management
- October 11, 2023, Central Texas Council of Governments
- December 6, 2023, Hamilton County Annex
- December 7, 2023, Mills County Sheriff's Office

PUBLIC PARTICIPATION SURVEY

In addition to public meetings, the Planning and Consultant Teams developed a public survey designed to solicit public input during the planning process from citizens and stakeholders and to obtain data regarding the identification of any potential hazard mitigation actions or problem areas. The survey was promoted by local officials and a link to the survey was posted on participating jurisdictions' websites. A total of 597 responses were completed online by members of the public in all four counties participating in the CTCOG Regional Hazard Mitigation Action Plan Updates. The survey results are analyzed in Appendix B. Participating jurisdictions within Bell County reviewed the input from the surveys and decided which information to incorporate into the Plan as hazard mitigation actions. For example, results indicate that extreme heat and tornado are the hazards of highest concern for the public and community education and emergency services were the types of actions indicated that the local government should take to mitigate risk to these hazards. As a result, the Planning Team has included mitigation actions related to public education on risk and mitigation for all hazards, developing a Community Wildfire Protection Plan (CWPP) for those participating jurisdictions without one, as well as installing generators at community and emergency shelters.



BELL COUNTY
JUSTICE CENTER

SECTION 3 COUNTY PROFILE

SECTION 3: COUNTY PROFILE

Overview	1
Population and Demographics	4
Central Texas Council of Governments	6
Population Growth	7
Economic Impact	8
Natural, Cultural, and Historic Resources	9
Existing Land Use and Development Trends	11
Changes in Vulnerability	13
Future Growth and Development	14

OVERVIEW

The land that would become Bell County has been the site of human habitation since 6,000 B.C., but it was not until January 22, 1850, that the land became officially incorporated as a county. County commissioners chose a county seat on the banks of Nolan Creek, naming it Nolanville; however, the town's name was changed two years later to Belton.

Following the Civil War, Bell County faced a troubled period, characterized by violence and deadly feuds between different political factions. Later in the nineteenth century, as law and order returned, farming and ranching in Bell County expanded dramatically, particularly in agricultural products from sheep, cattle, and cotton. As these economic opportunities grew, many immigrants came to the county, largely from older Texas counties or other southern states such as Arkansas, Alabama, Mississippi, and Tennessee.

In the early decades of the twentieth century, effects from soil depletion, overproduction, boll weevils, and the Great Depression damaged the cotton industry, Bell County's largest agricultural product. In the wake of this, farmers in the county turned to other crops such as sorghum and wheat, as well as livestock raising later in the century. In 1970, Bell County ranked first in the state in turkey raising, as poultry production took off in the region.

The growth of the Fort Cavazos-Killeen area and other development in Bell County led to huge increases in population and development in from 1950 to 1990, nearly tripling the county's population in that 40-year period. Increased urbanization, the introduction or growth of multiple educational and medical institutions and growing economic diversity in the region also contributed to this growth.

Today, Fort Cavazos remains a central element of the area's economy, along with a wide range of manufacturing firms making products such as computers, plastic goods, furniture, and clothing. In 2002, Bell County had 2,080 farms and ranches covering 450,923 acres, with 52 percent devoted to crops and 42 percent to pastures.

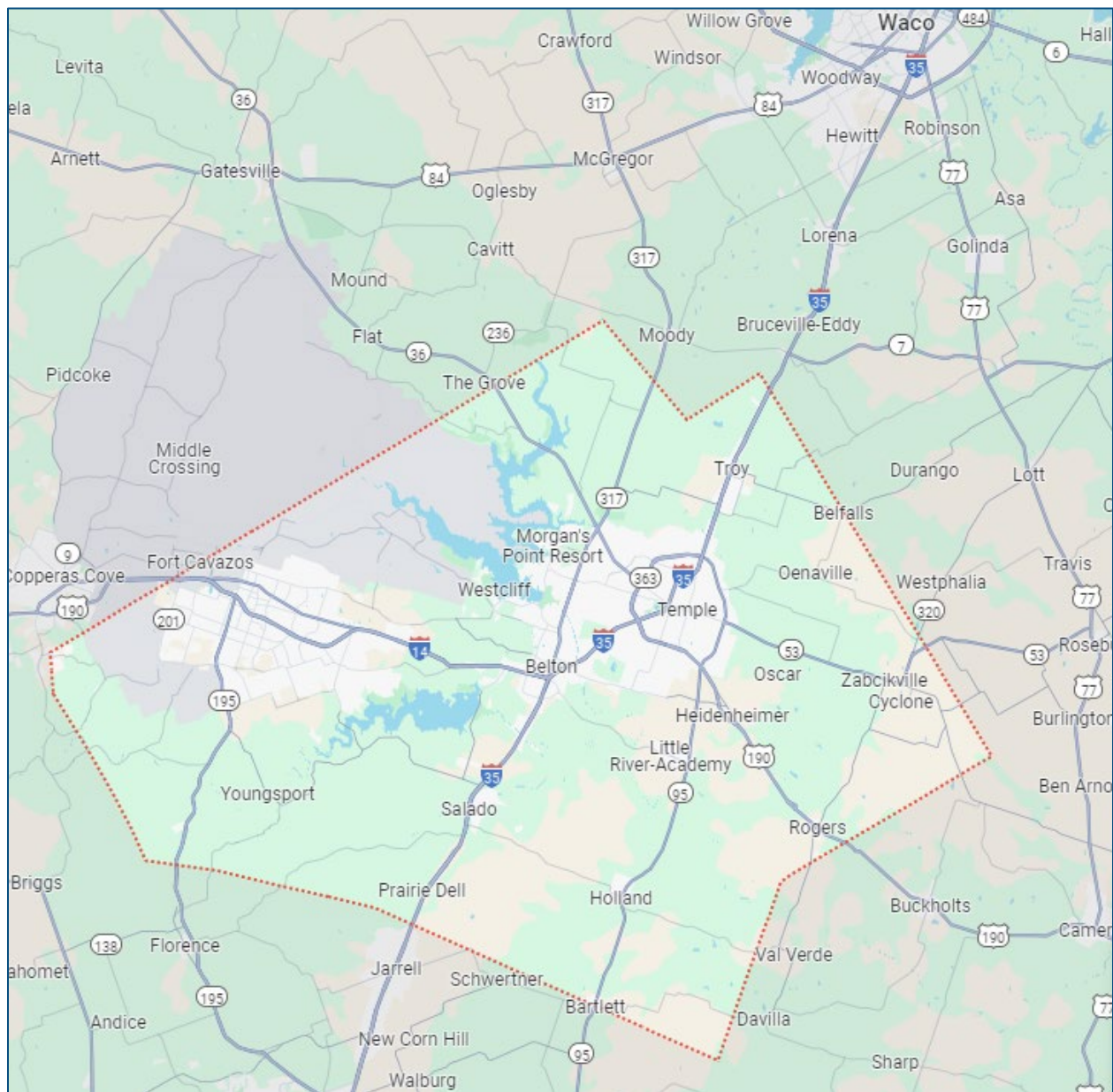
Bell County has 1,054 square miles of land area and is divided into regions by the Balcones Escarpment, which runs through the approximate center of the county from southeast to northwest. The eastern part of the county, on the Blackland Prairie, consists of comparatively level prairieland, mainly undulating to gently rolling. The western half of the county belongs to the Grand Prairie region of Texas, and includes undulating to rolling uplands, deeply cut with stream valleys that, in places, have stony slopes and steep bluffs. Bell County ranges in elevation from

SECTION 3: COUNTY PROFILE

about 450 feet above sea level in the southeast to about 1,200 feet above sea level on the western boundary.¹

Figure 3-1 shows the general location of Bell County along with the cities that are located within the county.

Figure 3-1. Location of Bell County

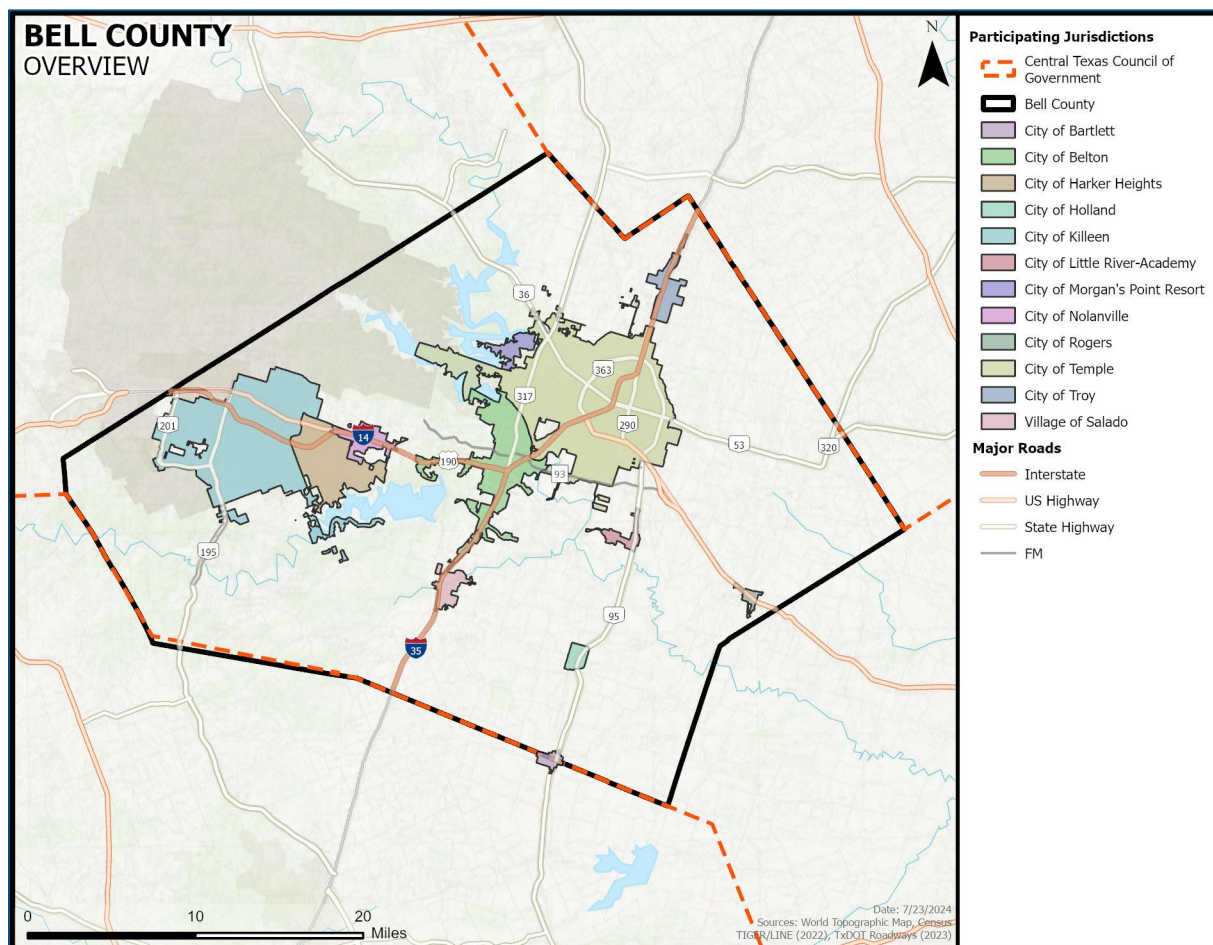


¹ Seymour V. Connor and Mark Odintz, "Bell County," Handbook of Texas Online, accessed May 31, 2024, <https://www.tshaonline.org/handbook/entries/bell-county>.

SECTION 3: COUNTY PROFILE

Figure 3-2 shows the participating jurisdictions within Bell County that are covered in the risk assessment analysis of the Plan Update. To see the full extent of the CTCOG boundary which extends beyond the Bell County line, please refer to Figure 3-3.

Figure 3-2. Bell County Planning Area²



Provided in Table 3-1 below is a listing of the jurisdictions in Bell County that participated in the Bell County Hazard Mitigation Action Plan Update 2025.

Table 3-1. Participating Jurisdictions

PARTICIPATING JURISDICTIONS	
Central Texas Council of Governments	Bell County
City of Bartlett	City of Belton
City of Harker Heights	City of Holland
City of Killeen	City of Little River Academy

² Please refer to Figure 3-3

SECTION 3: COUNTY PROFILE

PARTICIPATING JURISDICTIONS	
City of Morgan's Point Resort	City of Nolanville
City of Rogers	Village of Salado
City of Temple	City of Troy

POPULATION AND DEMOGRAPHICS

According to the 2020 Census population count, Bell County has an official population of 370,647 residents, a 19 percent increase since the 2010 census. Table 3-2 show the population distribution in Bell County and the participating jurisdictions in 2010, 2020 (Census population count), and 2022 (2022 American Community Survey (ACS) five-year estimates). Note that in some cases the 2022 ACS estimates may differ from the 2020 Census count; the ACS estimates are used throughout this section for consistency.³

Table 3-2. Population Distribution by Jurisdiction

JURISDICTION	TOTAL 2010 POPULATION	TOTAL 2020 POPULATION (Census)	TOTAL 2022 POPULATION (ACS Estimates)	PERCENT CHANGE 2010- 2022
City of Bartlett	1,632	1,633	1,495	-8%
City of Belton	18,216	23,054	23,137	27%
City of Harker Heights	26,700	33,097	33,036	24%
City of Holland	1,121	1,075	1,297	16%
City of Killeen	127,921	153,095	153,708	20%
City of Little River Academy	1,961	1,992	2,374	21%
City of Morgan's Point Resort	4,170	4,636	4,661	12%
City of Nolanville	4,259	5,917	6,102	43%
City of Rogers	1,218	1,113	1,444	19%
Village of Salado	2,126	2,394	2,585	22%
City of Temple	66,102	82,073	82,473	25%
City of Troy	1,645	2,375	2,437	48%
Unincorporated Bell County	53,164	58,193	58,072	9%
Bell County	310,235	370,647	372,821	20%

³ Source: <https://demographics.texas.gov/Data/Decennial/2010/>, <https://www.census.gov/en.html> and <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2022/>

SECTION 3: COUNTY PROFILE

Table 3-3 summarizes select characteristics of vulnerable or sensitive populations in Bell County and the participating jurisdictions using data from the U.S. Census Bureau 2022 American Community Survey (ACS) five-year estimates.

Between official U.S. Census population counts, the estimate uses a formula based on new residential building permits and household size. It is simply an estimate and there are many variables involved in achieving an accurate estimation of people living in a given area at a given time.

Table 3-3. Estimated Vulnerable or Sensitive Populations⁴

JURISDICTION	YOUTH (under 5)	ELDERLY (over 65)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Bartlett	106	216	237	230	426
City of Belton	1,353	2,652	2,999	4,142	4,375
City of Harker Heights	1,906	3,280	4,632	3,931	5,934
City of Holland	111	210	178	179	60
City of Killeen	14,603	11,467	20,953	24,593	33,510
City of Little River Academy	265	263	301	147	371
City of Morgan's Point Resort	187	733	794	345	380
City of Nolanville	322	528	1,094	1,043	590
City of Rogers	80	183	249	319	157
Village of Salado	247	634	279	184	298
City of Temple	6,943	12,448	12,483	14,020	12,346
City of Troy	259	332	340	234	202
Unincorporated Bell County	3,212	9,098	7,352	5,438	7,570
Bell County	29,594	42,044	51,891	54,805	66,219

Another key vulnerable population within the planning area is those experiencing homelessness. While accurate data to determine the exact number of individuals experiencing homelessness at any given time is limited, Bell County has a Homeless Strategic Plan, adopted in 2023, in place which includes study findings related to homelessness and recommended actions for the planning area. Entitled "Operation: RISE (Robust Interagency Strategic Engagement), A Strategic Plan to reduce or eliminate homelessness in Bell County," the plan utilizes a survey with 414 unique responses to analyze the state of homelessness in the planning area. Some of the findings on

⁴ The Estimated Vulnerable or Sensitive Populations are based off the 2022 American Community Survey 5-Year Estimates Data Profiles.

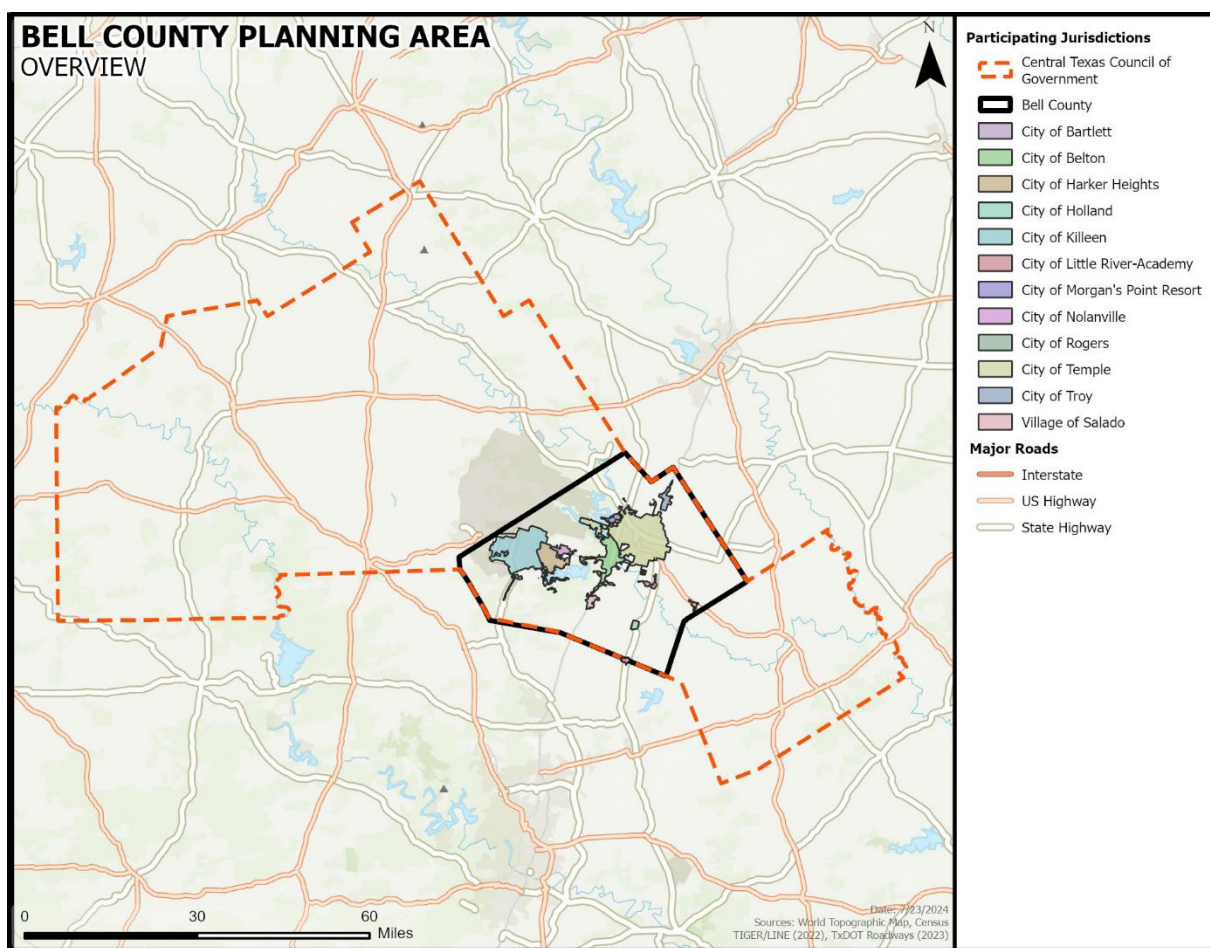
SECTION 3: COUNTY PROFILE

the homeless population include that the median age is 49.0; 58.5 percent did not have a job in Bell County prior to experiencing homelessness; and homeless individuals have lived in Bell County for 14.4 years, on average. Leveraging this survey data, the plan makes recommendations for Bell County and several of the participating jurisdictions. Some of the countywide recommendations include developing nine clinical tracks within three focus areas across Bell County, establishing the Arbor of Hope non-profit to coordinate homeless services, and opening the Bell County Diversion Center.

CENTRAL TEXAS COUNCIL OF GOVERNMENTS

Figure 3-3 shows the participating special district, Central Texas Council of Governments (CTCOG), that is covered in the risk assessment analysis of the Bell County Hazard Mitigation Action Plan Update 2025.

Figure 3-3. CTCOG including the Bell County Planning Area



CTCOG is a voluntary association of counties, cities, and special districts within the seven-county Central Texas region. CTCOG helps local communities work cooperatively to improve the conditions and well-being of Central Texans. Programs and services include those for Central Texas seniors, workforce, regional planning, public safety, and housing needs. CTCOG's mission is to improve the quality of life for all citizens within the region including services such as nursing home assistance, affordable housing assistance, essential transportation planning, and emergency and security programs.

SECTION 3: COUNTY PROFILE

In addition to Bell County, CTCOG serves the following counties: Coryell, Hamilton, Lampasas, Milam, Mills, and San Saba.

Table 3-4 provides the number of people employed and served by CTCOG.

Table 3-4. CTCOG Population

SPECIAL DISTRICT	EMPLOYEES	POPULATION SERVED	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS
			Staff Works Outdoors
Central Texas Council of Governments	132	518,529	0

POPULATION GROWTH

The official 2020 Bell County population is 370,647. Overall, Bell County experienced an increase in population between 1990 and 2020 of 94 percent, or an increase of 179,574 residents. Between 2010 and 2020, the City of Holland (-4%) and City of Rogers (-9%) were the only jurisdictions to experience a population decline, while the other participating jurisdictions, including Bell County, experienced population growth. Table 3-5 provides historic growth rates in Bell County.

Table 3-5. Population Growth by Jurisdictions 1990-2020⁵

JURISDICTIONS	1990	2000	2010	2020	POP CHANGE 1990-2020	PERCENT OF CHANGE	POP CHANGE 2010-2020	PERCENT OF CHANGE
City of Bartlett	1,439	1,675	1,632	1,633	194	13%	1	0%
City of Belton	12,463	14,623	18,216	23,054	10,591	85%	4,838	27%
City of Harker Heights	12,932	17,308	26,700	33,097	20,165	156%	6,397	24%
City of Holland	1,118	1,102	1,121	1,075	-43	-4%	-46	-4%
City of Killeen	63,535	86,911	127,921	153,095	89,560	141%	25,174	20%
City of Little River Academy	1,390	1,645	1,961	1,992	602	43%	31	2%
City of Morgan's Point Resort	1,766	2,989	4,170	4,636	2,870	163%	466	11%
City of Nolanville	1,834	2,150	4,259	5,917	4,083	223%	1,658	39%
City of Rogers	1,131	1,117	1,218	1,113	-18	-2%	-105	-9%
Village of Salado	1,216	3,475	2,126	2,394	1,178	97%	268	13%
City of Temple	46,150	54,514	66,102	82,073	35,923	78%	15,971	24%
City of Troy	1,395	1,378	1,645	2,375	980	70%	730	44%

⁵ U.S. Census Bureau

SECTION 3: COUNTY PROFILE

JURISDICTIONS	1990	2000	2010	2020	POP CHANGE 1990- 2020	PERCENT OF CHANGE	POP CHANGE 2010- 2020	PERCENT OF CHANGE
Unincorporated Bell County	44,704	49,087	53,164	58,193	13,489	30%	5,029	9%
Bell County	191,073	237,974	310,235	370,647	179,574	94%	60,412	19%

ECONOMIC IMPACT

Building and maintaining infrastructure depends on the economy, and therefore, protecting infrastructure from risk due to natural hazards in the planning area is important to the participating jurisdictions within Bell County. Whether it's expanding culverts under a road that washes out during flash flooding, shuttering a fire station, or flood-proofing a wastewater facility, infrastructure must be mitigated from natural hazards in order to continue providing essential utility and emergency response services in a fast-growing planning area.

Based on the American Community Survey 2022 estimates, 66 percent of the population 16 years and over is employed in the labor force. The per capita income is \$31,822 and the median household income countywide is \$62,858. It is estimated that 32 percent of households have incomes below \$50,000. Families with incomes below the poverty level in 2022 made up 15 percent of all families. Of families that have children under 18 years old, 18 percent are below the poverty level.

Table 3-6 and Table 3-7 show the various occupations and industries within Bell County, according to the 2022 estimates by the American Community Survey.

Table 3-6. Occupations of Employed Population in Bell County⁶

OCCUPATION	ESTIMATE	PERCENT
Civilian employed population 16 years and over	152,373	-
Management, business, science, and arts occupations	53,545	35.1%
Sales and office occupations	34,025	22.3%
Service occupations	28,963	19.0%
Production, transportation, and material moving occupations	20,044	13.2%
Natural resources, construction, and maintenance occupations	15,796	10.4%

⁶ 2022 American Community Survey 5-Year Estimates Data Profiles.

SECTION 3: COUNTY PROFILE

Table 3-7. Industries of Employed Population in Bell County⁷

INDUSTRY	ESTIMATE	PERCENT
Civilian employed population 16 years and over	152,373	-
Educational services, and health care and social assistance	38,495	25.3%
Retail trade	17,059	11.2%
Professional, scientific, and management, and administrative and waste management services	16,173	10.6%
Arts, entertainment, and recreation, and accommodation and food services	15,185	10.0%
Public administration	12,225	8.0%
Construction	11,861	7.8%
Transportation and warehousing, and utilities	9,579	6.3%
Manufacturing	8,682	5.7%
Finance and insurance, and real estate and rental and leasing	8,314	5.5%
Other services, except public administration	8,247	5.4%
Wholesale trade	2,762	1.8%
Information	1,992	1.3%
Agriculture, forestry, fishing and hunting, and mining	1,799	1.2%

NATURAL, CULTURAL, AND HISTORIC RESOURCES

Bell County's territory is composed of roughly 1,088 square miles, with roughly 1,054 square miles being land and the rest water. The county is primarily drained by the Little River and its tributaries, especially the Leon, Lampasas, and Salado rivers, which conjoin at the historic Three Forks to form the Little River. Soils in the eastern part of the county are mostly dark, loamy to clayey "blackland" soils; the rich Houston black clay is the most common type and the most suitable for farming. The soils west of the Balcones fault are light to dark and loamy clay, with limy subsoils; shallow, stony soils in places have encouraged ranching and hardwood and pine production. Vegetation west of the fault is characterized by tall grasses and oak, juniper, pine, and mesquite trees, while the eastern part of the county, which has been extensively utilized for farming, is still wooded along its streams with a variety of hardwood trees. Between 41 and 50 percent of the land in Bell County is considered prime farmland. Mineral resources include limestone, oil, gas, sand and gravel, and dolomite.

⁷ 2022 American Community Survey 5-Year Estimates Data Profiles.

SECTION 3: COUNTY PROFILE

Bell County provides a habitat for many wild species, including deer, antelope, and numerous birds and waterfowl such as ducks and geese. This biodiversity makes the Bell County planning area a popular destination for recreation activities like hunting, fishing, and hiking. Belton Lake and Stillhouse Hollow Lake provide a refuge for the wildlife in Bell County.⁸

Throughout the planning area, the participating jurisdictions maintain a multitude of community assets and recreational areas which both serve residents and attract visitors. These include Chisholm Trail Park, Heritage Park, and the Landing at Creekside Park in City of Belton⁹; the Family Recreation & Aquatics Center, Stonetree Gold Course, and Conder Community Park in the City of Killeen¹⁰; and Miller Park, South Temple Park, and Wilson Park in the City of Temple¹¹, among many others.

Several of the participating jurisdictions have master plans guiding development of parks, trails, and open spaces in place. One such plan is The Killeen Parks and Open Space Master Plan, adopted in February 2022. Killeen's Parks and Open Space Master Plan prioritizes smaller, incremental improvements which result in transformational change over time and support longer-term sustainable growth. The plan implements a Complete Parks model, comprised of five key attributes: detailed focus on accessibility, safety and comfort, social interaction, activation, and maintenance. Using this approach, the plan recommends actions for improving the park system in the short, medium, and long term, in addition to ongoing park maintenance measures.

To further understand natural resources that may be vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the planning area. A federally endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by federal law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed.

According to the U.S. Fish and Wildlife Service, as of May 2024, there are 10 federally endangered, threatened, or candidate species in Bell County, listed in Table 3-8. Additionally, two species found in Bell County are listed as being in recovery: the bald eagle and black-capped vireo. The plains spotted skunk is also listed as a resolved taxon.

Table 3-8. Endangered Species in Bell County¹²

TYPE of SPECIES	COMMON NAME	SCIENTIFIC NAME	SPECIES STATUS
Birds	Whooping crane	Grus americana	Endangered

⁸ Seymour V. Connor and Mark Odintz, "Bell County," Handbook of Texas Online, accessed May 31, 2024, <https://www.tshaonline.org/handbook/entries/bell-county>.

⁹ Source: https://www.beltontexas.gov/departments/parks_and_recreation/parks.php

¹⁰ Source: <https://www.killeentexas.gov/559/Parks>

¹¹ Source: https://www.templeparks.com/parks___trails/parks/index.php

¹² U.S. Fish and Wildlife Service, Environmental Conservation Online System <https://ecos.fws.gov/ecp/report/species-listings-by-current-range-county?fips=48027>

SECTION 3: COUNTY PROFILE

TYPE of SPECIES	COMMON NAME	SCIENTIFIC NAME	SPECIES STATUS
Mammals	Tricolored bat	Perimyotis subflavus	Proposed Endangered
Insects	Monarch Butterfly	Danaus plexippus	Candidate
Birds	Rufa Red knot	Calidris canatus rufa	Threatened
Clams	Texas Fawnsfoot	Truncilla macrodon	Proposed Threatened
Flowering Plants	Bracted twistflower	Streptanthus bracteatus	Threatened
Birds	golden-cheeked warbler	Setophaga chrysoparia	Endangered
Birds	Piping Plover	Charadrius melodus	Threatened
Amphibians	Salado Salamander	Eurycea chisholmensis	Threatened
Clams	false spike	Fusconaia mitchelli	Proposed Endangered

Bell County has a rich history that is preserved through its designated historic buildings and sites. Throughout the county there are 74 buildings, sites, and districts listed on the National Register of Historic Places.¹³ Historic buildings are vulnerable to natural hazards as their construction pre-dates modern building codes. There are also historic preservation considerations and requirements for historic structures when they are included in mitigation or recovery projects.

EXISTING LAND USE AND DEVELOPMENT TRENDS

Zoning ordinance sets forth regulations and standards related to the extent of use of land and structures that are allowed in certain areas. A zoning map shows the areas within a community where the various zoning districts and standards are located and gives an overall picture of what types of development are located in a community and how a community intends to continue to grow. The planning area does not have a zoning ordinance at the county level, however every participating jurisdiction within Bell County, except the CTCOG, has a zoning ordinance in place.

A review of building permits can also give a picture of the built environment and the number of buildings that are being constructed in the county and each jurisdiction. Table 3-9 lists the number of residential buildings and total units authorized through a permit from each jurisdiction, where data was available, between 2018 and 2022. The data includes total buildings and total units permitted. Permits are reported annually in September and the data includes that from 2018 through 2022 to demonstrate growth. Of the residential building permits issued in this period, over 92 percent were for single-family buildings and less than 8 percent for multi-family buildings. Housing type can also be an indication of an individual's ability to recover from a disaster.

¹³ National Register of Historic Places

SECTION 3: COUNTY PROFILE

Table 3-9. Building Permits, By Jurisdiction, 2018-2022¹⁴

JURISDICTION	2018		2019		2020		2021		2022	
	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units
Bell County*	-	-	-	-	-	-	-	-	-	-
City of Bartlett*	-	-	-	-	-	-	-	-	-	-
City of Belton	158	174	127	147	145	149	331	358	358	478
City of Harker Heights	174	190	162	182	109	134	191	222	148	199
City of Holland	1	1	2	2	5	5	9	9	10	10
City of Killeen	703	875	779	858	1,016	1,314	627	1,204	576	655
City of Little River Academy	0	0	2	2	1	1	0	0	0	0
City of Morgan's Point Resort	41	41	33	33	29	29	22	22	12	12
City of Nolanville	52	52	64	64	99	99	174	174	110	110
City of Rogers	0	0	1	1	0	0	0	0	0	0
Village of Salado	3	3	2	2	1	1	6	6	5	5
City of Temple	809	829	1,003	1,006	1,306	1,347	1,240	1,922	1,203	1,920
City of Troy	5	5	58	58	29	29	102	102	174	183
Grand Total	1,946	2,170	2,233	2,355	2,740	3,108	2,702	4,019	2,596	3,572

*Data for jurisdiction was not included in the database

Certain types of housing found in the Bell County planning area are more vulnerable than typical site-built, newly constructed residential structures. This includes mobile or manufactured homes, of which there are 9,516 (6 percent of total housing stock) in the planning area. Additionally, single-family residences (SFR) built before 1980 are typically built to lower or less stringent construction standards than newer construction, making these homes more susceptible to damage during hazard events. These older homes make up 30 percent (approximately 45,058 structures) of housing stock in the planning area. Table 3-10 includes housing inventory data for the participating jurisdictions per the American Community Survey five-year estimates.

¹⁴ U.S. Census Bureau, Building Permit Survey, 1992-2022, <https://www.census.gov/construction/bps/>

SECTION 3: COUNTY PROFILE

Table 3-10. Housing Inventory and Vulnerable Structures, By Jurisdiction¹⁵

JURISDICTION	TOTAL HOUSING UNITS	BUILT PRIOR TO 1980	MOBILE HOMES
City of Bartlett	644	469	57
City of Belton	8,213	2,992	361
City of Harker Heights	12,770	6,087	1,448
Town of Holland	552	248	39
City of Killeen	63,801	16,684	1,882
City of Little River Academy	857	394	142
City of Morgan's Point Resort	1,883	384	164
City of Nolanville	2,407	274	727
City of Rogers	510	332	99
Village of Salado	1,088	230	20
City of Temple	34,110	13,425	988
City of Troy	821	276	27
Central Texas Council of Governments	N/A	1	0
Unincorporated Bell County	21,131	3,263	3,562
Bell County	148,787	45,058	9,516

CHANGES IN VULNERABILITY

The Bell County planning area has experienced an increase in overall population of 19 percent between 2010 and 2020. The American Community Survey estimates the 2022 total housing units for the planning area to be 148,787. The total building permits issued between 2018 and 2022 represent approximately 10% of the total housing units available in the planning area. The overall population increase, combined with the increase in housing units indicates an increase in vulnerability to all hazards in terms of populations and the built environment. Changes in vulnerability vary by jurisdiction based on each jurisdiction's trends in population and development. Changes in vulnerability vary by jurisdiction based on each jurisdiction's trends in population and development (Table 3-11).

Table 3-11. Changes in Vulnerability, by Jurisdiction

¹⁵ The Housing Inventory and Vulnerable Structures are based off the 2022 American Community Survey 5-Year Estimates Data Profiles.

SECTION 3: COUNTY PROFILE

JURISDICTION	POPULATION TREND	HOUSING TREND	OVERALL VULNERABILITY CHANGES
City of Bartlett	Stagnant	Stagnant	No Change
City of Belton	Increasing	Increasing	Increase
City of Harker Heights	Increasing	Increasing	Increase
Town of Holland	Decreasing	Increasing	No Change
City of Killeen	Increasing	Increasing	Increase
City of Little River Academy	Increasing	Increasing	Increase
City of Morgan's Point Resort	Increasing	Increasing	Increase
City of Nolanville	Increasing	Increasing	Increase
City of Rogers	Decreasing	Increasing	No Change
Village of Salado	Increasing	Increasing	Increase
City of Temple	Increasing	Increasing	Increase
City of Troy	Increasing	Increasing	Increase
Central Texas Council of Governments	N/A	N/A	No Change
Bell County	Increasing	Increasing	Increase

Changes in vulnerability are applicable to all natural hazards except when discussing dam failure as vulnerability for this hazard is discussed in relation to changes in the estimated inundation areas for profiled dams. For the 11 dams profiled in Section 5, there are no known changes in vulnerability in the estimated inundation areas. While flood and wildfire hazards feature geographical boundaries, increases in population and building inventory can increase overall vulnerability for these hazards even when the trends occur outside of the known hazard boundary. Development decreases permeable surface areas and increases runoff, increasing flood risk. As population density increases, the Wildland Urban Interface (WUI) typically increases. WUI growth often results in more wildfire ignitions, which puts more houses and lives at risk.

FUTURE GROWTH AND DEVELOPMENT

To better understand how future growth and development in Bell County might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management efforts. This section includes an analysis of the projected population change and economic impacts.

Population projections from 2010 to 2050 are listed in Table 3-12, as provided by the Office of the State Demographer, Texas State Data Center, and the Institute for Demographic and Socioeconomic Research. Population projections are based on a 0.5 scenario growth rate, which

SECTION 3: COUNTY PROFILE

is 50 percent of the population growth rate that occurred during 2000-2010. This information is only available at the county level; however, the population projection shows an increase in population density for the county, which would mean overall growth for the county.

Table 3-12. Bell County Population Projections¹⁶

LAND AREA (SQ MI)	2010		2020		2030		2040		2050	
	Population									
	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)
1,053.8	310,235	294.4	353,629	335.6	396,782	376.5	440,967	418.4	483,613	458.9

Comprehensive Plans are guiding documents in a community that sets forth a vision, goals, policies, and guidelines to direct future physical, social and economic development that will occur within a jurisdiction. Comprehensive Plans are part of a continuous process to provide an environment for the citizens and to consider the general desire of the community to conserve, preserve, and protect the natural environment of their jurisdiction. These plans are used to guide staff, decision-makers, and citizens in making decisions which affect the community with the understanding of the long-term effects. The following is a summary of a sample of Comprehensive Plans participating jurisdictions in Bell County have in place. Refer to Appendix F Capability Assessment for a complete list of participating jurisdictions with Comprehensive Plans.

The 2022 Comprehensive Plan for the City of Killeen, Texas accounts for the recent growth of the city and makes recommendations to address new and reoccurring challenges in development patterns and housing since the previous Comprehensive Plan was adopted in 2010. The actions Killen's Comprehensive Plan recommends serve to accomplish the following goals: remaining fiscally stable by generating enough revenue to cover liabilities today and in the future; having a clear identify and set of values for the City; creating priorities for land, infrastructure, and economic development decisions; enabling clear expectations and consistent, predictable decisions from city personnel; and creating an informed and engaged citizenry.

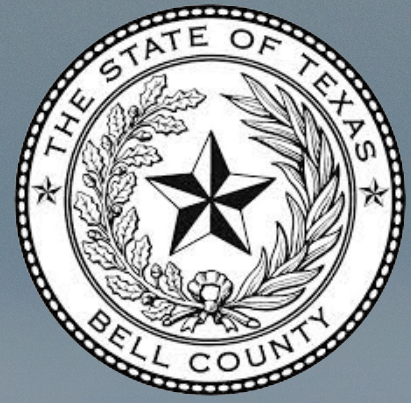
The City of Belton 2030 Comprehensive Plan establishes a vision for Belton, provides policy guidance for growth and development, and contains both action items and big ideas to help implement the City's vision. To accomplish the Comprehensive Plan's goals, the plan divides its strategy into six categories: governance, public safety, quality of life, economic development, connectivity, and parks/natural beauty. The strategy outlined for each of these categories within the plan consists of a hierarchy of goals and tasks that specify responsible parties and funding sources, and then prioritizes these goals for the purpose of strategic budgetary processes.

The City of Temple 2020 Comprehensive Plan was adopted in 2020 and covers 2020 through 2025. The Comprehensive Plan's vision states that it "encourages community investment and prosperity, integrated mobility and connectivity, and smart growth, while remaining a place people

¹⁶ Office of the State Demographer, Texas State Data Center, and the Institute for Demographic and Socioeconomic Research

SECTION 3: COUNTY PROFILE

love to call home.” The Plan’s goals include supporting desired development through thoughtful consideration of infrastructure, community character, and economic impact; designing a comprehensive mobility network that is planned to meet the needs of the future; expanding Temple’s burgeoning economy through targeted economic development initiatives; providing exceptional police and fire protection services; promoting livability and community through urban design and investing in public spaces; encouraging development in downtown to create a central destination and activity zone; supporting stable neighborhoods and a variety of housing options; and sustaining a forward-thinking, high-performing, and accountable City government.



SECTION 4

RISK OVERVIEW

SECTION 4: RISK OVERVIEW

Hazard Description	1
Disaster Declaration History	4
Natural Hazards and Climate Change	6
Overview of Hazard Analysis	8
Hazard Ranking	10

HAZARD DESCRIPTION

Section 4 is the first phase of the Risk Assessment, providing background information for the hazard identification process and descriptions for the hazards identified. The Risk Assessment continues with Sections 5 through 20, which include hazard descriptions and vulnerability assessments.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, Bell County, including all participating jurisdictions and CTCOG, identified 13 natural hazards and 3 human-caused hazards that are addressed in the Hazard Mitigation Plan Update and were identified as significant, as shown in Table 4-1. The hazards were identified through input from Planning Team members and a review of the current 2023 State of Texas Hazard Mitigation Plan (State Plan). Readily available online information from reputable sources such as federal and state agencies were also evaluated and utilized to supplement information as needed.

In general, there are three main categories of natural hazards: atmospheric, hydrologic, and technological. Atmospheric hazards are events or incidents associated with weather generated phenomenon. The following have been identified as significant for the planning area include extreme heat, hail, lightning, thunderstorm wind, tornado, hurricane / tropical storm, and winter storm (Table 4-1).

Hydrologic hazards are events or incidents associated with water-related damage and account for over 75 percent of federal disaster declarations in the United States. Hydrologic hazards identified as significant for the planning area include flood and drought.

Technological hazards refer to the origins of incidents that can arise from human activities, such as the construction and maintenance of dams. They are distinct from natural hazards primarily because they originate from human activity. The risks presented by natural hazards may be increased or decreased as a result of human activity, however they are not inherently human-induced. Therefore, dam failure is classified as a quasi-technological hazard and referred to as “technological” in Table 4-1 for purposes of description.

For the Risk Assessment, earthquake, wildfire, and expansive soils hazards are considered “other,” since these hazards are not considered atmospheric, hydrologic, nor technological.

Human-caused hazards are events or incidents caused by human intent, human error, or as a result of failed systems. These hazards can be caused or exacerbated by either accidental or intentional human actions that result in the loss of life or property. The human-caused hazards identified as significant for the county include cyber attack, terrorism, and hazardous materials.

SECTION 4: RISK OVERVIEW

Table 4-1. Hazard Descriptions

HAZARD	DESCRIPTION
ATMOSPHERIC	
Extreme Heat	Extreme heat is the condition whereby temperatures hover ten degrees or more above the average high temperature in a region for an extended period of time.
Hail	Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and subsequent cooling of the air mass.
Hurricane / Tropical Storm	A hurricane is an intense tropical weather system of strong thunderstorms with a well-defined surface circulation and maximum sustained winds of 74 mph or higher.
Lightning	Lightning is a sudden electrostatic discharge that occurs during an electrical storm. This discharge occurs between electrically charged regions of a cloud, between two clouds, or between a cloud and the ground.
Thunderstorm Wind	A thunderstorm occurs when an observer hears thunder. Radar observers use the intensity of the radar echo to distinguish between rain showers and thunderstorms. Lightning detection networks routinely track cloud-to-ground flashes, and therefore thunderstorms.
Tornado	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. The destruction caused by tornadoes ranges from light to catastrophic, depending on the location, intensity, size, and duration of the storm.
Winter Storm	Severe winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 mph, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads, and other hard surfaces. Winter storms and ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
HYDROLOGIC	
Drought	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality.

SECTION 4: RISK OVERVIEW

HAZARD	DESCRIPTION
Flood	The accumulation of water within a body of water, which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, and shallow flooding.
OTHER	
Earthquake	An earthquake is the sudden, rapid, shaking of the earth, caused by the breaking and shifting of subterranean rock as it releases strain that has accumulated over a long time. Initial mild shaking may strengthen and become extremely violent within seconds.
Expansive Soils	Expansive soils are soils and soft rock that tend to swell or shrink due to changes in moisture content. Changes in soils volume present a hazard primarily to structures built on top of expansive soils.
Wildfire	A wildfire is an uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.
TECHNOLOGICAL	
Dam Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam.
HUMAN-CAUSED	
Cyber Attack	A cyber-attack is any type of offensive maneuver employed by individuals or whole organizations that targets computer information systems, infrastructures, computer networks, and/or personal computer devices by various means of malicious acts usually originating from an anonymous source that either steals, alters, or destroys a specified target by hacking into a susceptible system.
Hazardous Materials	Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.

SECTION 4: RISK OVERVIEW

HAZARD	DESCRIPTION
Terrorism	Terrorism is the unlawful use of violence and intimidation, especially against civilians, in the pursuit of political aims. Terrorism can be classified as either domestic, which involves groups or individuals without foreign direction, or international terrorism, those whose actions are foreign-based and/or directed. Terrorist incidents can be of many types, including biological or chemical weapons, the use of firearms or explosives, cyber-attacks, or various other means that pose a threat to civilians, property, and the environment.

Hazards that were not considered significant and were not included in the Plan Update are located in Table 4-2, along with the evaluation process used for determining the significance of each of these hazards. Hazards not identified for inclusion at this time may be addressed during future evaluations and updates.

Table 4-2. Other Hazards Deferred

HAZARD CONSIDERED	REASON FOR DETERMINATION
Coastal Erosion	The planning area is not located on the coast, therefore coastal erosion does not pose a risk.
Land Subsidence	There are no historical occurrences of land subsidence for the planning area and it is located in an area where occurrences are considered rare. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of land subsidence and none is expected in the future.

DISASTER DECLARATION HISTORY

One method of understanding hazards that pose a risk to Bell County is to identify past hazard events that triggered federal or state disaster declarations. Federal and state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. Table 4-3 lists state and federal disaster declarations received by Bell County. Many of the disaster events were regional or statewide.

Between 1953 and May 2024 Bell County received 23 federal disaster declarations. Out of the 23 federally declared disasters, the largest share (7) was related to wildfire, followed by declarations for hurricane (4), severe storm (3), flood (3), biological (2), severe ice storms (2), drought (1), and other (1).

In addition to the 23 federally declared disaster there have been 38 U.S. Department of Agriculture (USDA) Secretarial disaster designations between 2012 and 2023. The Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans available to producers suffering losses in those counties and in counties that are contiguous to a designated

SECTION 4: RISK OVERVIEW

county.¹ Of the 38 USDA designations for Bell County, many listed multiple factors as having caused the disaster area designation. The leading factor was drought, which was included in 32 designations. Other factors listed include excessive heat (included in 13 designations), high wind (12), fire / wildfire (11), insects (11), excessive rain, moisture, and humidity (3), winter storm (2), and flood (1).

Table 4-3. Disaster Declaration History in Bell County, 1953-2024

YEAR	DECLARATION TITLE	HAZARD	DECLARATION TYPE	DISASTER No.
11/30/1974	Severe Storms, Flooding	Flood	DR	DR-454
5/19/1989	Severe Storms, Tornadoes, Flooding	Severe Storm	DR	DR-828
12/26/1991	Severe Storm, Thunderstorms	Flood	DR	DR-930
9/10/1993	Extreme Fire Hazard	Drought	EM	EM-3113
2/23/1996	Fire Emergency	Fire	EM	EM-3117
8/26/1998	Tropical Storm Charley	Severe Storm	DR	DR-1239
8/21/1999	Reese Creek Fire	Fire	FSA	FSA-2270
9/1/1999	Extreme Fire Hazards	Fire	EM	EM-3142
2/1/2003	Loss of the Space Shuttle Columbia	Other	EM	EM-3171
9/2/2005	Hurricane Rita	Hurricane	EM	EM-3216
9/21/2005	Hurricane Rita	Hurricane	EM	EM-3261
9/24/2005	Hurricane Rita	Hurricane	DR	DR-1606
1/5/2006	Rosewood Fire	Fire	FM	FM-2610
1/11/2006	Extreme Wildfire Threat	Fire	DR	DR-1624
6/29/2007	Severe Storms, Tornadoes, and Flooding	Severe Storm	DR	DR-1709
3/14/2008	Wildfires	Fire	EM	EM-3284
6/4/2008	Rein Street Fire	Fire	FM	FM-2767
9/10/2008	Hurricane Ike	Hurricane	EM	EM-3294
3/13/2020	Covid-19	Biological	EM	EM-3458
3/25/2020	Covid-19 Pandemic	Biological	DR	DR-4485

¹ United States Department of Agriculture https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/emergency_disaster_designation_declaration_process-factsheet.pdf

SECTION 4: RISK OVERVIEW

YEAR	DECLARATION TITLE	HAZARD	DECLARATION TYPE	DISASTER No.
2/14/2021	Severe Winter Storm	Severe Ice Storm	EM	EM-3554
2/19/2021	Severe Winter Storms	Severe Ice Storm	DR	DR-4586
5/17/2024	Severe Storms, Straight-line Winds, Tornadoes, and Flooding	Flood	DR	DR-4781

NATURAL HAZARDS AND CLIMATE CHANGE

Climate change is defined as a long-term shift in temperature and weather patterns. These shifts can increase or decrease the risk of natural hazards. Global climate change is expected to exacerbate the risks of certain types of natural hazards impacted through rising sea levels, warmer ocean temperatures, higher humidity, the possibility of stronger storms, and an increase in wind and flood damages due to storm surges. Texas is considered one of the more vulnerable states in the U.S. to both abrupt climate changes and to the impact of gradual climate changes to the natural and built environments.

Climate change is expected to lead to an increase in average temperatures as well as an increase in frequency, duration, and intensity of extreme heat events. With no reductions in emissions worldwide, the state of Texas is projected to experience an additional 30 to 60 days per year above 100°F than what is experienced now.²

The State Climatologist's *Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036* identifies ongoing and likely future trends out to the year 2036 based on analysis of historic observations of temperatures, precipitation, and extreme weather. Table 4-4 highlights future trends in extreme weather from the report.

² Kloesel, K., B. Bartush, J. Banner, D. Brown, J. Lemery, X. Lin, C. Loeffler, G. McManus, E. Mullens, J. Nielsen-Gammon, M. Shafer, C. Sorensen, S. Sperry, D. Wildcat, and J. Ziolkowska, 2018: Southern Great Plains. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 987–1035. doi: 10.7930/NCA4.2018.CH23. <https://nca2018.globalchange.gov/chapter/23/>

SECTION 4: RISK OVERVIEW

Table 4-4. Future Trends in Extreme Weather in Texas³⁴

HAZARDS	EXPECTED TRENDS
Extreme Temperatures	<ul style="list-style-type: none"> • The average annual surface temperature in 2036 is expected to be 3.0°F warmer than the 1950-1999 average and 1.8°F warmer than the 1991-2020 average. • Nearly double the number of 100°F days by 2036 compared to 2001-2020. • Higher frequency of 100°F days in urban areas. • The number of nighttime temperatures below 32°F are expected to decrease. • The number of frost days per year are expected to decrease. • The coolest days of the summer are expected to continue becoming warmer. • The number of heatwaves per year and number of days per year classified as heatwaves are expected to increase.
Precipitation	<ul style="list-style-type: none"> • Precipitation has increased by 10 percent or more in eastern Texas, but little trend is present in western Texas. • Precipitation trends to 2036 are likely to be dominated by natural variability. • Extreme precipitation is expected to increase in intensity on average statewide by 6-10 percent compared to the 1950-1999 averages and 2-3 percent relative to the 2001-2020 averages. • This translates to an increase in the frequency of extreme rain of 30-50 percent relative to the climatological expected frequency in 1950-1999 and 10-15 percent relative to 2001-2020. • Annual precipitation is projected to increase while the number of extreme precipitation (>2") will remain relatively consistent.
Drought	<ul style="list-style-type: none"> • Increasing temperatures, rainfall variability, and other factors will on balance decrease water availability, but impact changes will vary strongly across applications. • Impact trends to be highly sector-specific, with the impacts possibly smaller for agriculture than for surface water supply.
Flood	<ul style="list-style-type: none"> • No long-term river flooding trend has been identified in the observations, nor is such a trend projected at this point, except perhaps for the most extreme floods and areas with normally high rainfall. • Urban flooding is projected to increase, both as a simple matter of urban population increase and because of the projected increase of precipitation intensity, which drives

³ Nielsen-Gammon, John, Holman, Sara, Buley, Austin and Jorgensen, Savannah. Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, 2021 Update. Texas A&M University Office of the Texas State Climatologist. October 7, 2021. <https://climatexas.tamu.edu/files/ClimateReport-1900to2036-2021Update>

⁴ University of Texas at Austin, February 2023, Austin Future Climate, Climate Change Predictions for the City of Austin 2022, Technical Report.

SECTION 4: RISK OVERVIEW

HAZARDS	EXPECTED TRENDS
	<p>flooding in fast-response drainages like those usually found in urban areas.</p> <ul style="list-style-type: none">• The climate-driven trend in urban flood frequency should be similar to the climate-driven trend in extreme precipitation frequency: 30-50 percent in 2036 relative to 1950-1999 and 10-15 percent relative to 2001-2020.• Areas already experiencing flooding are likely to see an increase in frequency and magnitude of events.
Winter Weather	<ul style="list-style-type: none">• As the climate warms, the likelihood of winter weather decreases.• Both extreme cold and snowfall either become less frequent or are expected to do so.• Widespread snowfall events in Texas such as the one that took place in February 2021 are extremely rare.• Fewer cold spells are projected to occur per year, but the length of cold spells will be longer when they do occur.
Thunderstorms (Wind, Hail, Lightning)	<ul style="list-style-type: none">• Historical trend data is unreliable.• Indirect evidence supports an increase in the number of days capable of producing severe thunderstorms and an increase in the frequency of very large hail in early springtime, but these possible trends are too uncertain to quantify.
Wildfire	<ul style="list-style-type: none">• Weather and climate drivers of wildfire risk are projected to increase the risk of wildfires throughout the state, primarily due to increased rates of drying and increased fuel load.

OVERVIEW OF HAZARD ANALYSIS

The methodologies utilized to develop the Risk Assessment are a historical analysis and a statistical approach. Both methodologies provide an estimate of potential impact by using a common, systematic framework for evaluation.

Records retrieved from National Centers for Environmental Information (NCEI) and National Oceanic and Atmospheric Administration (NOAA) were reported for participating jurisdictions within Bell County. Remaining records identifying the occurrence of hazard events in the planning area and the maximum recorded magnitude of each event were also evaluated.

Geographic information system (GIS) technology was used to identify and assess risks for Bell County and evaluate community assets and their vulnerability to the hazards.

The four general parameters that are described for each hazard in the Risk Assessment include frequency of return, approximate annualized losses, a description of general vulnerability, and a statement of the hazard's impact.

Frequency of return was calculated by dividing the number of events in the recorded time period for each hazard by the overall time period that the resource database was recording events. Frequency of return statements are defined in Table 4-5, and impact statements are defined in Table 4-6 below.

SECTION 4: RISK OVERVIEW

Table 4-5. Frequency of Return Statements

PROBABILITY	DESCRIPTION
Highly Likely	Event is probable in the next year.
Likely	Event is probable in the next three years.
Occasional	Event is probable in the next five years.
Unlikely	Event is probable in the next ten years.

Table 4-6. Impact Statements

POTENTIAL SEVERITY	DESCRIPTION
Substantial	Multiple deaths. Complete shutdown of facilities for 30 days or more. More than 50 percent of property destroyed or with major damage.
Major	Injuries and illnesses resulting in permanent disability. Complete shutdown of critical facilities between one and four weeks. More than 25 percent of property destroyed or with major damage.
Minor	Injuries and illnesses do not result in permanent disability. Complete shutdown of critical facilities for up to one week. More than 10 percent of property destroyed or with major damage.
Limited	Injuries and illnesses are treatable with first aid. Shutdown of critical facilities and services for 24 hours or less. Less than 10 percent of property destroyed or with major damage.

Each of the hazard profiles includes a description of a general Vulnerability Assessment. Vulnerability is the total of assets that are subject to damages from a hazard, based on historic recorded damages. Assets in the region were inventoried and defined in hazard zones where appropriate. The total amount of damages, including property and crop damages, for each hazard is divided by the total number of assets (building value totals) in that community to determine the percentage of damage that each hazard can cause to the community. Risk and consequences will be addressed and covered within each hazard profile under the Vulnerability and Impact section as well as under the Assessment of Impact sections, where applicable.

To better understand how future growth and development in the Bell County region might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management efforts. Hazard vulnerability for all participating jurisdictions within Bell County was reviewed based on recent development changes that occurred throughout the planning area. The overall population of Bell County has grown by 19 percent between 2010 and 2020, according to the U.S. Census Bureau, therefore the vulnerability to the population, infrastructure, and buildings has increased for all natural hazards. It is noted that the City of Bartlett is the only jurisdiction that has

SECTION 4: RISK OVERVIEW

seen a decrease in population and stagnant development since 2010, indicating a slight decrease in overall vulnerability to all hazards for that jurisdiction.

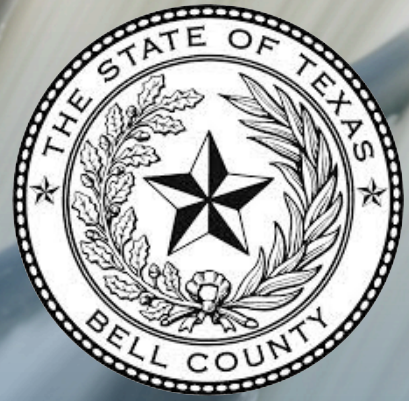
Once loss estimates and vulnerability were known, an impact statement was applied to relate the potential impact of the hazard on the assets within the area of impact.

HAZARD RANKING

During the 2023 planning process, the Planning Team conducted a risk ranking exercise to get input from the Planning Team and stakeholders. Table 4-7 portrays the results of the risk assessment analysis including the frequency of occurrence and potential severity and the Planning Team's self-assessment for hazard ranking, based on local knowledge of past hazard events and impacts for each of the identified hazards. The definitions for frequency of occurrence and potential severity can be found in Table 4-5 and Table 4-6.

Table 4-7. Hazard Risk Ranking

HAZARD	FREQUENCY OF OCCURENCE	POTENTIAL SEVERITY	RANKING
NATURAL HAZARDS			
Drought	Highly Likely	Minor	High
Extreme Heat	Highly Likely	Limited	High
Hail	Highly Likely	Limited	High
Lightning	Highly Likely	Substantial	High
Thunderstorm Wind	Highly Likely	Major	High
Wildfire	Highly Likely	Minor	High
Expansive Soils	Occasional	Limited	Moderate
Flood	Highly Likely	Substantial	Moderate
Tornado	Highly Likely	Substantial	Moderate
Winter Storm	Highly Likely	Limited	Moderate
Dam Failure	Unlikely	Limited	Low
Earthquake	Unlikely	Limited	Low
Hurricane/Tropical Storm	Occasional	Substantial	Low



SECTION 5

DAM FAILURE

SECTION 5: DAM FAILURE

Hazard Description	1
Location	3
Extent.....	5
Historical Occurrences.....	18
Probability of Future Events.....	19
Vulnerability and Impact.....	19
Assessment of Impacts	21
Climate Change Considerations	22

HAZARD DESCRIPTION

Dams are water storage, control, or diversion structures that impound water upstream in reservoirs. Dam failure can take several forms, including a collapse of or breach in the structure. While most dams have storage volumes small enough that failures have few or no repercussions, dams storing large amounts can cause significant flooding downstream. Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which cause most failures;
- Inadequate spillway capacity, resulting in excess overtopping of the embankment;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, or maintain gates, valves, and other operational components;
- Improper design or use of improper construction materials;
- Failure of upstream dams in the same drainage basin;
- High winds, which can cause significant wave action and result in substantial erosion;
- Destructive acts of terrorism; and,
- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments, leading to structural failure.

Benefits provided by dams include water supplies for drinking; irrigation and industrial uses; flood control; hydroelectric power; recreation; and navigation. Dams in Texas serve many purposes, some of which include recreation, flood mitigation, irrigation, water supply, and fire protection. About 1 in 3 of the state's dams are for flood risk mitigation and 1 in 7 dams are for irrigation or water supply.¹

While dams serve a role in helping communities' function, dams also represent a risk to public safety. Dams require ongoing maintenance, monitoring, safety inspections, and sometimes even rehabilitation to continue safe service.

In the event of a dam failure, the energy of the water stored behind the dam is capable of causing rapid and unexpected flooding downstream, resulting in loss of life and substantial property damage. A devastating effect on water supply and power generation could be expected as well.

¹ American Society of Civil Engineers. "2021 Report Card for America's Infrastructure: Infrastructure Texas Report Card." 2021. <https://infrastructurereportcard.org/state-item/texas/>

SECTION 5: DAM FAILURE

The terrorist attacks of September 11, 2001, generated increased focus on protecting the country's infrastructure, including ensuring the safety of dams.

One major issue with the safety of dams is their age. The average age of the United States' more than 90,000 dams is 57 years.² According to estimates released in 2022 by the Association of State Dam Safety Officials, the total cost of rehabilitating non-federal dams is \$75.69 billion. Of non-federal dams, the high-hazard potential dams are estimated at a total of \$24.04 billion for rehabilitation.³ In addition to the continual aging of dams, there have not been significant increases in the number of safety inspectors resulting in haphazard maintenance and inspection. Within Texas there are over 3,200 dams exempt from dam safety requirements by State legislation.⁴ The current maintenance budget does not match the scale of the United States' long-term modifications of its watersheds. Worse still, more people are moving into risky areas. As the population grows, dams that once could have failed without major repercussions are now upstream of cities and development.



² American Society of Civil Engineers. "2021 Report Card for America's Infrastructure." 2021.

<https://infrastructurereportcard.org/>

³ Association of State Dam Safety Officials, "The Cost of Rehabilitating Our Nation's Dams". March 2022.

https://damsafety-stag.s3.amazonaws.com/s3fs-public/files/Cost%20of%20Rehab%20Report-2022%20FINAL_0.pdf

⁴ American Society of Civil Engineers. "2021 Report Card for America's Infrastructure: Infrastructure Texas Report Card." 2021. <https://infrastructurereportcard.org/state-item/texas/>

SECTION 5: DAM FAILURE

LOCATION

The State of Texas has 7,413 dams, all regulated by the Texas Commission on Environmental Quality (TCEQ). The National Dam Safety Review Board (in coordination with FEMA) and the National Inventory of Dams (NID) list a total of 76 dams in the entire Bell County planning area, including all jurisdictions. Each of these dams were analyzed individually by location, volume, elevation, and condition (where available) when determining the risk, if any, for each dam. Each dam site was further analyzed for potential risks utilizing FEMA's National Flood Hazard Layer to map locations and fully understand development near the dam and topographical variations that may increase risk.

Most of the dams listed were embankments for typically dry detention drainage areas or shored up stream embankments. These types of structures are utilized for flood control and do not pose a dam failure risk. Other dams in the planning area feature such limited storage capacity that they pose no risk to structures, infrastructure, or citizens. Dams that were deemed to pose no past, current, or future risk to the planning area are not profiled in the plan as no loss of life or impact to critical facilities or infrastructure is expected in the event of a breach. Based on this detailed analysis, the planning team was able to determine that only 11 of the 76 dams identified pose a risk to the planning area. All 11 of these dams are listed in Table 5-1 with regulation information. These dams are profiled in detail in the Extent section of this hazard profile.

Figure 5-1 illustrates the general location for the critical dams in the planning area. While inundation maps are not available for the profiled dams, an estimated inundation radius has been included on the location map for each profiled dam (indicated by the red circle). For dams with a maximum storage capacity of 100,000 acre-feet or more, all structures within five miles are considered to be at risk to potential dam or levee failure hazards. For dams with a maximum storage capacity between 10,000 and 100,000 acre-feet, all structures within three miles are considered to be at risk to potential dam or levee failure hazards. For dams with a maximum storage capacity of less than 10,000 acre-feet, all structures within one mile are considered to be at risk to potential dam failure hazards.

The jurisdictions profiling dam failure include Bell County, City of Belton, City of Killeen, City of Morgan's Point Resort, City of Nolanville, City of Temple, City of Troy, Village of Salado, and CTCOG. None of the remaining participating jurisdictions are profiling dam failure, including those jurisdictions that may experience localized flooding due to a dam breach, as flood is addressed as a separate hazard in this plan.

SECTION 5: DAM FAILURE

Figure 5-1. Planning Area Dams with Potential Risk

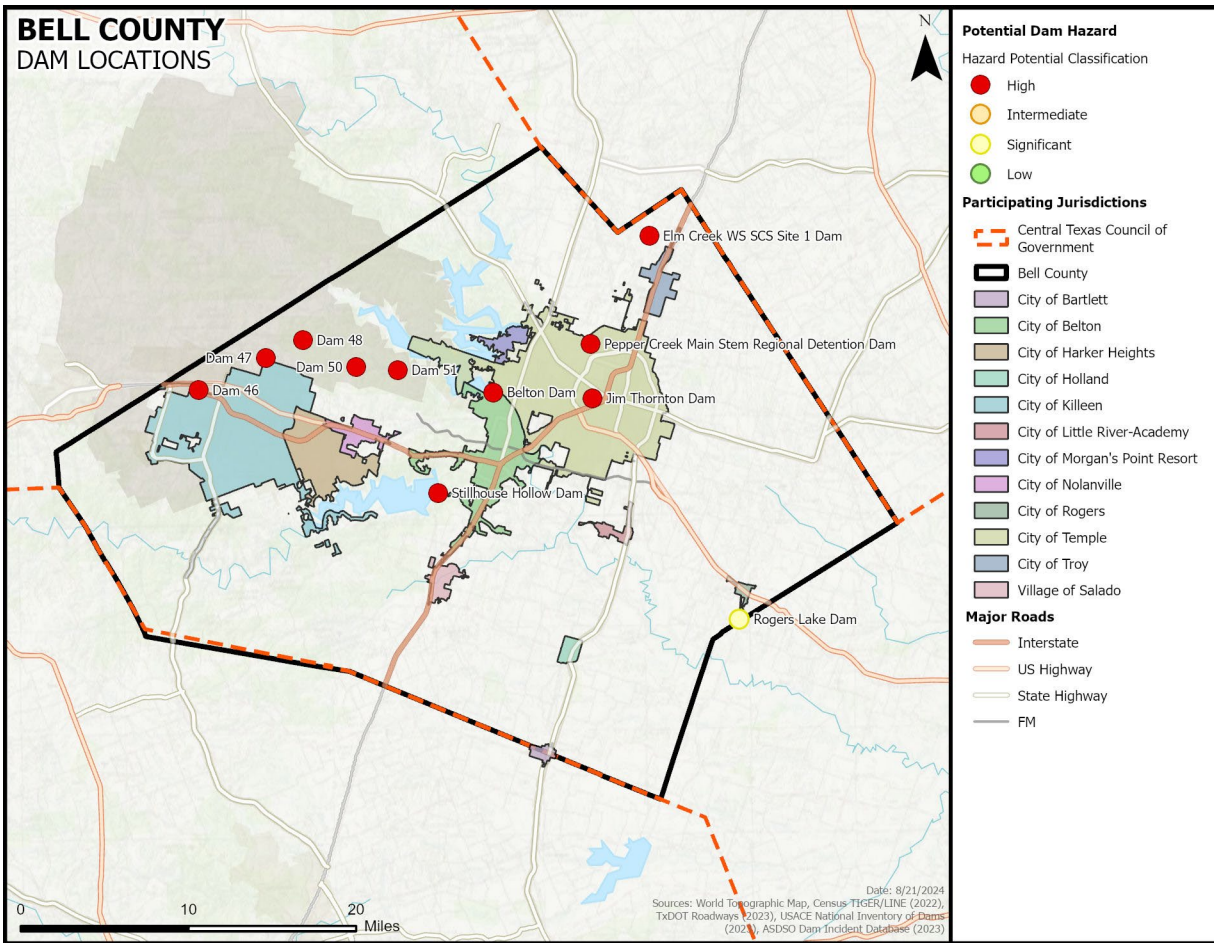


Table 5-1. Bell County Dam Survey

JURISDICTION	DAM NAME	HEIGHT (feet)	STORAGE (acre feet)	CONDITION	HAZARD CLASSIFICATION
City of Belton, City of Morgan's Point Resort, City of Temple, CTCOG	Belton Dam	192	1,876,700	Not Available	High
City of Temple, City of Killeen	Dam 46	49	4,758	Poor	High
City of Killeen	Dam 47	32	1,189	Poor	High
City of Belton	Dam 48	24	490	Poor	High
City of Belton	Dam 50	30	236	Poor	High
City of Belton	Dam 51	62	6,025	Poor	High

SECTION 5: DAM FAILURE

JURISDICTION	DAM NAME	HEIGHT (feet)	STORAGE (acre feet)	CONDITION	HAZARD CLASSIFICATION
Bell County, City of Troy	Elm Creek WS SCS Site 1 Dam	74	18,300	Satisfactory	High
City of Temple	Jim Thornton Dam	30	778.5	Satisfactory	High
City of Killeen	Pepper Creek Main Stem Regional Detention Dam	25	255.9	Fair	High
Bell County	Rogers Lake Dam	22	216	Not Available	Significant
Bell County, City of Belton, City of Nolanville, Village of Salado	Stillhouse Hollow Dam	200	1,013,800	Not Available	High

EXTENT

The extent or magnitude of a dam failure event is described in terms of the classification of damages that could result from a dam's failure, not the probability of failure. For dams with a maximum storage capacity of 100,000 acre-feet or more, all census blocks within five miles are considered to be at risk to potential dam failure hazards. For dams with a maximum storage capacity between 10,000 and 100,000 acre-feet, all census blocks within three miles are considered to be at risk to potential dam failure hazards. For dams with a maximum storage capacity of less than 10,000 acre-feet, all census blocks within one mile are considered to be at risk to potential dam or levee failure hazards. Each profiled dam describes the structures or infrastructure considered to be at risk in the event of a breach based on each estimated inundation zone. An estimated depth for dam breach is indicated for each profiled dam.⁵

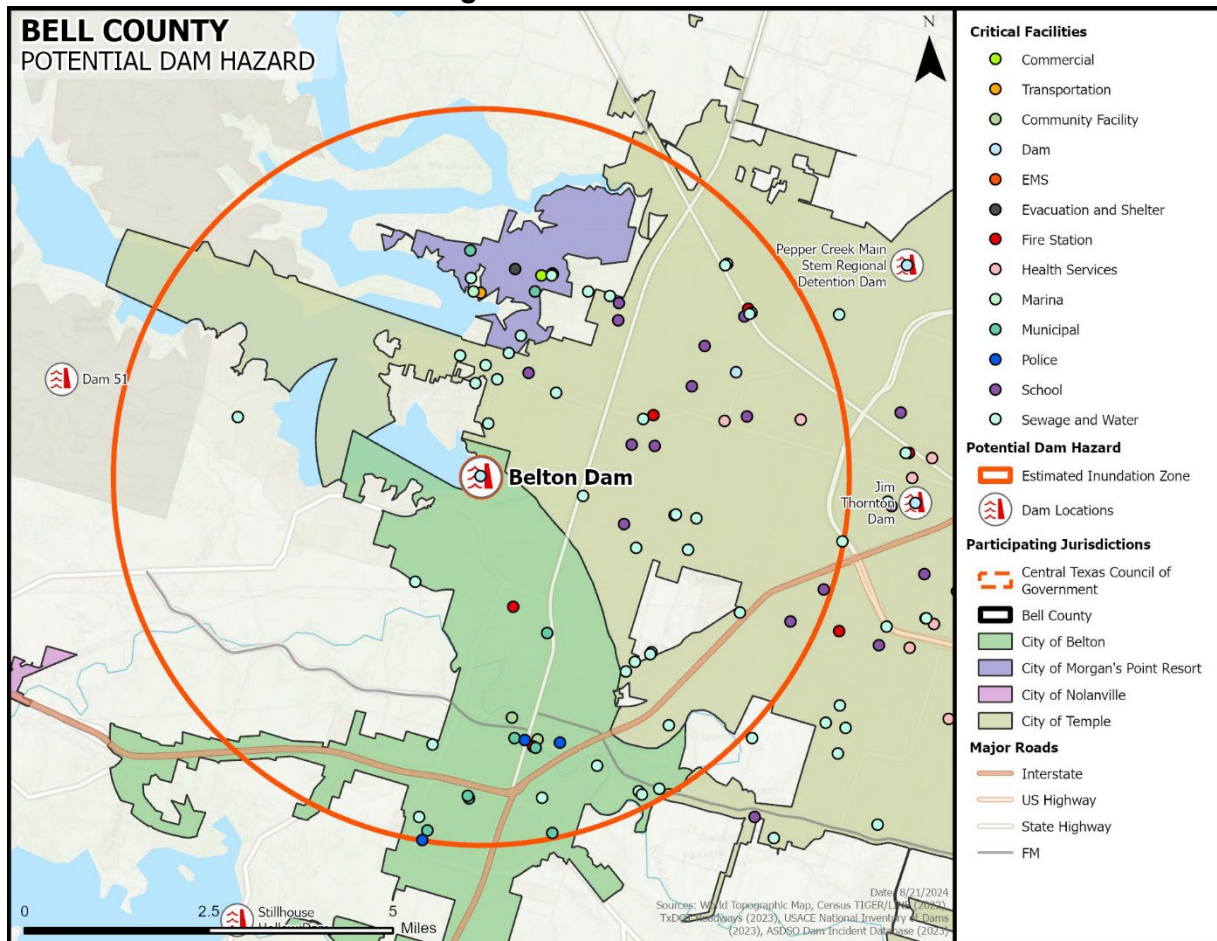
⁵ Dam breach depth is an estimate based on best available data, not statistical data.

SECTION 5: DAM FAILURE

Belton Lake Dam

Belton Lake Dam is located in Bell County within the City of Belton on the Leon River. The dam was constructed in 1954 and is used for recreational purposes. It is owned by the U.S. Army Corps of Engineers. The area located near the dam is densely populated with residential and commercial development. While the flow of the breach is anticipated to follow the designated floodplain area, a catastrophic breach could impact approximately 2,000 residential structures within five miles of the dam as well as multiple commercial structures including a Super Walmart, waterpark, Walgreens, Goodwill, HEB, the University of Mary Hardin-Baylor, Heritage Park, Lakewood Elementary School, and multiple restaurants. The CTCOG facility is also located in the estimated inundation zone and could be impacted by a dam breach. In addition, there are many critical facilities located within the estimated inundation area, see Table 5-3. A dam failure could cause substantial infrastructure damages, power outages, and utility systems disruptions. In the event of a breach, it is estimated the average breach width would be 1,308 feet with a maximum breach flow of 5,195,402 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth up to 25 feet with the highest depth in the immediate area of the dam.

Figure 5-2. Belton Lake Dam

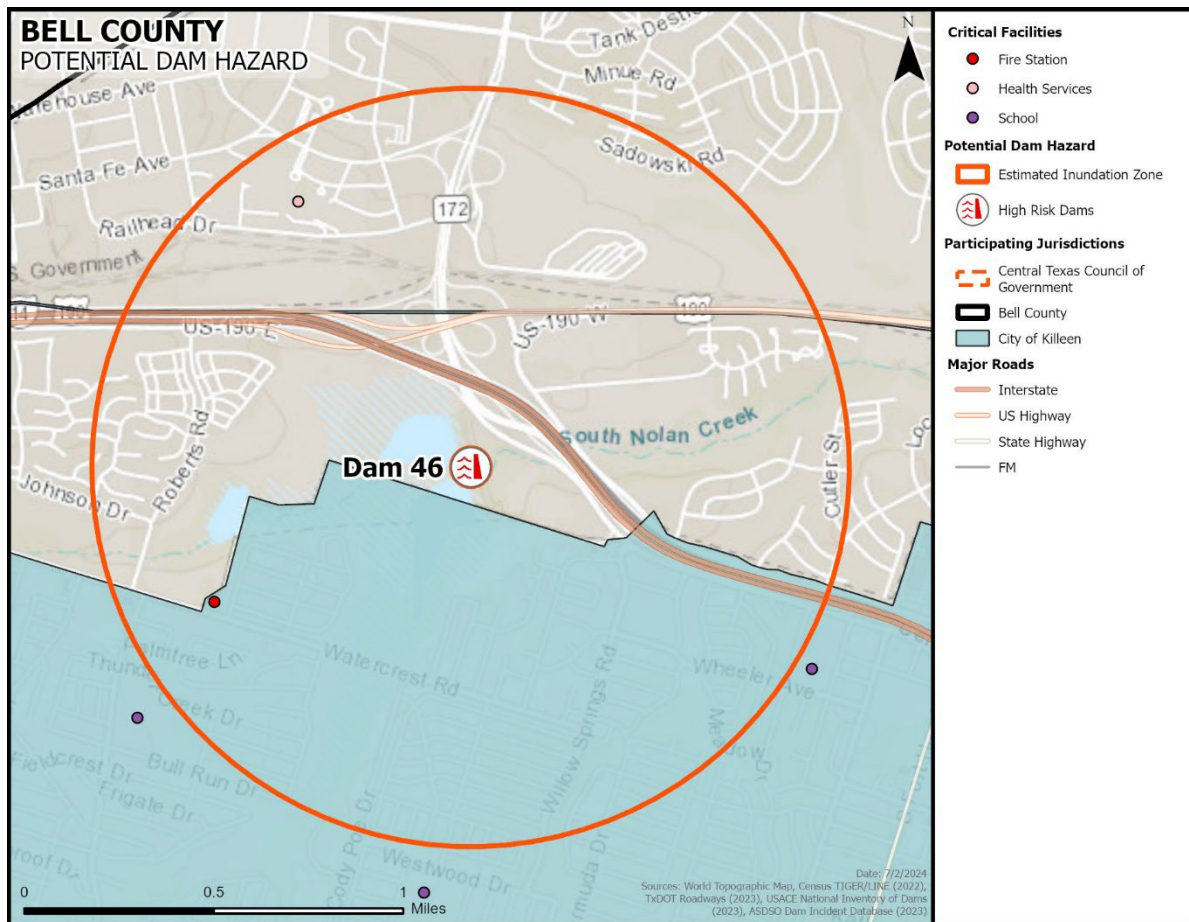


SECTION 5: DAM FAILURE

Dam 46

Dam 46 is located in the City of Killeen. This dam is owned by Fort Cavazos and was constructed in 1915 for water supply purposes. While this is a smaller dam, it is located in a developed and densely populated area. A large waterpark, baseball complex, and an estimated 200 residential structures are located within one mile of the dam. In addition, there are a couple of critical facilities located within the estimated inundation area, see Table 5-3. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam and it is anticipated that the breach flow would primarily follow the course of the Leon River. In the event of a breach, it is estimated that the average breach width would be 208 feet with a maximum breach flow of 62,957 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate (primarily undeveloped) area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 5-3. Dam 46

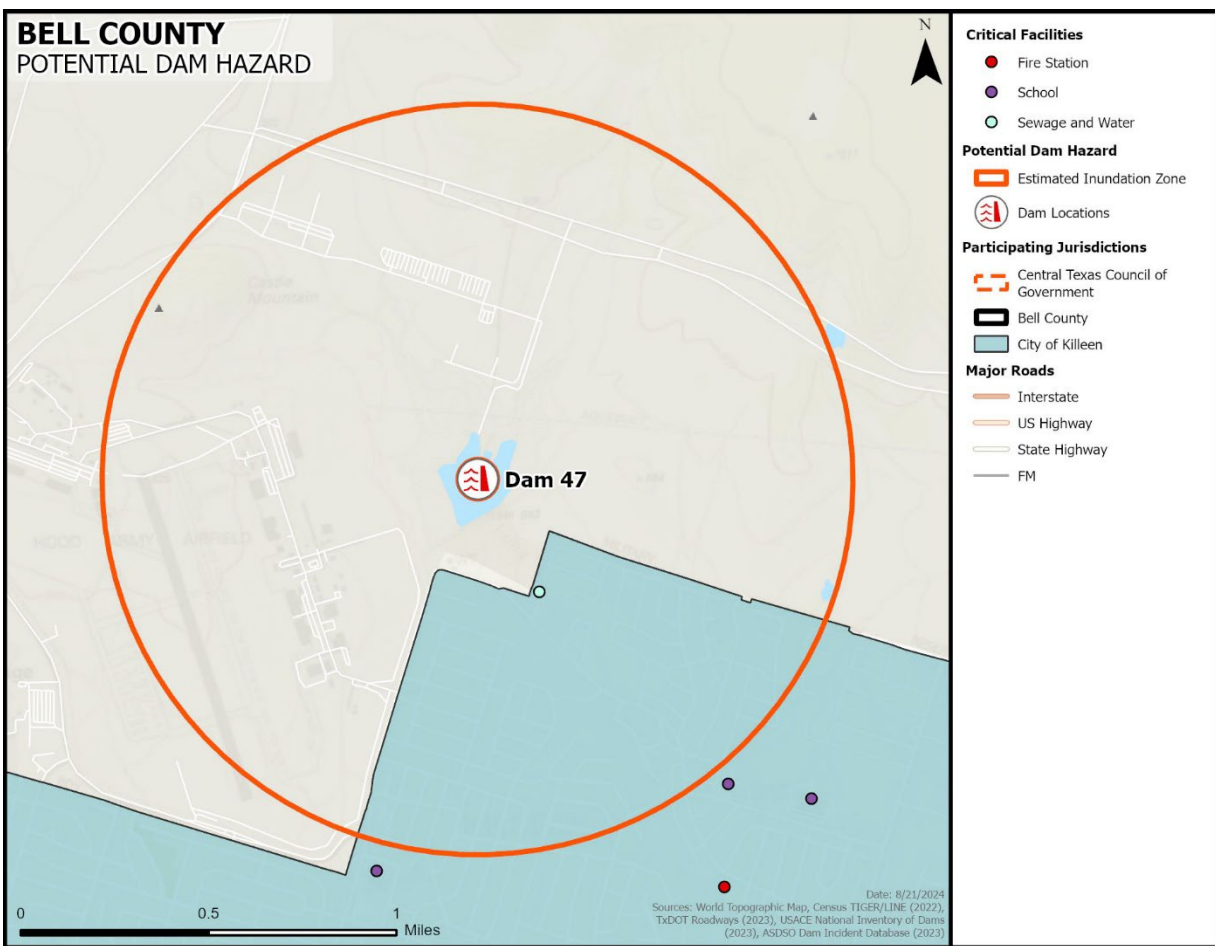


SECTION 5: DAM FAILURE

Dam 47

Dam 47 is located in the City of Killeen. This dam is owned by Fort Cavazos and was constructed in 1968 for flood risk reduction purposes. This dam is located in a developed and densely populated area. An estimated 300 residential and commercial structures are located within one mile of the dam. In addition, there is a critical facility located within the estimated inundation area, see Table 5-3. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 132 feet with a maximum breach flow of 20,486 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 5-4. Dam 47

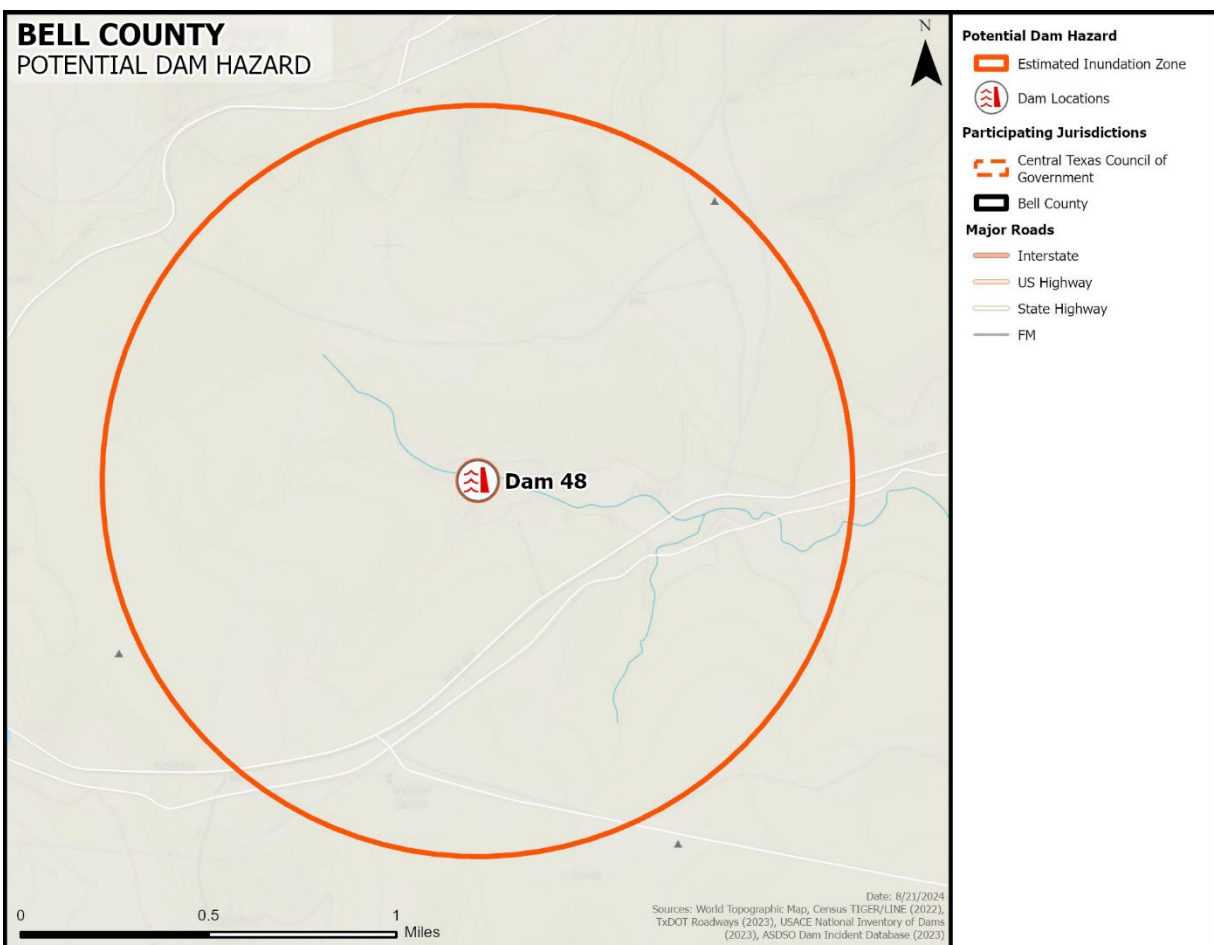


SECTION 5: DAM FAILURE

Dam 48

Dam 48 is located in the City of Belton. This dam is owned by Fort Cavazos and was constructed in 1963 for recreational purposes. This dam is located in a sparsely populated area and is surrounded by open land. Less than 10 estimated structures are located within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam and it is anticipated that the breach flow would primarily follow the course of Engineer Lake and possibly inundating banks long its path. In the event of a breach, it is estimated that the average breach width would be 98 feet with a maximum breach flow of 9,857 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate (primarily undeveloped) area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 5-5. Dam 48

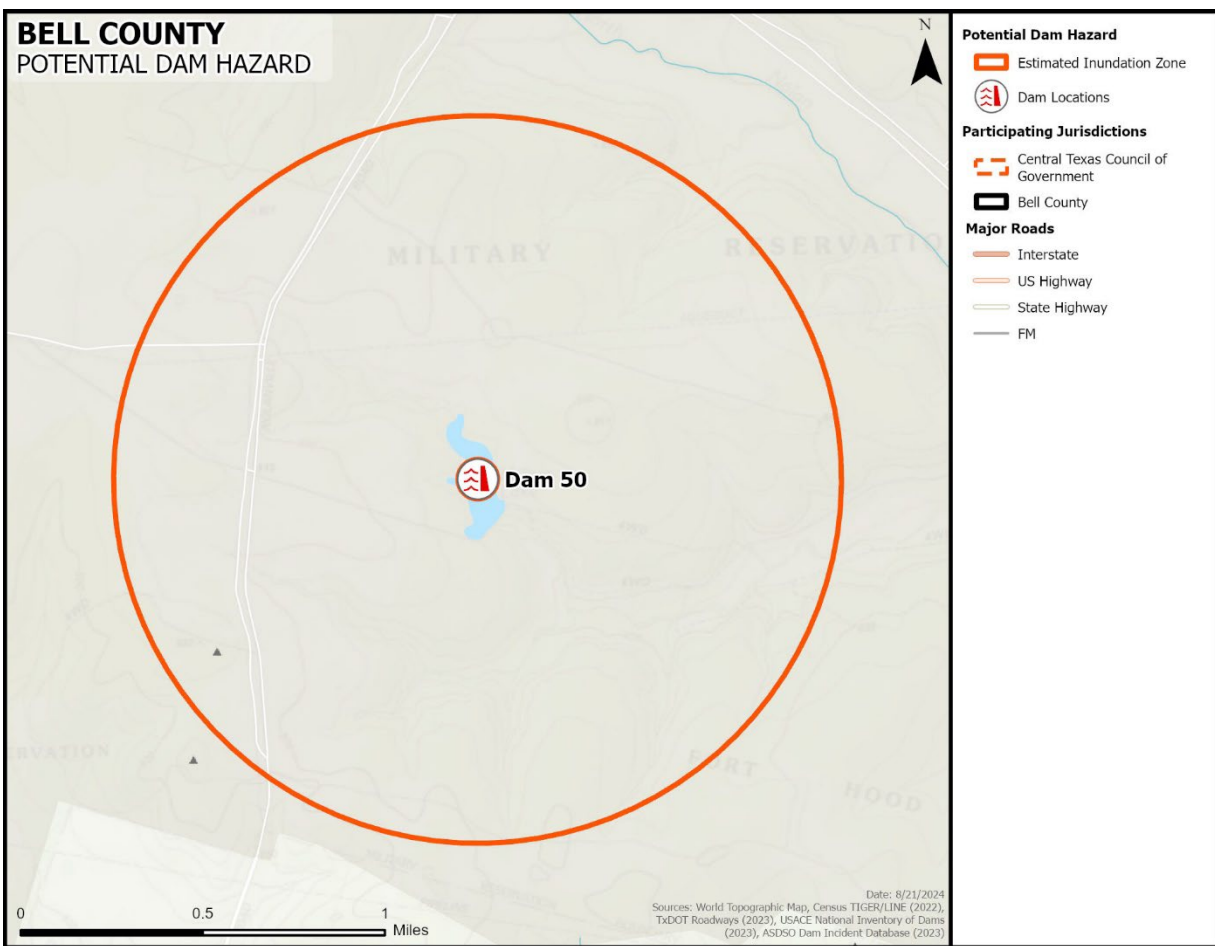


SECTION 5: DAM FAILURE

Dam 50

Dam 50 is located in the City of Belton. This dam is owned by Fort Cavazos and was constructed in 1959 for recreation purposes. This dam is located in a sparsely populated area and is surrounded by open land. Less than 10 estimated structures are located within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam and it is anticipated that the breach flow would primarily follow the course of Heiner Lake. In the event of a breach, it is estimated that the average breach width would be 87 feet with a maximum breach flow of 8,199 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate (primarily undeveloped) area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 5-6. Dam 50

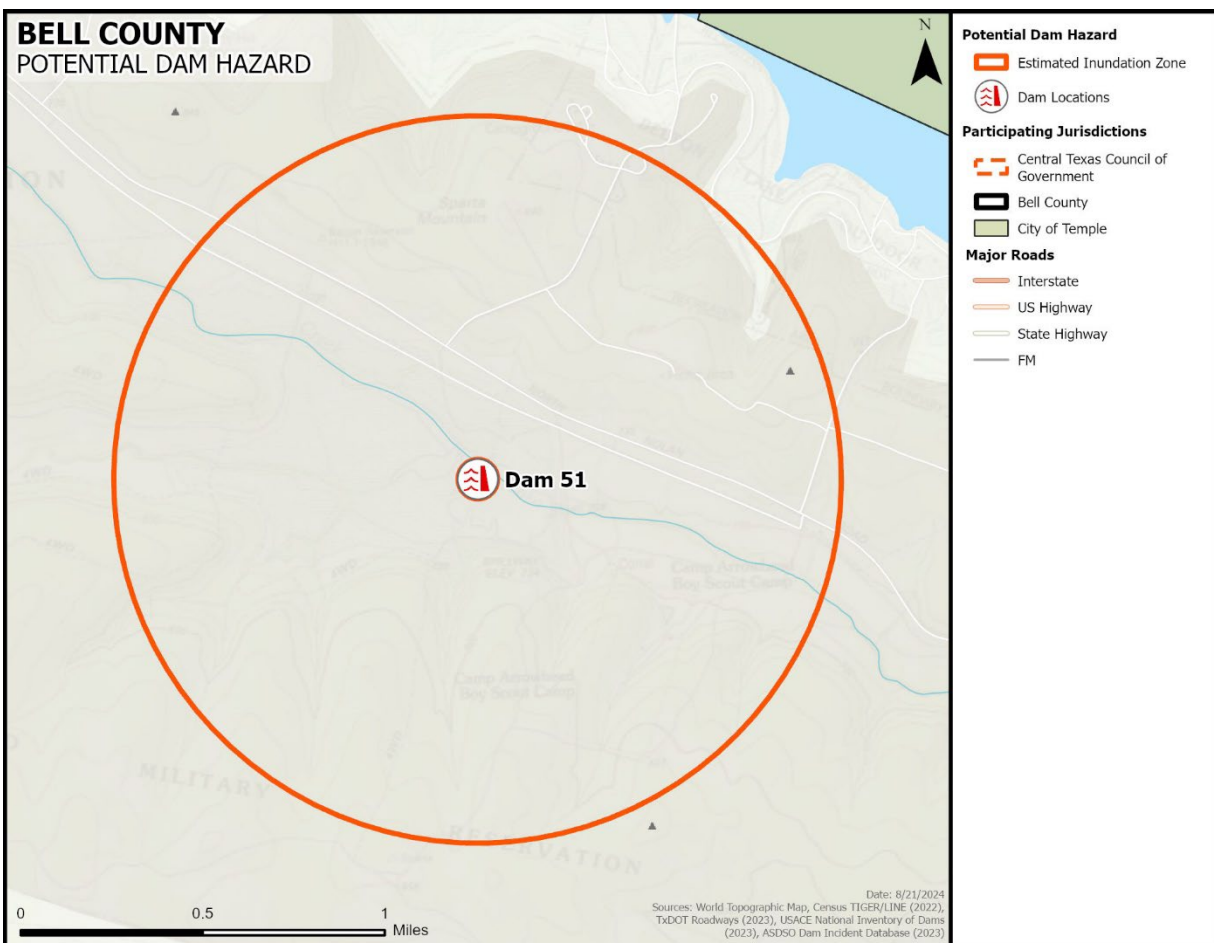


SECTION 5: DAM FAILURE

Dam 51

Dam 51 is located in the City of Belton. This dam is owned by the Fort Cavazos and was constructed in 1970 for irrigation purposes. This dam is located in a sparsely populated area and is surrounded by open land. Less than 10 estimated structures are located within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam and it is anticipated that the breach flow would primarily follow the course of Nolan Lake. In the event of a breach, it is estimated that the average breach width would be 235 feet with a maximum breach flow of 88,387 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate (primarily undeveloped) area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 5-7. Dam 51

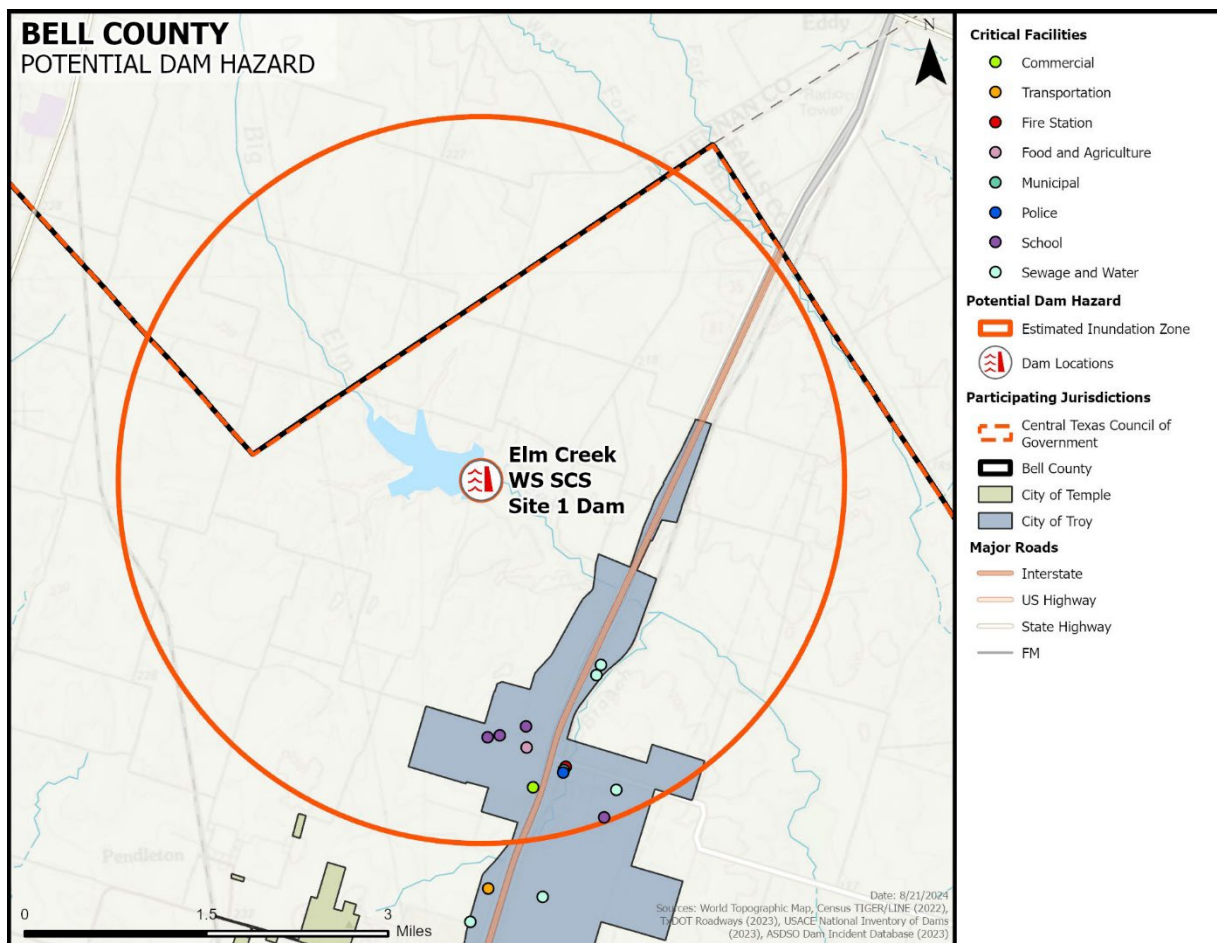


SECTION 5: DAM FAILURE

Elm Creek WS SCS Site 1 Dam

Elm Creek WS SCS Site 1 Dam is located on Big Elm Creek within Bell County. The dam was constructed in 1984. The dam is owned by the Central Texas Soil and Water Conservation District. The reservoir is used for flood control purposes. The area located near the dam is rural with limited residential development. The area near the dam is limited rolling terrain with relatively limited changes in elevations. Approximately 150 structures within three miles of the dam may be impacted in the event of a breach. In addition, there are many critical facilities located within the estimated inundation area, see Table 5-3. A dam failure could also cause limited infrastructure damages, minor power outages, and utility systems disruptions. In the event of a breach, it is estimated the average breach width would be 324 feet with a maximum breach flow of 187,083 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of zero to 15 feet with the highest depth in the immediate area of the dam.

Figure 5-8. Elm Creek WS SCS Site 1 Dam

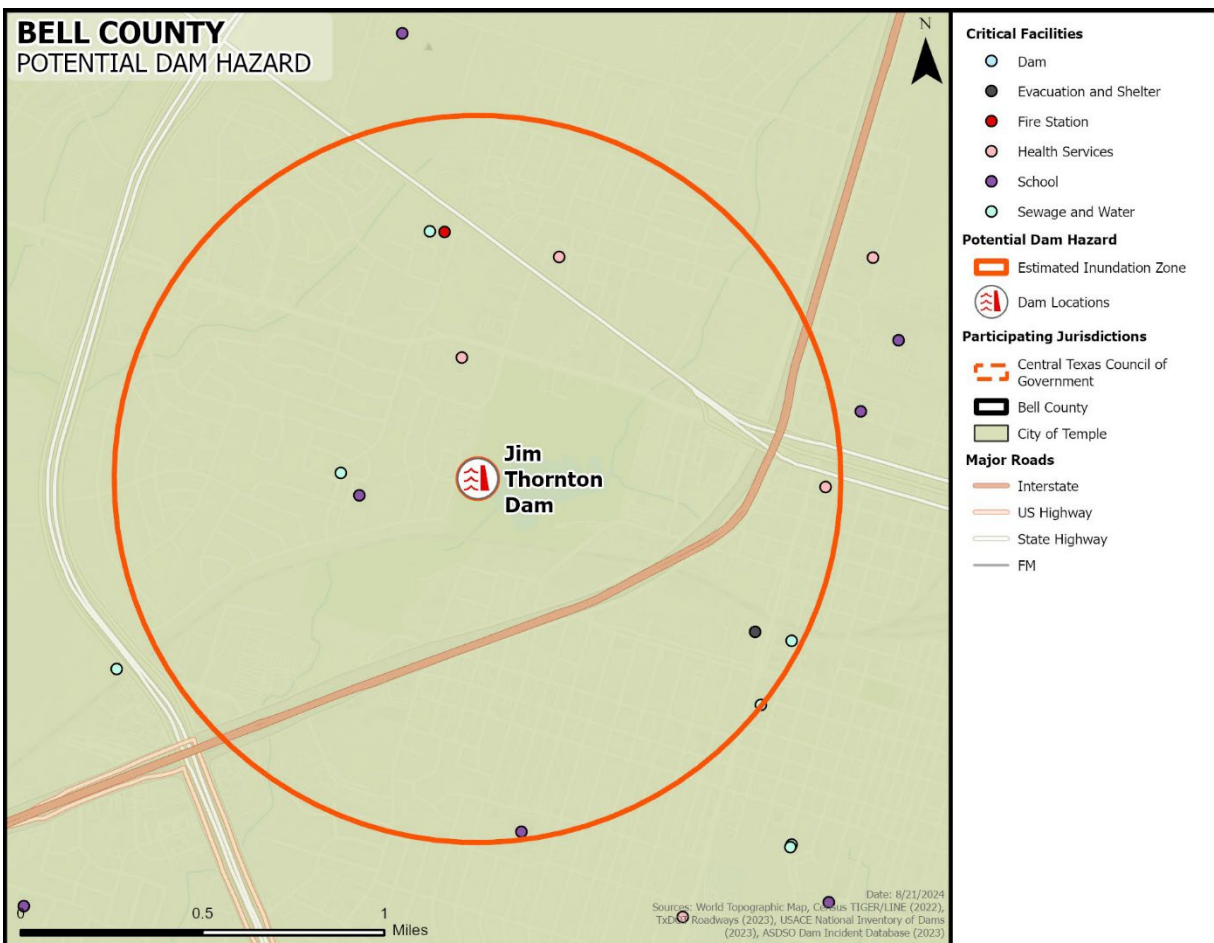


SECTION 5: DAM FAILURE

Jim Thornton Dam

Jim Thornton Dam is located in and owned by the City of Temple. This dam was constructed in 1925 for irrigation purposes. This dam is located in a developed and densely populated area. An estimated 300 residential and commercial structures are located within one mile of the dam. In addition, there are many critical facilities located within the estimated inundation area, see Table 5-3. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam and it is anticipated that the breach flow would primarily follow the course of Lake Polk and Bird Creek. In the event of a breach, it is estimated that the average breach width would be 117 feet with a maximum breach flow of 15,429 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the highest depth in the immediate area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 5-9. Jim Thornton Dam

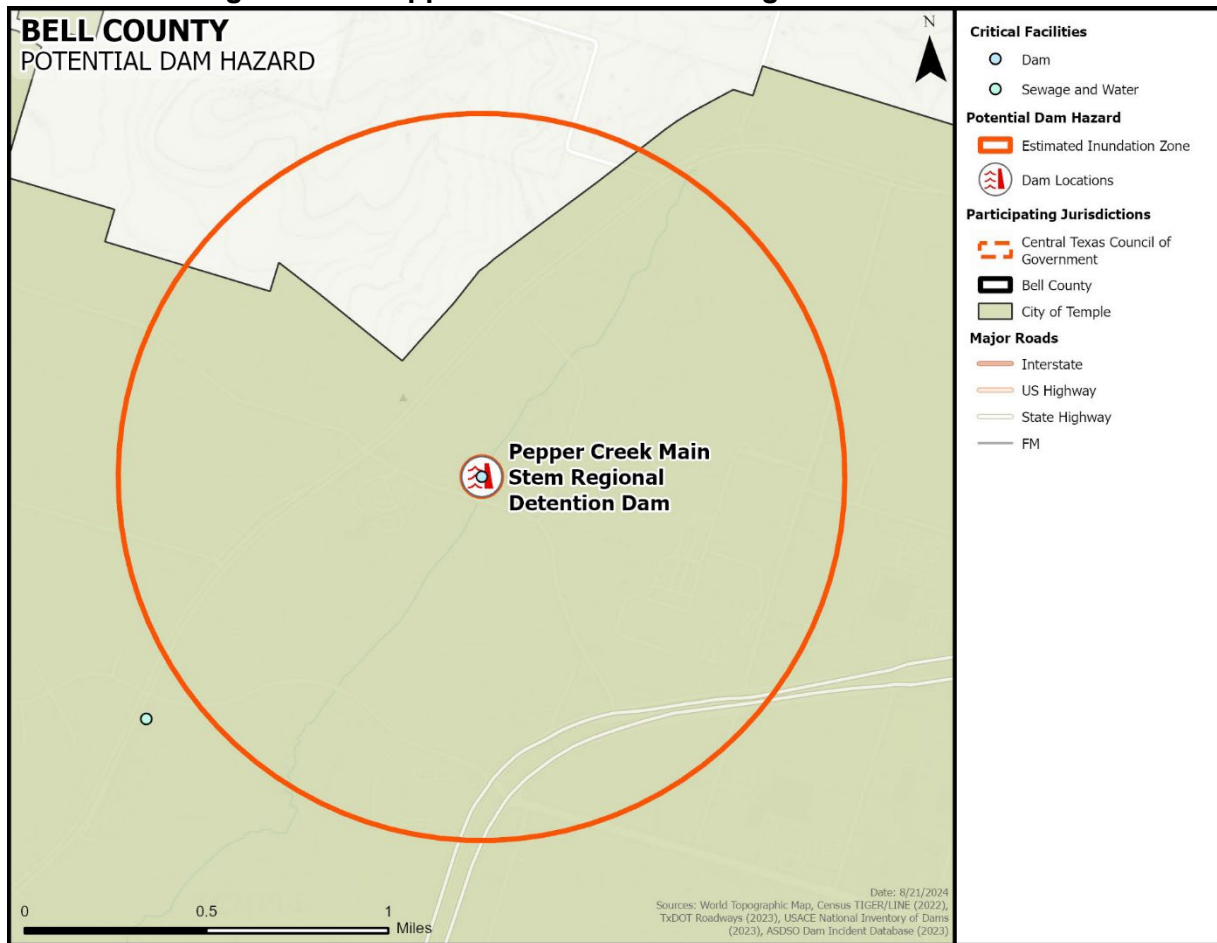


SECTION 5: DAM FAILURE

Pepper Creek Main Stem Regional Detention Dam

The Pepper Creek Main Stem Regional Detention Dam is located in the City of Temple. The earthen dam was constructed in 1968 for the purposes for irrigation purposes. The Dam is owned by the City of Temple. The area located near the dam is densely populated with mostly residential structures. There are an estimated 300 residential structures within one mile of the dam. In addition, there are many critical facilities located within the estimated inundation area, see Table 5-3. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam but the structures closest may be impacted. It is estimated that the average breach width would be 85 feet, with a maximum breach flow of 7,236 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 10 feet, with the immediate area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 5-10. Pepper Creek Main Stem Regional Detention Dam

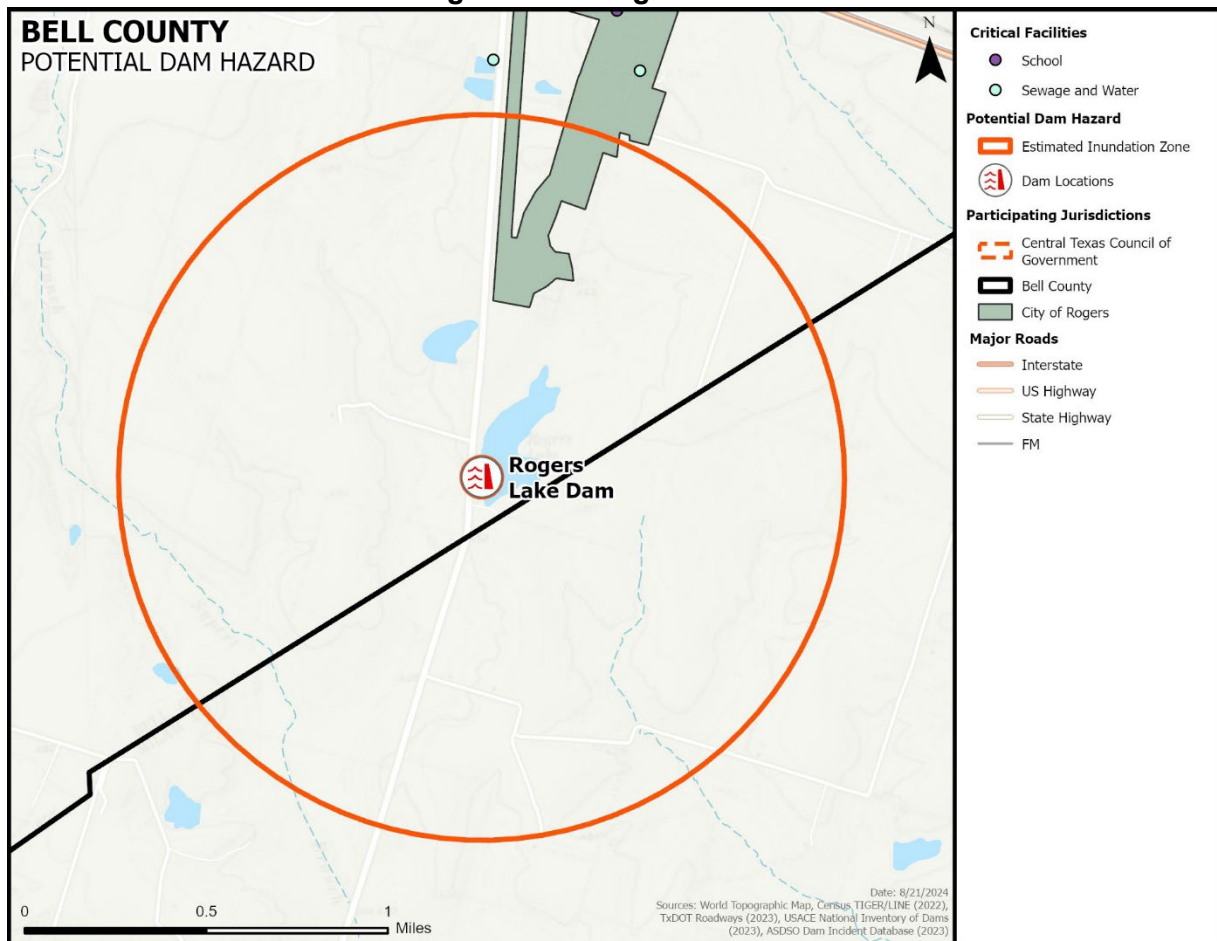


SECTION 5: DAM FAILURE

Rogers Lake Dam

The Rogers Lake Dam is located in the City of Rogers. The dam is owned by the City of Rogers and was constructed in 1967 for flood risk reduction purposes. While this is a smaller dam, it is located in a semi-densely populated area and an estimated 150 residential structures are within one mile of the dam. Extensive damages are not anticipated in the event of a breach due to the capacity of the dam. In the event of a breach, it is estimated that the average breach width would be 78 feet with a maximum breach flow of 5,899 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth of up to 15 feet, with the highest depth in the immediate (primarily undeveloped) area of the dam. Water depths would drop dramatically as the flow travels away from the dam.

Figure 5-11. Rogers Lake Dam

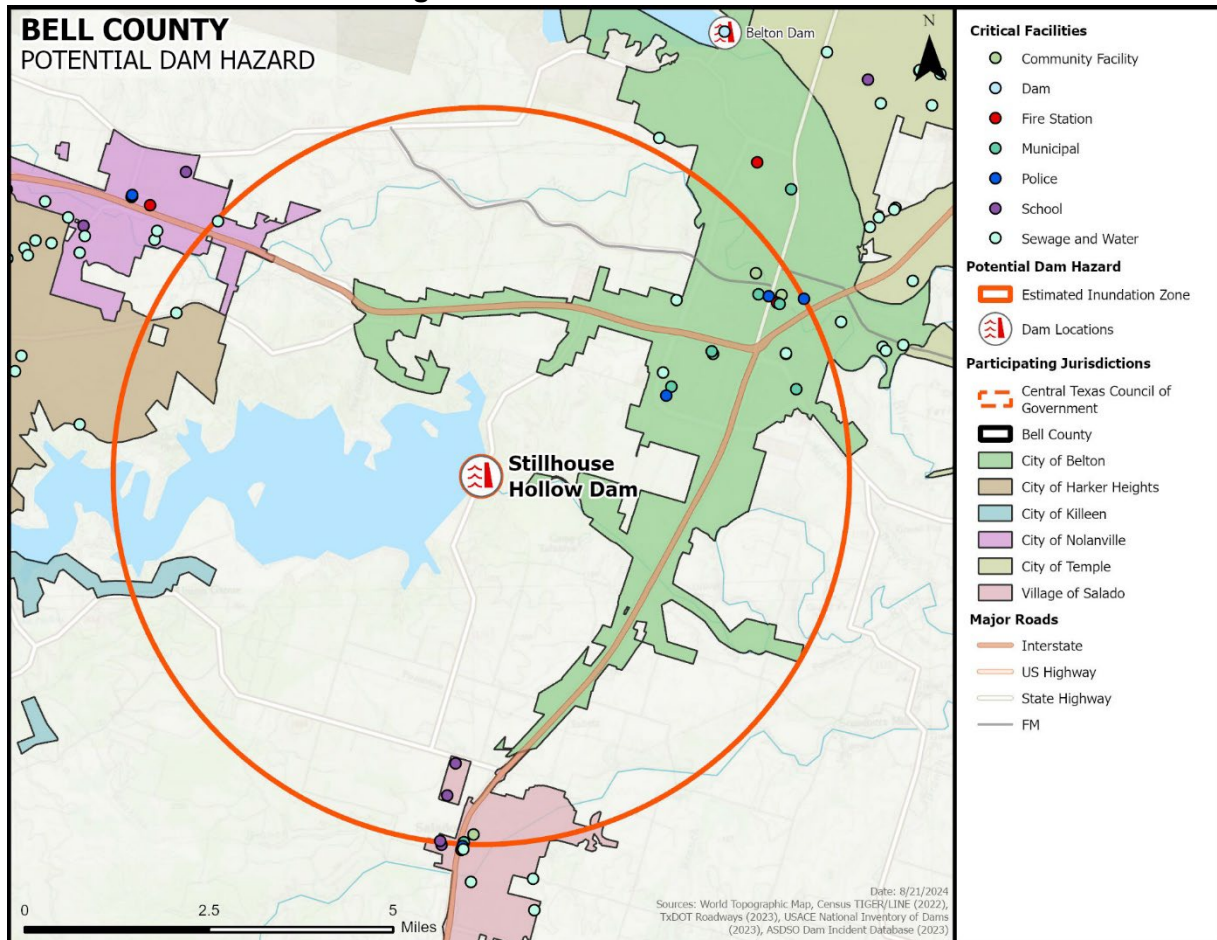


SECTION 5: DAM FAILURE

Stillhouse Hollow Dam

Stillhouse Hollow Dam is located in Bell County on the Lampasas River. The dam was constructed in 1968. The Dam is owned by the U.S. Corps of Engineers and is used for recreational purposes. The area near the dam is rolling terrain with relatively limited changes in elevations. Approximately 300 residential structures and 10 commercial structures within five miles of the dam may be impacted in the event of a breach. In addition, there is a UPS Service Center, RV center and park, Central Texas State Fair Grounds, 2 gas stations, hotel, and a veterinary clinic. In addition, there are many critical facilities located within the estimated inundation area, see Table 5-3. A dam failure could also cause limited infrastructure damages, minor power outages, and utility systems disruptions. In the event of a breach, it is estimated the average breach width would be 1,133.6 feet with a maximum breach flow of 4,161,539 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth up to 25 feet with the highest depth in the immediate area of the dam.

Figure 5-12. Stillhouse Hollow Dam



SECTION 5: DAM FAILURE

Table 14-2 represents the extent or magnitude of a dam failure event that could be expected for the Bell County planning area, per profiled dam. The jurisdictions profiling dam failure include Bell County, City of Belton, City of Killeen, City of Morgan's Point Resort, City of Nolanville, City of Temple, City of Troy, Village of Salado, and CTCOG. None of the remaining participating jurisdictions are profiling dam failure, including those jurisdictions that may experience localized flooding due to a dam breach, as flood is addressed as a separate hazard in this plan.

Table 5-2. Extent for the Bell County Planning Area per Profiled Dam

JURISDICTION	PROFILED DAM	EXTENT (Flow Depth)	LEVEL OF INTENSITY TO MITIGATE
City of Belton, City of Morgan's Point Resort, City of Temple, CTCOG	Belton Dam	0-25 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
City of Temple, City of Killeen	Dam 46	0-10 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
City of Killeen	Dam 47	0-10 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
City of Belton	Dam 48	0-10 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
City of Belton	Dam 50	0-10 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
City of Belton	Dam 51	0-10 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.

SECTION 5: DAM FAILURE

JURISDICTION	PROFILED DAM	EXTENT (Flow Depth)	LEVEL OF INTENSITY TO MITIGATE
Bell County, City of Troy	Elm Creek WS SCS Site 1 Dam	0-15 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
City of Temple	Jim Thornton Dam	0-10 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
City of Killeen	Pepper Creek Main Stem Regional Detention Dam	0-10 Feet	Dam failure presents a low threat for the City. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Bell County	Rogers Lake Dam	0-15 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.
Bell County, City of Belton, City of Nolanville, Village of Salado	Stillhouse Hollow Dam	0-25 Feet	Dam failure presents a low threat for the County. Loss of life is not expected, no critical facilities or infrastructure would be impacted, and economic loss would be minimal in the event of a dam failure.

HISTORICAL OCCURRENCES

In the State of Texas there have been 171 dam failures since 1900, although the State has not experienced loss of life or extensive economic damage due to a dam failure since the first half of the twentieth century. However, there may be many incidents that are not reported and, therefore, the actual number of incidents is likely to be greater.

In Bell County, there has been one dam failure incident which occurred at the Rogers Lake Dam. This event occurred on January 3, 2019, and the incident cause is unknown, according to the Association of State Dam Safety Officials Dam Incident Database. Local news reports state that the area received high rainfall which caused the local lake to breach the dam. While reports are limited, they indicate that no homes or structures were threatened. Some nearby roads were washed out and temporarily closed.

SECTION 5: DAM FAILURE

PROBABILITY OF FUTURE EVENTS

There has been one dam failure incident in Bell County between 2010 and 2023. Based on historical occurrences of dam failures, the probability for future events is “Unlikely” for the Bell County planning area, meaning an event is possible in the next ten years.

VULNERABILITY AND IMPACT

There are 76 dams in the Bell County planning area. All dams were evaluated in-depth to determine the risk, if any, associated with each dam. This analysis indicated 11 dams in the planning area that present a risk to structures or infrastructure in the planning area.

Flooding is the most prominent effect of dam failure. If the dam failure is extensive, a large amount of water would enter the downstream waterways, forcing them out of their banks. There may be significant environmental effects, resulting in flooding that could disperse debris and hazardous materials downstream that can damage local ecosystems. If the event is severe, debris carried downstream can block traffic flow, cause power outages, and disrupt local utilities, such as water and wastewater, which could result in school closures. For specific vulnerability, please refer to the narrative for each dam under the Extent section of this profile.

The Bell County planning area identified the following critical facilities (Table 5-3) as assets that are considered the most important to the planning area and are susceptible to a range of potential impacts caused by dam failure events. All of the identified critical facilities were located outside of estimated dam inundation zones except as noted below. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 5-3. Critical Facilities Vulnerable to Dam Failure Events

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	Bell County: 2 Police Stations	<ul style="list-style-type: none">Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.Structures, and emergency vehicles, including critical equipment, can be damaged by rising flood waters and floating debris.Power outages could disrupt communications, delaying emergency response times. Power outages could disrupt critical care.Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.Debris can impede emergency response vehicle access to areas.Washed out roads and bridges can impede emergency response vehicle access to areas.Flood-related rescues may be necessary at swift and low water crossing or in flooded neighborhoods where roads have become impassable, placing first responders in harm's way.
	City of Belton: 1 Police, 2 Fire Stations	
	City of Killeen: 1 Health Services, 1 Fire Station	
	City of Morgan's Point Resort: 1 Fire Station, 1 Police Station, 1 EMS	
	City of Temple: 3 Fire Stations, 5 Health Services	
	City of Troy: 1 Police, 1 Fire Station	

SECTION 5: DAM FAILURE

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
		<ul style="list-style-type: none"> • Evacuations may be required for entire neighborhoods because of rise of floodwaters, or at hospitals due to extended power outages, gas line ruptures, or structural damages to facilities, further taxing limited response capabilities and increasing sheltering needs for displaced residents. • Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. • First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions. • Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<p>Bell County: 3 Municipal</p> <p>City of Belton: 3 Municipal, 2 Community Facilities</p> <p>CTCOG: 1 Municipal</p> <p>City of Temple: 14 Schools, 1 Evacuation Shelter</p> <p>City of Morgan's Point Resort: 2 Municipal, 1 Transportation, 1 Evacuation Shelter</p> <p>Village of Salado: 1 Municipal, 1 Community Facility, 3 Schools</p> <p>City of Troy: 1 Municipal, 4 Schools</p>	<ul style="list-style-type: none"> • Structures can be damaged by rising flood waters. • Power outages could disrupt critical care. • Backup power sources could be damaged, inundated or otherwise inoperable. • Critical staff may be impacted and unable to report for duty, limiting response capabilities. • Evacuations may be necessary due to extended power outages, gas line ruptures, or inundation of facilities. • Additional emergency responders and critical aid workers may not be able to reach the area for days. • Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. • Temporary break in operations may significantly inhibit post event evacuations. • Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.
Commercial Supplier (food, fuel, etc.)	<p>City of Morgan's Point Resort: 1 Commercial</p> <p>City of Troy: 2 Commercial</p>	<ul style="list-style-type: none"> • Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. • Essential supplies like medicines, water, food, and equipment deliveries may be delayed. • Economic disruption due to power outages and fires negatively impact airport services as well as area businesses reliant on airport operations.

SECTION 5: DAM FAILURE

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Utility Services and Infrastructure (electric, water, wastewater, communications)	City of Belton: 9 Sewage and Water	<ul style="list-style-type: none"> Emergency operations and critical services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency service vehicles can be damaged by rising flood waters. Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing emergency service workers in harm's way. Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. Service responders are exposed to downed power lines, contaminated and unusual debris, hazardous materials, and generally unsafe conditions. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
	City of Killeen: 1 Sewage and Water	
	City of Morgan's Point Resort: 3 Sewage and Water, 1 Marina	
	City of Nolanville: 1 Sewage and Water	
	City of Temple: 40 Sewage and Water	
	City of Troy: 2 Sewage and Water	

Annualized loss-estimates for dam failure are not available; neither is there a breakdown of potential dollar losses for critical facilities, infrastructure and lifelines, or hazardous-materials facilities. If a major dam should fail, the severity of impact could be substantial.

Historically, the overall severity of impact from a dam breach would be considered "Limited," meaning it could result in injuries that can be treated with first-aid, critical facilities being shut down for 24-hours or less and less than 10 percent of the property in the estimated breach inundation area destroyed or with major damage.

ASSESSMENT OF IMPACTS

Any individual dam has a very specific area that will be impacted by a catastrophic failure. Dams identified with potential risk can directly threaten the lives of individuals living or working in the inundation zone below the dam. The impact from any catastrophic failure would be similar to that of a flash flood. Potential impacts for the planning area include:

- Lives could be lost.
- There could be injuries from impacts with debris carried by the flood.
- Swift-water rescue of individuals trapped by the water puts the immediate responders at risk for their own lives.
- Individuals involved in the cleanup may be at risk from the debris left behind.
- Continuity of operations for any jurisdiction outside the direct impact area could be very limited.
- Roads and bridges could be destroyed.
- Homes and businesses could be damaged or destroyed.

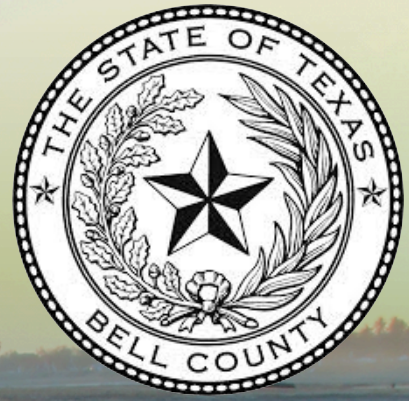
SECTION 5: DAM FAILURE

- Emergency services may be temporarily unavailable.
- Disruption of operations and the delivery of services in the impacted area.
- A large dam with a high head of water could effectively scour the terrain below it for miles, taking out all buildings, and other infrastructure.
- Scouring force could erode soil and any buried pipelines.
- Scouring action of a large dam will destroy all vegetation in its path.
- Wildlife and wildlife habitat caught in the flow will likely be destroyed.
- Fish habitat will likely be destroyed.
- Topsoil will erode, slowing the return of natural vegetation.
- The destructive high velocity water flow may include substantial debris and hazardous materials, significantly increasing the risks to life and property in its path.
- Debris and hazardous material deposited downstream may cause further pollution of areas far greater than the inundation zone.
- Destroyed businesses and homes may not be rebuilt, reducing the tax base and impacting long term economic recovery.
- Historical or cultural resources may be damaged or destroyed.
- Recreational activities and tourism may be temporarily unavailable or unappealing, slowing economic recovery.

The economic and financial impacts of dam failure on the area will depend entirely on the location of the dam, scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any dam failure event.

CLIMATE CHANGE CONSIDERATIONS

A direct connection between climate change and dam failure events is unclear. As air temperatures increase, so does the amount of moisture the atmosphere can hold leading to more frequent and intense rain and flooding. Additionally, the aging dams increase the possibility of dam failure and the risk of catastrophic flooding inside estimated dam inundation zones. Safety features, known as spillways, are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events can result in increased discharges downstream and increased flooding potential. Climate change is likely to increase the probability of spillway overflows.



SECTION 6 **DROUGHT**

SECTION 6: DROUGHT

Hazard Description	1
Location	1
Extent.....	4
Historical Occurrences.....	6
Significant Events	9
Probability of Future Events.....	10
Vulnerability and Impact.....	10
Assessment of Impacts	13
Climate Change Considerations	15

HAZARD DESCRIPTION

Drought is a period of time without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period of time, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic. Table 6-1 presents definitions for these different types of droughts.

Droughts are one of the most complex of all natural hazards as 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 6-1. Drought Classification Definitions¹

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.

LOCATION

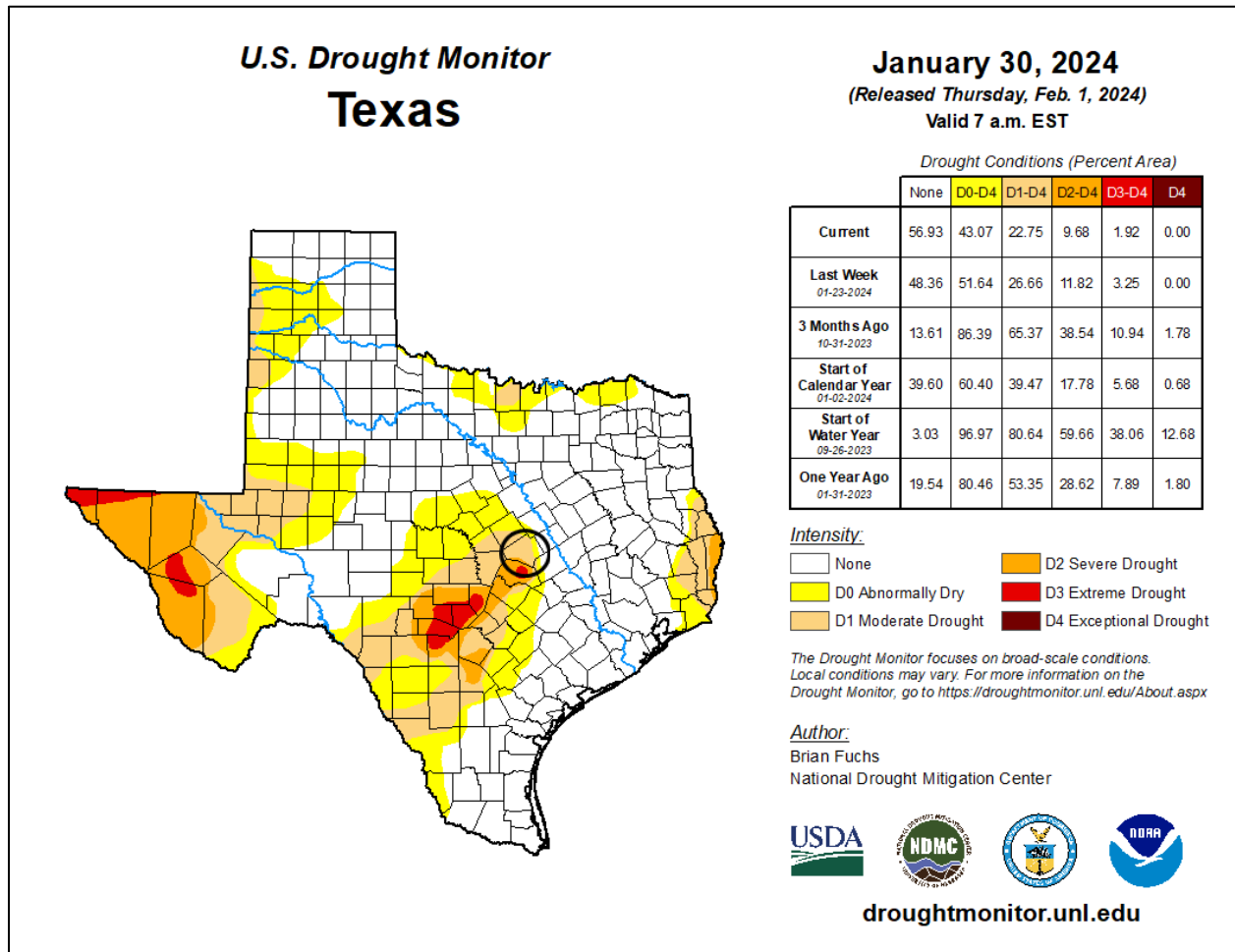
Droughts occur regularly throughout Texas and the Bell County planning area, including participating jurisdictions and the CTCOG, and are considered a normal condition. However, they can vary greatly in their intensity and duration. The U.S. Drought Monitor, produced through a

¹ Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA

SECTION 6: DROUGHT

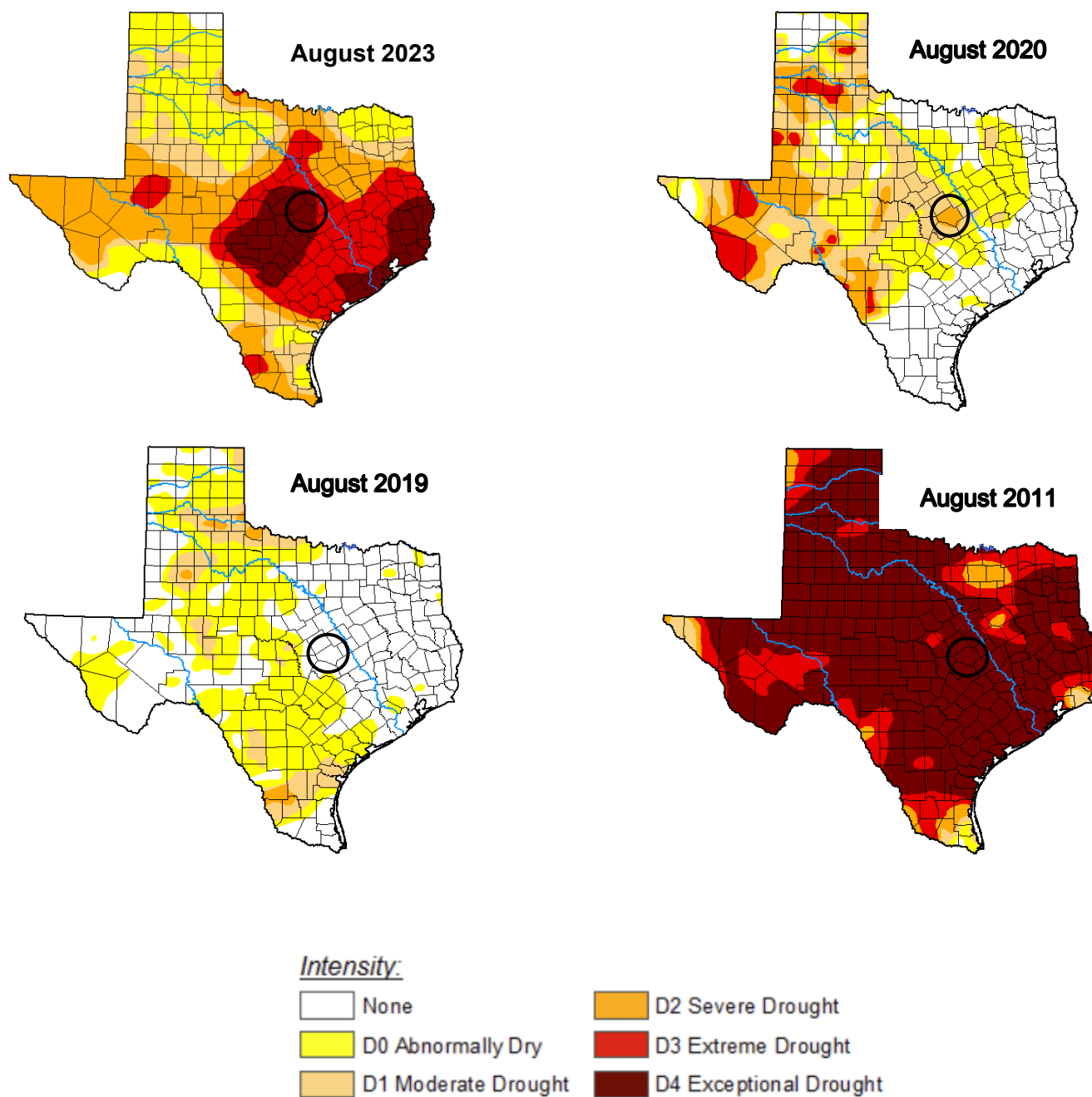
partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, U.S. Department of Agriculture and the National Oceanic and Atmospheric Administration, shows the planning area is currently experiencing abnormally dry to moderate drought conditions (Figure 6-1) but has experienced a range of conditions from normal (none) to exceptional drought conditions over the last decade (Figure 6-2). There is no distinct geographic boundary to drought; therefore, it can occur anywhere throughout the Bell County planning area.

Figure 6-1. U.S. Drought Monitor, January 2024



SECTION 6: DROUGHT

Figure 6-2. U.S. Drought Monitor, August 2011, August 2019, August 2022, August 2023



SECTION 6: DROUGHT

EXTENT

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 6-2 depicts magnitude of drought, while Table 6-3 describes the classification descriptions.

Table 6-2. Palmer Drought Index

DROUGHT INDEX	DROUGHT CONDITION CLASSIFICATIONS						
	Extreme	Severe	Moderate	Normal	Moderately 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 +2.99	+3.00 to +3.99	+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 +2.99	+3.00 to +3.99	+4.00 and above

Table 6-3. Palmer Drought Category Descriptions²

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

² Source: National Drought Mitigation Center

SECTION 6: DROUGHT

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

Based on the historical occurrences for drought and the location of the Bell County planning area, the area can anticipate the full range of drought from abnormally dry to exceptional drought, or D0 to D4, based on the Palmer Drought Category. The entire planning area has experienced exceptional drought conditions. This is the highest level of drought severity and the most extreme drought conditions the planning area can anticipate in the future.

Kempner Water Supply Corporation (KWSC) is a public water supplier providing water to Bell, Burnet, Coryell, and Lampasas counties. The source of water for KWSC is 100% surface water from Stillhouse Hollow Lake. A Drought Contingency Plan was developed by KWSC and will notify Bell County and the planning area about the conditions under which each stage of the plan is to be implemented. Table 6-4 reflects the stages of the Drought Contingency Plan of the KWSC.

Table 6-4. Stages of the KWSC Drought Contingency Plan

TRIGGERS	TARGET	DESCRIPTION
Stage 1 Daily water demand exceeds 70% of treatment or storage for 3 consecutive days.	Achieve a reduction in total water use	<ul style="list-style-type: none">• Initiate increased public information efforts• Customers are requested to follow Stage 1 Watering Schedule• Increase leak detection and repair• Notify Texas Commission on Environmental Quality (TCEQ)
Stage 2 Daily water demand exceeds 80% of treatment or storage capacity for 3 consecutive days.	Achieve a 10% reduction in total water use	<ul style="list-style-type: none">• Parks, institutional, and commercial landscapes limited to drip and handheld hose• Customers are requested to follow Stage 2 Watering Schedule• Increase KWSC oversight of watering schedule and wastewater• Water main flushing only as needed• Notify TCEQ
Stage 3 Daily water demand exceeds 90% of treatment or storage capacity for 3 consecutive days.	Achieve a 20% reduction in total water use	<ul style="list-style-type: none">• Implementation of water usage surcharges for excessive use• Customers are requested to follow Stage 3 Watering Schedule• Increase KWSC enforcement of watering schedule and wastewater• Water main flushing only as needed• Notify TCEQ
Stage 4 Daily water demand exceeds 100% of treatment or storage capacity for 3 consecutive days.	Achieve a 30% reduction in total water use	<ul style="list-style-type: none">• Watering can or bucket only during AM hours• Customers are requested to follow Stage 4 Watering Schedule• Pro rata allocation to wholesale customers per TWC 11.039• Water main flushing only as needed

SECTION 6: DROUGHT

TRIGGERS	TARGET	DESCRIPTION
		<ul style="list-style-type: none"> Notify TCEQ
Stage 5 Emergency Major water production or distribution limitations Supply source contamination System outage due to failure of major water system components	Achieve necessary reduction in total water use	<ul style="list-style-type: none"> Evaluate the use of social media All outdoor and nonessential use of water prohibited Pro rata allocation to wholesale customers per TWC 11.039 Discontinue water main flushing Notify TCEQ and appropriate emergency contacts

HISTORICAL OCCURRENCES

The Bell County planning area may experience an extreme drought in any given year. According to the U.S. Drought Monitor, between January 2000 and 2023, the Bell County planning area spent 820 consecutive weeks (65%) in some level of drought as defined as Abnormally Dry (D0) or worse conditions. Bell County has received 33 USDA disaster declarations for drought from 2012 through 2023.

Figure 6-3. Bell County Drought Intensity, 2000-2023³

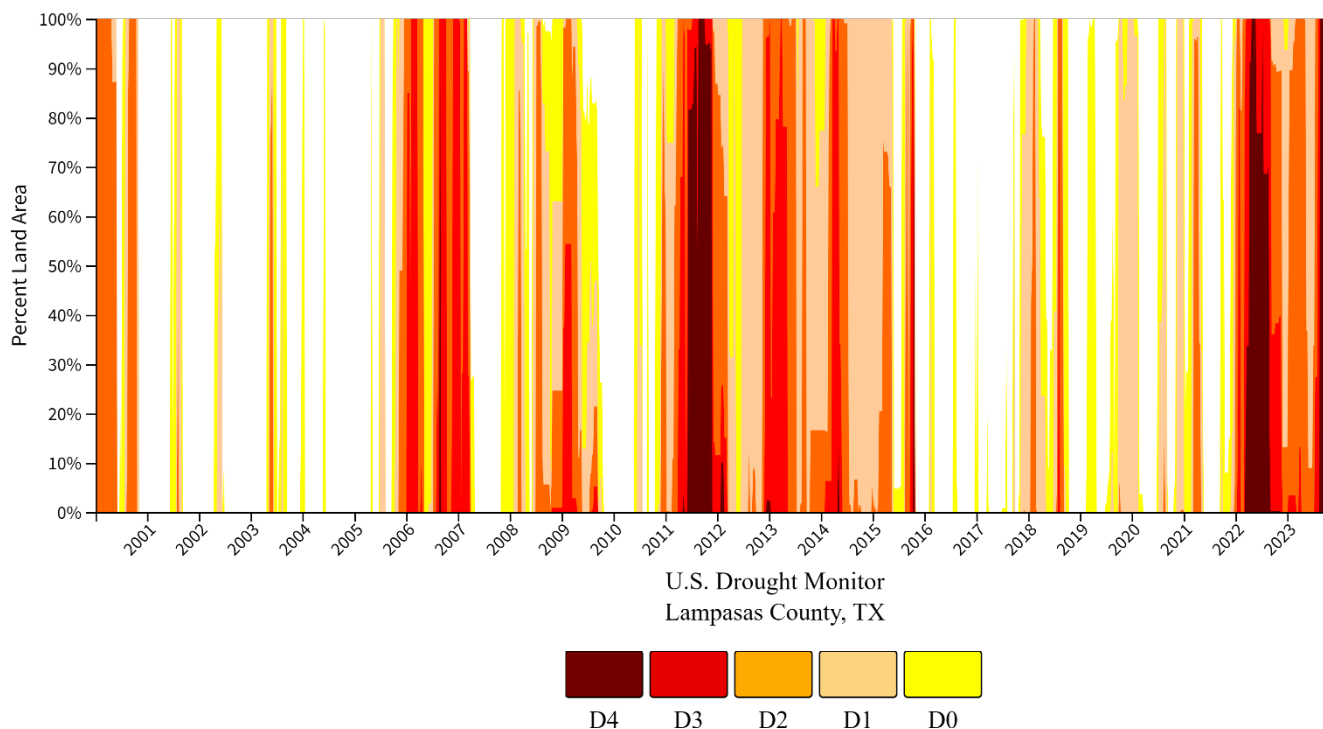


Table 6-5 lists historical events that have occurred in Bell County as reported in the National Centers for Environmental Information Storm Events Database (NCEI). A total of 102 drought

³ U.S. Drought Monitor

SECTION 6: DROUGHT

events were reported in the NCEI over 24 unique drought periods impacting Bell County from 2000 through 2023. Historical drought impacts reported in the NCEI database for the Bell County planning area, including all participating jurisdictions and the CTCOG, over the 24-year reporting period has resulted in more than \$3 million (2023 dollars) in property and crop damages.

Historical drought information shows drought activity across a multi-county forecast area for each event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event. Historical drought data is provided on a county-wide basis per the NCEI Storm Events database. Only those events with reported damages are provided in Table 6-5. Historical drought data for all participating jurisdictions, including the CTCOG, are provided on a county-wide basis per the NCEI database.

Table 6-5. Historical Drought Events, 2000-2023⁴

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Bell County	11/1/2006	0	0	\$0	\$1,175,900
Bell County	12/1/2006	0	0	\$36,700	\$36,700
Bell County	1/1/2007	0	0	\$0	\$43,900
Bell County	2/1/2007	0	0	\$0	\$43,700
Bell County	7/1/2008	0	0	\$0	\$33,700
Bell County	8/1/2008	0	0	\$0	\$33,800
Bell County	9/1/2008	0	0	\$0	\$20,300
Bell County	10/1/2008	0	0	\$0	\$20,500
Bell County	11/1/2008	0	0	\$0	\$48,800
Bell County	12/1/2008	0	0	\$0	\$352,200
Bell County	1/1/2009	0	0	\$0	\$350,700
Bell County	2/1/2009	0	0	\$0	\$418,700
Bell County	3/1/2009	0	0	\$0	\$34,800
Bell County	4/1/2009	0	0	\$0	\$34,700
Bell County	5/1/2009	0	0	\$0	\$20,800
Bell County	6/9/2009	0	0	\$0	\$8,200
Bell County	7/1/2009	0	0	\$0	\$13,800

⁴ Only those events with reported injuries, fatalities, or damages were included in the table.

SECTION 6: DROUGHT

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Bell County	8/1/2009	0	0	\$0	\$34,300
Bell County	9/1/2009	0	0	\$0	\$6,900
Bell County	3/21/2011	0	0	\$0	\$6,600
Bell County	4/1/2011	0	0	\$0	\$32,900
Bell County	5/1/2011	0	0	\$0	\$32,800
Bell County	6/1/2011	0	0	\$0	\$45,900
Bell County	7/1/2011	0	0	\$0	\$52,400
Bell County	8/1/2011	0	0	\$0	\$65,400
Bell County	9/1/2011	0	0	\$0	\$39,200
Bell County	10/1/2011	0	0	\$0	\$26,200
Bell County	11/1/2011	0	0	\$0	\$19,600
Bell County	12/1/2011	0	0	\$0	\$19,700
Bell County	1/1/2012	0	0	\$0	\$13,100
Bell County	2/1/2012	0	0	\$0	\$5,200
Bell County	6/19/2012	0	0	\$2,600	\$0
Bell County	7/1/2012	0	0	\$0	\$2,600
Bell County	9/11/2012	0	0	\$0	\$2,600
Bell County	11/20/2012	0	0	\$0	\$2,600
Bell County	12/1/2012	0	0	\$0	\$6,500
Bell County	1/1/2013	0	0	\$0	\$3,900
Bell County	2/1/2013	0	0	\$0	\$2,600
Bell County	3/1/2013	0	0	\$2,600	\$0
Bell County	4/1/2013	0	0	\$0	\$3,800
Bell County	5/1/2013	0	0	\$0	\$3,800
Bell County	6/1/2013	0	0	\$0	\$5,100
Bell County	7/1/2013	0	0	\$0	\$3,800

SECTION 6: DROUGHT

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Bell County	8/1/2013	0	0	\$0	\$3,800
Bell County	9/1/2013	0	0	\$0	\$3,800
Bell County	2/25/2014	0	0	\$0	\$1,300
Bell County	4/1/2014	0	0	\$0	\$1,200
Bell County	5/1/2014	0	0	\$0	\$1,200
Bell County	6/1/2014	0	0	\$0	\$1,200
Bell County	9/1/2015	0	0	\$0	\$600
Bell County	10/1/2015	0	0	\$2,500	\$0
Bell County	12/1/2017	0	0	\$0	\$1,200
Bell County	8/1/2018	0	0	\$0	\$2,300
Bell County	9/1/2018	0	0	\$0	\$11,700
Bell County	9/10/2019	0	0	\$0	\$5,800
TOTALS		0	0	\$44,400	\$3,162,800

Table 6-6. Historical Drought Events Summary, 2000-2023

JURISDICTION	DROUGHT EVENTS	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Bell County	102	0	0	\$44,400	\$3,162,800

Based on the historical drought events for the Bell County planning area 30 drought impacts were reported during 5 drought periods since the 2018 Plan.

SIGNIFICANT EVENTS

March 2011 to September 2013

One of the most severe droughts on record impacted the Bell County planning area. The dry, parched conditions caused over \$7 billion in crop and livestock losses, sparked wildfires, pushed power grids to the limit, and reduced reservoirs to dangerously low levels. The planning area was not spared from these drought conditions and remained at some level of drought for nearly three years.

Severe dry conditions (D2) started in the Bell County planning area in March of 2011 and further escalated to exceptional drought (D4) conditions just three months later (June 2011), despite beneficial rainfall in late May. Extreme heat during the summer months of 2011 only exacerbated the drought conditions. On June 24th, the USDA declared Bell County a primary natural disaster area. The planning area received some rainfall in December 2011 (3 inches), January 2012 (3 inches), February 2012 (4 inches), March 2012 (2 inches) though not enough to substantially

SECTION 6: DROUGHT

improve drought conditions. Over the course of the two years the planning area would move between drought categories D1 and D3.

January 1, 2022

Extreme (D3) to severe (D2) drought conditions affected the Bell County planning area from January to December of 2022. Despite a few instances of soaking rains, drought continued to plague much of the region as precipitation was low. According to reports in the NCEI database, the drought prompted a significant spike in cattle sales across North and Central Texas, as both hay and water were low in supply. There are no reported damages for this drought event. This is the second most severe drought to impact the planning area, following 2011 the drought.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been 102 reported drought events in the NCEI over 24 drought periods (ranging in length from approximately 1 month to over 1 year) within a 24-year reporting period, which provides a probability of approximately one event every year. This frequency supports a “Highly Likely” probability of future events for the Bell County planning area. The impact of climate change could produce longer, more severe droughts, exacerbating the current drought impacts. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Loss estimates were based on 24 years of statistical data from the NCEI and the U.S. Drought Monitor. A drought event frequency-impact was then developed to determine an impact profile on agriculture products and estimate potential losses due to drought in the area. All existing and future buildings, facilities, and populations are exposed to this hazard and could potentially be impacted. However, drought impacts are mostly experienced in water shortages, breaks in water lines, or crop and livestock losses on agricultural lands and typically have minimal impact on buildings.

The Bell County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by drought events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 6-8. Critical Facilities Vulnerable to Drought Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS, Hospitals)	<ul style="list-style-type: none">Increased law enforcement activities may be required to enforce water restrictions.Firefighters may have limited water resources to aid in firefighting and suppression activities, increasing risk to lives and property.Potential for increased number of emergency calls as drought events can lead to cascading hazard events such as wildfires and flash flooding.

SECTION 6: DROUGHT

CRITICAL FACILITIES	POTENTIAL IMPACTS
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities	<ul style="list-style-type: none"> • Strain on staff as drought may cause health problems related to low water flows and poor water quality. • Water main breaks due to soil shrinking and swelling cycles could lead to facility closures. • Building foundations may crack due to soil shrinking and swelling cycles. • Operations dependent on water supply may be adversely impacted. • Economic disruptions due to cracked foundations and infrastructure damages as a result of soil shrinking and swelling cycles.
Commercial Suppliers (food, gas, etc.)	<ul style="list-style-type: none"> • Operations dependent on water supply may be adversely impacted. • Economic disruptions due to cracked foundations and infrastructure damages as a result of soil shrinking and swelling cycles.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> • Potential for increased number of emergency calls as drought events can lead to cascading hazard events such as wildfires and flash flooding. • Water main breaks due to soil shrinking and swelling cycles could lead to facility closures. • Operations dependent on water supply may be adversely impacted.

Even with the planning area relying on multiple water utility providers as well as local and private service, high demand can still deplete these resources during extreme drought conditions. As resources are depleted, potable water is in short supply and overall water quality can suffer, elevating health concerns for all residents but especially vulnerable populations – typically children, the elderly, and the ill. In addition, potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities. The Bell County planning area has several watershed protection plans, for Lampasas River⁵ and Nolan Creek⁶, to guide community decisions to protect water resources and water quality.

The average person will survive only a few days without potable water, and this timeframe can be drastically shortened for those people with more fragile health – typically children, the elderly, and people with disabilities. During summer drought, or hot and dry conditions, elderly persons, small children, infants, those with disabilities, or who do not have adequate cooling units in their homes may become more vulnerable to injury and/or death. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. The population over 65 in the Bell County planning area is estimated at 11 percent of the total population and children under the age of 5 are estimated at 8 percent. The population

⁵ Lampasas River Watershed Protection Plan. <https://lampasasriver.org/overview/>

⁶ Watershed Protection Plan for Nolan Creek/South Nolan Creek.
<https://www.nolanvilletx.gov/upload/page/0079/Nolan%20Creek%20Watershed%20Protection%20Plan.pdf>

SECTION 6: DROUGHT

with a disability is estimated at 14 percent of the total population. An estimated 15 percent of the planning area population live below the poverty level and 18 percent of the populations speaks a language other than English (Table 6-9).

Table 6-9. Populations at Greater Risk by Participating Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375
City of Harker Heights	3,280	1,906	4,632	3,931	5,934
City of Holland	210	111	178	179	60
City of Killeen	11,467	14,603	20,953	24,593	33,510
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

The planning area is also vulnerable to food shortages when drought conditions exist, and potable water is in short supply. Potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities. All residents in the Bell County planning area could be adversely affected by drought conditions, which could limit water supplies and present health threats.

The economic impact of droughts can be significant as they produce a complex web of impacts that spans many sectors of the economy and reach well beyond the area experiencing physical drought. This complexity exists because water is integral to our ability to produce goods and provide services. If droughts extend over several years, the direct and indirect economic impact can be significant.

SECTION 6: DROUGHT

Crop production can also suffer greatly during extreme drought conditions, limiting fresh local food supplies, driving up costs, and negatively impacting the local economy. Drought conditions could adversely affect the agricultural industry throughout the Bell County planning area.

Impacts of past droughts experienced in the Bell County planning area, including participating jurisdictions and the CTCOG, have not resulted in injuries or fatalities supporting a “Minor” severity of impact meaning injuries and/or illnesses do not result in permanent disability, shutdown of facilities and services for possibly more than one week, and more than 10 percent of property is impacted. The annualized estimated losses due to drought over the 24-year reporting period in the Bell County planning area are significant with an annual loss estimate of \$133,600. Table 6-10 shows annualized exposure.

Table 6-10. Estimated Annualized Losses for Bell County

JURISDICTION	TOTAL PROPERTY & CROP LOSS (2023 dollars)	ANNUAL LOSS ESTIMATES (2023 dollars)
Bell County	\$3,207,200	\$133,600

ASSESSMENT OF IMPACTS

The Drought Impact Reporter was developed in 2005 by the University of Nebraska-Lincoln to provide a national database of drought impacts. Droughts can have an impact on agriculture, business and industry; energy; fire; plants and wildlife; relief, response, and restrictions; society and public health; tourism and recreation; and water supply and quality. The reports are submitted from individuals to Federal, State, and local agencies, as well as the general public. Table 6-11 lists the drought impacts to Bell County from 2005 to 2023 based on reports received by the Drought Impact Reporter.

Table 6-11. Drought Impacts, 2005-2023

DROUGHT IMPACTS 2005-2023	
Agriculture	97
Business & Industry	2
Energy	0
Fire	23
Plants & Wildlife	70
Relief, Response & Restrictions	33
Society & Public Health	7
Tourism & Recreation	3
Water Supply & Quality	47

SECTION 6: DROUGHT

Drought has the potential to impact people in the Bell County planning area. While it is rare that drought, in and of itself, leads to a direct risk to the health and safety of people in the U.S., severe water shortages could result in inadequate supply for human needs. The Texas Demographic Center projects continued growth for Central Texas. The region has experienced significant population growth in Bell, Coryell, and Lampasas Counties, adding approximately 26,719 people between 2010 and 2016. Population projections for 2045 show that the region is likely to continue growing over the next twenty to thirty years and could reach over 700,000 people.⁷ This level of future growth can cause concern for the current water infrastructure and demand for the planning area. Severe drought conditions can be frequently associated with a variety of impacts, including:

- Dry clay soil can lead to water main lines shifting and breaking. Often repair to water lines includes shutting off water to multiple homes at one time.
- The number of health-related low-flow issues (e.g., diminished sewage flows, increased pollution concentrations, reduced firefighting capacity, and cross-connection contamination) will increase as the drought intensifies.
- Public safety from forest/range/wildfires will increase as water availability and/or pressure decreases.
- Respiratory ailments may increase as the air quality decreases.
- There may be an increase in disease due to wildlife concentrations (e.g., rabies, Rocky Mountain spotted fever, Lyme disease).
- Residents may disagree with the County and participating Cities over water use/water rights, creating conflict.
- Political conflicts may increase between municipalities, counties, states, and regions.
- Water management conflicts may arise between competing interests.
- Increased law enforcement activities may be required to enforce water restrictions.
- Severe water shortages could result in inadequate supply for human needs as well as lower quality of water for consumption.
- Firefighters may have limited water resources to aid in firefighting and suppression activities, increasing risk to lives and property.
- During drought there is an increased risk for wildfires and dust storms.
- The community may need increased operational costs to enforce water restriction or rationing.
- Prolonged drought can lead to increases in illness and disease related to drought.
- Utility providers can see decreases in revenue as water supplies diminish.
- Utilities providers may cut back energy generation and service to their customers to prioritize critical service needs.
- Hydroelectric power generation facilities and infrastructure would have significantly diminished generation capability. Dams simply cannot produce as much electricity from low water levels as they can from high water levels.
- Fish and wildlife food and habitat will be reduced or degraded over time during a drought and disease will increase, especially for aquatic life.
- Wildlife will move to more sustainable locations creating higher concentrations of wildlife in smaller areas, increasing vulnerability, and further depleting limited natural resources.

⁷ Central Texas Council of Governments, Regional Demographics

SECTION 6: DROUGHT

- There are 10 federally endangered, threatened or candidate species in Bell County. Severe and prolonged drought can result in the reduction of a species or cause the extinction of a species altogether.
- Plant life will suffer from long-term drought. Wind and erosion will also pose a threat to plant life as soil quality will decline. The urban tree canopy, including county and city parks, are vulnerable to the impacts of prolonged drought.
- Dry and dead vegetation will increase the risk of wildfire.
- Drought poses a significant risk to annual and perennial crop production and overall crop quality leading to higher food costs.
- Drought-related declines in production may lead to an increase in unemployment.
- Drought may limit livestock grazing resulting in decreased livestock weight, potential increased livestock mortality, and increased cost for feed.
- Negatively impacted water suppliers may face increased costs resulting from the transport water or develop supplemental water resources.
- Long term drought may negatively impact future economic development.

The overall extent of damage caused by periods of drought is dependent on its extent and duration. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a drought event.

CLIMATE CHANGE CONSIDERATIONS

With the range of factors influencing drought conditions, it is impossible to make quantitative statewide projections of drought trends; however, many factors point toward increased drought severity. Drought will continue to be driven largely by precipitation variability over multiple decades, with long-term precipitation trends expected to be relatively small. Other factors affecting drought impacts, such as increased temperatures and improved plant water use efficiency, decrease water availability but will cause drought impact trends to be highly sector-specific, with the impacts possibly smaller for agriculture than for surface water supply.⁸

The Bell County planning area can anticipate an increased likelihood of droughts in the future due to an estimated increase in the number of dry days in the Bell County area. In addition, it is projected that future changes to Bell County will include increased temperatures, which according to the U.S. Climate Explorer, the planning area may experience a 6°F increase in the average extreme heat temperatures. Historically, extreme temperatures averaged 100°F in Bell County, but between 2035 and 2064 the average will be 106°F, increasing the severity and frequency of drought events. Changes in precipitation will also impact drought occurrences. The U.S. Climate Explorer also shows that a decrease in overall precipitation is likely overtime, leading to more dry periods, but the severity is dependent on overall future emissions.

⁸ Cleaveland, M. K., T. H. Votteler, D. K. Stahle, R. C. Casteel, and J. L. Banner, 2011: Extended Chronology of Drought in South Central, Southeastern and West Texas. Texas Water Journal, 2, 54-96, as cited in Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.



SECTION 7 **EARTHQUAKE**

SECTION 7: EARTHQUAKE

Hazard Description	1
Location	2
Extent.....	4
Historical Occurrences.....	7
Probability of Future Events.....	7
Vulnerability and Impact.....	7
Climate Change Considerations	8

HAZARD DESCRIPTION

An earthquake is the sudden movement of the Earth's surface caused by the release of stress accumulated within or along the edge of the Earth's tectonic plates, volcanic eruption, or by a manmade explosion. The majority of earthquakes occur along faults; however, earthquakes can occur within plate interiors. Over geologic time, plates move and plate boundaries change, pushing weakened boundary regions to the interior part of the plates. These areas of weakness within the continents can cause earthquakes in response to stresses that originate at the edges of the plate or in the deeper crust.

Earthquake locations are described by the focal depth and geographic position of the epicenter. The focal depth of an earthquake is the depth from the Earth's surface to the region where an earthquake's energy originates (the focus or hypocenter). The epicenter is the point on the Earth's surface directly above the hypocenter. Earthquakes usually occur without warning, with their effects impacting great distances away from the epicenter.

According to the U.S. Geological Society (USGS) Earthquake Hazards Program, an earthquake hazard is anything associated with an earthquake that may influence an individual's normal activities. Table 7-1 describes definition of examples.

Table 7-1. Definitions of Earthquake Hazards¹

HAZARD	DESCRIPTION
Surface Faulting	Displacement that reaches the earth's surface during slip along a fault. Commonly occurs with shallow earthquakes, those with an epicenter less than 20 kilometers.
Ground Motion (shaking)	The movement of the earth's surface from earthquakes or explosions. Ground motion or shaking is produced by waves that are generated by sudden slip on a fault or sudden pressure at the explosive source and travel through the earth and along its surface.
Landslide	A movement of surface material down a slope.
Liquefaction	A process by which water-saturated sediment temporarily loses strength and acts as a fluid, like when you wiggle your toes in the wet sand near the water at the beach. This effect can be caused by earthquake shaking.

¹ Source: USGS, 2012

SECTION 7: EARTHQUAKE

HAZARD	DESCRIPTION
Tectonic Deformation	A change in the original shape of a material due to stress and strain.
Tsunami	A sea wave of local or distant origin that results from large-scale seafloor displacements associated with large earthquakes, major submarine slides, or exploding volcanic islands.
Seiche	The sloshing of a closed body of water from earthquake shaking.

LOCATION

Earthquake hazard areas are mapped by the USGS's National Seismic Hazard Model (NSHM). Figure 7-1 shows the most recent 2023 iteration of this USGS model. The NSHM defines the potential for earthquake ground shaking for various probability levels across the United States. The 2023 NSHM is an update to the previous 2018 version, and compiles data and findings from a number of sources including earthquake catalogs, geodetic- and geologic-based fault and deformation models, and ground motion models (GMMs), among others.² The map shows the percent chance that a given area will experience a category VI (or stronger) earthquake in 100 years, as defined by the Modified Mercalli Intensity (MMI) Scale (Table 7-3). The likelihood of a significant earthquake event is signified by the color-coding on the map. Densely populated areas are also highlighted on the map (purple and black dotting) to indicate areas of elevated vulnerability in relation to higher seismic risk. The Bell County planning area, including all participating jurisdictions and CTCOG, as identified in Figure 7-1, is located in a low hazard area, with less than five percent chance of experiencing a strong earthquake every 100 years.

² A comprehensive overview of the modelling process can be found at the USGS website, <https://www.usgs.gov/programs/earthquake-hazards/science/2023-50-state-long-term-national-seismic-hazard-model-0#overview>

SECTION 7: EARTHQUAKE

Figure 7-1. U.S. Map of Peak Ground Acceleration³

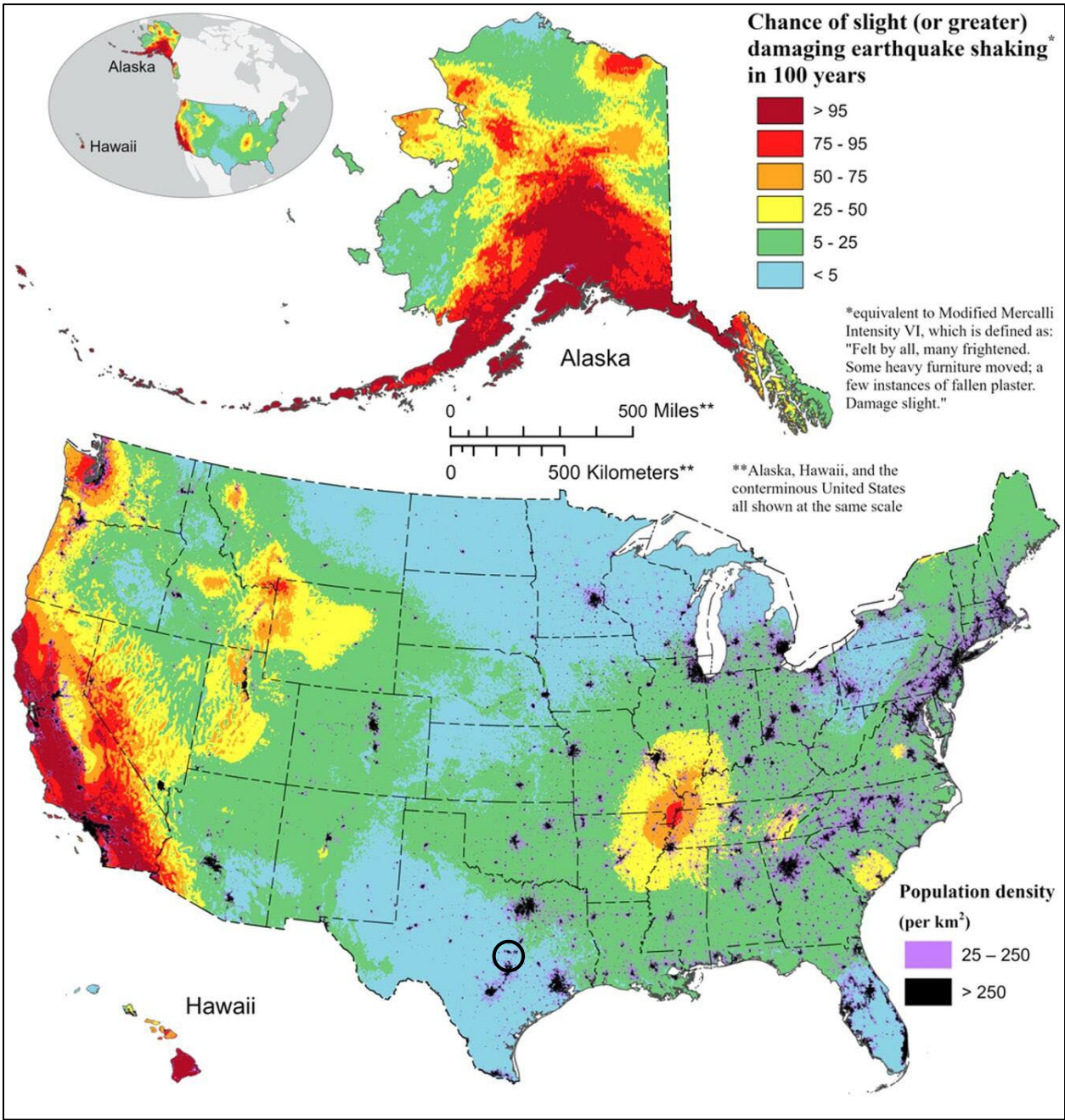
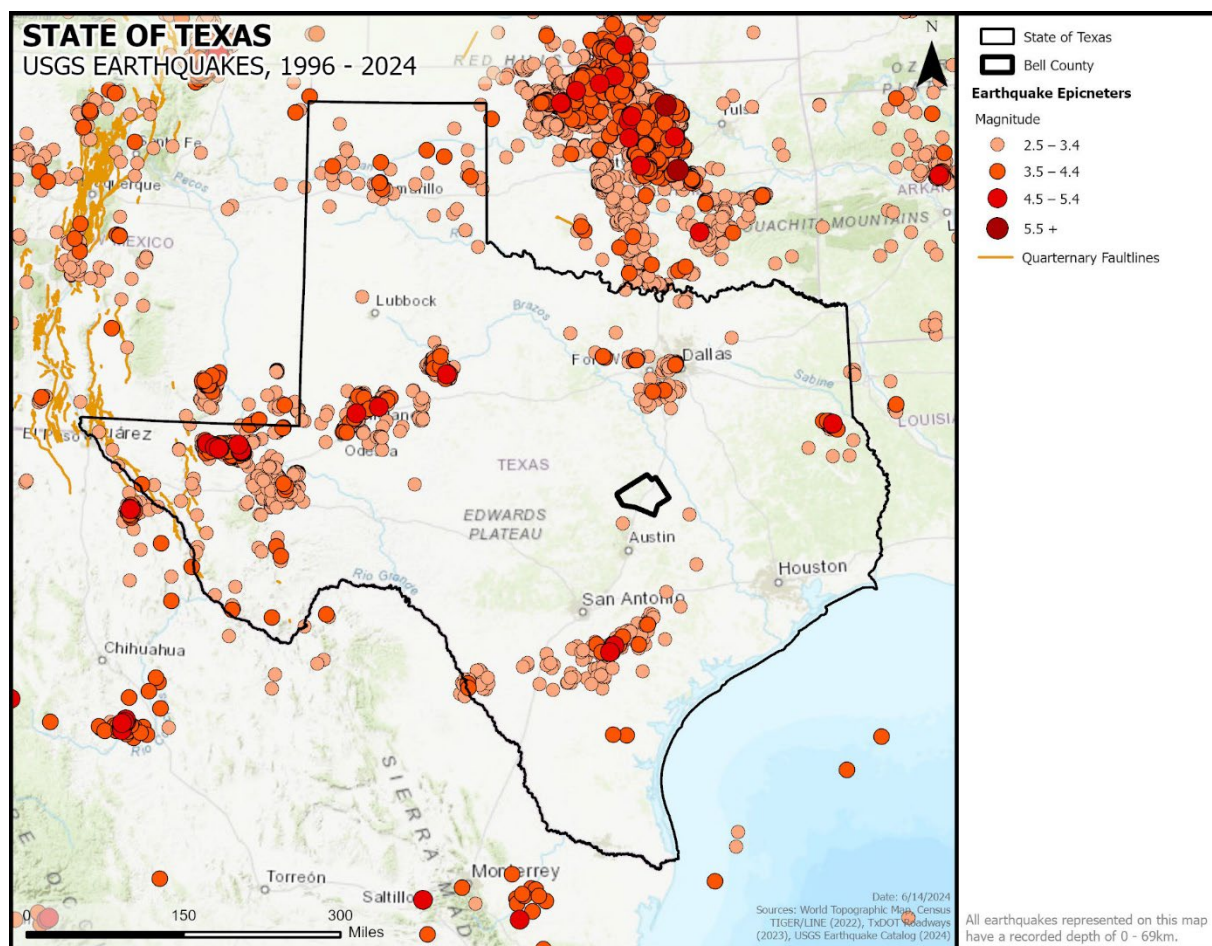


Figure 7-2 maps historic earthquake epicenters across Texas between 1996 and 2024.

³ Bell County is indicated by the black circle.

SECTION 7: EARTHQUAKE

Figure 7-2. Historic Earthquake Epicenters in Texas, 1996-2024⁴



EXTENT

Earthquakes are measured in terms of magnitude and intensity. The prevalent magnitude measurement in use today is based on the Moment Magnitude Scale (MMS). MMS measures the movement of rock along the fault. It accurately measures larger earthquakes, which can last for minutes, affect a much larger area, and cause more damage. Magnitudes are based on a logarithmic scale (base 10), meaning that for each whole number you go up on the magnitude scale, the amplitude of the ground motion recorded by a seismograph goes up ten times. Using this scale, a magnitude 5 earthquake would result in ten times the level of ground shaking as a magnitude 4 earthquake (and about 32 times as much energy would be released).⁵ The USGS reports earthquake magnitudes above 4.0 as “moment magnitude,” often described in the press as “Richter” magnitude. Table 4-17 shows the magnitude levels for the current Richter/Moment Magnitude scale.

⁴ Bell County is indicated by the black circle.

⁵ (n.d.). How Do We Measure Earthquake Magnitude? Michigan Tech.

<https://www.mtu.edu/geo/community/seismology/learn/earthquake-measure/#:~:text=The%20moment%20magnitude%20scale%20is,the%20earthquake%20at%20multiple%20stations.>

SECTION 7: EARTHQUAKE

Table 7-2. Richter / Moment Magnitude Scale⁶

MAGNITUDE	CATEGORY	DESCRIPTION OF EFFECTS	EVENTS PER YEAR
< 3.0	Micro	Usually not felt, but can be recorded by seismograph	+100,000
3.0 – 3.9	Minor	Often felt, but causes no damage	12,000 - 100,000
4.0 – 4.9	Light	Felt by all, minor breakage of objects	2,000 - 12,000
5.0 – 5.9	Moderate	Some damage to weak structures	200 – 2,000
6.0 – 6.9	Strong	Moderate damage in populated areas	20 – 200
7.0 – 7.9	Major	Serious damage over large areas with loss of life expected	3 – 20
> 7.9	Great	Severe destruction and loss of life over large areas	Less than 3

Earthquake Intensity measurement is an on-the-ground description. The measurement qualitatively explains the severity of earthquake shaking and its effects on people and their environment. Intensity measurements will differ depending on each location's proximity to the epicenter or point on the surface of the earth directly above the focus where the earthquake started. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and total destruction. There can be multiple intensity measurements associated with an earthquake as opposed to one magnitude measurement.⁷ The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced at a specific location. The scale provides the intensity of the earthquake in values ranging from I to X. Table 7-3 describes the typical effects and Intensities associated with earthquakes of various magnitudes. The intensity and effects depend on multiple factors (earthquake depth, epicenter location, site geology, population density, to name a few) and can vary widely.

⁶ (n.d.). Earthquakes. Britannica. <https://www.britannica.com/science/earthquake-geology>

⁷ Wood, H. O., and Neumann, Frank (1931). Modified Mercalli Intensity Scale of 1931: Seismological Society of America Bulletin, v. 21, no. 4, p. 277-283.

SECTION 7: EARTHQUAKE

Table 7-3. Magnitude and Modified Mercalli Intensity (MMI) Scale⁸

INTENSITY	CATEGORY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER MAGNITUDE
I	Not Felt	Not felt except by a very few under especially favorable conditions	< 2.0
I	Not Felt	Felt only by a few persons at rest, especially on upper floors of buildings.	2.0 – 2.9
II – III	Weak	Felt quite noticeably by persons indoors, with shaking of indoor objects. Rarely causes damages.	3.0 – 3.9
IV – V	Light to Moderate	Noticeable shaking of indoor objects and rattling noises. Felt by most people in the affected area. Generally, no to minimal damage	4.0 – 4.9
VI – VII	Strong to Very Strong	Significant damages to poorly constructed buildings. Limited to moderate damages to well-built structures.	5.0 – 5.9
VIII – IX	Severe to Violent	Damage slight in specially designed structures; considerable damage in ordinary buildings with partial collapse. Damage great in poorly built structures.	6.0 – 6.9
VIII +	Severe to Extreme	Damage considerable in specially designed structures. Damage substantial to most buildings, with partial or complete collapse. Felt across great distances with major damage mostly limited to 250 km from Epicenter.	7.0 – 7.9
VIII – IX	Severe to Violent	Major damage to buildings, structures likely to be destroyed; will cause moderate to heavy damage to sturdy or earthquake-resistant buildings; damaging in large areas; felt in extremely large regions.	8.0 – 8.9
VIII +	Severe to Extreme	At or near total destruction. Severe damage or collapse to all buildings; heavy damage and shaking extends to distant locations and permanent changes in ground topography.	9.0+

⁸ Source: USGS

SECTION 7: EARTHQUAKE

Taking into consideration the possible extent of an earthquake for the area, by reviewing Tables 7-2 and 7-3 in conjunction with no significant previous occurrences, as depicted in Figure 7-2, the Bell County planning area experiences on average less than 3.0 magnitude or Levels II-III (weak impact) on the Modified Mercalli intensity scale. This is the greatest extent the entire planning area, including all participating jurisdictions and the CTCOG, can anticipate in the future, based on historic records.

HISTORICAL OCCURRENCES

According to USGS, and the National Geophysical Data Center (NGDC), there are no “significant” earthquakes on record for the State of Texas and the entire Bell County planning area from 2150 B.C. to present. A significant earthquake, as defined by NGDC, is one that has caused at least moderate damage (approximately \$1 million or more), has resulted in 10 or more deaths, has registered as a magnitude 7.5 or greater, has registered as Modified Mercalli Intensity (MMI) Scale X or greater, or generated a tsunami. None of these criteria have been met by any seismic activity known to have impacted the planning area.

PROBABILITY OF FUTURE EVENTS

Earthquake Hazard Maps show the distribution of earthquake shaking levels that have a certain probability of occurring over a given period. According to the USGS, the entire Bell County planning area has a less than five percent chance of a slightly damaging (or greater) earthquake within 100 years. Based on historical records, the probability of an earthquake affecting the planning area, including all participating jurisdictions and the CTCOG, is “Unlikely”, meaning that an event is probable in the next 10 years.

VULNERABILITY AND IMPACT

Little warning is usually associated with earthquakes and can impact areas a great distance away from the epicenter. The amount of damage depends on the density of population and buildings, and infrastructure construction in the affected area. Some places may be more vulnerable than others based on soil type, building age, and building codes in the Bell County planning area.

The Bell County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by earthquake events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 7-5. Critical Facilities Vulnerable to an Earthquake

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none">• Emergency operations and services may be significantly impacted due to power outages, damaged facilities, fires and/or loss of communications. Impact can impede emergency response vehicle access to areas.• Power outages could disrupt communications, delaying emergency response times.• Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

SECTION 7: EARTHQUAKE

CRITICAL FACILITIES	POTENTIAL IMPACTS
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none">• Power outages could disrupt critical care.• Backup power sources could be damaged.• Evacuations may be necessary due to extended power outages or other associated damages to facilities.• Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations.
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none">• Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.• Essential supplies like medicines, water, food, and equipment deliveries may be delayed.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none">• Emergency operations and critical services may be significantly impacted due to power outages, damaged facilities, and/or loss of communications. Impact can impede emergency service vehicle access to areas.• Power outages could disrupt communications, delaying emergency response times further straining the capacity and resources of emergency service personnel.

With no historical events recorded, neither annualized loss-estimates nor a breakdown of potential dollar losses of critical facilities and infrastructure from earthquakes are available. The potential severity of impact from an earthquake for the entire Bell County planning area, including all participating jurisdictions and the CTCOG, is classified as “Limited”, meaning that injuries and illnesses are treatable with first aid, less than 10 percent of infrastructure would be damaged, and critical facilities being shut down for less than 24 hours.

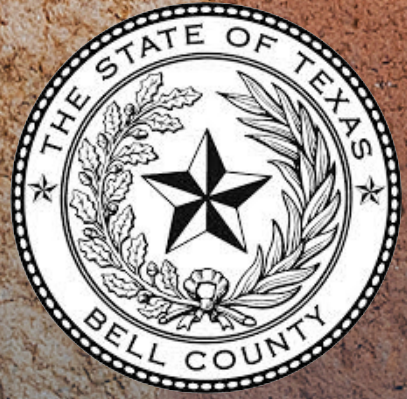
CLIMATE CHANGE CONSIDERATIONS

Damaging earthquakes are rare within the State of Texas, including the Bell County planning area. Changing conditions of weather patterns and climate change has not been established as having a direct impact on earthquake intensity or frequency.

According to the USGS, statistically there is an approximately equal distribution of earthquakes in all cold weather, hot weather, rainy weather, etc. Very large low-pressure changes associated with major storm systems, like typhoons and hurricanes, are known to trigger episodes of fault slip or slow earthquakes in the Earth’s crust and may also play a role in triggering some damaging earthquakes. However, the numbers are small and are not statistically significant.⁹

The Bell County planning area is located outside of any known earthquake hazard areas and is not located on or near any fault lines. Climate change is assumed to have no impact on the probability or intensity of potential earthquakes in the planning area.

⁹ (n.d.). *Natural Hazards*. United States Geological Survey. <https://www.usgs.gov/faqs/there-earthquake-weather>



SECTION 8

EXPANSIVE SOILS

SECTION 8: EXPANSIVE SOILS

Hazard Description	1
Location	1
Extent.....	4
Historical Occurrences.....	5
Probability of Future Events.....	5
Vulnerability and Impact.....	6
Assessment of Impacts	8
Climate Change Considerations	9

HAZARD DESCRIPTION

Expansive soils are soils and soft rocks with a relatively high percentage of clay minerals that are subject to changes in volume as they swell and shrink with changing moisture conditions. Expansive soils contain minerals such as smectite clays that are capable of absorbing water. When these clays absorb water, they increase in volume and expand. The change in soil volume and resulting expansion can exert enough force on a building or other structure to cause damage.



Expansive soils will also lose volume and shrink when they dry. Drought conditions can cause soils to contract in response to a loss of soil moisture. A reduction in soil volume can affect the support to buildings or other structures and result in damage. Fissures in the soil can also develop and facilitate the deep penetration of water when moist conditions or runoff occurs. This produces a cycle of shrinkage and swelling that place repetitive stress on structures. The effect of expansive soil is most prevalent in regions prone to prolonged periods of drought followed by periods of moderate to high precipitation.

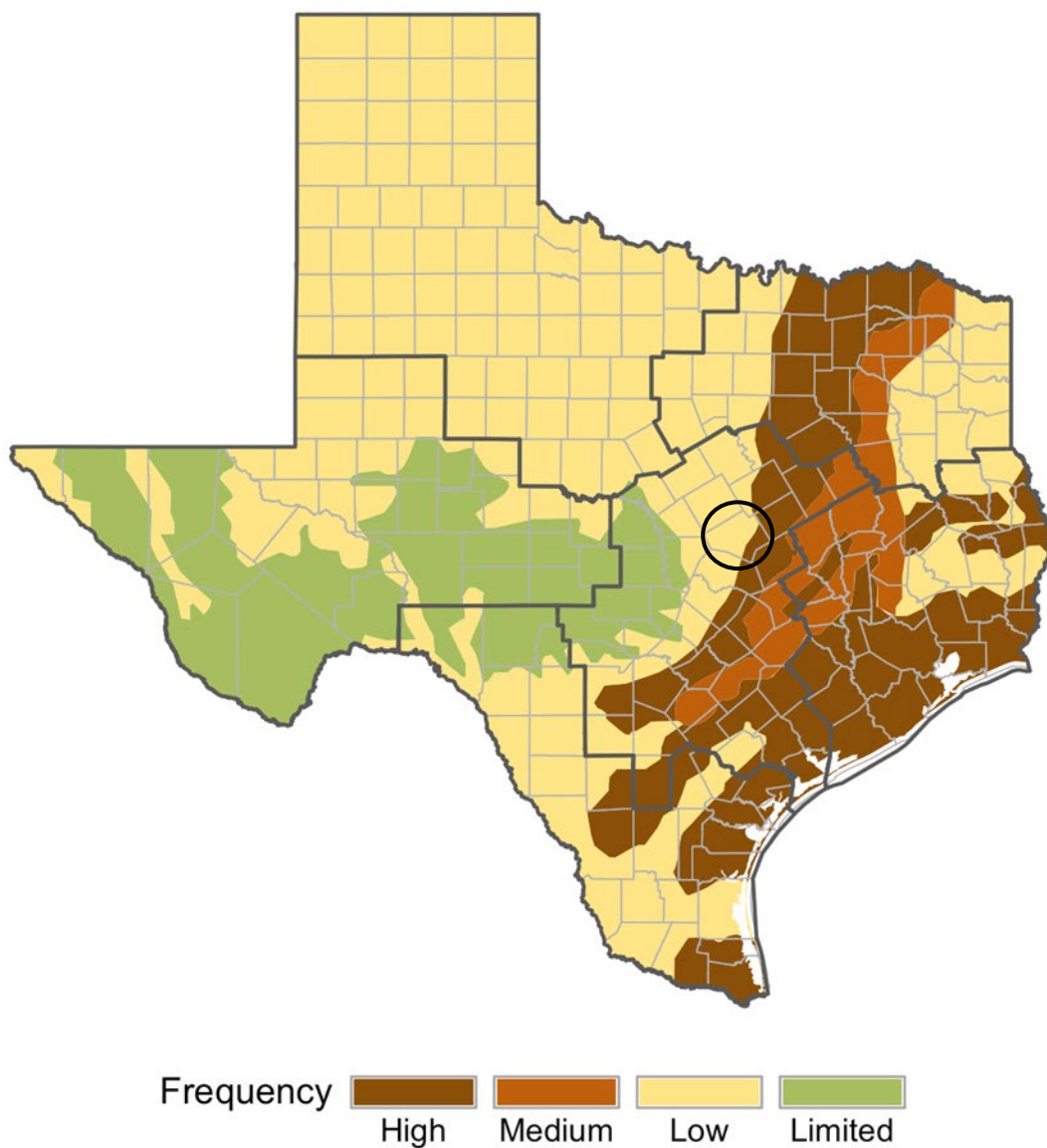
LOCATION

In Texas, the most expansive soils are in a band 200 miles west from the coastline, stretching approximately from Beaumont down to Brownsville. These areas receive the most moisture and are also vulnerable to droughts, which can cause the soil to contract. In the Bell County planning area, the problems associated with expansive soil typically occur during drought periods. Expansive soils (bentonite, smectite, or other reactive clays) expand when the soil particles attract water and can shrink when the clay dries.

Figure 8-1 shows areas of expansive soil in Texas. Most of Bell County falls within the low-risk area, indicated in yellow, while the eastern edge falls within the high-risk area, indicated in brown. Figure 8-2 depicts the types of land resources in the State of Texas due to their soil types.

SECTION 8: EXPANSIVE SOILS

Figure 8-1. Location of Expansive Soils in Texas¹

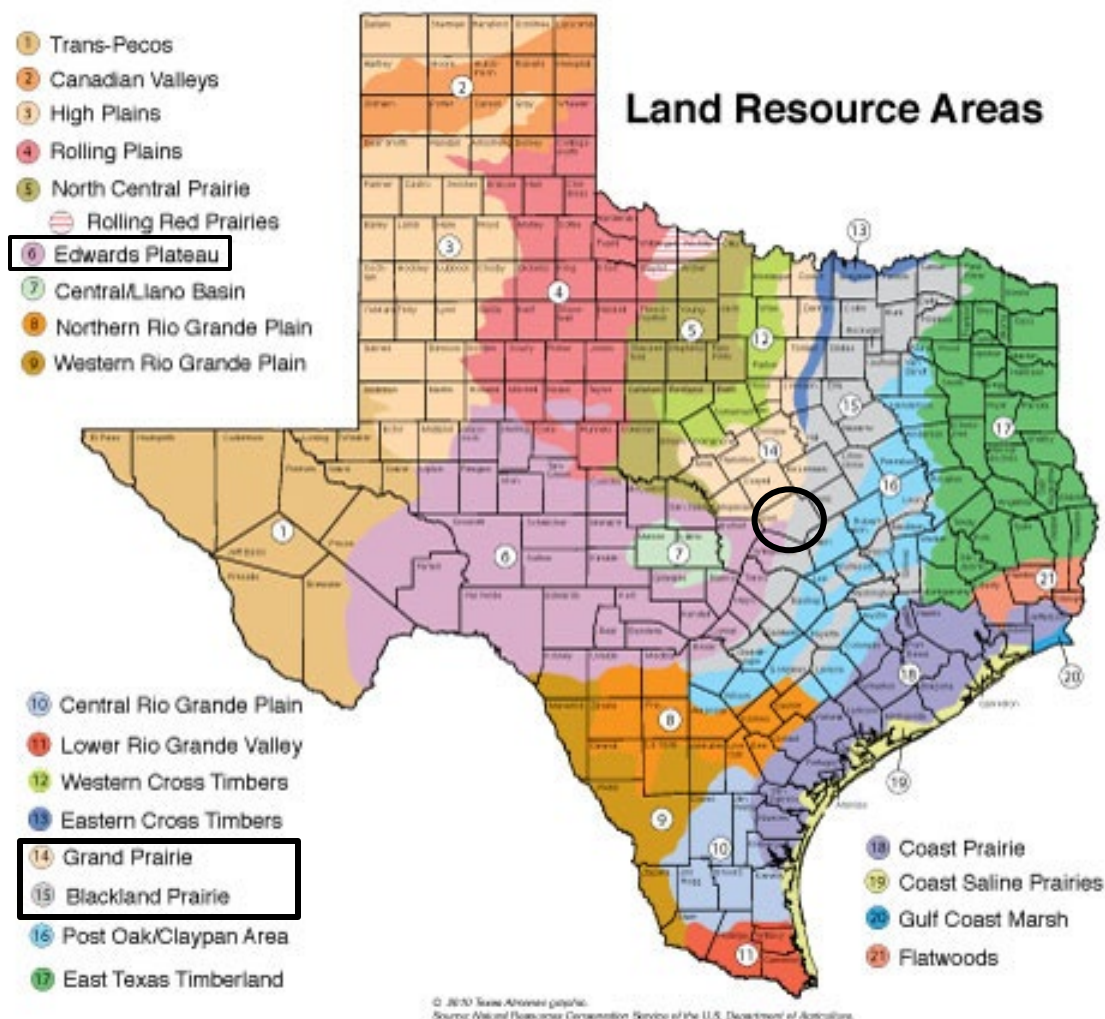


Source: Tavakoli, E. (2016). *Laboratory Evaluation of TX-PROCHEM as an Ionic Liquid Soil Stabilizer*. [Master's Thesis].

¹ Tavakoli, E. (2016). *Laboratory Evaluation of TX-PROCHEM as an Ionic Liquid Soil Stabilizer*. [Master's Thesis].

SECTION 8: EXPANSIVE SOILS

Figure 8-2. Texas Geological Survey²



The Bell County planning area, including all participating jurisdictions and the CTCOG, is located primarily within three land resource areas as indicated by the black circle in Figure 8-2: Blackland Prairie, Grand Prairie, and the Edwards Plateau. The entire planning area, including all participating jurisdictions and the CTCOG, is located in an area affected by expansive soils.

Blackland Prairie: The Blackland Prairie region is named for the deep, fertile black soils that characterize the area. Blackland Prairie soils once supported a tallgrass prairie dominated by tall-growing grasses such as big bluestem, little bluestem, Indiangrass, and switchgrass. Because of the fertile soils, much of the original prairie has been plowed to produce food and forage crops. The south-central part of the Blackland Prairie region receives fairly uniform rainfall distribution throughout the year.

² Source: USDA, <http://www.nrcs.usda.gov>

SECTION 8: EXPANSIVE SOILS

Typically, soils are uniformly dark-colored alkaline clays, often referred to as "black gumbo," interspersed with some gray acidic sandy loams. The landscape is gently rolling to nearly level, and elevations range from 300 to 800 feet above sea level. Crop production and cattle ranching are the primary agricultural industries.

Grand Prairie: The Grand Prairie comprises about 6.3 million acres in North Central Texas. It extends from the Red River to about the Colorado River. It lies between the Eastern and Western Cross Timbers in the northern part and just west of the Blackland Prairie in the southern part. The landscape is undulating to hilly and is dissected by many streams including the Red, Trinity, and Brazos rivers. Surface drainage is rapid.

Upland soils are mostly dark-gray, alkaline clays; some are shallow over limestone and some are stony. Some areas have light-colored loamy soils over chalky limestone. Bottomland soils along the Red and Brazos rivers are reddish silt loams and clays. Other bottomlands have dark-gray loams and clays.

Land use is a mixture of rangeland, pastureland, and cropland. The area is mainly used for growing beef cattle. Some small grain, grain sorghums, corn, and hay are grown. Brush control and water erosion are the major management concerns.

Edwards Plateau: The 22.7 million acres of the Edwards Plateau are in South Central Texas, east of the Trans-Pecos and west of the Blackland Prairie. Uplands are nearly level to undulating, except near large stream valleys, where the landscape is hilly with deep canyons and steep slopes. There are many cedar brakes in this area and surface drainage is rapid.

Upland soils are mostly shallow, stony, or gravelly, and consisting of dark alkaline clays and clay loams underlain by limestone. Lighter-colored soils are on steep side slopes and deep, less-stony soils are in the valleys. Bottomland soils are mostly deep, dark-gray or brown, with alkaline loams and clays.

Raising beef cattle is the main enterprise in this region, but it is also the center of Texas' and the nation's mohair and wool production. The area provides a major deer habitat and hunting leases produce income. Cropland is mostly in the valleys on the deeper soils and is used mainly for growing forage crops and hay. The major soil-management concerns are brush control, large stones, low fertility, excess lime, and limited soil moisture.

EXTENT

Expansive soils risk is measured by the degree to which soils may shrink or swell. Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent, moderate if 3 to 6 percent, high if 6 to 9 percent, and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures.³

³ (2009). *Soil Reports*. Natural Resources Conservation Service.
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_016186.pdf

SECTION 8: EXPANSIVE SOILS

Figure 8-3. NRCS Soil Linear Extensibility Risk Categories

Potential Category	Linear Extensibility %	Clay %
Low	< 3%	< 25%
Moderate	3% - 6%	25% - 35%
High	6% - 9%	35% - 45%
Very High	> 9%	> 45%

The Soil Survey was developed by the USDA Soils Conservation Service and contains information that can be applied in determining the suitability of soils in the planning area when selecting sites for roads, structures, and infrastructure. Based on Soil Survey data, roughly 33.9 percent of the Bell County planning area is subject to very high (>9%) linear extensibility and high frequency of expansive soils (Figure 8-1). The majority of these soils with very high linear extensibility are found in the eastern portion of the planning area. The next most common linear extensibility category is moderate (3-6%) found in 24.7 percent of the planning area, followed by roughly 22.0 percent subject to high (6-9%) linear extensibility. Approximately 16.0 percent of the planning area falls within the low (<3%) linear extensibility category. The remaining 3.4 percent of the planning area consists of water, quarries, or sand and gravel pits which do not receive a linear extensibility rating.⁴

HISTORICAL OCCURRENCES

Expansive soil is a condition that is native to Texas soil characteristics and cannot be documented as a time-specific event, except when it leads to structural and infrastructure damage. Extreme conditions can damage roads, structures, and infrastructure, including projects still under construction. Damages from expansive soils are typically associated with droughts, previous occurrences for expansive soils can be correlated with previous occurrences of drought, which are typically negligible. Bell County has no known recorded events of damaging expansive soils. Refer to the Drought profile (Section 6) of this plan for more information on the impacts of past drought events.

PROBABILITY OF FUTURE EVENTS

The Texas Department of Licensing and Regulation requires structures built after 2005 to include soil tests to be conducted for the likelihood of soil expansion, compression, or shifting. In such cases, top or subsoils are required to be removed and remaining soils stabilized. Builders must ensure that water drains away from the structure on all sides and building owners notified of the potential for damage if changes in drainage flow occur. These measures significantly reduce the probability of expansive soil impacts on newer and future development. It is considered “Occasional” that the high-risk areas in the Bell County planning area, including the eastern

⁴ Source: <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

SECTION 8: EXPANSIVE SOILS

portion of the planning area that falls within the high-risk area (Figure 8-1), will experience expansive soil impacts such as problems with foundations, roadways, sidewalks and other structures and infrastructure in the future, especially during times of drought. Older structures will be impacted with greater frequency due to the soil testing and stabilization requirements for newer structures. In the remainder of the planning area, expansive soil events would be considered “Unlikely”, with an event probably in the next ten years. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

The effects of expansive soils are most prevalent when periods of moderate to high precipitation are followed by drought and then again by periods of rainfall. Other cases of damage result from increases in moisture volume from such sources as broken or leaking water and sewer lines. Dry clays are capable of absorbing water and will increase in volume in an amount proportional to the amount of water absorbed. Soils capable of changes in volume present a hazard to structures built over them and to the pipelines buried in them. Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling clays than are multi-story buildings, which are usually heavy enough to counter swelling pressures. However, if constructed on wet clay, multi-story buildings may also be damaged by clay shrinkage when moisture levels are substantially reduced.



Cracked foundations and floors, jammed windows and doors, and ruptured pipelines are typical types of damage resulting from swelling soils. Damage to the upper floors of larger buildings can occur when motion in the structure is significant. While all infrastructure within the planning area is minimally vulnerable, slab on grade structures are more likely to suffer damages from expansive soils. In addition, older structures built to less stringent building codes may also be more susceptible to damage than new construction.

While the number of slabs on grade structures is not available, the U.S. Census data indicates approximately 45,058 of the housing units (30 percent of all housing units) in the planning area were built before 1980 and may be more susceptible to damages.

Table 8-3. Residential Structures at Greatest Risk

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
Bell County	45,058
City of Bartlett	469
City of Belton	2,992
City of Harker Heights	6,087
City of Holland	248

SECTION 8: EXPANSIVE SOILS

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
City of Killeen	16,684
City of Little River Academy	394
City of Morgan's Point Resort	384
City of Nolanville	274
City of Rogers	332
Village of Salado	230
City of Temple	13,425
City of Troy	276
Central Texas Council of Governments	1

The Bell County Planning Team identified the following critical facilities (Table 8-4) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by expansive soils. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 8-4. Critical Facilities Vulnerable to Expansive Soils

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> • Uneven settling and shifting cause cracks in building foundations impacting the integrity of critical facility structures and lead to doors being unable to open or close properly. • Damages and cracks in streets and highway infrastructure may lead to emergency vehicles being unable to access areas increasing the need for emergency operations. • Ruptured water pipes can lead to loss of function or water pressure impacting drinking water availability and firefighting capabilities.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> • Uneven settling and shifting cause cracks in building foundations impacting the integrity of critical facility structures and lead to doors being unable to open or close properly. • Damages and cracks in streets and highway infrastructure may lead to emergency vehicles being unable to access areas increasing the need for emergency operations.
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none"> • Essential supplies like medicines, water, food, and equipment deliveries may be delayed.

SECTION 8: EXPANSIVE SOILS

CRITICAL FACILITIES	POTENTIAL IMPACTS
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none">• Wastewater and drinking water facilities and infrastructure may be damaged or destroyed resulting in services disruption or outage for multiple days or weeks.• Disruptions and outages impact public welfare as safe drinking water is critical.• A break in essential and effective wastewater collection and treatment is a health concern, potentially spreading disease.• Exposure to untreated wastewater is harmful to people and the environment.

ASSESSMENT OF IMPACTS

Expansive soils are generally influenced by how wet or dry reactive clay types of soils become, so the climate of an area, and more specifically the seasonal precipitation-drought cycle associated with arid or semi-arid regions, influences the occurrence and severity of these hazards. Problems associated with expansive soils in Bell County typically occur during extended periods of drought.

Expansive soils present a hazard to lightweight buildings and other infrastructure. Uneven settling and shifting in such structures may occur, causing cracks in foundations, walls, streets, driveways, and sidewalks; ruptured pipes; and windows and doors that do not open and close properly. Special provisions are necessary in the construction of footings and slabs resting on expansive soils to minimize damages due to the expansiveness. Homeowners and public agencies that assume they cannot afford preventative measures such as more costly foundations and floor systems, often incur the largest percentage of damage and costly repairs from expanding soil. No figures are available for the total damage to homes in the planning area from expansive clays. The greatest damage occurs when structures are constructed when clays are dry (such as during a drought) and then subsequent soaking rains swell the clay.

Infrastructure such as pipelines can be damaged, causing increased maintenance and repairs, replacement, or damage to the point of failure. Sewer and water lines are also affected by shrinking and swelling soils. The movement of the soil can snap water and sewer lines, producing a minimum of temporary discomfort, and a maximum of serious health and welfare risk. Field monitoring and testing should be conducted on a regular basis, especially during extended drought periods, to avoid loss of function or water pressure, which could impact drinking water and firefighting capabilities. In addition, highways (such as Interstate 35, U.S Highway 190, and State Highway 95) can be affected by expansive soils and could hinder evacuations if deemed not usable during disasters.

Unlike many other environmental hazards, the effects of expansive soil are deceptive in that they are not revealed suddenly or caused by a single event, but rather become increasingly evident and destructive over time. As such, the vast majority of expansive soil impacts are relatively benign in terms of emergency management and emergency response.

Expansive soil can directly impact infrastructure and, as a result, indirectly create impacts on residents. The impact of climate change could produce more severe expansive soils events, exacerbating the current expansive soils impacts. The following are a summary of impacts frequently associated with expansive soils:

SECTION 8: EXPANSIVE SOILS

- Expansive soils are influenced by the seasonal precipitation-drought cycle. Most impacts on Bell County typically occur during extended periods of drought.
- Impacts to lightweight buildings and other infrastructure are most likely to occur. Impacts include uneven settling and shifting in structures; cracks in foundations, walls, streets, driveways, and sidewalks; ruptured pipes; and windows and doors that do not open and close properly.
- 30 percent of homes in Bell County were built before 1980 leading them to more susceptible to damages from expansive soils. There are 74 buildings and sites in Bell County on the National Register of Historic Places, many of which pre-date modern building codes.
- Highways (such as Interstate 35, U.S Highway 190, and State Highway 95) can be affected by expansive soils.
- Economic impacts are limited to uninsured damages.
- Impacts on people are indirect, with impacts related to disruption in county and city services such as water and sewer.
- As population grows and development increases in the county, the potential risk to expansive soils will also increase.
- Limited impact is anticipated to the natural environment other than changes in soil characteristics.

The impact of expansive soils experienced in Bell County, including all participating jurisdictions and the CTCOG, has resulted in no injuries and fatalities, supporting a “Limited” severity of impact meaning injuries and illnesses are treatable with first aid, shutdown of critical facilities and services for 24 hours or less, and less than 10 percent of property destroyed or with major damage.

CLIMATE CHANGE CONSIDERATIONS

Expansive soils are directly connected to drought and flood conditions as they literally swell and shrink with changing moisture conditions. Impacts of climate change on drought and flood events indicate similar changes to expansive soil frequency and impacts. Refer to Probability of Future Events section in Section 6 (Drought) and Section 10 (Flood) for more information on those hazards.



SECTION 9

EXTREME HEAT

SECTION 9: EXTREME HEAT

Hazard Description	1
Location	1
Extent.....	1
Historical Occurrences.....	4
Significant Events	6
Probability of Future Events.....	7
Vulnerability and Impact.....	7
Assessment of Impacts	10
Climate Change Considerations	11

HAZARD DESCRIPTION

Extreme heat is a prolonged period of excessively high temperatures and exceptionally humid conditions. Extreme heat during the summer months is a common occurrence throughout the State of Texas, and the Bell County planning area is no exception. The County typically experiences extended heat waves or an extended period of extreme heat and is often accompanied by high humidity.



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

Critical infrastructure can also be damaged or impacted by extreme heat. High temperatures may cause a rise in electricity consumption as homes, schools, and businesses try to regulate the temperature. This may lead to energy shortages and possible blackouts.

LOCATION

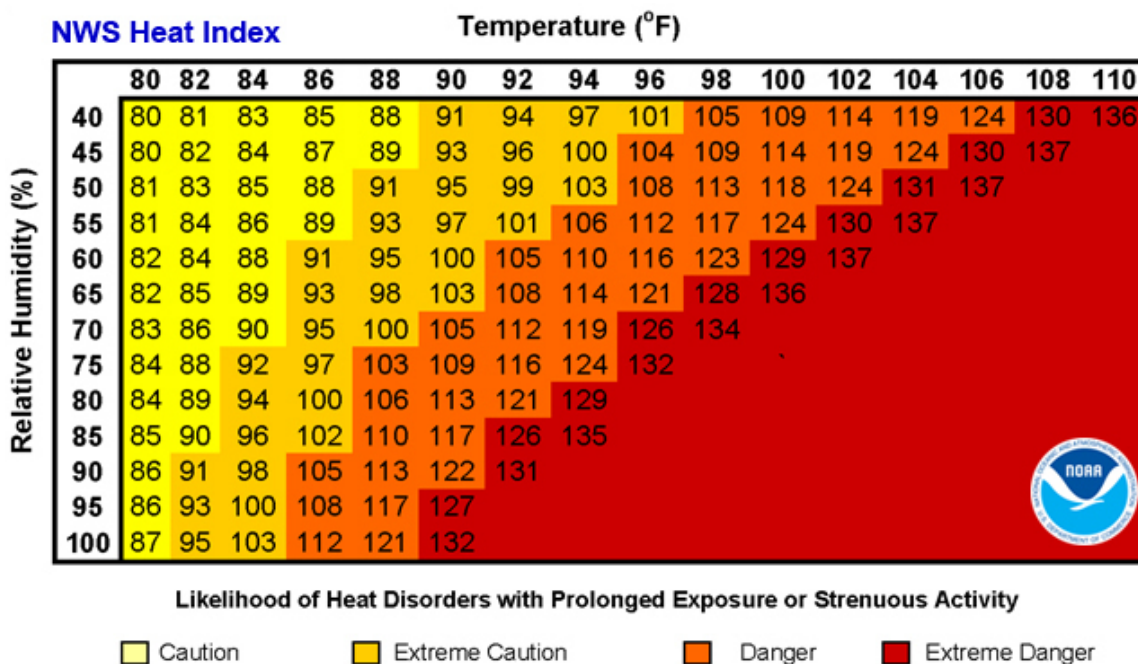
Extreme heat events can occur throughout the Bell County planning area, including all participating jurisdictions and the CTCOG, as there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere within the Bell County planning area.

EXTENT

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmospheric Administration (NOAA), this relationship is referred to as the “Heat Index” and is depicted in Figure 9-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

SECTION 9: EXTREME HEAT

Figure 9-1. Extent Scale for Extreme Heat¹



The index in Figure 9-1 displays varying categories of caution depending on the relative humidity combined with the temperature. For example, when the temperature is at 90 degrees Fahrenheit (°F) or lower, caution should be exercised if the humidity level is at or above 40 percent.

The shaded zones on the chart indicate varying symptoms or disorders that could occur depending on the magnitude or intensity of the event. “Caution” is the first category of intensity, and it indicates when fatigue due to heat exposure is possible. “Extreme Caution” indicates that sunstroke, muscle cramps, or heat exhaustion are possible, and a “Danger” level means that these symptoms are likely. “Extreme Danger” indicates that heat stroke is likely. The National Weather Service (NWS) initiates alerts based on the Heat Index as shown in Table 9-1.

Table 9-1. Heat Index and Warnings

CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Danger	125°F and higher	Heat stroke or sun stroke likely.	An Excessive Heat Warning is issued if the Heat Index rises above 105°F at least 3 hours during the day or above 80°F at night.
Danger	103 – 124°F	Sunstroke, muscle cramps, and/or heat exhaustion are likely. Heatstroke possible with prolonged exposure and/or physical activity.	An Excessive Heat Warning is issued if the Heat Index rises above 105°F at least 3 hours during the day or above 80°F at night.

¹ Source: NOAA

SECTION 9: EXTREME HEAT

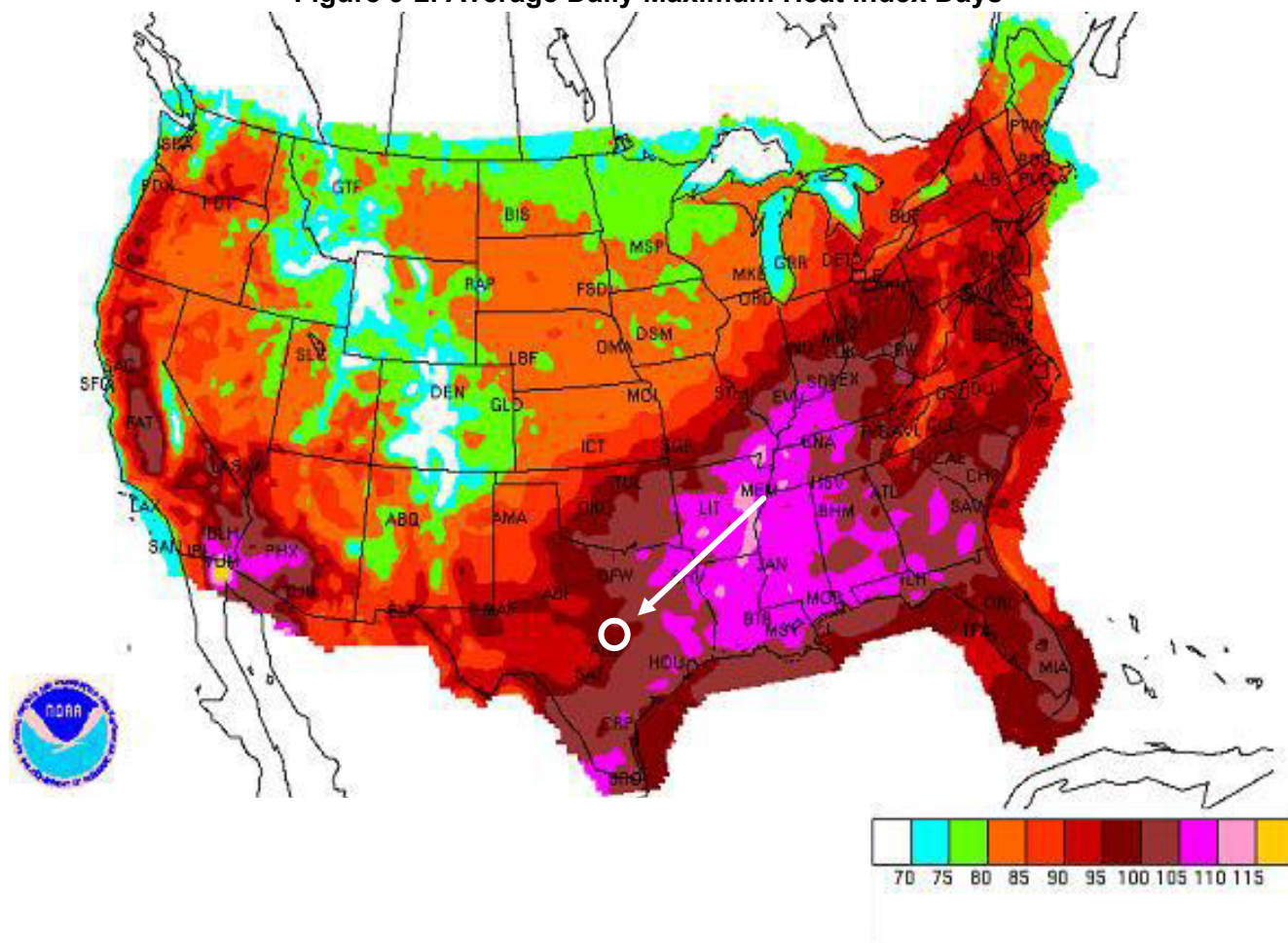
CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Caution	90 – 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.	A Heat Advisory will be issued to warn that the Heat Index may exceed 105°F.
Caution	80 – 90°F	Fatigue is possible with prolonged exposure and/or physical activity.	A Heat Advisory will be issued to warn that the Heat Index may exceed 105°F.

Bell County is located in Central Texas and features a mix of rolling plains and rugged terrains. Due to its geography and its warm, sunny, and humid subtropical climate, the Bell County planning area can expect an extreme heat event each summer. Citizens, especially children and the elderly should exercise caution by staying out of the heat for prolonged periods when a heat advisory or excessive heat warning is issued. In addition, those working or remaining outdoors for extended periods of time are at greater risk.

Figure 9-2 displays the daily maximum heat index as derived from NOAA based on data compiled from 1838 to 2015. The white circle shows the Bell County planning area. The planning area is represented in dark red across the County. The dark red color indicates an average daily heat index of 95°F to 100°F. Therefore, Bell County could experience dangerous heat from 95°F to 100°F and should mitigate to the extent of “Extreme Caution” and “Danger,” which can include sunstroke, muscle cramps, heat exhaustion and potential heat stroke. This is the average maximum temperature the planning area can anticipate based on historical events.

SECTION 9: EXTREME HEAT

Figure 9-2. Average Daily Maximum Heat Index Days²



HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration (NOAA). The NCEI is the largest archive available for historic storm events data. Previous occurrences for extreme heat are derived from the NCEI database, which identifies extreme heat events at the county level for each event. According to heat related incidents located solely within Bell County, there have been 39 extreme heat events on record for the planning area (Table 9-2). Historical extreme heat information, as provided by the NCEI, shows extreme heat activity across a multi-county forecast area for each event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event.

² NRDC and the white circle indicates the Bell County planning area.

SECTION 9: EXTREME HEAT

Historical data for all participating jurisdictions, including the CTCOG, are provided on a county-wide basis per the NCEI database from 1998 through 2023. No injuries, or damages were reported, but there have been three fatalities (occurring in 2011, 2012, and 2016). Only extreme heat events that have been reported have been factored into this Risk Assessment. It is highly likely additional extreme heat occurrences have gone unreported before and during the recording period. Due to the limited number of reported events, average high temperatures have been analyzed in order to determine the probability of future events.

Table 9-2. Historical Extreme Heat Events, 1998-2023³

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	7/1/1998	0	0	\$0	\$0
Bell County	8/1/1999	0	0	\$0	\$0
Bell County	7/1/2000	0	0	\$0	\$0
Bell County	8/1/2000	0	0	\$0	\$0
Bell County	9/1/2000	0	0	\$0	\$0
Bell County	8/1/2011	1	0	\$0	\$0
Bell County	6/26/2012	1	0	\$0	\$0
Bell County	7/10/2016	1	0	\$0	\$0
Bell County	6/19/2019	0	0	\$0	\$0
Bell County	7/8/2019	0	0	\$0	\$0
Bell County	8/7/2019	0	0	\$0	\$0
Bell County	8/17/2019	0	0	\$0	\$0
Bell County	8/26/2019	0	0	\$0	\$0
Bell County	7/1/2020	0	0	\$0	\$0
Bell County	7/9/2020	0	0	\$0	\$0
Bell County	8/12/2020	0	0	\$0	\$0
Bell County	8/14/2020	0	0	\$0	\$0
Bell County	8/28/2020	0	0	\$0	\$0
Bell County	9/1/2020	0	0	\$0	\$0
Bell County	7/25/2021	0	0	\$0	\$0
Bell County	7/29/2021	0	0	\$0	\$0

³ NOAA, NCEI Storm Events Database

SECTION 9: EXTREME HEAT

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	8/1/2021	0	0	\$0	\$0
Bell County	9/1/2021	0	0	\$0	\$0
Bell County	6/11/2022	0	0	\$0	\$0
Bell County	7/6/2022	0	0	\$0	\$0
Bell County	8/3/2022	0	0	\$0	\$0
Bell County	6/14/2023	0	0	\$0	\$0
Bell County	6/15/2023	0	0	\$0	\$0
Bell County	6/26/2023	0	0	\$0	\$0
Bell County	7/10/2023	0	0	\$0	\$0
Bell County	7/12/2023	0	0	\$0	\$0
Bell County	7/17/2023	0	0	\$0	\$0
Bell County	8/1/2023	0	0	\$0	\$0
Bell County	8/1/2023	0	0	\$0	\$0
Bell County	8/17/2023	0	0	\$0	\$0
Bell County	8/17/2023	0	0	\$0	\$0
Bell County	9/5/2023	0	0	\$0	\$0
Bell County	9/7/2023	0	0	\$0	\$0
Bell County	9/23/2023	0	0	\$0	\$0
TOTALS		3	0	\$0	\$0

Table 9-3. Historical Extreme Heat Events Summary, 1998-2023

JURISDICTION	NUMBER OF EVENTS	DEATH	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	39	3	0	\$0	\$0

Based on the list of historical extreme heat events for the Bell County planning area, 24 events were reported to the NCEI since the 2018 Plan.

SIGNIFICANT EVENTS

June 26, 2012

During this reported extreme heat event, a 42-year-old male died from a heat stroke in the City of Harker Heights. The man was working outside at the time of the stroke and temperatures were around 105 degrees at the time.

SECTION 9: EXTREME HEAT

July 10, 2023

The start of what would be one of the hottest summer months on record began in July of 2023. North and Central Texas experienced above average temperatures from July 10th through the end of the month. Several prolonged Heat Advisories were in effect, and at times Excessive Heat Warnings were needed, as temperatures soared over 100°F and heat index values were recorded over 105°F. The average temperature for the month of July ranked in the Top 10 warmest for climate sites in both North and Central Texas. However, it was the month of August that really tipped the average temperature for the summer season into the Top 5, as reported by the National Weather Service.

PROBABILITY OF FUTURE EVENTS

According to historical records, the Bell County planning area has experienced 39 events in a 26-year reporting period. Historical records in combination with an analysis of maximum average temperatures provides a probability of at least one event every year. This frequency supports a “Highly Likely” probability of future events. See additional information on the impacts of climate change at the end of this section.

VULNERABILITY AND IMPACT

While the entirety of the Bell County planning area is exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not likely to sustain significant damage from extreme heat events. Therefore, any estimated property losses associated with the extreme heat hazard are anticipated to be minimal across the area.

Every summer, the hazard of heat-related illness becomes a significant public health issue throughout much of the United States. Mortality rates increase during heat waves, and excessive heat is an important contributing factor to deaths from other causes, particularly among the elderly. Extreme temperatures present a significant threat to life and safety for the population of the County as a whole. Heat casualties, for example, are typically caused by a lack of adequate air-conditioning or heat exhaustion. The most vulnerable population to heat casualties are the elderly or infirmed who frequently live on fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well-being. Children may also be more vulnerable if left unattended in vehicles. Populations living below the poverty level are often unable to run air-conditioning on a regular basis and are limited in their ability to seek medical treatment.

According to the Texas Homeless Network, more than 50% of heat related deaths happen to those experiencing homelessness. In addition, people experiencing homelessness are 200 times more likely to die from heat-related causes than sheltered individuals. During extreme heat events, special sheltering considerations should be made for those that are most vulnerable. Currently, Bell County has a Homeless Strategic Plan, adopted in 2023, in place which includes study findings related to homelessness and recommended actions for the planning area. Entitled “Operation: RISE (Robust Interagency Strategic Engagement), A Strategic Plan to reduce or eliminate homelessness in Bell County,” the plan addresses both temporary and long-term sheltering needs for unhoused individuals.

SECTION 9: EXTREME HEAT

The population over 65 in the Bell County planning area is estimated at 11 percent of the total population and children under the age of 5 are estimated at 8 percent. The population with a disability is estimated at 14 percent of the total population. An estimated 15 percent of the planning area population live below the poverty level and 18 percent of the populations speaks a language other than English (Table 9-4). Vulnerable and underserved populations are disproportionately impacted by extreme heat events as they may be more susceptible to health risks. The population below the poverty level are less likely to be able to afford air conditioning during the hot summer months as well as less likely to have access to medical care. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

Table 9-4. Populations at Greater Risk by Participating Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375
City of Harker Heights	3,280	1,906	4,632	3,931	5,934
City of Holland	210	111	178	179	60
City of Killeen	11,467	14,603	20,953	24,593	33,510
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

Extremely high temperatures can have significant secondary impacts, leading to droughts, water shortages, increased fire danger, and prompt excessive demands for energy. The possibility of rolling blackouts increases with unseasonably high temperatures in what is a normally mild month

SECTION 9: EXTREME HEAT

with low power demands. Typically, more than 12 hours of warning time would be given before the onset of an extreme heat event.

In terms of vulnerability to structures, the impact from extreme heat is considered negligible. It is possible that critical facilities and infrastructure could be shut down for 24 hours if cooling units are running constantly, leading to a temporary power outage (Table 9-5). Less than ten percent of residential and commercial property could be damaged if extreme heat events lead to structure fires. Based on historical records, annualized property and crop losses for the Bell County planning area are negligible. The number of historical injuries and fatalities also indicates a “Limited” level of impact.

The Bell County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by extreme heat events. The following critical facilities would be vulnerable to extreme heat events in the Bell County planning area. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 9-5. Critical Facilities Vulnerable to Extreme Heat Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS, Hospitals)	<ul style="list-style-type: none">• Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.• Exposure to heat can cause heat illnesses in first responders, especially for those in heavy equipment.• Roads may become impassable due to excessive heat causing asphalt roads to soften and concrete roads to shift or buckle impacting response times by emergency services.• Extended power outages due to increased usage may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities	<ul style="list-style-type: none">• Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.• Power outages due to increased usage could disrupt critical care.• Backup power sources could be damaged.• Evacuations may be necessary due to extended power outages, breaks in water main lines or other associated damage to facilities.• Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.• Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations.
Commercial Suppliers (food, gas, etc.)	<ul style="list-style-type: none">• Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.• Essential supplies like medicines, water, food, and equipment deliveries may be delayed.

SECTION 9: EXTREME HEAT

CRITICAL FACILITIES	POTENTIAL IMPACTS
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none">• Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.• Roads may become impassable due to excessive heat causing asphalt roads to soften and concrete roads to shift or buckle impacting response times by emergency services.• Breaks in water main lines or other associated damage to facilities.

ASSESSMENT OF IMPACTS

The greatest risk from extreme heat is to public health and safety. Extreme heat conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (11 percent of total population), children under 5 (8 percent of total population), and those with a disability (14 percent of total population) can face serious or life-threatening health problems from exposure to extreme heat including hyperthermia, heat cramps, heat exhaustion, and heat stroke (or sunstroke).
- Response personnel, including utility workers, public works personnel, and any other professions where individuals are required to work outside, are more subject to extreme heat related illnesses since their exposure would typically be greater.
- High energy demand periods can outpace the supply of energy, potentially creating the need for rolling brownouts which would elevate the risk of illness to vulnerable residents.
- Highways and roads may be damaged by excessive heat causing asphalt roads to soften and concrete roads to shift or buckle.
- Vehicle engines and cooling systems typically run harder during extreme heat events resulting in increases in mechanical failures.
- Extreme heat events during times of drought can exacerbate the environmental impacts associated with drought, decreasing water and air quality and further degrading wildlife habitat.
- Extreme heat increases ground-level ozone (smog), increasing the risk of respiratory illnesses.
- Negatively impacted water suppliers may face increased costs resulting from the transport of water resources or development of supplemental water resources.
- Tourism and recreational activities at places may be negatively impacted during extreme heat events, reducing seasonal revenue.
- Outdoor activities may see an increase in school injury or illness during extreme heat events.

The economic and financial impacts of extreme heat on the community will depend on the duration of the event, demand for energy, drought associated with extreme heat, and many other factors. The level of preparedness and the amount of planning done by the community, local businesses, and citizens will impact the overall economic and financial conditions before, during, and after an extreme heat event.

SECTION 9: EXTREME HEAT

CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to lead to an increase in average temperatures as well as an increase in frequency, duration, and intensity of extreme heat events. With no reductions in emissions worldwide, the state of Texas is projected to experience an additional 30 to 60 days per year above 100°F than what is experienced now.⁴ In addition, it is projected that future changes to Bell County will include increased temperatures, which according to the U.S. Climate Explorer, the planning area may experience a 6°F increase in the average extreme heat temperatures. Historically, extreme temperatures averaged 100°F in Bell County, but between 2035 and 2064 the average will be 106°F, increasing the severity and frequency of extreme heat events.

⁴ Nielsen-Gammon, John, Holman, Sara, Buley, Austin and Jorgensen, Savannah. Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, 2021 Update. Texas A&M University Office of the Texas State Climatologist. October 7, 2021. <https://climatexas.tamu.edu/files/ClimateReport-1900to2036-2021Update>



SECTION 10 **FLOOD**

SECTION 10: FLOOD

Hazard Description	1
Location	1
Extent	16
Historical Occurrences	19
Significant Events	22
Probability of Future Events	23
Vulnerability and Impact.....	23
Assessment of Impacts.....	27
Climate Change Considerations.....	29
National Flood Insurance Program (NFIP) Participation	29
NFIP Compliance and Maintenance.....	31
Repetitive Loss	31

HAZARD DESCRIPTION

Floods generally result from excessive precipitation. The severity of a flood event is determined by a combination of several major factors, including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surfaces. Typically, floods are long-term events that may last for several days.

The primary types of general flooding are inland and coastal flooding. Due to Bell County's inland location, only inland flooding is profiled in this section. Inland or riverine flooding is a result of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Inland or riverine flooding is overbank flooding of rivers and streams, typically resulting from large-scale weather systems that generate prolonged rainfall over a wide geographic area. Therefore, it is a naturally occurring and inevitable event. Some river floods occur seasonally when winter or spring rainfalls fill river basins with too much water, too quickly. Torrential rains from decaying hurricanes or tropical systems can also produce river flooding.

The Bell County planning area is subject to extreme rainfall events, often in short durations, leading to dangerous flash flooding events. Floods are a natural and recurrent event and take place every year, in all seasons.

LOCATION

The Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide an overview of flood risk but can also be used to identify the areas of the County that are vulnerable to flooding. FIRMs are used to regulate new development and to control the substantial improvement and repair of substantially damaged buildings. Flood Insurance Studies (FIS) are often developed in conjunction with FIRMs. The FIS typically contains a narrative of the flood history of a community and discusses the engineering methods used to develop the FIRMs. The FIS also contains flood profiles for studying flooding sources and can be used to determine Base Flood Elevations (BFEs) for some areas.

SECTION 10: FLOOD

The FIS for Bell County is dated September 26, 2008. This FIS is composed of seven volumes and compiles all previous flood information including data collected on numerous waterways. This study indicates that the principal flood problems are due to large drainage areas, particularly the Little River, Leon River, and Lampasas River, and impervious surfaces that result in rapid runoff in high concentrations. Small culverts and bridges under roads and railroads tend to aggravate the flooding issue, and flooding commonly occurs along all streams studied in the FIS.

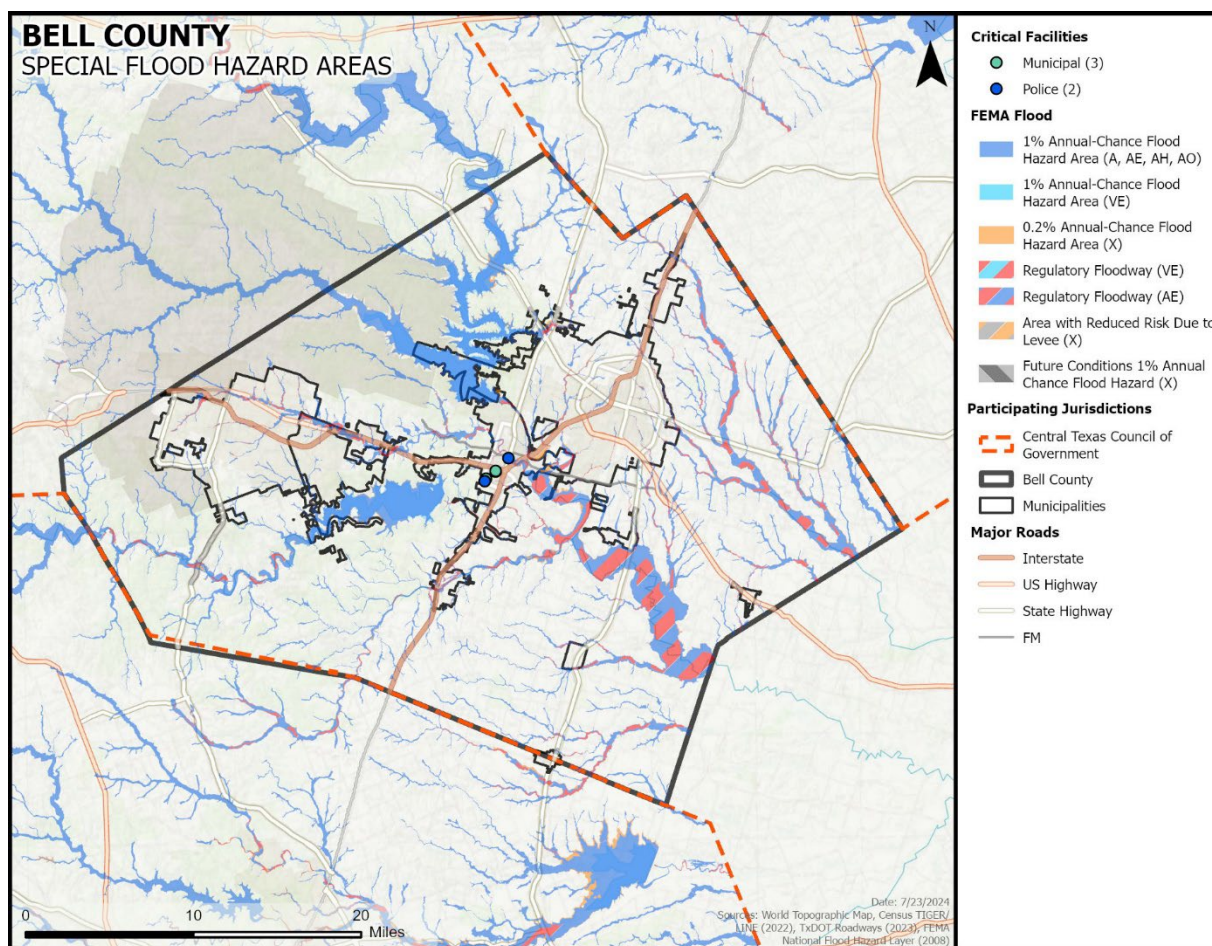
The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for Bell County shows the following flood hazard areas:

- Zone A: Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance requirements and floodplain management standards apply.
- Zone AE: Areas subject to inundation by 1-percent-annual-chance shallow flooding. It is the base floodplain where BFEs are provided. AE zones are now used on new format FIRMs instead of A1-30 zones.
- Zone AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone.
- Zone X: Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones.

Locations of flood zones in Bell County based on the Digital Flood Insurance Rate Map (DFIRM) from FEMA are illustrated in Figures 10-1 to 10-14.

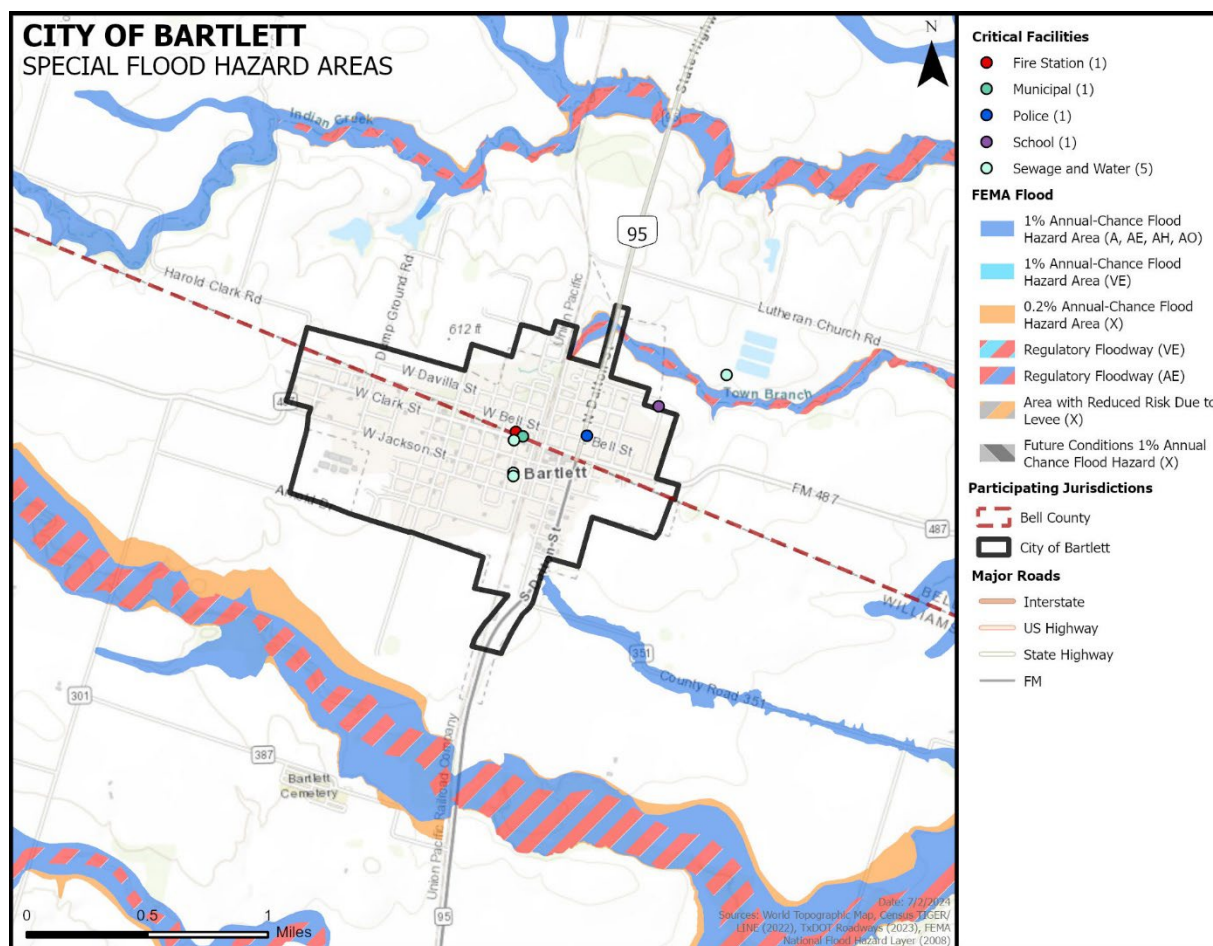
SECTION 10: FLOOD

Figure 10-1. Estimated Flood Zones in Bell County



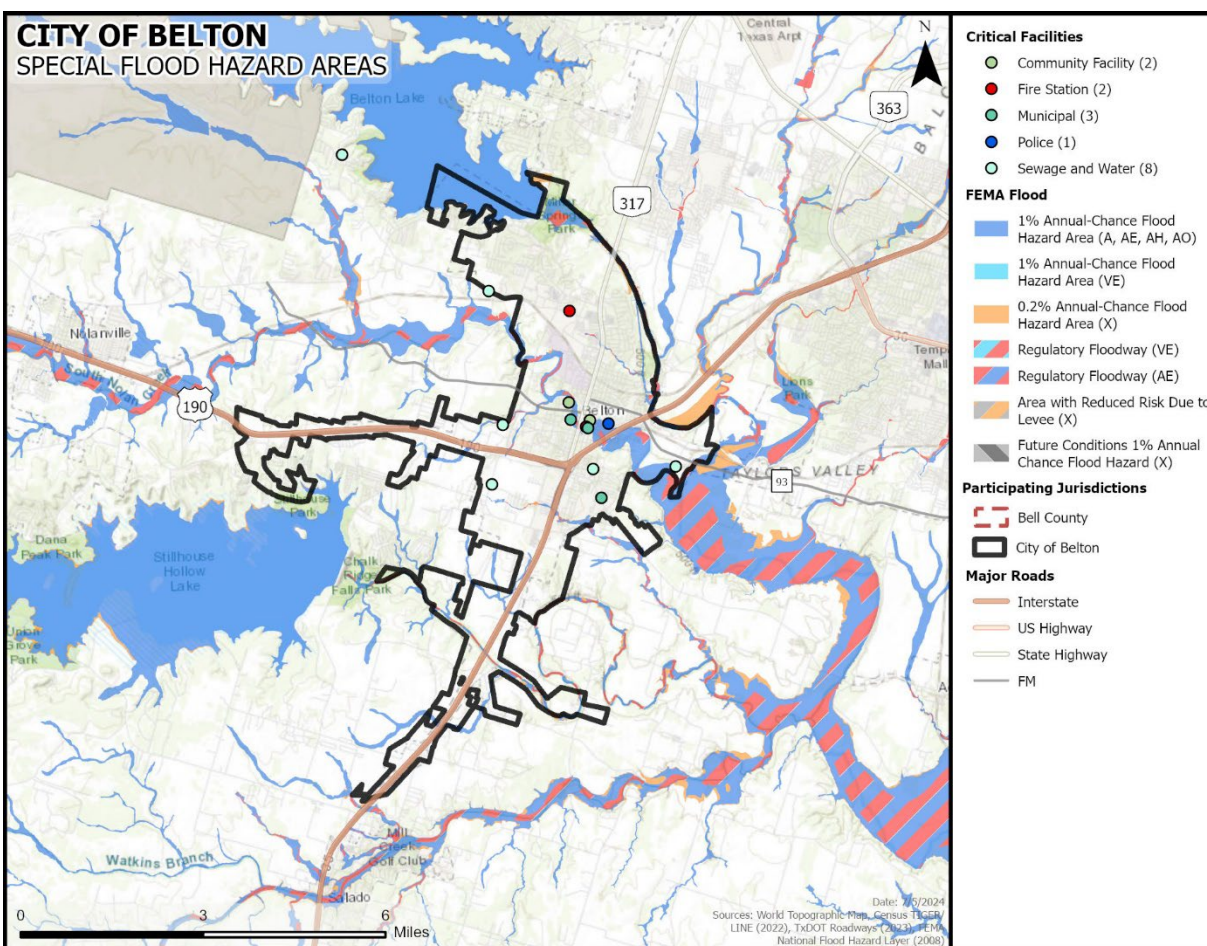
SECTION 10: FLOOD

Figure 10-2. Estimated Flood Zones in the City of Bartlett



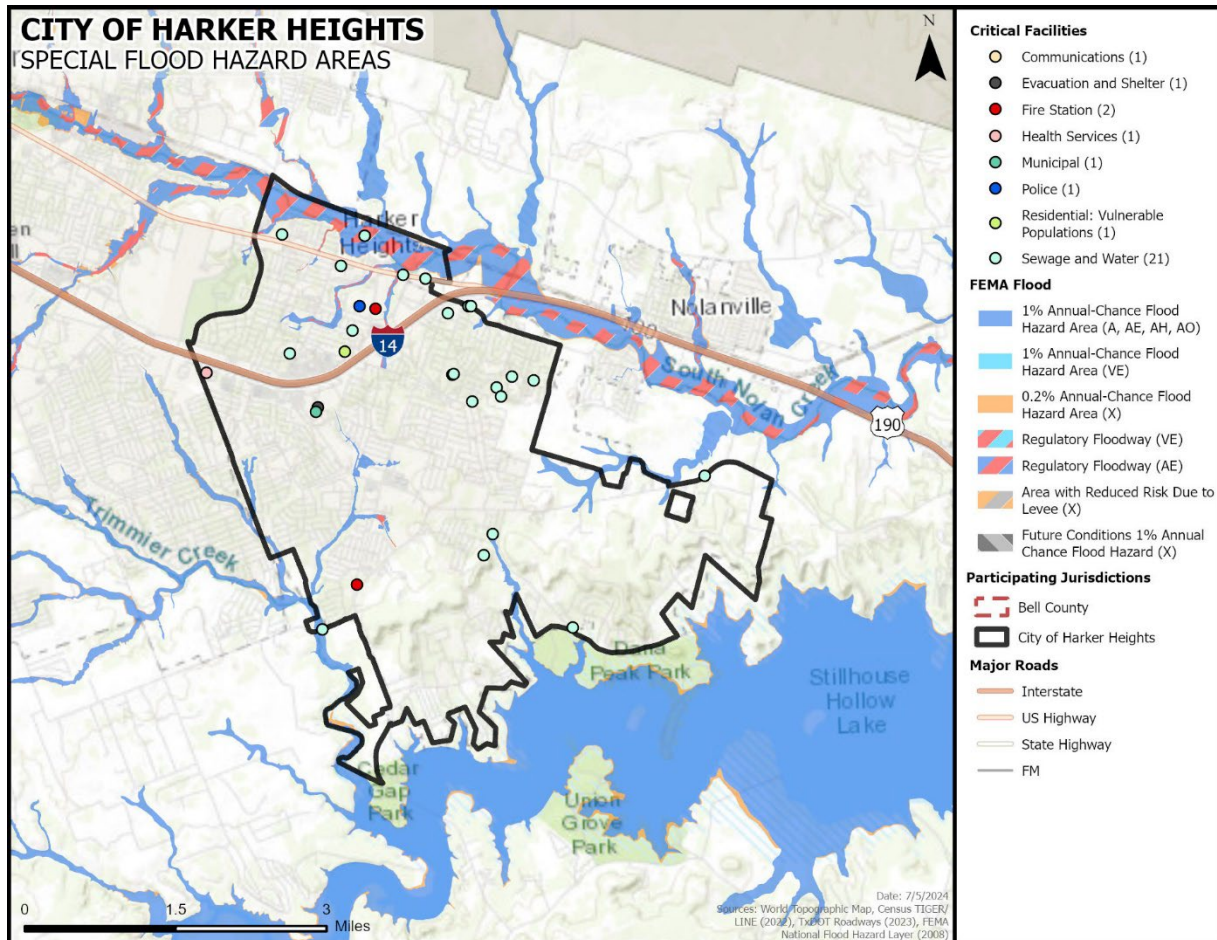
SECTION 10: FLOOD

Figure 10-3. Estimated Flood Zones in the City of Belton



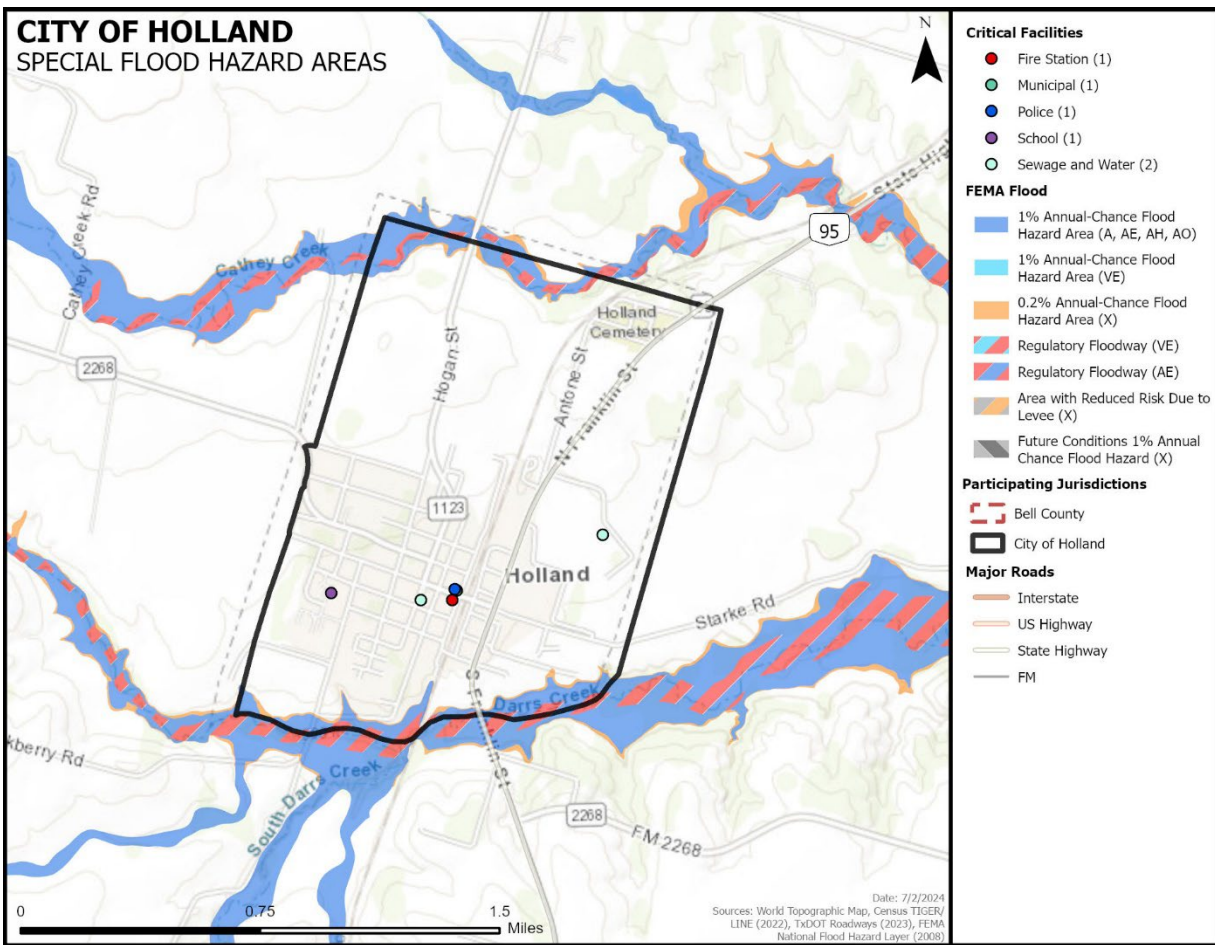
SECTION 10: FLOOD

Figure 10-4. Estimated Flood Zones in the City of Harker Heights



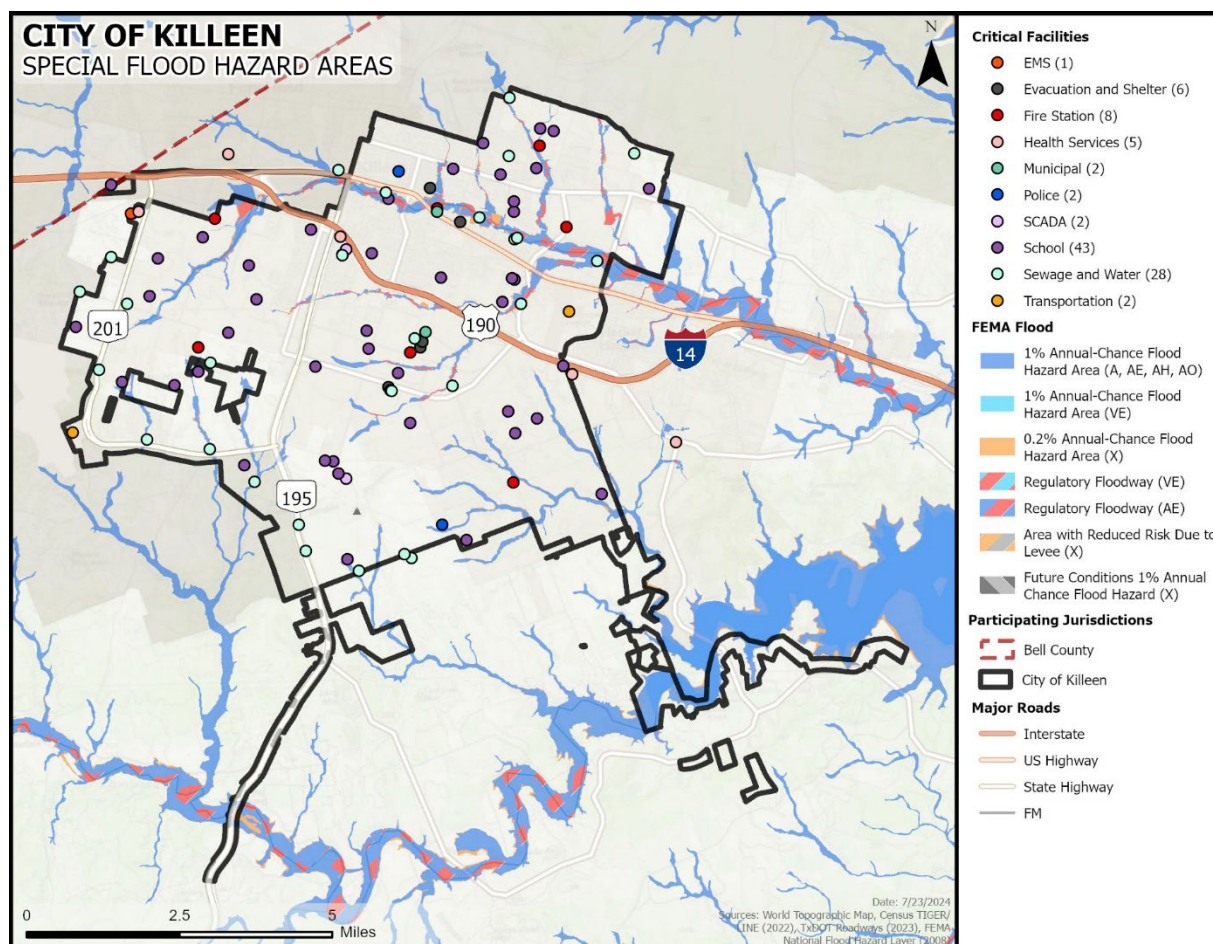
SECTION 10: FLOOD

Figure 10-5. Estimated Flood Zones in the City of Holland



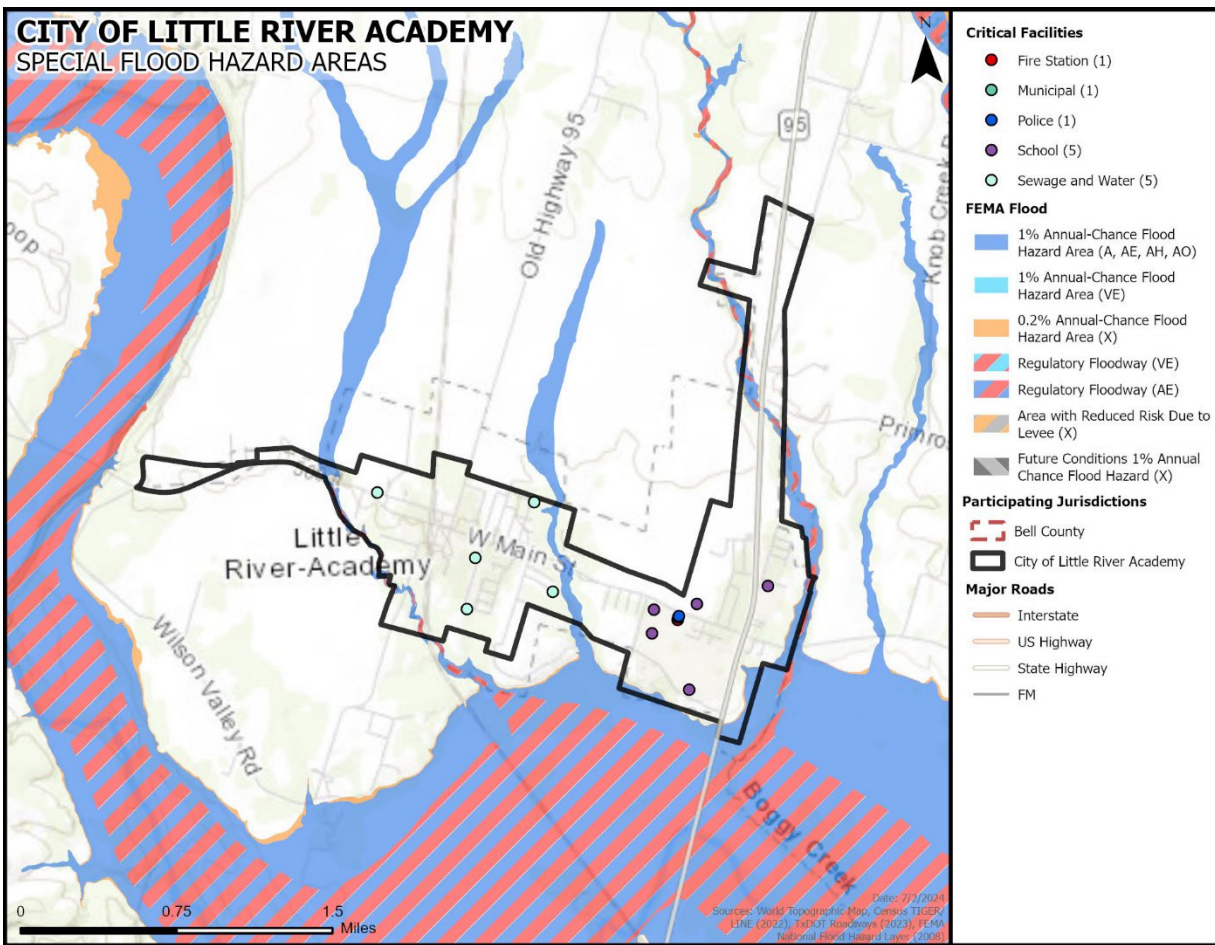
SECTION 10: FLOOD

Figure 10-6. Estimated Flood Zones in the City of Killeen



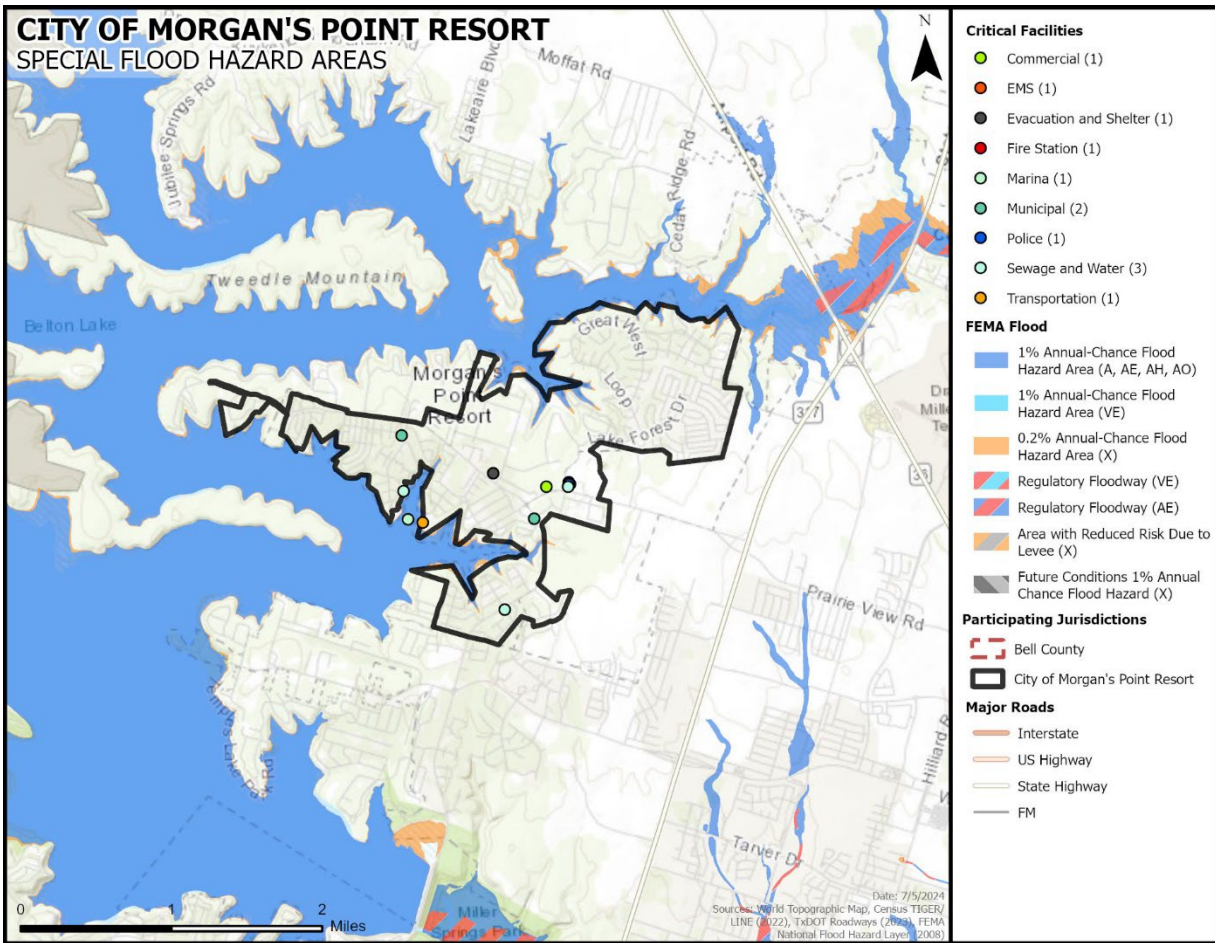
SECTION 10: FLOOD

Figure 10-7. Estimated Flood Zones in the City of Little River Academy



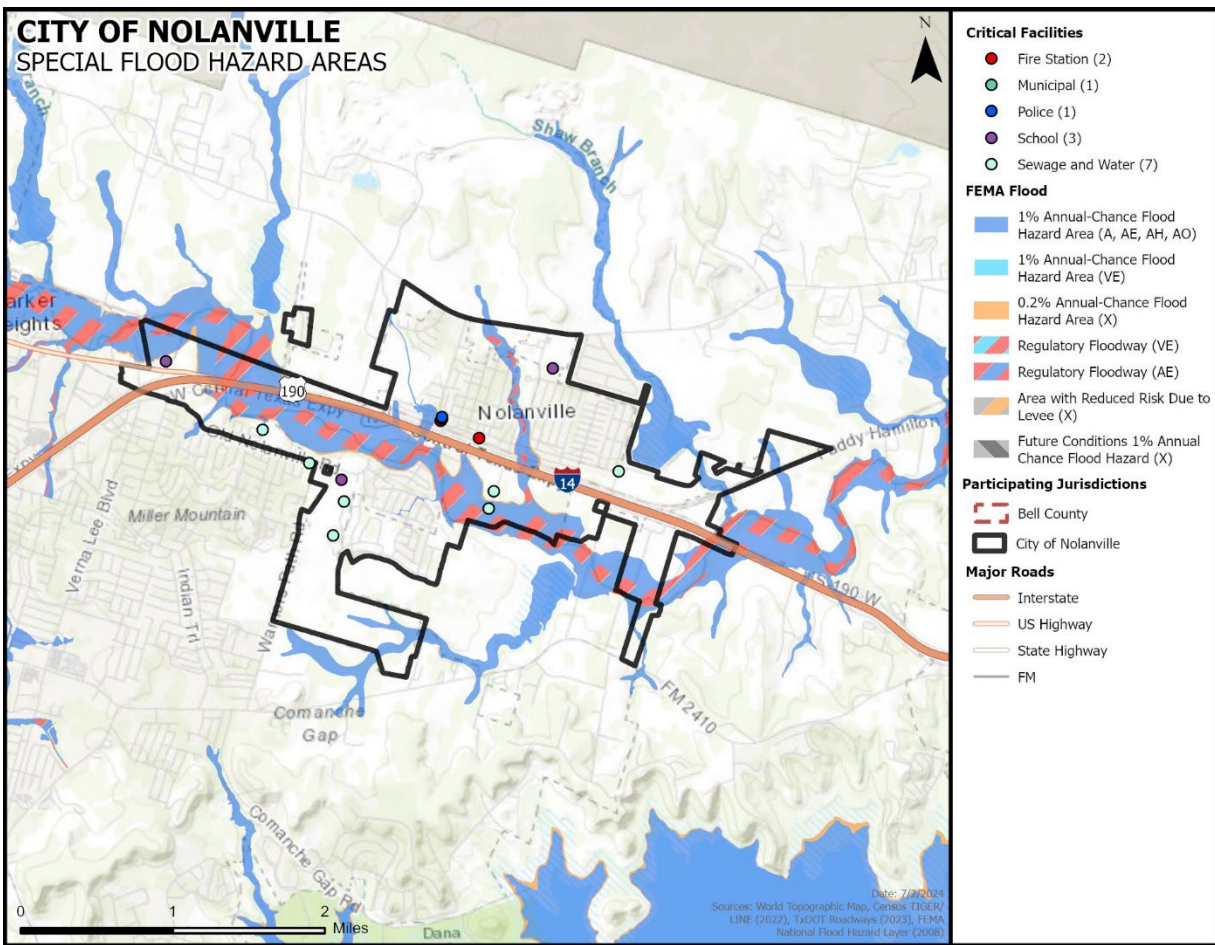
SECTION 10: FLOOD

Figure 10-8. Estimated Flood Zones in the City of Morgan's Point Resort



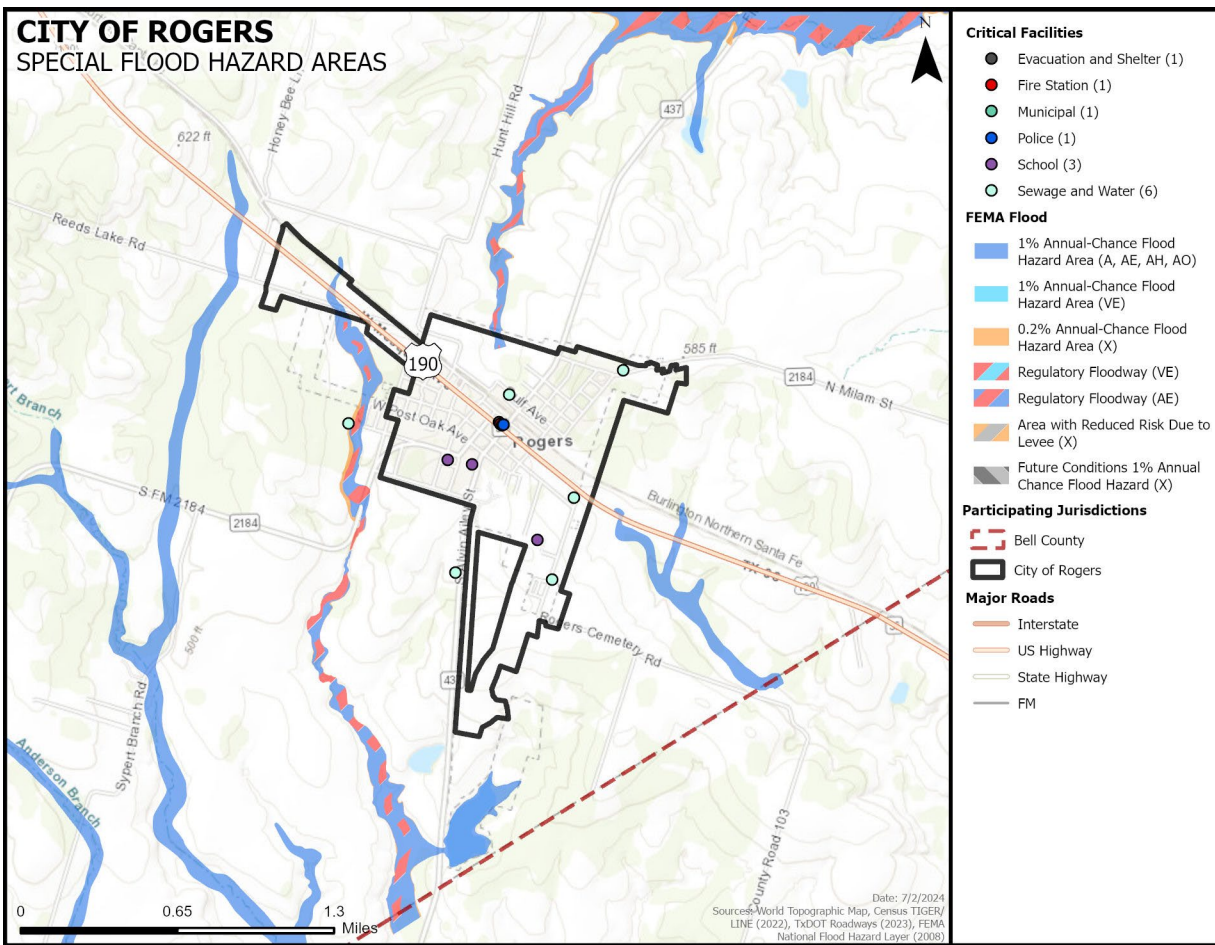
SECTION 10: FLOOD

Figure 10-9. Estimated Flood Zones in the City of Nolanville



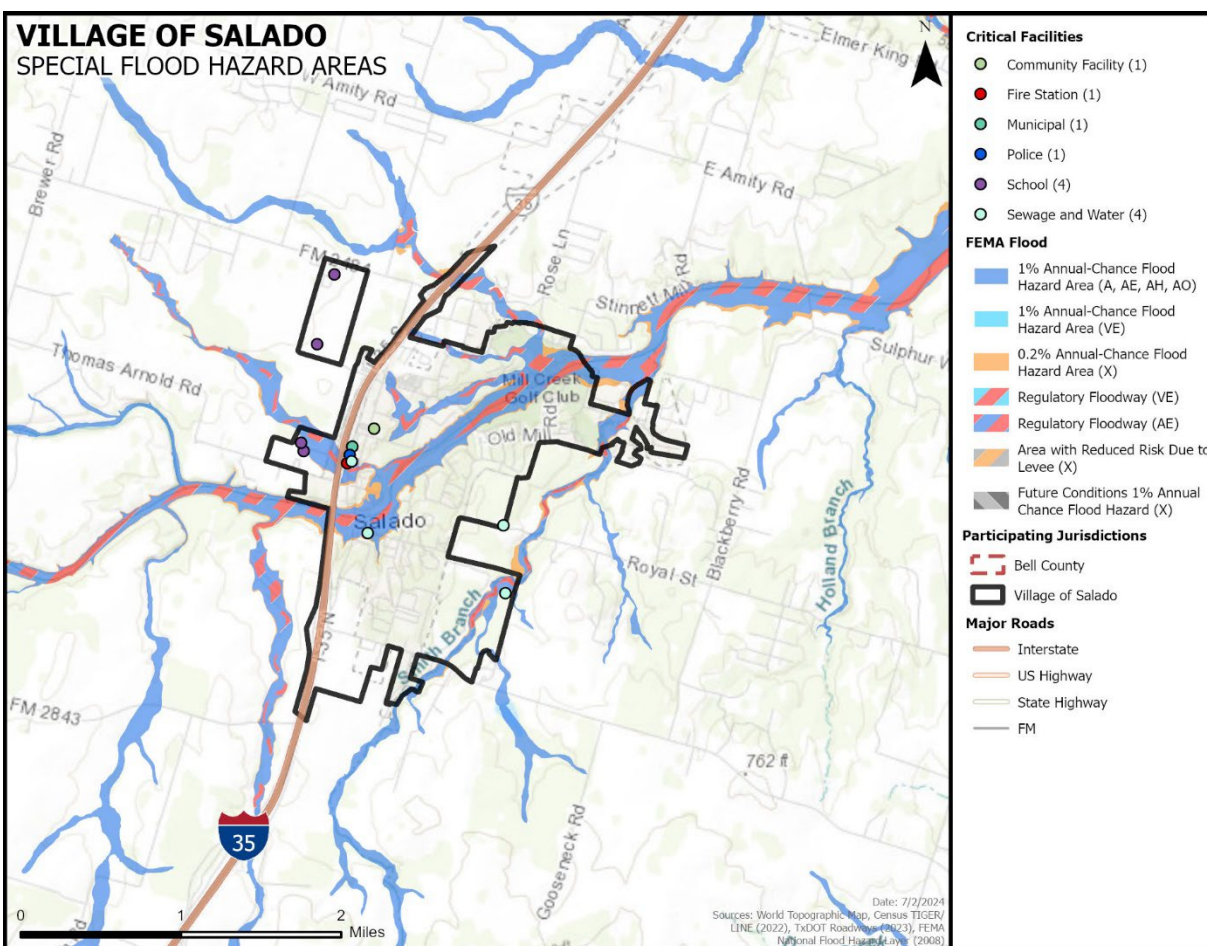
SECTION 10: FLOOD

Figure 10-10. Estimated Flood Zones in the City of Rogers



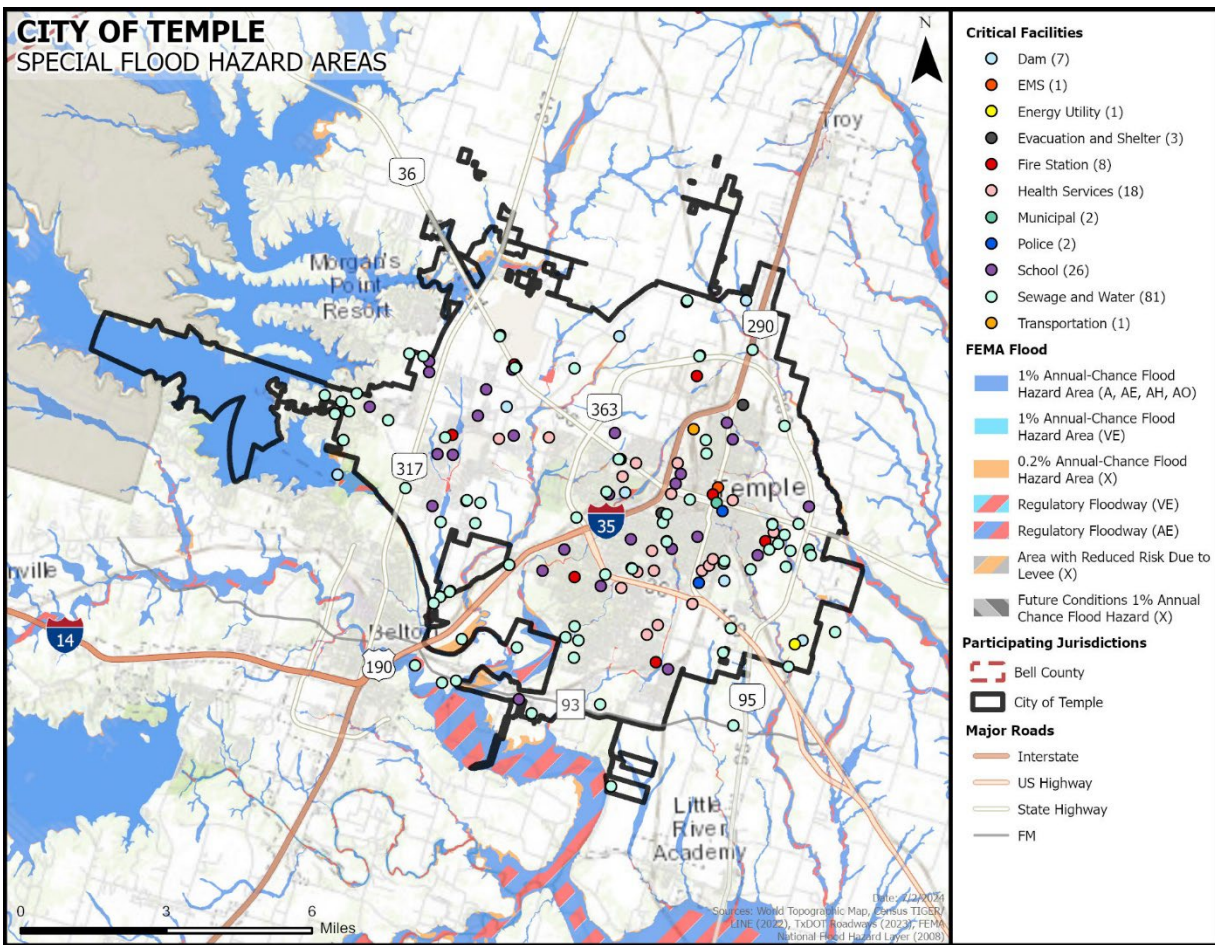
SECTION 10: FLOOD

Figure 10-11. Estimated Flood Zones in the Village of Salado



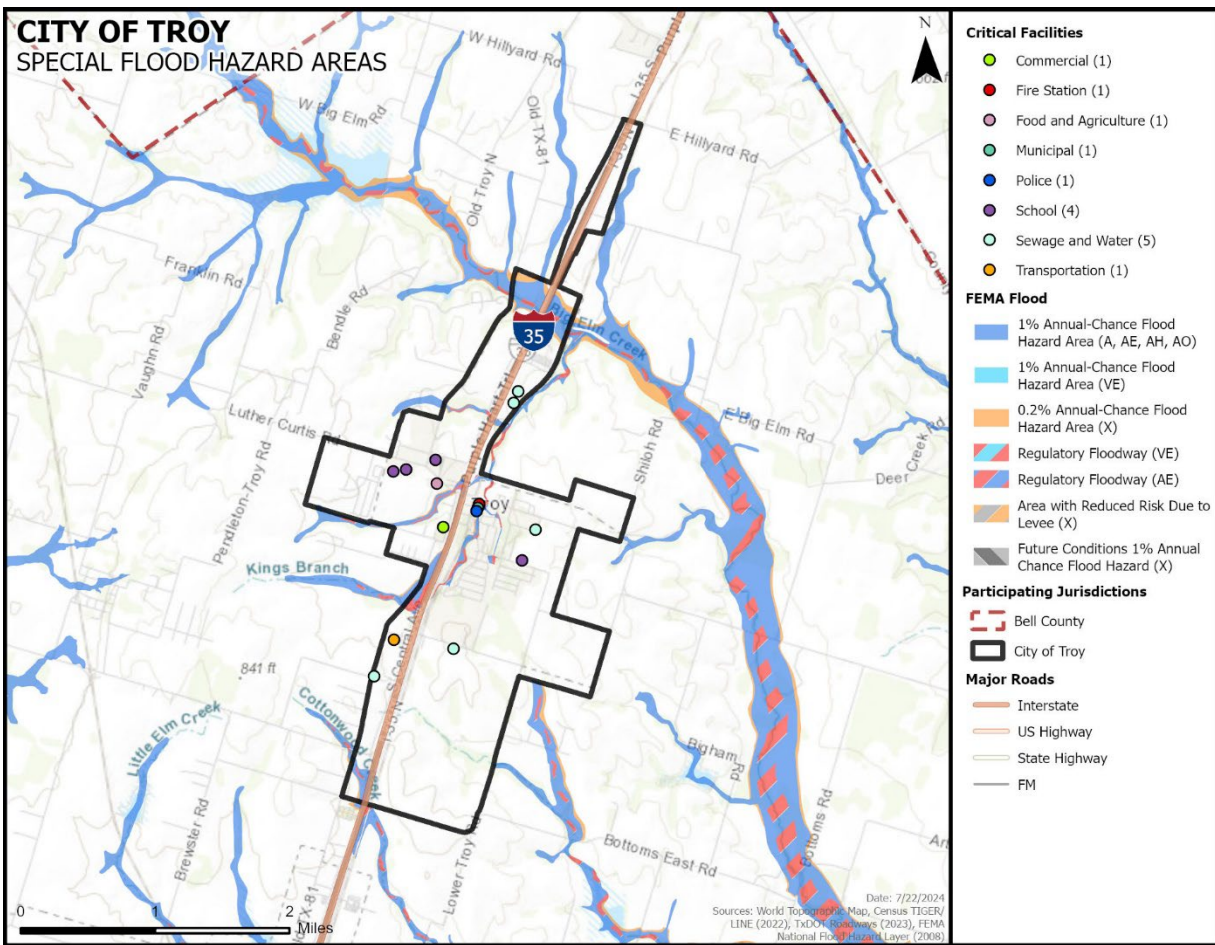
SECTION 10: FLOOD

Figure 10-12. Estimated Flood Zones in the City of Temple



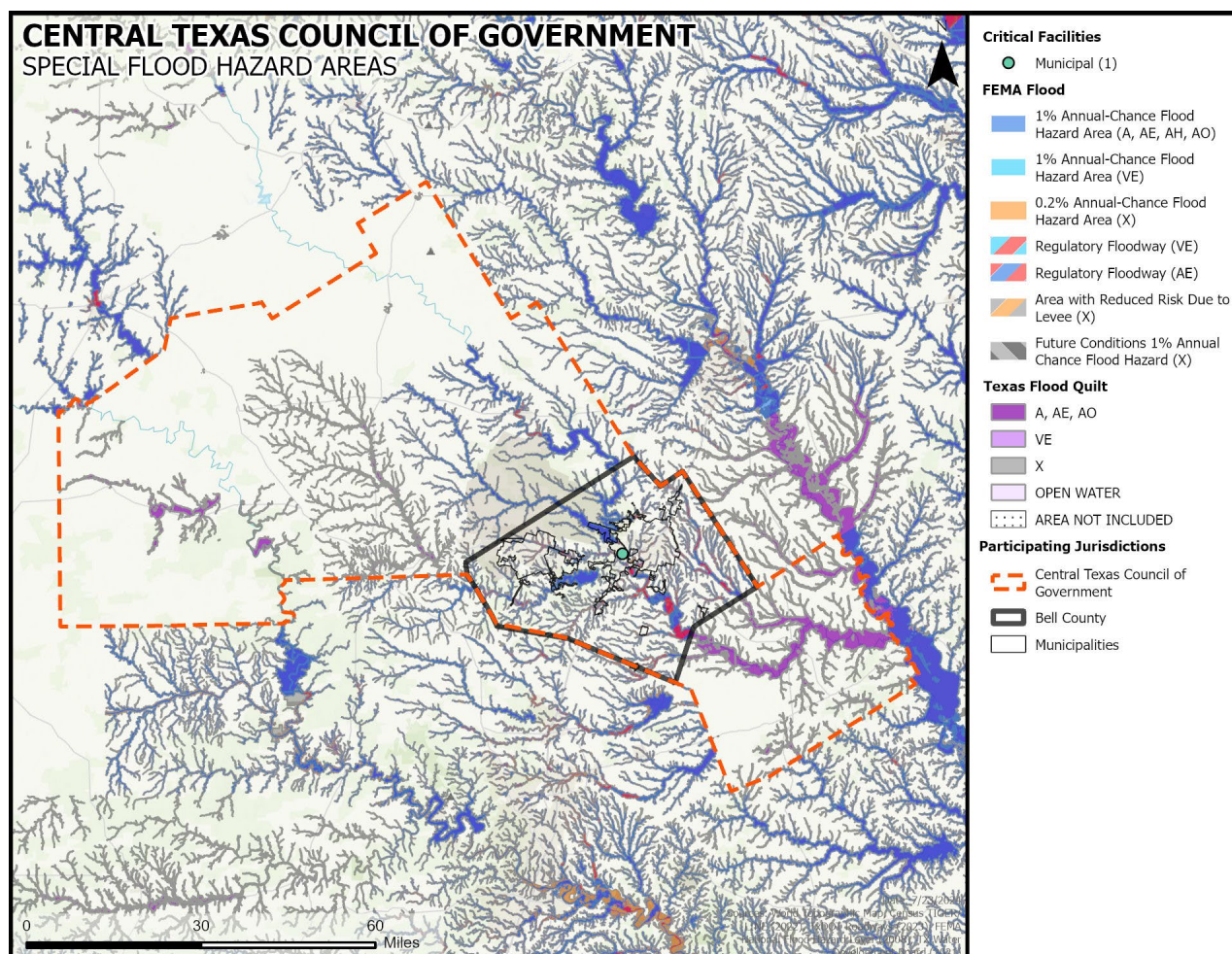
SECTION 10: FLOOD

Figure 10-13. Estimated Flood Zones in the City of Troy



SECTION 10: FLOOD

Figure 10-14. Estimated Flood Zones in the CTCOG



EXTENT

The severity of a flood event is determined by a combination of several major factors, including stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surfaces. Typically, floods are long-term events that may last for several days.

Determining the intensity and magnitude of a flood event is dependent upon the flood zone and location of the flood hazard area in addition to the depths of flood waters. The extent of flood damages can be expected to be more damaging in the areas that will convey a base flood. FEMA categorizes areas on the terrain according to how the area will convey flood water. Flood zones are the categories that are mapped on FIRMs. Table 10-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm. Flood Zones A, AE, AO and X are the hazard areas mapped in the region. Figures 10-1 through 10-14 should be read in conjunction with the extent for flooding in Tables 10-1, 10-2, and 10-3 to determine the intensity of a potential flood event.

SECTION 10: FLOOD

Table 10-1. Flood Zones

INTENSITY	ZONE	DESCRIPTION
HIGH	ZONE A	Areas with a 1-percent-annual-chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
	ZONE A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a Base Flood Elevation (BFE) (old format).
	ZONE AE	The base floodplain where BFEs are provided. AE Zones are now used on the new format FIRMs instead of A1-A30 Zones.
	ZONE AO	River or stream flood hazard areas and areas with a 1-percent-annual-chance or greater of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
	ZONE AH	Areas with a 1-percent-annual-chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. BFEs derived from detailed analyses are shown at selected intervals within these zones.
	ZONE A99	Areas with a 1-percent-annual-chance of flooding that will be protected by a federal flood control system where construction has reached specified legal requirements. No depths or BFEs are shown within these zones.
MODERATE to LOW	ZONE AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
	ZONE X 500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.

Zone A is interchangeably referred to as the 100-year flood, the 1-percent-annual-chance flood, the Special Flood Hazard Area (SFHA), or more commonly, the base flood. This is the area that will convey the base flood and constitutes a threat to the planning area. The impact from a flood event can be more damaging in areas that will convey a base flood.

SECTION 10: FLOOD

Structures built in the SFHA are subject to damage by rising waters and floating debris. Moving flood water exerts pressure on everything in its path and causes erosion of soil and solid objects. If not elevated above Base Flood Elevation, utility systems, such as heating, ventilation, air conditioning, fuel, electrical systems, sewage maintenance systems and water systems, may also be damaged.

The intensity and magnitude of a flood event is also determined by the depth of flood water. Table 10-2 describes the stream gauge data provided by the United States Geological Survey (USGS). Peak flood data at the locations available in the planning area indicate a peak flood depth range of 2 to 31 feet above average peak flows.

Table 10-2. Extent for Bell County¹

JURISDICTION ²	PEAK FLOOD EVENT
Bell County	Nolan Creek near Belton reached an overflow elevation of 44 feet in May of 1957. The average peak flow at this site is 13 feet. This indicates a maximum flood depth of 31 feet above the average peak flow at this site.
Bell County	Lampasas River near Belton reached an overflow elevation of 44 feet in May of 1957. The average peak flow at this site is 13 feet. This indicates a maximum flood depth of 31 feet above the average peak flow at this site.
Bell County	Leon River near Belton reached an overflow elevation of 25 feet in 1913. The average peak flow at this site is 9 feet. This indicates a maximum flood depth of 16 feet above the average peak flow at this site.
Bell County	Salado Creek in Salado reached an overflow elevation of 12 feet in May of 2019. The average peak flow at this site is 7 feet. This indicates a maximum flood depth of 5 feet above the average peak flow at this site.
Bell County	Little River near Little River Academy reached an overflow elevation of 46 feet in September of 1921. The average peak flow at this site is 26 feet. This indicates a maximum flood depth of 20 feet above the average peak flow at this site.
Bell County	North Elm Creek near Meeks reached an overflow elevation of 13 feet in April of 2016. The average peak flow at this site is 11 feet. This

¹ Severity estimated by averaging floods at certain stage level over the history of flood events. Severity and peak events are based on USGS data.

² Severity is provided where peak data was available for streams, creeks and rivers throughout the planning area.

SECTION 10: FLOOD

JURISDICTION ²	PEAK FLOOD EVENT
	indicates a maximum flood depth of 2 feet above the average peak flow at this site.

The range of flood intensity that the planning area can experience is high, or Zone A. Based on historical occurrences, the planning area could expect to experience an average of 3 inches of rain within a 3-hour period, resulting in flash flooding.

The data described in Tables 10-1 and 10-2, together with Figures 10-1 through 10-14, and historical occurrences for the area, provides an estimated potential magnitude and severity for the Bell County planning area, including participating jurisdictions and the CTCOG.

HISTORICAL OCCURRENCES

Historical evidence indicates that areas within the planning area are susceptible to flooding, especially in the form of flash flooding. It is important to note that only flood events that have been reported have been factored into this risk assessment, therefore it is likely that additional flood occurrences have gone unreported before and during the recording period. Table 10-3 identifies historical flood events that resulted in damages, injuries, or fatalities within the Bell County planning area. Table 10-4 provides the historical flood event summary by jurisdiction. Historical Data is provided by the Storm Prediction Center (NOAA), National Centers for Environmental Information (NCEI) database for Bell County, including all participating jurisdictions and the CTCOG. There have been 153 recorded flood events in Bell County.

Historical flood data events for the CTCOG are primarily provided in the NCEI database within the county or city in which the special district is located. The CTCOG does not have events reported separate and apart from the reported community events.

It is important to note that Bell County and all participating jurisdictions experienced significant flooding during the drafting of this plan. The flood events of May 2024 have greatly impacted the planning area, including the City of Bartlett, the City of Temple, and the City of Rogers. Bell County was included in a disaster declaration (FEMA-4781-DR) on May 29, 2024. Currently, reports of damages are limited, and this event has not yet been recorded in the NCEI database. Therefore, it will not be included in this analysis but will be detailed in the next plan update.

Table 10-3. Historical Flood Events, 1996-2023³

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Killeen	12/20/1997	2	1	\$0	\$0
City of Killeen	12/20/1997	0	0	\$504,900	\$0
City of Killeen	12/20/1997	0	0	\$73,400	\$0
City of Nolanville	12/20/1997	0	0	\$55,100	\$0

³ Values are in 2023 dollars.

SECTION 10: FLOOD

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Killeen	5/6/2001	0	0	\$33,300	\$0
City of Killeen	7/1/2001	0	0	\$5,000	\$0
Bell County	7/2/2002	0	0	\$3,300	\$0
City of Rogers	5/13/2004	0	0	\$7,800	\$0
City of Killeen	7/7/2004	0	0	\$15,600	\$0
City of Killeen	8/9/2005	0	0	\$30,200	\$0
City of Troy	8/10/2005	0	0	\$15,100	\$0
City of Belton	4/20/2006	0	0	\$22,000	\$0
City of Belton	10/18/2006	0	0	\$4,400	\$0
City of Killeen	3/30/2007	1	0	\$0	\$0
City of Killeen	5/22/2007	0	0	\$142,400	\$0
City of Killeen	5/24/2007	4	0	\$156,700	\$0
City of Temple	5/26/2007	0	0	\$5,700	\$0
City of Belton	6/27/2007	0	0	\$14,200	\$0
Village of Salado	6/27/2007	0	0	\$1,066,100	\$0
Bell County	9/11/2009	0	0	\$205,700	\$0
Village of Salado	10/13/2009	0	0	\$4,100	\$0
Village of Salado	10/13/2009	0	0	\$20,600	\$0
Bell County	10/26/2009	0	0	\$4,100	\$0
Bell County	6/28/2010	0	0	\$40,800	\$0
Bell County	9/7/2010	1	0	\$4,067,600	\$0
Bell County	5/11/2011	0	0	\$32,800	\$0
City of Killeen	5/11/2011	0	0	\$327,700	\$0
Bell County	1/25/2012	0	0	\$1,300	\$0
City of Holland	10/30/2013	0	0	\$50,700	\$0
Bell County	10/31/2013	0	0	\$6,300	\$0

SECTION 10: FLOOD

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Little River Academy	10/31/2013	0	0	\$50,700	\$0
City of Holland	6/17/2015	0	0	\$186,200	\$0
City of Nolanville	6/17/2015	1	0	\$37,200	\$0
Bell County	10/24/2015	0	0	\$124,500	\$0
Bell County	10/24/2015	0	0	\$124,500	\$0
City of Belton	10/24/2015	0	0	\$249,100	\$0
Bell County	10/30/2015	0	0	\$2,500	\$0
Bell County	10/30/2015	0	0	\$1,200	\$0
City of Temple	10/30/2015	0	0	\$6,200	\$0
City of Temple	10/30/2015	0	0	\$2,500	\$0
Bell County	11/7/2016	0	0	\$1,200	\$0
Total Losses		9	1	\$7,702,700	\$0

Table 10-4. Summary of Historical Flood Events, 1996-2023⁴

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	45	1	0	\$4,763,400	\$0
City of Bartlett	1	0	0	\$50,700	\$0
City of Belton	14	0	0	\$1,396,300	\$0
City of Harker Heights	0	-	-	-	-
City of Holland	4	0	0	\$51,300	\$0
City of Killeen	29	7	1	\$950,900	\$0
City of Little River Academy	1	0	0	\$186,200	\$0
City of Morgan's Point Resort	0	-	-	-	-
City of Nolanville	11	1	0	\$146,500	\$0

⁴ Participating jurisdictions with no reported events show a "-" in table columns where damages, deaths or injuries would be otherwise reported.

SECTION 10: FLOOD

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Rogers	3	0	0	\$0	\$0
Village of Salado	5	0	0	\$34,800	\$0
City of Temple	28	0	0	\$71,900	\$0
City of Troy	12	0	0	\$50,700	\$0
CTCOG	0	-	-	-	-
Total Losses	153	9	1	\$7,702,700	

Based on the list of historical flood events for the Bell County planning area and including all participating jurisdictions and the CTCOG, 11 events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

Flash Flood on May 24, 2007 – City of Killeen

A cold front across Texas created severe thunderstorms with several reports of hail and flash flooding. Several roads were flooded throughout the City of Killeen and the City of Harker Heights. Reports note that the Killeen Police Department urged residents to stay off flooded roadways. Mobile home parks were flooded, and one permanent residence near Nolan Creek had four feet of water inside. A mobile home was washed into Nolan Creek and caught fire when the gas line hit a bridge and at least two cars were swept away into the creek. There are four reported deaths from this event, including a drowned resident who was near a culvert when the rain began.

Flash Flood on September 7, 2010 – Bell County

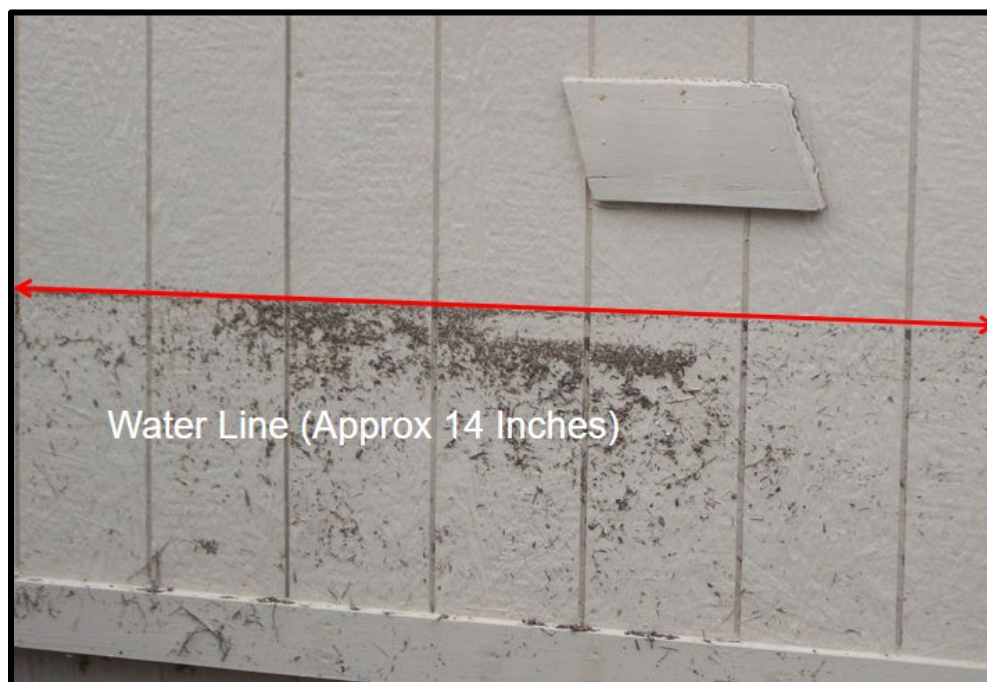
Significant flooding occurred in Bell County from the remnants of Tropical Storm Hermine and on September 9, 2010, Bell County and 39 other counties were included in a disaster declaration.

In the City of Killeen, Highway 190 was closed due to flood waters. Residents were evacuated from an apartment complex on Watercrest Drive due to rising waters, and numerous cars with occupants were submerged. There was one fatality in the City of Killeen when a vehicle was submerged in flood waters on Reese Creek Road. Homes near the Towns of Elms and Robinette had to be evacuated by boat. In the City of Nolanville, a car was swept away, and a mobile home park was evacuated resulting in the rescue of 40 people. Salado Creek in the Village of Salado flooded the access roads of Interstate 35 and destroyed several businesses and residential structures along the creek. A bridge on Armstrong Road which crossed Salado Creek was washed away. Numerous roads were also flooded in the City of Temple. There were 17 businesses and 26 residences affected by the flood waters in the City of Belton. This event caused \$4,067,600 (2023 dollars) in damages across Bell County and is the costliest flood event reported for the planning area.

The City of Harker Heights was especially impacted by the flooding with several areas and neighborhoods experiencing high waters. Booker Park was completely covered in water, and several major roads were closed and damaged. Residents needed to be rescued from flooded homes, and nearly 50 evacuees were sheltered. The wastewater plant was damaged, resulting in a disruption of critical services.

SECTION 10: FLOOD

Figure 10-14. Flood Damage on East Turnbo Road in the City of Harker Heights



PROBABILITY OF FUTURE EVENTS

Based on 153 recorded historical occurrences within a 28-year reporting period within the Bell County planning area, including all participating jurisdictions and the CTCOG, flooding is considered “Highly Likely,” meaning an event is probable within the next year.

VULNERABILITY AND IMPACT

A property’s vulnerability to a flood depends on its location and proximity to the floodplain. Structures that lie along banks of a waterway are the most vulnerable and are often repetitive loss structures. Bell County promoted development outside of the floodplain. In terms of structure and infrastructure damages and service disruptions, the potential severity of impacts for flood events is considered Limited, with critical facilities shut down for 24-hours or less and less than ten percent of property destroyed or with major damage. However, due to reported injuries and fatalities, the impact of flooding in Bell County is considered “Substantial” with multiple deaths possible, depending on the size and extent of the event.

Table 10-5 includes the comprehensive critical facilities identified in Appendix C that were considered the most important to the planning area that are subject to a range of impacts due to flooding and are located in the regulatory floodplain. For a comprehensive list of identified critical facilities by participating jurisdiction, please see Appendix C.

Table 10-5. Critical Facilities in the Floodplain by Participating Jurisdiction

SECTION 10: FLOOD

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Emergency Response Departments (EOC, Fire, Police, EMS), Hospitals	Bell County: 2 Police City of Belton: 1 Fire City of Killeen: 1 Fire Station Village of Salado: 1 Fire Station	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency vehicles can be damaged by rising flood waters. Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing first responders in harm's way. Evacuations may be required for entire neighborhoods because of rising floodwaters, further taxing limited response capabilities and increasing sheltering needs for displaced residents. Power outages could disrupt communications, delaying emergency response times. Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. Washed out roads and bridges can impede emergency response vehicle access to areas. Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. First responders are exposed to downed power lines, contaminated and unusual debris, hazardous materials, and generally unsafe conditions. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities	City of Belton: 2 Municipal City of Killeen: 1 Municipal, 2 Schools City of Morgan's Point Resort: 1 Marina	<ul style="list-style-type: none"> Structures can be damaged by rising flood waters. Power outages could disrupt critical care. Backup power sources could be damaged, inundated or otherwise inoperable. Critical staff may be impacted and unable to report for duty, limiting response capabilities. Evacuations may be necessary due to extended power outages, gas line ruptures, or inundation of facilities. Additional emergency responders and critical aid workers may not be able to reach the area for days. Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. Temporary break in operations may significantly inhibit post event evacuations. Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.

SECTION 10: FLOOD

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Commercial Suppliers (food, gas, etc.)	None	<ul style="list-style-type: none"> Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed.
Utility Services and Infrastructure (electric, water, wastewater, communications)	City of Belton: 2 Sewage and Water City of Killeen: 4 Sewage and Water City of Nolanville: 1 Sewage and Water City of Rogers: 1 Sewage and Water City of Temple: 4 Dams, 7 Sewage and Water Village of Salado: 2 Sewage and Water	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency service vehicles can be damaged by rising flood waters. Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing emergency service workers in harm's way. Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. Service responders are exposed to downed power lines, contaminated and unusual debris, hazardous materials, and generally unsafe conditions. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

Historic loss estimates due to flood are presented in Table 10-6 below. Considering 153 flood events over a 28-year period, frequency is approximately five events every year.

Table 10-6. Average Annualized Losses by Jurisdiction, 1997-2023

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Bell County	\$4,763,400	\$170,100
City of Bartlett	\$50,700	\$1,800
City of Belton	\$1,396,300	\$49,900
City of Harker Heights	-	-
City of Holland	\$51,300	\$1,800
City of Killeen	\$950,900	\$34,000
City of Little River Academy	\$186,200	\$6,700
City of Morgan's Point Resort	-	-
City of Nolanville	\$146,500	\$5,200

SECTION 10: FLOOD

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
City of Rogers	\$0	\$0
Village of Salado	\$34,800	\$1,200
City of Temple	\$71,900	\$2,600
City of Troy	\$50,700	\$1,800
CTCOG	-	-
TOTALS	\$7,702,700	\$275,100

While all citizens are at risk of the impacts of a flood, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. In addition, due to factors like limited mobility, communication difficulties, medical needs, reliance on support services, transportation challenges, housing accessibility issues, and possible shortages in emergency shelter accommodations, the elderly, children, and people with disabilities are also disproportionately affected by flooding events. People who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Bell County planning area is estimated at 11 percent of the total population and children under the age of 5 are estimated at 8 percent. The population with a disability is estimated at 14 percent of the total population. An estimated 15 percent of the planning area population live below the poverty level and 18 percent of the populations speaks a language other than English.

Table 10-7. Populations at Greatest Risk by Jurisdiction⁵

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375
City of Harker Heights	3,280	1,906	4,632	3,931	5,934
City of Holland	210	111	178	179	60

⁵ U.S. Census Bureau Five-Year estimates

SECTION 10: FLOOD

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
City of Killeen	11,467	14,603	20,953	24,593	33,510
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

ASSESSMENT OF IMPACTS

Flooding is the deadliest natural disaster that occurs in the U.S. each year, and it poses a constant and significant threat to the health and safety of the people in the Bell County planning area. Impacts to the planning area can include:

- Flood-related rescues may be necessary at swift water and low water crossings or in flooded neighborhoods where roads have become impassable, placing first responders in harm's way.
- Evacuations may be required for entire neighborhoods because of rising floodwaters, further taxing limited response capabilities and increasing sheltering needs for displaced residents.
- Health risks and threats to residents are elevated after the flood waters have receded due to contaminated flood waters (untreated sewage and hazardous chemicals) and mold growth typical in flooded buildings and homes. Bell County has a Watershed Protection Plan in place for both the Lampasas River and Nolan Creek which outlines measures to manage and preserve water quality.
- Significant flood events often result in widespread power outages, increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outages can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Floods can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.

SECTION 10: FLOOD

- First responders are exposed to downed power lines, contaminated and potentially unstable debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities.
- Significant flooding can result in the inability of emergency response vehicles to access areas of the community.
- Critical staff may suffer personal losses or otherwise be impacted by a flood event and be unable to report for duty, limiting response capabilities.
- City or county departments may be flooded, delaying response and recovery efforts for the entire community.
- Private sector entities that the planning area and its residents rely on, such as utility providers, financial institutions, and medical care providers, may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- Some businesses not directly damaged by the flood may be negatively impacted while utilities are being restored or water recedes, further slowing economic recovery.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures substantially damaged by a flood may not be rebuilt for years and uninsured or underinsured residential structures may never be rebuilt, reducing the tax base for the community.
- Large floods may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable, and tourism can be unappealing for years following a large flood event, devastating directly related local businesses and negatively impacting economic recovery.
- Flooding may cause significant disruptions of clean water and sewer services, elevating health risks and delaying recovery efforts.
- The psychosocial effects on flood victims and their families can traumatize them for long periods of time, creating long term increases in medical treatment and services.
- Extensive or repetitive flooding can lead to decreases in property value for the affected community.
- Flood poses a potential catastrophic risk to annual and perennial crop production and overall crop quality, leading to higher food costs.

SECTION 10: FLOOD

- Flood related declines in production may lead to an increase in unemployment.
- Large floods may result in loss of livestock, potential increased livestock mortality due to stress and water borne disease, and increased cost for feed.

The overall extent of damage caused by floods is dependent on the extent, depth, and duration of flooding, in addition to the velocities of flows in the flooded areas. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a flood event.

CLIMATE CHANGE CONSIDERATIONS

River flooding in Texas is projected to have no substantial change through 2036. This is in large part due to the construction of dams and reservoirs for flood management in the 20th century. There is a mixture of historical trends categorized by season, with no one clear trend to project. In addition, meteorological drivers of river flooding (increased rainfall intensity, decreased soil moisture) are projected to have competing influences. On balance, if an increasing trend is present in river flooding, it will be at the most extreme flood events or in the wettest parts of the state where there is so much rainfall that a decrease in soil moisture would have little mitigating impact.⁶

According to the U.S. Climate Explorer, which analyzes the top regional hazards for Bell County, according to the National Climate Assessment and compares projections for the middle third of this century (2035-2064) with average conditions observed from 1961-1990, the planning area may see a slight increase in precipitation events. Annual counts of intense rainstorms, those that drop two or more inches in one day, are projected to increase up to 6%. While this is a small projected increase, more intense rainfall events can lead to increased flood events.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) PARTICIPATION

Flood insurance offered through the National Flood Insurance Program (NFIP) is the best way for home and business owners to protect themselves financially against the flood hazard. Bell County and all participating jurisdictions in the planning area participate in the NFIP and are in good standing. It is noted that entities, such as the CTCOG, are not eligible participants in the NFIP.

As an additional indicator of floodplain management responsibility, communities may choose to participate in FEMA's Community Rating System (CRS). This is an incentive-based program that allows communities to undertake flood mitigation activities that go beyond NFIP requirements. Currently, none of the participating communities in the planning area participate in the CRS.

Bell County and all participating jurisdictions currently have in place standard flood damage prevention ordinances which include minimum NFIP standards for new construction and substantial Improvements of structures. In addition, all participating jurisdictions have adopted subdivision regulations which ensure adequate drainage and egress (among other things) which further reduces flood risks to property and residents. The Cities of Belton, Harker Heights, Killeen, Morgan's Point Resort, Nolanville, Salado, and Temple have adopted stormwater ordinances to

⁶ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.

SECTION 10: FLOOD

manage stormwater runoff and mitigate flooding. All NFIP participating jurisdictions are considering adopting higher regulatory NFIP standards to limit or further regulate floodplain development.

The flood hazard areas throughout Bell County are subject to periodic inundation, which may adversely affect public safety, resulting in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief. Flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities, and by the occupancy of flood hazard areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, flood-proofed, or otherwise protected from flood damage. Mitigation actions are included to address flood maintenance issues as well, including routinely clearing debris from roadside ditches and bridges, and expanding drainage culverts and storm water structures to convey flood water more adequately.

It is the purpose of Bell County and the participating jurisdictions to continue to promote public health, safety, and general welfare by minimizing public and private losses due to flood conditions in specific areas. All participating communities in the planning area are guided by their local Flood Damage Prevention Ordinance. These communities will continue to comply with NFIP requirements through their local permitting, inspection, and record-keeping requirements for new and substantially developed construction. Further, the NFIP program promotes sound development in floodplain areas and includes provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in floodplains;
- Help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood blight areas; and
- Ensure that potential buyers are notified that property is in a flood area.

In order to accomplish these tasks, Bell County and participating NFIP jurisdictions seek to observe the following guidelines in order to achieve flood mitigation:

- Restrict or prohibit uses that are dangerous to health, safety, or property in times of flood, such as filling or dumping, that may cause excessive increases in flood heights or velocities;
- Require that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction, as a method of reducing flood losses;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of floodwaters;
- Control filling, grading, dredging, and other development, which may increase flood damage; and

SECTION 10: FLOOD

- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

NFIP COMPLIANCE AND MAINTENANCE

All NFIP participating jurisdictions have developed mitigation actions that relate to either NFIP maintenance or compliance. Compliance and maintenance actions can be found in Section 23.

Flooding was identified as a high-risk hazard during hazard ranking activities at the Risk Assessment Workshop by the majority of the planning team. As such, many of the mitigation actions were developed with flood mitigation in mind. A majority of these flood actions address compliance with the NFIP and implementing flood awareness programs. All participating jurisdictions recognize the need and are working towards adopting higher NFIP regulatory standards to further minimize flood risk in their community. In addition, each jurisdiction is focusing on public flood awareness activities. This includes promoting the availability of flood insurance by placing NFIP brochures and flyers in public libraries or public meeting places in participating jurisdictions.

Each NFIP participating jurisdiction in this planning process has a designated floodplain administrator. All floodplain administrators in the planning area will continue to maintain compliance with the NFIP, including continued floodplain administration, zoning ordinances, and development regulation. The floodplain ordinance adopted by each participating jurisdiction outlines the minimum requirements for development in Special Flood Hazard Areas.

All participating jurisdictions have a permitting process in place and each local floodplain administrator is responsible for coordinating inspections of damaged homes located in the floodplain. Following a flood event, local officials inspect damaged homes to make a substantial damage determination. Substantially damaged homes must be brought into compliance. Similarly, proposed improvements to homes located in the floodplain are reviewed by local building officials to determine if a substantial improvement is proposed. The floodplain administrator oversees permitted repairs and improvements to ensure compliance during the rebuilding or improvement process.

REPETITIVE LOSS

The Flood Mitigation Assistance (FMA) Grant Program under FEMA provides federal funding to assist states and communities in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to buildings that are insured under the National Flood Insurance Program. The Texas Water Development Board (TWDB) administers the FMA grant program for the State of Texas. One of the goals of the FMA program is to reduce the burden of repetitive loss and severe repetitive loss properties on the NFIP through mitigation activities that significantly reduce or eliminate the threat of future flood damages.

Repetitive Loss properties are defined as structures that are:

- Any insurable building for which 2 or more claims of more than \$1,000 each, paid by the National Flood Insurance Program (NFIP) within any 10-year period, since 1978;
- May or may not be currently insured under the NFIP.

Severe Repetitive Loss properties are defined as structures that are:

SECTION 10: FLOOD

- Covered under the NFIP and have at least 4 flood related damage claim payments (building and contents) over \$5,000.00 each, and the cumulative amount of such claims payments exceed \$20,000; or
- At least 2 separate claim payments (building payments only) have been made, with the cumulative amount of the building portion of such claims exceeding the market value of the building.

In either scenario, at least 2 of the referenced claims must have occurred within any 10-year period and must be greater than 10 days apart.⁷ Table 10-8 shows repetitive loss and severe repetitive loss properties for Bell County. There are no repetitive or severe repetitive loss properties reported for the City of Bartlett, City of Holland, City of Nolanville, City of Little River Academy, and City of Rogers.

Table 10-8. Repetitive Loss and Severe Repetitive Loss Properties

JURISDICTION	BUILDING TYPE ⁸	NUMBER OF STRUCTURES	NUMBER OF LOSSES
Bell County	Single Family	21	48
City of Belton	Single Family	3	7
City of Harker Heights	Single Family	9	26
City of Harker Heights	Non-Resident	1	2
City of Killeen	Single Family	11	24
City of Killeen	Non-Resident	2	4
City of Killeen	2-4 Family	1	2
City of Morgan's Point Resort	Single Family	1	2
Village of Salado	Single Family	6	12
City of Temple	Single Family	8	17
City of Troy	Single Family	1	2

⁷ Source: Texas Water Development Board.

⁸ Some structures assumed to be single family residential.



SECTION 11

HAIL

SECTION 11: HAIL

Hazard Description	1
Location	1
Extent.....	2
Historical Occurrences.....	3
Significant Events	7
Probability of Future Events.....	7
Vulnerability and Impact.....	7
Assessment of Impacts	11
Climate Change Considerations	12

HAZARD DESCRIPTION



Hailstorm events are a potentially damaging outgrowth of severe thunderstorms. During the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere, and the subsequent cooling of the air mass. Frozen droplets gradually accumulate into ice crystals until they fall as precipitation that is round or irregularly shaped masses of ice typically greater than 0.75 inches in diameter. The size of hailstones is a direct result of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a by-product of heating on the Earth's surface. Higher temperature gradients above Earth's surface result in increased suspension time and hailstone size.

According to the National Insurance Crime Bureau (NICB), between 2018 and 2020 the State of Texas had the greatest number of hail loss claims in the U.S. with 605,866 loss claims (23 percent of total hail claims in the U.S.) due to hail events. In this two-year period Texas experienced a total of 584 severe hail days. Five of the top ten cities for hail loss claims between 2017 and 2019 were in Texas, three of which were in the Dallas-Fort Worth metropolitan area.¹

In 2021, 6.8 million properties in the U.S. experienced one or more damaging hail events, resulting in a total of \$16.5 billion in insured losses. Texas had the highest number of properties affected by hail with over 1.5 million properties or 17 percent of total properties in the state affected; an increase of 80,000 properties affected between 2020 and 2021. Texas hailstorms accounted for almost a quarter of total U.S. properties affected by hail in 2021.

LOCATION

Hailstorms are an extension of severe thunderstorms that could potentially cause severe damage. As a result, they are not confined to any specific geographic location and can vary greatly in size, location, intensity, and duration. Therefore, the entire Bell County planning area, including all

¹ Manasek, Thomas, "2018-2020 United States Hail Loss Claims and Questionable Claims" (National Insurance Crime Bureau, March 15, 2021). <http://www.rmiaa.org/downloads/PUBLIC%202018%20-%202020%20Hail%20foreCAST-%20TJM.pdf>

SECTION 11: HAIL

participating jurisdictions and the CTCOG, is equally at risk to the hazard of hail. Refer to Figure 11-1 for the location of past hail events in the planning area.

EXTENT

The National Weather Service (NWS) classifies a storm as “severe” if there is hail three-quarters of an inch in diameter (approximately the size of a penny) or greater, based on radar intensity or as seen by observers. The intensity category of a hailstorm depends on hail size and the potential damage it could cause, as depicted in the National Centers for Environmental Information (NCEI) Intensity Scale in Table 11-1.

Table 11-1. Hail Intensity and Magnitude²

SIZE CODE	INTENSITY CATEGORY	SIZE (diameter inches)	DESCRIPTIVE TERM	TYPICAL DAMAGE
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33 – 0.60	Marble	Slight damage to plants and crops
H2	Potentially Damaging	0.60 – 0.80	Dime	Significant damage to plants and crops
H3	Severe	0.80 – 1.20	Nickel	Severe damage to plants and crops
H4	Severe	1.2 – 1.6	Quarter	Widespread glass and auto damage
H5	Destructive	1.6 – 2.0	Half Dollar	Widespread destruction of glass, roofs, and risk of injuries
H6	Destructive	2.0 – 2.4	Ping Pong Ball	Aircraft bodywork dented and brick walls pitted
H7	Very Destructive	2.4 – 3.0	Golf Ball	Severe roof damage and risk of serious injuries
H8	Very Destructive	3.0 – 3.5	Hen Egg	Severe damage to all structures
H9	Super Hailstorms	3.5 – 4.0	Tennis Ball	Extensive structural damage, could cause fatal injuries
H10	Super Hailstorms	4.0 +	Baseball	Extensive structural damage, could cause fatal injuries

The intensity scale in Table 11-1 ranges from H0 to H10, with increments of intensity or damage potential in relation to hail size (distribution and maximum), texture, fall speed, speed of storm translation, and strength of the accompanying wind. Based on the best available data regarding the previous occurrences for the area, the Bell County planning area may experience hailstorms

² NCEI Intensity Scale, based on the TORRO Hailstorm Intensity Scale.

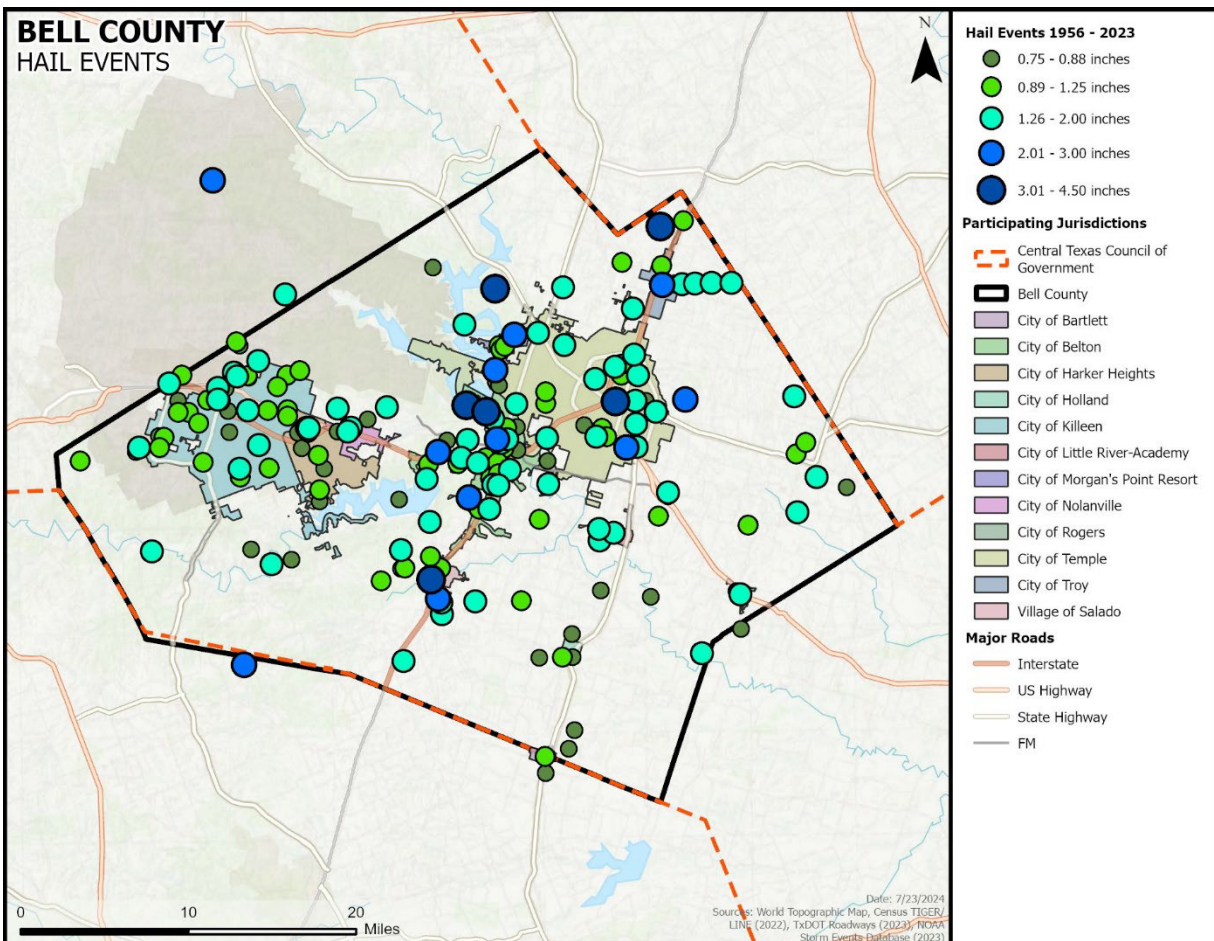
SECTION 11: HAIL

ranging from an H0 (pea size) to an H10 (baseball size). The largest size hail to be reported was 5.68 inches in diameter, or a H10, which is considered a very destructive hailstorm that can cause extensive structural damages and fatal injuries. The hailstorm occurred in the Village of Salado on April 12, 2022. Refer to the Historical Occurrences section below for more details on this event. This is likely the greatest extent the planning area can anticipate in the future based on historical events.

HISTORICAL OCCURRENCES

Historical evidence shown in Figure 11-1 demonstrates that the planning area is vulnerable to hail events overall. Historical events with reported damages, injuries, or fatalities are shown in Table 11-2. A total of 367 reported historical hail events impacted the Bell County planning area between 1956 and 2023; these events were reported to NCEI and NOAA databases and may not represent all hail events to have occurred during the past 68 years. Only those events for the Bell County planning area with latitude and longitude available were plotted (Figure 11-1). Historical hail events for the CTCOG are provided in the county and jurisdictional events below as they do not have events reported separate and apart from the NCEI database.

Figure 11-1. Spatial Historical Hail Events, 1956-2023



SECTION 11: HAIL

Table 11-2. Damaging Historical Hail Events, 1956-2023³

JURISDICTION	DATE	MAGNITUDE (inches)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Temple	6/27/1995	1.75	0	0	\$582,600	\$0
City of Killeen	4/20/2006	1.75	0	0	\$7,300	\$0
City of Killeen	5/5/2006	2.75	0	0	\$14,600	\$0
Village of Salado	6/3/2007	1.25	0	0	\$1,400	\$0
Bell County	4/25/2008	1.75	0	0	\$6,900	\$0
Bell County	4/25/2008	1.75	0	0	\$6,900	\$0
Bell County	4/25/2008	4.25	0	0	\$41,400	\$0
Bell County	4/25/2008	2.75	0	0	\$34,500	\$0
Bell County	4/25/2008	2.5	0	0	\$34,500	\$0
City of Belton	4/25/2008	1.75	0	0	\$6,900	\$0
City of Belton	4/25/2008	2.75	0	0	\$27,600	\$0
City of Belton	4/25/2008	1.75	0	0	\$6,900	\$0
City of Belton	4/25/2008	1.75	0	0	\$55,100	\$0
City of Little River Academy	4/25/2008	1.75	0	0	\$6,900	\$0
Village of Salado	4/25/2008	1.75	0	0	\$6,900	\$0
City of Temple	4/25/2008	1.75	0	0	\$6,900	\$0
City of Temple	4/25/2008	1.75	0	0	\$6,900	\$0
City of Temple	5/9/2013	1.75	0	0	\$6,400	\$0
Bell County	3/28/2014	1.5	0	0	\$5,000	\$0
City of Belton	3/28/2014	2.75	0	0	\$125,300	\$0
City of Belton	3/28/2014	1.75	0	0	\$15,000	\$0
City of Belton	3/28/2014	1.75	0	0	\$25,100	\$0
City of Belton	3/28/2014	4.25	0	0	\$18,800	\$0
City of Killeen	3/28/2014	1.5	0	0	\$5,000	\$0
City of Nolanville	3/28/2014	1.75	0	0	\$18,800	\$0

³ Only recorded events with damages are listed. No reports of injuries or fatalities were recorded in the NCEI database.

SECTION 11: HAIL

JURISDICTION	DATE	MAGNITUDE (inches)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Village of Salado	3/28/2014	1.5	0	0	\$5,000	\$0
City of Belton	5/8/2014	1.75	0	0	\$24,900	\$0
Bell County	4/28/2016	2	0	0	\$24,800	\$0
City of Belton	4/28/2016	1.75	0	0	\$61,900	\$0
City of Temple	4/29/2016	1.75	0	0	\$24,800	\$0
Bell County	3/26/2017	1.75	0	0	\$6,100	\$0
Bell County	3/26/2017	1	0	0	\$12,100	\$0
City of Nolanville	3/26/2017	1.75	0	0	\$6,100	\$0
Bell County	3/27/2017	1.75	0	0	\$72,900	\$0
Village of Salado	6/16/2019	2	0	0	\$11,600	\$0
Bell County	5/3/2021	1.75	0	0	\$110,000	\$0
City of Nolanville	3/21/2022	0.75	0	0	\$6,100	\$0
Village of Salado	4/12/2022	4	0	0	\$1,084,500	\$0
Village of Salado	4/12/2022	5.68	0	0	\$542,300	\$0
City of Belton	4/12/2022	3	0	0	\$271,100	\$0
Bell County	4/12/2022	1.75	0	0	\$27,100	\$0
Bell County	4/12/2022	1.75	0	0	\$27,100	\$0
Bell County	4/12/2022	1.75	0	0	\$27,100	\$0
City of Belton	4/12/2022	1.75	0	0	\$27,100	\$0
City of Belton	4/12/2022	2	0	0	\$27,100	\$0
City of Belton	4/12/2022	2.25	0	0	\$27,100	\$0
Bell County	4/12/2022	1.75	0	0	\$27,100	\$0
City of Temple	4/12/2022	1.75	0	0	\$27,100	\$0
City of Temple	4/12/2022	1.75	0	0	\$27,100	\$0
City of Nolanville	4/12/2022	0.75	0	0	\$6,100	\$0
Bell County	10/24/2022	1.75	0	0	\$52,600	\$0
Bell County	11/11/2022	1.75	0	0	\$7,400	\$0

SECTION 11: HAIL

JURISDICTION	DATE	MAGNITUDE (inches)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Little River Academy	11/11/2022	2	0	0	\$3,200	\$0
Bell County	4/2/2023	1.75	0	0	\$103,400	\$0
City of Temple	4/26/2023	1.75	0	0	\$10,300	\$0
Bell County	4/28/2023	1.75	0	0	\$5,200	\$0
Bell County	6/10/2023	1.75	0	0	\$20,600	\$0
TOTALS		(Max Extent)	0	0	\$3,790,500	\$0

Table 11-3. Historical Hail Events Summary, 1956-2023⁴

JURISDICTION	NUMBER of EVENTS	MAX MAGNITUDE (inches)	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Bell County	165	4.5	0	0	\$652,700	\$0
City of Bartlett	3	1	0	0	\$0	\$0
City of Belton	51	4.25	0	0	\$719,900	\$0
City of Harker Heights	0	-	-	-	-	-
City of Holland	7	2.75	0	0	\$0	\$0
City of Killeen	43	4.5	0	0	\$26,900	\$0
City of Little River Academy	6	1.75	0	0	\$10,100	\$0
City of Morgan's Point Resort	0	-	-	-	-	-
City of Nolanville	12	2	0	0	\$37,100	\$0
City of Rogers	8	1.5	0	0	\$0	\$0
Village of Salado	25	5.68	0	0	\$1,651,700	\$0
City of Temple	40	4.5	0	0	\$692,100	\$0
City of Troy	7	4.5	0	0	\$0	\$0
CTCOG	0	-	-	-	-	-
TOTAL LOSSES	367	(Max Extent)	0	0	\$3,790,500	\$0

⁴ Participating jurisdictions with no reported events show a "-" in table columns where damages, deaths or injuries would be otherwise reported.

SECTION 11: HAIL

Based on the list of historical hail events for the Bell County planning area (listed above), 68 of the events have occurred since 2018 Plan according to reports in the NCEI database. Unincorporated Bell County has had the greatest number of events (165) over the reporting period followed by Cities of Belton (52) and Killeen (43).

SIGNIFICANT EVENTS

April 12, 2022

Thunderstorms developed along a dryline across North and Central Texas, producing all modes of severe weather. Extremely large hail occurred over parts of our Central Texas counties, where a record-breaking hailstone over 5.6 inches in length was documented in the Village of Salado. This event was very costly and widespread, impacting many jurisdictions.

This storm produced the largest recorded hailstone at the time, according to the National Weather Service. The large hail fell for several minutes. A tornado also occurred in the Village of Salado at this time. This is the costliest hail event reported across the Bell County planning area with a total of \$1,626,800 (2023 dollars) in damages for the Village of Salado alone.

Other jurisdictions also experienced large hail and subsequent damages including the City of Belton, City of Temple, and other unincorporated areas of Bell County. A trained spotter reported 3-inch diameter hail in the City of Belton which caused a total of \$352,400 (2023 dollars) in damages. In addition, hail at 1.75 inches in diameter was reported in the City of Temple which caused a total of \$54,200 (2023 dollars) in damages. Unincorporated areas of Bell County reported a total of \$108,400 (2023 dollars) in damages.

While there are no reported damages, hail was also reported in the City of Killeen (1.25 inches), the City of Nolanville (0.75), and the City of Rogers (1.25).

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 367 events in a 68-year reporting period for Bell County provides an average annual occurrence of five to six events per year. This frequency supports a “Highly Likely” probability of future events for the Bell County planning area, including all participating jurisdictions and the CTCOG. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are most damaged by hail.

Utility systems on roofs of buildings and critical facilities would be vulnerable and could be damaged. Hail could cause a significant threat to people, as they could be struck by hail and falling trees and branches. Outdoor activities and events may elevate the risk to residents and visitors when a hailstorm strikes with little warning. Portable buildings typically utilized by schools and commercial sites such as construction areas would be more vulnerable to hail events than the typical site-built structures.

The Bell County planning area features mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to hail events than typical site-built

SECTION 11: HAIL

structures. In addition, manufactured homes are located sporadically throughout the planning area, including all participating jurisdictions, which would also be more vulnerable. The U.S. Census data indicates a total of 9,516 (6 percent of total housing stock) manufactured homes located in the Bell County planning area. In addition, 30 percent (approximately 45,058 structures) of the housing structures in the Bell County planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events.

Table 11-4. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Bell County	45,058	9,516
City of Bartlett	469	57
City of Belton	2,992	361
City of Harker Heights	6,087	1,448
City of Holland	248	39
City of Killeen	16,684	1,882
City of Little River Academy	394	142
City of Morgan's Point Resort	384	164
City of Nolanville	274	727
City of Rogers	332	99
Village of Salado	230	20
City of Temple	13,425	988
City of Troy	276	27
CTCOG	1	N/A

While all citizens are at risk of the impacts of hail, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 15 percent of the planning area population live below the poverty level (Table 11-5). While warning times for this type of hazard events should be substantial enough for these individuals to seek shelter, the elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

SECTION 11: HAIL

Table 11-5. Populations at Greatest Risk by Jurisdiction⁵

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375
City of Harker Heights	3,280	1,906	4,632	3,931	5,934
City of Holland	210	111	178	179	60
City of Killeen	11,467	14,603	20,953	24,593	33,510
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

The Bell County Planning Team identified the following critical facilities (Table 11-6) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by hail events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 11-6. Critical Facilities Vulnerable to Hail

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency vehicles can be damaged by hailstones. Power outages could disrupt communications, delaying emergency response times.

⁵ US Census Bureau 2022 data for Bell County

SECTION 11: HAIL

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
	<ul style="list-style-type: none"> Accumulated hail on the streets may impede emergency response vehicle access to areas. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> Structures can be damaged by hailstones. Power outages could disrupt critical care. Backup power sources could be damaged. Evacuations may be necessary due to extended power outages, gas line ruptures, or structural damage to facilities. Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. Temporary break in operations may significantly inhibit post event evacuations. Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.
Commercial Supplier (Food, fuel, etc.)	<ul style="list-style-type: none"> Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Power outages could disrupt communications, delaying emergency response times. Accumulated hail on the streets may impede service response vehicle access to areas. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

There are no reports of injuries or fatalities from hail in Bell County. Overall, the average loss estimate of property and crops in the planning area is considered \$3,790,500 with an average annualized loss of \$55,700. Based on historic loss and damages, the impact of hail damages on the Bell County planning area can be considered “Limited” severity of impact, meaning minor quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed or with major damage.

Table 11-7. Estimated Annualized Losses by Jurisdiction

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Bell County	\$652,700	\$9,600
City of Bartlett	\$0	\$0
City of Belton	\$719,900	\$10,600

SECTION 11: HAIL

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
City of Harker Heights	-	-
City of Holland	\$0	\$0
City of Killeen	\$26,900	\$400
City of Little River Academy	\$10,100	\$100
City of Morgan's Point Resort	-	-
City of Nolanville	\$37,100	\$500
City of Rogers	\$0	\$0
Village of Salado	\$1,651,700	\$24,300
City of Temple	\$692,100	\$10,200
City of Troy	\$0	\$0
CTCOG	-	-
TOTALS	\$3,790,500	\$55,700

ASSESSMENT OF IMPACTS

Hail events have the potential to pose a significant risk to people and can create dangerous situations. Hail conditions can be frequently associated with a variety of impacts, including:

- Hail may create hazardous road conditions during and immediately following an event, potentially delaying critical staff from reporting for duty as well as delaying first responders from providing for or preserving public health and safety and.
- Individuals and first responders who are exposed to the storm may be struck by hail, falling branches, or downed trees resulting in injuries or possible fatalities.
- Large hail events will likely cause extensive roof damage to residential structures along with siding damage and broken windows, creating a spike in insurance claims and a rise in premiums, and potentially result in physical harm to occupants.
- Automobile damage may be extensive depending on the size of the hail and length of the storm.
- Hail events can result in power outages over widespread areas increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- First responders are exposed to downed power lines, damaged structures, hazardous spills, and debris that often accompany hail events, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.

SECTION 11: HAIL

- Some businesses not directly damaged by the hail event may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damage without a backup power source.
- Depending on the severity and scale of damage caused by large hail events, damage to power transmission and distribution infrastructure can require days or weeks to repair.
- A significant hail event could significantly damage agricultural crops, resulting in extensive economic losses for the community and surrounding area.
- Hail events may injure or kill livestock and wildlife or destroy wildlife habitat.
- A large hail event could impact the accessibility of recreational areas and parks due to extended power outages or debris clogged access roads.
- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are 74 historical sites listed on the National Register of Historic Places for Bell County.

The economic and financial impacts of hail will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning conducted by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of any hail event.

CLIMATE CHANGE CONSIDERATIONS

Although the impact of climate change on the frequency and severity of hail events is uncertain, some climate studies attempt to give insight on the future conditions of hailstorms. As ocean temperatures rise due to climate change, more moisture is evaporating into the atmosphere. The warm and moist air masses that fuel severe weather may become more unstable on average, which could favor the increased development of thunderstorms and hail. However, it is also suggested that in a warming climate, the average melting level will rise in thunderstorms, meaning small hailstones will have more of a chance to melt as they fall to the ground. Therefore, hail may become less frequent, but large hail can be expected when it does occur, leading to the possibility of increased damages.⁶

⁶ Yale Climate Connections, Hailstorms and Climate Change, March 17, 2022.



SECTION 12
**HURRICANE /
TROPICAL STORM**

SECTION 12: HURRICANE / TROPICAL STORM

Hazard Description	1
Location	1
Extent.....	2
Historical Occurrences.....	2
Significant Events	4
Probability of Future Events.....	5
Vulnerability and Impact.....	6
Assessment of Impacts	9
Climate Change Considerations	10

HAZARD DESCRIPTION

According to the National Oceanic and Atmospheric Administration (NOAA), a hurricane is an intense tropical weather system of strong thunderstorms with well-defined surface circulation and maximum sustained winds of 74 mph or higher. In the Northern Hemisphere, circulation of winds near the Earth's surface is counterclockwise.

Hurricanes often begin as tropical depressions that intensify into tropical storms when maximum sustained winds increase to between 35–64 knots (39–73 mph). At these wind speeds, the storm becomes more organized and circular in shape and begins to resemble a hurricane. Tropical storms can be equally problematic without ever becoming a hurricane. Tropical storms resulting in high winds and heavy rainfall can be dangerous to people and property, as Tropical Storm Frances was for southeast Texas in September 1998. Once sustained winds reach or exceed 74 mph, the storm becomes a hurricane. The intensity of a landfalling hurricane is expressed in categories relating wind speeds to potential damage. Tropical storm-force winds are strong enough to be dangerous to those caught in them. For this reason, emergency managers plan to have evacuations completed and personnel sheltered before winds of tropical storm-force arrive, which precedes the arrival of hurricane-force winds.



LOCATION

The location of the Bell County planning area is approximately 230 miles from the coast making the planning area vulnerable to threats directly and indirectly related to a hurricane event, such as high-force winds and flooding. While Bell County is not located along the Gulf Coast, due to the regional nature of hurricanes and tropical storms, the County is exposed and susceptible to the impacts of hurricane and tropical storm events. Hurricanes and tropical storms can impact Bell County from June to November, the official Atlantic U.S. hurricane season. Bell County planning area is in a low risk area for hurricane wind speeds up to 200 miles per hour (mph).

SECTION 12: HURRICANE / TROPICAL STORM

EXTENT

As a hurricane develops, the barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour, the storm is deemed a hurricane.

Hurricanes are categorized according to the strength and intensity of their winds using the Saffir-Simpson Hurricane Scale (Table 12-1). A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest. However, a lower category storm can inflict greater damage than higher category storms depending on where they strike, the amount of storm surge, other weather they interact with, and how slow they move.

Table 12-1. Extent Scale for Hurricanes¹

CATEGORY	MAXIMUM SUSTAINED WIND SPEED (mph)	MINIMUM SURFACE PRESSURE (millibars)	STORM SURGE (feet)
1	74 – 95	Greater than 980	3 – 5
2	96 – 110	979 – 965	6 – 8
3	111 – 130	964 – 945	9 – 12
4	131 – 155	944 – 920	13 – 18
5	155+	Less than 920	19+

Based on the historical storm tracks, most hurricanes turn into tropical storms by the time they reach Bell County, however, the average estimated extent to be mitigated for is a Category 3 storm².

HISTORICAL OCCURRENCES

Bell County is located inland and is not directly along the coastline. As hurricanes typically form over the ocean and affect coastal areas, Bell County is less prone to direct impacts from hurricanes. The hurricanes usually fade and downgrade to tropical storms or tropical depressions as they move away from the coast. However, it is important to note that the remnants of tropical systems, including hurricanes, can still bring heavy rainfall and potential flooding to inland areas.

Hurricanes and tropical storms do not typically track across the planning area. The last known system to track across Bell County was Tropical Storm Bill in 2015. While tropical storms and hurricanes frequently make landfall along the Gulf Coast, these systems weaken over land. By the time these systems reach the planning area they have typically been downgraded to a tropical storm or tropical depression. Historical systems that have tracked in close proximity to the

¹ Source: National Hurricane Center, https://www.nhc.noaa.gov/HAW2/english/basics/saffir_simpson.shtml

² Determined by the storm category recorded at landfall.

SECTION 12: HURRICANE / TROPICAL STORM

planning area, bringing storm systems, excessive precipitation and potentially damaging wind to Bell County, including participating jurisdictions and the CTCOG, are listed in Table 12-2 below.

According to the historical hurricane tracks from NOAA's National Hurricane Center, there have been 17 storms that are known to have come within 60 miles of the Bell County planning area from 1961 through 2023.

Table 12-2. Historical Hurricane/Tropical Storm Events, 1961-2023³

DATE	STORM NAME	CATEGORY (Max)
9/3/1961 - 9/18/1961	Carla	Category 4
6/22/1968 - 6/26/1968	Candy	Tropical Storm
9/12/1970 - 9/19/1970	Felice	Tropical Storm
9/1/1970 -9/2/1970	Unnamed	Tropical Depression
9/1/1973 - 9/7/1973	Delia	Tropical Storm
8/29/1974-9/10/1974	Carmen	Category 4
7/15/1979-7/29/1979	Claudette	Tropical Storm
8/15/1983-8/21/1983	Alicia	Category 3
7/30/1989 - 8/03/1989	Chantal	Category 1
9/8/1993 - 9/14/1993	Lidia	Category 4
7/28/1995 - 8/2/1995	Dean	Tropical Storm
9/8/1998 - 9/13/1998	Frances	Tropical Storm
6/05/2001 - 6/19/2001	Allison	Tropical Storm
8/30/2003-9/2/2003	Grace	Tropical Storm
8/3/2008 - 8/6/2008	Edouard	Tropical Storm
8/23/2022-8/26/2022	Hermine	Tropical Storm
6/16/2015 - 6/21/2015	Bill	Tropical Storm

Table 12-3 lists the storms that have impacted the Bell County planning area from 1961 through 2023 as reported in the NCEI. The CTCOG did not report any events separate and apart from the NCEI database. Not all events are recorded in the NCEI, so damages and events are often unreported or underreported. Historical hurricane data for Bell County is provided on a countywide basis per the NCEI and NOAA databases. Table 12-3 includes storm event impacts directly

³ Source: NOAA Historical Hurricane Tracks, <https://coast.noaa.gov/hurricanes/#map=4/32/-80>

SECTION 12: HURRICANE / TROPICAL STORM

related to hurricane or tropical storm events. These impacts were reported under flood events associated with heavy precipitation from tropical systems.

Table 12-3. Historical Flood Events, 1996-2023⁴

JURISDICTION	DATE	TROPICAL SYSTEM	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	9/7/2010	Tropical Storm Hermine	1	0	\$4,067,600	\$0
City of Holland	6/17/2015	Hurricane Bill	0	0	\$186,200	\$0
City of Nolanville	6/17/2015	Hurricane Bill	1	0	\$37,200	\$0
Total Losses			2	0	\$4,291,000	\$0

Based on the list of historical hurricane events for Bell County planning area, no events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

There have been 4 declared disasters and emergency declarations between 1996 and 2023 (Table 12-4). These declarations were related to Hurricane Katrina, Hurricane Rita, and Hurricane Ike.

Table 12-4. Disaster Declarations for Hurricane/Tropical Storm, 1996-2023

YEAR	DECLARATION TITLE	DECLARATION TYPE	DISASTER NO.
2005	Hurricane Katrina in Texas	EM	3216
2005	Hurricane Rita in Texas	EM	3261
2005	Hurricane Rita in Texas	DR	1606
2008	Hurricane Ike in Texas	EM	3294

September 7, 2010 – Tropical Storm Hermine

The remnants of Tropical Storm Hermine moved through north and central Texas dropping several inches of water in some locations and producing 8 tornadoes. On September 9, 2010, Bell County and 39 other counties were included in a disaster declaration.

In the City of Killeen, Highway 190 was closed due to flood waters. Residents were evacuated from an apartment complex on Watercrest Drive due to rising waters, and numerous cars with occupants were submerged. There was one fatality in the City of Killeen when a vehicle was submerged in flood waters on Reese Creek Road. Homes near the Towns of Elms and Robinette had to be evacuated by boat. In the City of Nolanville, a car was swept away, and a mobile home park was evacuated resulting in the rescue of 40 people. Salado Creek in the Village of Salado flooded the access roads of Interstate 35 and destroyed several businesses and residential structures along the creek. A bridge on Armstrong Road which crossed Salado Creek was washed

⁴ Values are in 2023 dollars.

SECTION 12: HURRICANE / TROPICAL STORM

away. Numerous roads were also flooded in the City of Temple. There were 17 businesses and 26 residences affected by the flood waters in the City of Belton. This event caused \$4,067,600 (2023 dollars) in damages across Bell County.

The City of Harker Heights was especially impacted by the tropical storm with several areas and neighborhoods experiencing intense flooding. Booker Park was completely covered in water, and several major roads were closed and damaged. Residents needed to be rescued from flooded homes, and nearly 50 evacuees were sheltered. The wastewater plant was damaged, resulting in a disruption of critical services.

Figure 12-1. Tropical Storm Damage in the City of Harker Heights



June 17, 2015 – City of Holland and City of Nolanville – Tropical Depression Bill

Tropical Depression Bill brought flooding to parts of central Texas. Heavy rainfall resulted in flooding in both the City of Holland and City of Nolanville. The local newspaper reported that streets were impassable and several homes flooded. In the City of Holland, the city hall, the police station, the fire department, and a recording studio were damaged. In the City of Nolanville, a young boy was swept into a drainage culvert near Avenue H and 10th Street after losing his footing when approaching whirling high waters in the culvert, and unfortunately passed away. This event caused \$223,400 (2023 dollars) in damages.

PROBABILITY OF FUTURE EVENTS

Based on historical occurrences of significant hurricane events, including storms that tracked in close proximity to the planning area, the probability of future events is considered “Occasional”, with an event probable in the next five years for Bell County planning area, including all

SECTION 12: HURRICANE / TROPICAL STORM

participating jurisdictions and the CTCOG. Impacts of climate change are not expected to increase the average frequency of events but may lead to an increase in the intensity of these storms. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Hurricane and tropical storm events can cause major damage to large areas; hence, all existing buildings, facilities, and populations are equally exposed and vulnerable to this hazard and could potentially be impacted. Bell County planning area features multiple mobile or manufactured home parks throughout the planning area. These mobile home parks are typically more vulnerable to hurricane events than typical site-built structures. The U.S. Census data indicates a total of 9,516 (6 percent of total housing stock) manufactured homes located in the Bell County planning area. In addition, 30 percent (approximately 45,058 structures) of the housing structures in the Bell County planning area were built before 1980.⁵ These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant events.

Table 12-5. Structures at Greater Risk⁶

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Bell County	45,058	9,516
City of Bartlett	469	57
City of Belton	2,992	361
City of Harker Heights	6,087	1,448
City of Holland	248	39
City of Killeen	16,684	1,882
City of Little River Academy	394	142
City of Morgan's Point Resort	384	164
City of Nolanville	274	727
City of Rogers	332	99
Village of Salado	230	20
City of Temple	13,425	988
City of Troy	276	27

⁵ Source: US Census Bureau data estimates for 2022.

⁶ US Census Bureau American Community Survey Five-Year Estimates 2018-2022 data for Bell County.

SECTION 12: HURRICANE / TROPICAL STORM

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
CTCOG	1	N/A

Bell County identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by hurricane and tropical storm events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 12-6. Critical Facilities Vulnerable to Hurricane and Tropical Storm Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency vehicles can be damaged by falling trees or flying debris. Power outages could disrupt communications, delaying emergency response times. Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. Debris/downed trees can impede emergency response vehicle access to areas. Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> Structures can be damaged by falling trees or flying debris. Power outages could disrupt critical care. Backup power sources could be damaged. Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. Evacuations may be necessary due to extended power outages, gas line ruptures, or structural damages to facilities.
Commercial Supplier (Food, fuel, etc.)	<ul style="list-style-type: none"> Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed. Additional emergency responders and critical aid workers may not be able to reach the area for days.

SECTION 12: HURRICANE / TROPICAL STORM

CRITICAL FACILITIES	POTENTIAL IMPACTS
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency vehicles can be damaged by falling trees or flying debris. Power outages could disrupt communications, delaying emergency response times. Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. Debris/downed trees can impede emergency response vehicle access to areas. Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.

Table 12-7 shows impact or loss estimation for storms impacting Bell County. Damages within the NCEI database are reported on a countywide basis. Annual loss estimates were based on the 28-year reporting period for such damages⁷. The average annual loss estimate for the Bell County planning area is approximately \$153,250 (2023 dollars).

Table 12-7. Summary of Hurricane Events and Potential Annualized Losses, 1996-2023⁸

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Bell County	\$4,067,600	\$145,271
City of Bartlett	-	-
City of Belton	-	-
City of Harker Heights	-	-
City of Holland	\$186,200	\$6,650
City of Killeen	-	-
City of Little River Academy	-	-
City of Morgan's Point Resort	-	-
City of Nolanville	\$37,200	\$1,329

⁷ Historical damage estimates are recorded in the NCEI with records starting in 1996. Average annualized losses are calculated on this 28-year reporting period of available data. NOAA Office of Coastal Management provides hurricane tracking data for events over the last 175 years, thus allowing historical events to begin in 1961 (Table 12-2).

⁸ Values are in 2023 dollars.

SECTION 12: HURRICANE / TROPICAL STORM

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
City of Rogers	-	-
Village of Salado	-	-
City of Temple	-	-
City of Troy	-	-
CTCOG	-	-
Planning Area	\$4,291,000	\$153,250

Historical structure and infrastructure damages indicate a Minor severity of impact due to tropical storm systems with a complete shutdown of critical facilities for up to one week, and 10 percent or more of property destroyed or with major damage. However, with two reported fatalities, the severity of impact is considered “Substantial” with multiple deaths possible depending on the size, duration and severity of the event.

ASSESSMENT OF IMPACTS

Hurricane and tropical storm events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. The impact of climate change could produce larger, more severe hurricane events, exacerbating the current hurricane impacts. Impacts to the planning area can include:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Driving conditions in the planning area may be dangerous during a hurricane event, especially over elevated bridges, elevating the risk of injury and accidents during evacuations if not timed properly.
- Emergency evacuations may be necessary prior to a hurricane landfall, requiring emergency responders, evacuation routing, and temporary shelters.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- During hurricane landfall, first responders may be prevented from responding to calls as the winds may reach a speed in which their vehicles and equipment are unsafe to operate.
- Hurricane events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Extended power outages can also be deadly for individuals reliant on electricity to live independently in their homes.

SECTION 12: HURRICANE / TROPICAL STORM

- Extreme hurricane events may rupture gas lines and down trees and power lines, increasing the risk of structure fires during and after a storm event.
- Extreme hurricane events may lead to prolonged evacuations during search and rescue, and immediate recovery efforts requiring additional emergency personnel and resources to prevent entry, protect residents, and protect property.
- First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.
- Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.
- Critical staff may be unable to report for duty, limiting response capabilities.
- County and City departments may be damaged, delaying response and recovery efforts for the entire community.
- Private sector entities that the County, Cities, Village, and residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Some businesses not directly damaged by the hurricane may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to hurricane damage. In Bell County, 30 percent of homes were built before 1980, and 74 buildings and sites in the County are on the National Register of Historic Places, many of which pre-date modern building codes.
- Vegetation in the City urban parks may become flattened or oversaturated from high winds and heavy rains.
- Large scale hurricanes can have significant economic impact on the affected area, as it must now fund expenses such as infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damage without a backup power source.
- As the Bell County planning area continues to increase in population, the number of people and housing developments exposed to the hazard increases. Continued public education on the planning area's risks to hurricane and tropical storm events will continue to be key to the Planning Team's overall mitigation strategy.

The economic and financial impacts of hurricane events on the area will depend on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any hurricane event.

CLIMATE CHANGE CONSIDERATIONS

Hurricane and tropical storm events have the potential to pose a significant risk to people and property. Such events can create dangerous situations for public health and safety officials and

SECTION 12: HURRICANE / TROPICAL STORM

cause catastrophic damages. The impact of climate change could produce larger, more severe hurricane events, exacerbating the current hurricane impacts. The economic and financial impacts of hurricanes and tropical storms will depend entirely on the scale of the events, what is damaged, and how quickly repairs to critical components of the economy can be implemented.

The current climate assessment report for Texas indicates an expected increase in the intensity of very strong hurricanes, despite an expected lack of increase, or even a decrease, in hurricane frequency overall. Different research studies have produced some conflicting results. While some recent research has pointed to an apparent trend for U.S. tropical cyclones to move more slowly at landfall, much like Hurricane Harvey, other research suggests that Texas may be spared from such a slowdown. At this point, the enhanced risk is difficult to quantify, but substantial scientific progress on this topic is likely as climate models become better able to simulate the observed spatial distribution, frequency, and intensity of hurricanes.⁹

⁹ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.



SECTION 13 **LIGHTNING**

SECTION 13: LIGHTNING

Hazard Description	1
Location	1
Extent.....	1
Historical Occurrences.....	2
Significant Events	4
Probability of Future Events.....	4
Vulnerability and Impact.....	5
Assessment of Impacts	9
Climate Change Considerations	9

HAZARD DESCRIPTION

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a “bolt” when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning often strikes outside of heavy rain and might occur as far as 10 miles away from any rainfall.

According to the National Weather Service (NWS), the 10-year (2012–2021) average for fatalities is 23 people with an average of 300 injuries in the United States each year by lightning. Lightning can occur as cloud to ground flashes or as intra-cloud lightning flashes. Direct lightning strikes can cause significant damage to buildings, critical facilities, infrastructure, and communication equipment affecting emergency response. Lightning is also responsible for igniting wildfires that can result in widespread damages to property before firefighters have the ability to contain and suppress the resultant fire.

LOCATION

Lightning can strike in any geographic location and is considered a common occurrence in Texas. The Bell County planning area is in a region of the country that is moderately susceptible to a lightning strike. Therefore, lightning could occur at any location within the entire planning area. It is assumed that the entire Bell County planning area, including all participating jurisdictions and the CTCOG, is uniformly exposed to the threat of lightning.

EXTENT

According to the 2023 Annual Lightning Report by Vaisala, the State of Texas ranks tenth in the U.S. for lightning strike density with an average of 157.7 flashes per square mile.¹ Vaisala’s U.S. National Lightning Detection Network lightning flash density map shows an average of 195.3 lightning events per square mile per year for the Bell County planning area. This rate equates to

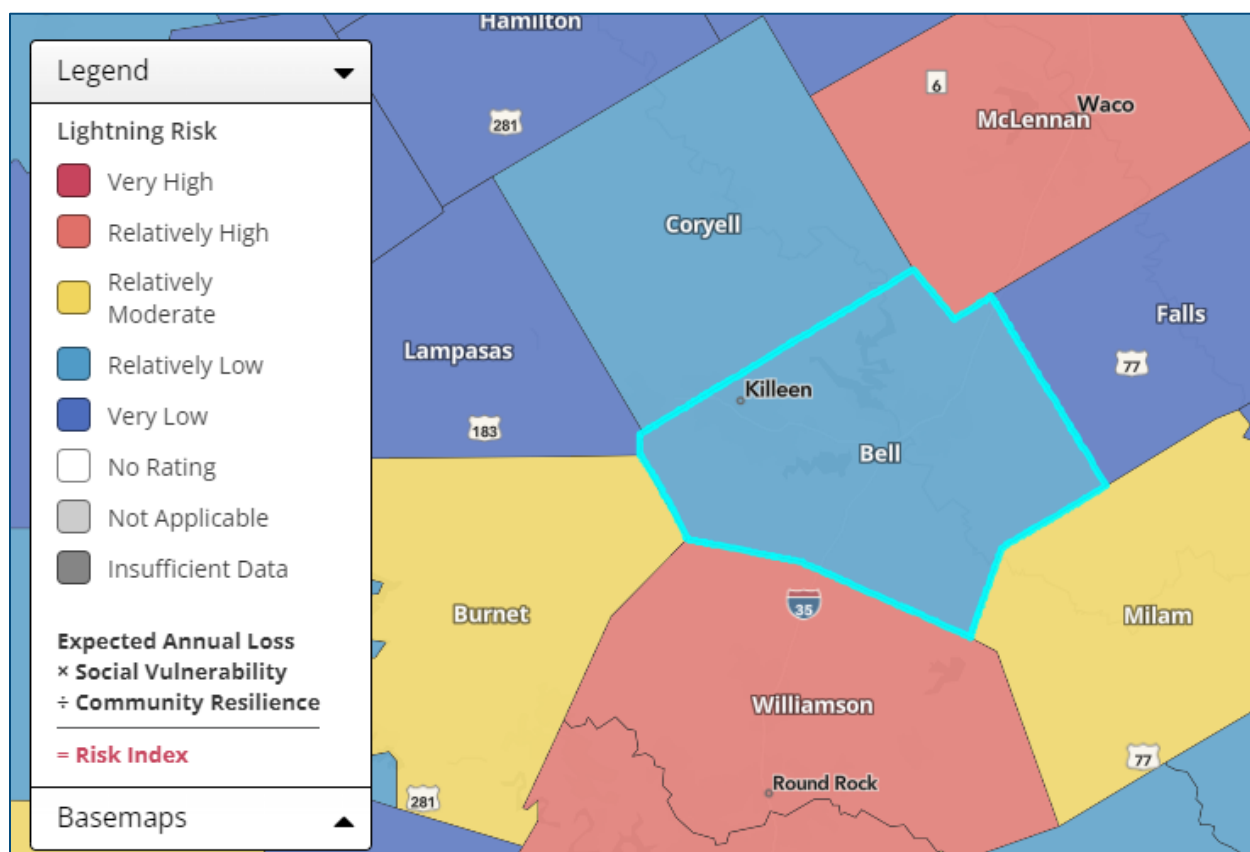
¹ Source: <https://www.xweather.com/annual-lightning-report>

SECTION 13: LIGHTNING

approximately 212,500 flashes per year for the entire planning area, or six to seven flashes per 15-minute interval during storm events.

FEMA's National Risk Index includes an analysis of the planning area's expected annual loss and the community's risk factor which incorporates social vulnerability as well as community resilience to determine the lightning risk for the area, compared to the rest of the United States. Bell County is located in an area where the extent is classified as relatively low (Figure 13-1).

Figure 13-1. Bell County Lightning Risk, National Risk Index, June 2024²



HISTORICAL OCCURRENCES

NCEI database indicates 12 lightning events for the Bell County planning area between 1996 and 2023. It is highly likely multiple lightning occurrences have gone unreported before and during the recording period. The NCEI is a national data source organized under the National Oceanic and Atmospheric Administration and considered a reliable resource for hazards. However, the flash density for the planning area along with input from local team members indicates regular lightning occurrences that simply have not been reported.

Historical lightning data for the CTCOG does not have events reported separately and apart from the reported county and city events. The CTCOG did not report any losses due to lightning.

² Source: Map | National Risk Index, <https://hazards.fema.gov/nri/map>

SECTION 13: LIGHTNING

Table 13-1. Historical Lightning Events, 1996-2023³

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Temple	8/29/1998	0	0	\$45,300	\$0
City of Belton	9/2/1999	0	0	\$17,600	\$0
City of Belton	3/28/2006	0	0	\$192,700	\$0
City of Belton	6/28/2006	0	0	\$73,000	\$0
City of Temple	12/29/2006	0	0	\$88,100	\$0
Bell County	7/31/2009	0	0	\$1,400	\$0
Bell County	7/31/2009	0	0	\$550,100	\$0
Bell County	11/1/2010	0	0	\$135,400	\$0
Bell County	6/18/2015	0	0	\$9,900	\$0
Bell County	8/30/2015	0	1	\$0	\$0
Bell County	4/27/2016	0	0	\$14,900	\$0
City of Temple	9/2/2020	2	0	\$68,300	\$0
TOTALS		2	1	\$1,196,700	

Table 13-2. Historical Lightning Events Summary, 1996-2023⁴

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGES	CROP DAMAGES
Bell County	6	0	1	\$711,700	\$0
City of Bartlett	-	-	-	-	-
City of Belton	3	0	0	\$283,300	\$0
City of Harker Heights	-	-	-	-	-
City of Holland	-	-	-	-	-
City of Killeen	-	-	-	-	-
City of Little River Academy	-	-	-	-	-
City of Morgan's Point Resort	-	-	-	-	-
City of Nolanville	-	-	-	-	-
City of Rogers	-	-	-	-	-

³ Values are in 2023 dollars. Database was searched for events between 1996 and 2023. Discrepancies in calculations may occur due to rounding of damage estimates when inflating to 2023 dollars.

⁴ Participating jurisdictions with no reported events show a "-" in table columns where damages, deaths or injuries would be otherwise reported.

SECTION 13: LIGHTNING

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGES	CROP DAMAGES
Village of Salado	-	-	-	-	-
City of Temple	3	2	0	\$201,700	\$0
City of Troy	-	-	-	-	-
CTCOG	0	-	-	-	-
TOTALS	12	2	1	\$1,196,700	\$0

Based on the list of historical lightning events for the Bell County planning area, including participating jurisdictions and the CTCOG, there has been one reported event since the 2018 Plan.

SIGNIFICANT EVENTS

March 28, 2006 – City of Belton

During a thunderstorm on the morning of March 28, lightning struck a utility box at a home north of the City of Belton. The resulting fire led to the one-story brick house being completely destroyed. Property damages from this event were estimated at \$192,700 (2023 dollars).

July 31, 2009 – Bell County

Afternoon thunderstorms developed near a stalled frontal boundary across the central portions of the state. Isolated events of damaging winds occurred in Bell County, with damage also reported in Coryell and Johnson counties. In Bell County, a house on Jewel Lane near Stillhouse Hollow Lake was destroyed by a fire started by lightning. Another lightning strike near the Copperas Cove Solid Waste Department on South FM 116 damaged the phone line and a computer in the building. In total, lightning caused \$551,500 (2023 dollars) in reported property damage in Bell County during this event.

August 30, 2015 – Bell County

On August 30, a 10-year-old girl was struck by lightning on Landfill Road in the City of Holland in Bell County while playing under a tree. She was hospitalized for several days.

September 2, 2020 – City of Temple

An upper-level trough moved very slowly from the Rockies into the Plains during the first week of September, resulting in several days of showers and thunderstorms. Many storms became strong with gusty winds and hail, but the primary result was heavy rain and flooding. In the City of Temple, a lightning strike from the storm caused a house fire which resulted in the deaths of an elderly couple who lived there. Additionally, \$68,300 (in 2023 dollars) of property damage was reported for this lightning event.

PROBABILITY OF FUTURE EVENTS

Based on historical records and input from the planning team the probability of occurrence for future lightning events in the Bell County planning area is considered “Highly Likely”, or an event probable in the next year. The planning team stated that lightning occurs regularly in the area. According to the 2023 Annual Lightning Report by Vaisala, the Bell County planning area, including participating jurisdictions and the CTCOG, are in an area of the country that experiences

SECTION 13: LIGHTNING

approximately 195.3 lightning flashes per square mile per year (approximately 212,500 total flashes per year). Given this estimated probability of events, it can be expected that future lightning events will continue to threaten life and cause minor property damage throughout the planning area. Impacts of climate change are not expected to increase the average frequency of lightning events but may lead to an increase in the intensity of events when they do occur. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since lightning events can occur at different strength levels, in random locations, and can create a broad range of damage depending on the strike location. Due to the randomness of these events, all existing and future structures and facilities in the Bell County planning area, including all participating jurisdictions and the CTCOG, could potentially be impacted and remain vulnerable to possible injury and property loss from lightning strikes.

The direct and indirect losses associated with these events include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on community resources. The entire population of the Bell County planning area, including participating jurisdictions and the CTCOG, are considered exposed to the lightning hazard. The peak lightning season in the State of Texas is from June to August; however, the most fatalities occur in July. CTCOG does not currently have any employees who work outdoors, and therefore do not face elevated risk of lightning strikes during working hours. Fatalities occur most often when people are outdoors and/or participating in some form of recreation. The population located outdoors during a lightning event is considered at risk and more vulnerable to a lightning strike compared to those inside a structure. Moving to a lower risk location will decrease a person's vulnerability.

The entire general building stock and all infrastructure of the Bell County planning area are considered exposed to the lightning hazard. Lightning can be responsible for damages to buildings, cause electrical, forest and/or wildfires, and damage infrastructure such as power transmission lines and communication towers.

While all citizens are at risk to the impacts of lightning, forced relocation and disaster recovery disproportionately impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 15 percent of the planning area population live below the poverty level. In addition, people who speak a language other than English (18% of the population) may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. These and other key vulnerable populations within the planning area are provided by jurisdiction in Table 13-3.

SECTION 13: LIGHTNING

Table 13-3. Populations at Greatest Risk by Jurisdiction⁵

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375
City of Harker Heights	3,280	1,906	4,632	3,931	5,934
City of Holland	210	111	178	179	60
City of Killeen	11,467	14,603	20,953	24,593	33,510
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

Table 13-4. Outdoor Operating Employees by Participating Special District

PARTICIPANT	EMPLOYEES OPERATING OUTDOORS
CTCOG	0

The Bell County Planning Team identified the following critical facilities (Table 13-5) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by lightning events. For a comprehensive list by participating jurisdiction, please see Appendix C.

⁵ US Census Bureau, American Community Survey Five-Year Estimates, 2022

SECTION 13: LIGHTNING

Table 13-5. Critical Facilities Vulnerable to Lightning Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> • Emergency operations and services may be significantly impacted due to power outages, damaged facilities, fires and/or loss of communications as a result of lightning strikes. • Emergency vehicles, including critical equipment, can be damaged by lightning strikes or by falling trees damaged by lightning. • Power outages could disrupt communications, delaying emergency response times. • Downed trees due to lightning strikes can impede emergency response vehicle access to areas. • Lightning strikes can be associated with structure fires and wildfires, further straining the capacity and resources of emergency personnel. • Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> • Structures can be damaged by falling trees damaged by lightning. • Power outages could disrupt critical care. • Backup power sources could be damaged. • Evacuations may be necessary due to extended power outages, fires, or other associated damages to facilities.
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none"> • Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. • Essential supplies like medicines, water, food, and equipment deliveries may be delayed. • Economic disruption due to power outages and fires negatively impact airport services as well as area businesses reliant on airport operations.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> • Emergency operations and critical services may be significantly impacted due to power outages, damaged facilities, fires and/or loss of communications as a result of lightning strikes. • Emergency vehicles, including critical equipment, can be damaged by lightning strikes or by falling trees damaged by lightning. • Power outages could disrupt communications, delaying emergency response times. • Downed trees due to lightning strikes can impede emergency response vehicle access to areas. • Lightning strikes can be associated with structure fires and wildfires, further straining the capacity and resources of emergency personnel.

SECTION 13: LIGHTNING

CRITICAL FACILITIES	POTENTIAL IMPACTS
	<ul style="list-style-type: none"> Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

There have been relatively limited historical losses and damages to property as a result of lightning events in Bell County, which would indicate a Limited severity of impact with critical facilities and services shutdown for 24 hours or less, and less than 10 percent of property destroyed or with major damage. However, the Bell County planning area has also experienced two reported deaths and one injury due to lightning strikes. Because of this, in relation to the population, a “Substantial” severity of impact may be anticipated for the Bell County planning area, including all participating jurisdictions and the CTCOG, with multiple deaths possible.

Overall, the total loss estimate for the planning area (2023 dollars) is considered \$1,196,700 with an average annualized loss of \$42,700 (Table 13-6).

Table 13-6. Potential Annualized Losses by Jurisdiction⁶

JURISDICTION	TOTAL PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Bell County	\$711,700	\$25,400
City of Bartlett	-	-
City of Belton	\$283,300	\$10,100
City of Harker Heights	-	-
Town of Holland	-	-
City of Killeen	-	-
City of Little River Academy	-	-
City of Morgan's Point Resort	-	-
City of Nolanville	-	-
City of Rogers	-	-
Village of Salado	-	-
City of Temple	\$201,700	\$7,200
City of Troy	-	-
CTCOG	-	-
PLANNING AREA	\$1,196,700	\$42,700

⁶ Damage values are in 2023 dollars. Participating jurisdictions with no reported events show a “-” in table columns where damages would be otherwise reported. Discrepancies in calculations may occur due to rounding of damage estimates when inflating to 2023 dollars.

SECTION 13: LIGHTNING

ASSESSMENT OF IMPACTS

Lightning events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. Additional impacts to the planning area can include:

- The Bell County planning area features developed parks and green spaces. Lightning events could impact recreational activities, placing residents and visitors in imminent danger, potentially requiring emergency services or park evacuation.
- Older structures built to less stringent building codes may suffer greater damage from a lightning strike as they are typically built with less fire-resistant materials and often lack any fire mitigation measures such as sprinkler systems. 30 percent of homes in the County were built before 1980. Similarly, historic buildings may lack fire mitigation materials or measures due to their historic status. Currently, 74 sites and districts in the Bell County planning area are listed on the National Register of Historic Places.
- Vegetation in urban parks may be destroyed by lightning caused brush fires and result in poor air quality impacting public health.
- Individuals exposed to the storm can be directly struck, posing significant health risks and potential death.
- Structures can be damaged or crushed by falling trees damaged by lightning, which can result in physical harm to the occupants.
- Lightning strikes can result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Lightning strikes can be associated with structure fires and wildfires, creating additional risk to residents and first responders.
- Emergency operations and services may be significantly impacted due to power outages and/or loss of communications.
- County and city departments may be damaged, delaying response and recovery efforts for the entire community.
- Economic disruption due to power outages and fires negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Some businesses not directly damaged by lightning events may be negatively impacted while utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damage without a backup power source.

The economic and financial impacts of lightning on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any significant lightning event.

CLIMATE CHANGE CONSIDERATIONS

As CO₂ increases and the land surface warms, stronger updrafts are more likely to produce lightning. In a climate with double the amount of CO₂, we may see fewer lightning storms overall,

SECTION 13: LIGHTNING

but 25 percent stronger storms, with a 5 percent increase in lightning. Lightning damage is also likely to increase because of its role in igniting forest fires, where dry vegetation, also caused by rising temperatures, creates more 'fuel' for fires, so even a small climate change may have huge consequences. While the impact climate change will have on our weather still remains uncertain, researchers agree that implementing simple measures like lightning detection systems and installing grounding systems in buildings could go a long way in avoiding deaths and injuries.⁷

Lightning events have the potential to pose a significant risk to people and property throughout the planning area. The economic and financial impacts of lightning on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. While no increase in the number of hazard events is anticipated, the impact of the hazard may see an increase in losses. As populations grow and urban development continues to rise, the overall vulnerability and impact are expected to increase in the next five years.

⁷ Environmental Journal, Nathan Neal, January 11, 2021.



SECTION 14 **THUNDERSTORM WIND**

SECTION 14: THUNDERSTORM WIND

Hazard Description	1
Location	1
Extent.....	2
Historical Occurrences.....	3
Significant Events	11
Probability of Future Events.....	12
Vulnerability and Impact.....	12
Assessment of Impacts	17
Climate Change Considerations	18

HAZARD DESCRIPTION

Thunderstorms create extreme wind events which includes straight line winds. Wind is the horizontal motion of the air past a given point, beginning with differences in air pressures. Pressure that is higher at one place than another sets up a force pushing from high toward low pressure; the greater the difference in pressures, the stronger the force. The distance between the area of high pressure and the area of low pressure also determines how fast the moving air accelerates.

Thunderstorms are created when heat and moisture near the Earth's surface are transported to the upper levels of the atmosphere. By-products of this process are the clouds, precipitation, and wind that become the thunderstorm.

According to the National Weather Service (NWS), a thunderstorm occurs when thunder accompanies rainfall. Radar observers use the intensity of radar echoes to distinguish between rain showers and thunderstorms.



Straight line winds are responsible for most thunderstorm wind damages. One type of straight-line wind, the downburst, is a small area of rapidly descending air beneath a thunderstorm. A downburst can cause damage equivalent to a strong tornado and make air travel extremely hazardous.

LOCATION

Thunderstorm wind events can develop in any geographic location and are considered a common occurrence in Texas. Therefore, a thunderstorm wind event could occur at any location within the Bell County planning area. These storms develop randomly and are not confined to any geographic area within the County. It is assumed that the entire Bell County planning area, including all participating jurisdictions and the CTCOG, is uniformly exposed to the threat of thunderstorm winds.

SECTION 14: THUNDERSTORM WIND

EXTENT

The extent or magnitude of a thunderstorm wind event is measured by the Beaufort Wind Scale. Table 14-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

Table 14-1. Beaufort Wind Scale¹

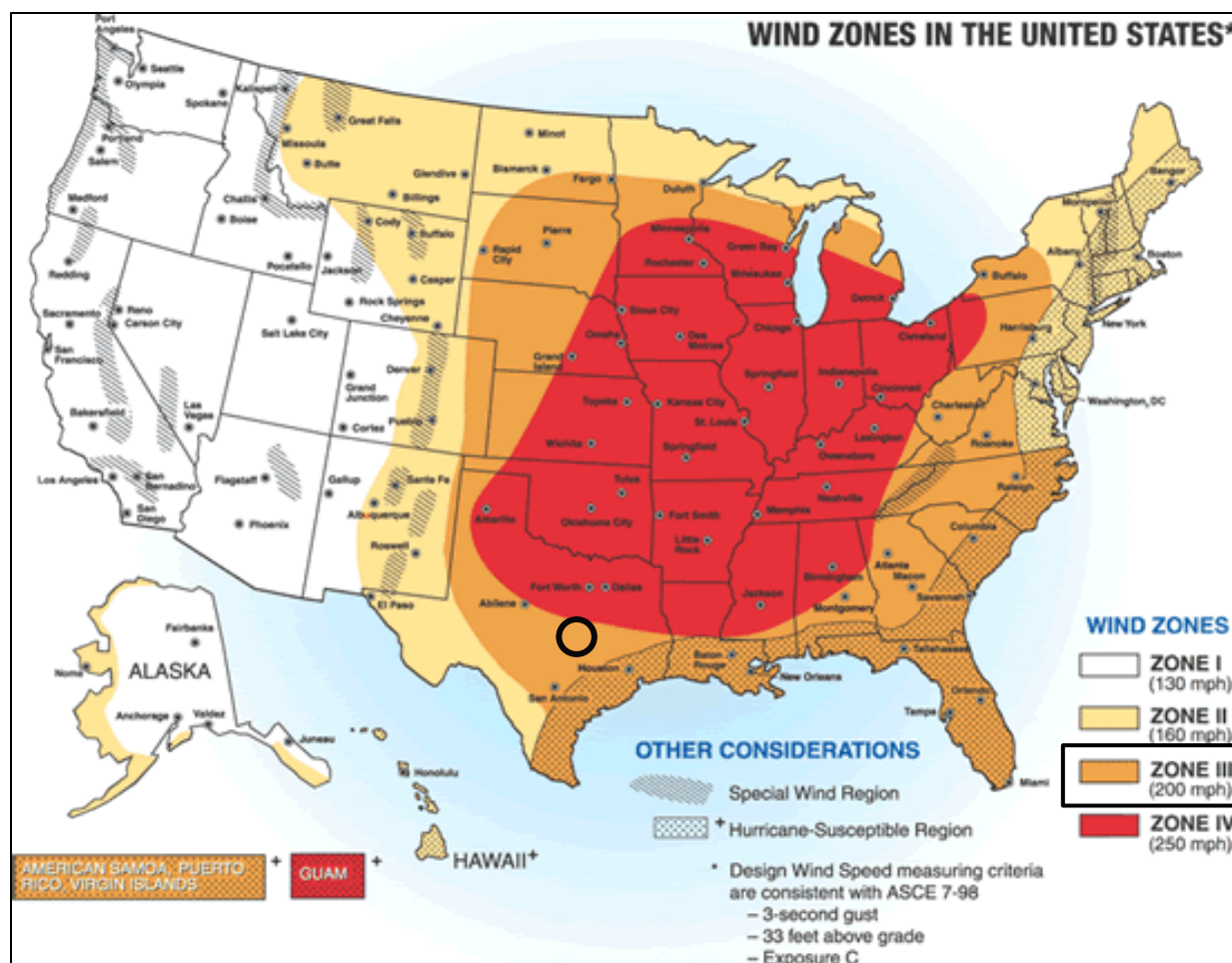
FORCE	WIND (mph)	WIND (knots)	WMO CLASSIFICATION	APPEARANCE OF WIND EFFECTS
0	Less than 1	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	4-6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	7-10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-18	11-16	Moderate Breeze	Dust, leaves and loose paper lifted, small tree branches move
5	19-24	17-21	Fresh Breeze	Small trees in leaf begin to sway
6	25-31	22-27	Strong Breeze	Larger tree branches moving, whistling in wires
7	32-38	28-33	Near Gale	Whole trees moving, resistance felt walking against wind
8	39-46	34-40	Gale	Whole trees in motion, resistance felt walking against wind
9	47-54	41-47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	48-55	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	64-72	56-63	Violent Storm	If experienced on land, widespread damage
12	72-83	64-71	Hurricane	Violence and destruction

Figure 14-1 displays the wind zones as derived from NOAA.

¹ Source: World Meteorological Organization

SECTION 14: THUNDERSTORM WIND

Figure 14-1. Wind Zones in the United States²



On average, the planning area experiences four to five thunderstorm wind events every year. The Bell County planning area is located within Wind Zone III, meaning it can experience winds up to 200 mph. The Bell County planning area has experienced a significant wind event, or an event with winds in the range of “Force 12” on the Beaufort Wind Scale with winds above 72 mph. This is the worst to be anticipated for the entire planning area based on historic events.

Based on a search of past events between 1957 through 2023, the greatest magnitude wind event that Bell County planning area recorded was 89 knots, or 102 mph, during an event occurring on March 19, 2002.

HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration. The NCEI is the largest archive available for historic storm events data; however, it is important to note that only incidents recorded in the NCEI have been factored into this risk assessment unless otherwise noted. It is likely that a high number of occurrences have gone unreported over the past 67 years.

² Bell County planning area is indicated by the black circle.

SECTION 14: THUNDERSTORM WIND

Tables 14-2 and 14-3 depict historical occurrences of thunderstorm wind events for the Bell County planning area according to the NCEI database.

Since 1957, 288 thunderstorm wind events are known to have occurred in the Bell County planning area. Based on NCEI data, 153 of these events resulted in damages. Table 14-3 presents information on known historical events impacting the Bell County planning area, resulting in damages, injuries, or fatalities. The strongest event reported in the planning area occurred in Bell County on March 19, 2002, with reported wind speeds of 89 knots, or 102 mph. Historical thunderstorm wind data for CTCOG does not have events reported separately and apart from the reported county and city events. CTCOG did not report any losses due to thunderstorm wind.

It is important to note that high wind events associated with other hazards, such as tornadoes, are not accounted for in this section. Property damage estimates are not always available. Where an estimate has been provided in a table for losses, the dollar amounts have been modified for inflation to indicate the damage in 2023 dollars.

Table 14-2. Historical Thunderstorm Wind Speeds, 1957-2023

MAXIMUM WIND SPEED RECORDED (knots)	NUMBER OF REPORTED EVENTS
0-30	1
31-40	5
41-50	41
51-60	96
61-70	34
71-80	7
81-90	2
91-100+	0
Unknown	102

Table 14-3. Historical Thunderstorm Wind Events, 1957-2023³

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Harker Heights	4/17/1993	0	0	0	\$102,800	\$0
City of Nolanville	4/17/1993	0	0	0	\$102,800	\$0
City of Killeen	4/29/1993	0	0	0	\$102,800	\$0
City of Killeen	5/13/1994	0	0	0	\$10,000	\$0

³ Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2023 dollars.

SECTION 14: THUNDERSTORM WIND

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Nolanville	5/13/1994	0	0	0	\$100,400	\$0
Bell County	5/26/1994	61	0	0	\$100,400	\$0
City of Killeen	5/29/1994	0	0	0	\$10,000	\$0
City of Killeen	7/13/1994	0	0	0	\$99,800	\$0
City of Killeen	6/10/1995	0	0	0	\$68,000	\$0
City of Nolanville	6/10/1995	0	0	0	\$38,800	\$0
Bell County	6/27/1995	0	0	0	\$2,913,200	\$0
City of Belton	6/27/1995	74	0	0	\$485,500	\$0
City of Belton	6/27/1995	69	0	0	\$388,400	\$0
City of Temple	6/27/1995	78	0	1	\$631,200	\$0
City of Temple	6/27/1995	0	0	0	\$145,700	\$0
City of Killeen	8/30/1995	0	0	0	\$290,600	\$0
City of Belton	9/7/1995	0	0	0	\$3,900	\$0
Bell County	4/19/1996	-	0	0	\$18,900	\$0
City of Belton	5/30/1996	-	0	0	\$9,500	\$0
City of Killeen	5/30/1996	-	0	0	\$5,700	\$0
Bell County	9/18/1996	74	0	0	\$9,400	\$0
City of Rogers	9/18/1996	-	0	0	\$3,800	\$0
Bell County	11/7/1996	-	0	3	\$280,100	\$0
City of Killeen	11/7/1996	80	0	0	\$840,300	\$0
City of Killeen	11/24/1996	-	0	0	\$9,300	\$0
City of Temple	3/1/1997	-	0	0	\$92,600	\$0
City of Belton	4/4/1997	-	0	0	\$3,700	\$0
City of Temple	4/4/1997	-	0	0	\$1,800	\$0
City of Belton	4/20/1997	-	0	0	\$3,700	\$0
City of Nolanville	5/30/1997	-	0	0	\$46,200	\$0
City of Bartlett	7/6/1997	-	0	0	\$7,400	\$0
City of Bartlett	2/25/1998	-	0	0	\$36,600	\$0

SECTION 14: THUNDERSTORM WIND

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Killeen	2/25/1998	-	0	0	\$137,200	\$0
City of Belton	4/26/1998	-	0	0	\$1,800	\$0
Bell County	7/14/1998	-	0	0	\$27,200	\$0
City of Troy	7/14/1998	-	0	0	\$1,800	\$0
City of Killeen	7/17/1998	-	0	0	\$3,600	\$0
City of Belton	8/29/1998	-	0	0	\$3,600	\$0
City of Temple	8/29/1998	-	0	0	\$18,100	\$0
Bell County	10/17/1998	-	0	0	\$90,300	\$0
City of Killeen	10/17/1998	-	0	0	\$180,600	\$0
City of Killeen	10/17/1998	-	0	0	\$180,600	\$0
City of Holland	5/10/1999	0	0	0	\$200	\$0
Bell County	8/28/1999	-	0	0	\$1,800	\$0
City of Belton	3/10/2000	-	0	0	\$3,500	\$0
City of Temple	3/26/2000	-	0	0	\$86,500	\$0
City of Killeen	3/28/2000	-	0	0	\$3,500	\$0
Bell County	5/6/2001	-	0	0	\$16,700	\$0
Bell County	5/6/2001	-	0	0	\$16,700	\$0
City of Rogers	5/6/2001	52	0	0	\$3,300	\$0
Village of Salado	5/6/2001	-	0	0	\$41,700	\$0
Village of Salado	5/6/2001	-	0	0	\$3,300	\$0
City of Rogers	8/26/2001	60	0	0	\$5,000	\$0
Village of Salado	11/15/2001	-	0	0	\$41,700	\$0
City of Temple	8/3/2002	52	0	0	\$41,000	\$0
City of Killeen	3/4/2004	61	0	0	\$47,400	\$0
City of Killeen	6/4/2004	52	0	0	\$3,100	\$0
City of Killeen	6/4/2004	52	0	0	\$3,100	\$0
City of Nolanville	6/4/2004	52	0	0	\$7,800	\$0
City of Temple	11/23/2004	52	0	0	\$1,600	\$0

SECTION 14: THUNDERSTORM WIND

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Temple	5/8/2005	52	0	0	\$114,300	\$0
City of Nolanville	5/28/2005	50	0	0	\$7,600	\$0
City of Belton	6/1/2005	50	0	0	\$7,600	\$0
City of Temple	6/1/2005	60	0	0	\$60,900	\$0
Bell County	7/11/2005	50	0	0	\$15,200	\$0
City of Troy	7/12/2005	50	0	0	\$30,300	\$0
City of Temple	10/31/2005	50	0	0	\$22,300	\$0
Bell County	4/18/2006	50	0	0	\$14,700	\$0
Bell County	4/18/2006	50	0	0	\$7,300	\$0
Bell County	4/18/2006	50	0	0	\$7,300	\$0
Bell County	4/20/2006	74	0	4	\$1,469,800	\$0
City of Belton	4/20/2006	61	0	0	\$29,400	\$0
City of Temple	4/20/2006	50	0	0	\$14,700	\$0
City of Temple	4/28/2006	65	0	0	\$88,200	\$0
Bell County	6/17/2006	35	0	0	\$14,600	\$0
Bell County	6/18/2006	31	0	0	\$1,500	\$0
City of Belton	7/22/2006	50	0	0	\$101,900	\$0
City of Temple	10/18/2006	50	0	0	\$4,400	\$0
Bell County	11/15/2006	42	0	0	\$29,400	\$0
Bell County	3/12/2007	41	0	0	\$1,400	\$0
City of Killeen	5/24/2007	51	0	0	\$35,600	\$0
Bell County	1/6/2008	28	0	0	\$1,400	\$0
City of Temple	4/10/2008	56	0	0	\$103,400	\$0
Bell County	5/13/2008	56	0	0	\$20,500	\$0
City of Belton	5/14/2008	56	0	0	\$34,200	\$0
City of Little River Academy	5/14/2008	65	0	0	\$478,500	\$0
City of Rogers	5/14/2008	56	0	0	\$41,000	\$0

SECTION 14: THUNDERSTORM WIND

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Village of Salado	5/14/2008	61	0	0	\$136,700	\$0
Village of Salado	5/14/2008	65	0	0	\$68,400	\$0
Village of Salado	5/14/2008	50	0	0	\$68,400	\$0
Village of Salado	5/14/2008	56	0	0	\$41,000	\$0
Village of Salado	5/14/2008	61	0	0	\$27,300	\$0
Village of Salado	7/8/2008	52	0	0	\$16,200	\$0
City of Belton	7/14/2008	50	0	0	\$26,900	\$0
Bell County	7/31/2008	50	0	0	\$1,300	\$0
City of Troy	2/10/2009	70	0	0	\$69,800	\$0
Bell County	4/2/2009	36	0	0	\$9,700	\$0
City of Bartlett	4/27/2009	52	0	0	\$4,200	\$0
City of Killeen	7/31/2009	50	0	0	\$1,400	\$0
Bell County	8/12/2009	50	0	0	\$2,700	\$0
City of Belton	8/12/2009	50	0	0	\$13,700	\$0
City of Holland	3/24/2010	50	0	0	\$700	\$0
Bell County	4/23/2010	54	0	0	\$5,400	\$0
City of Temple	4/23/2010	63	0	0	\$6,800	\$0
Bell County	4/26/2010	52	0	0	\$1,400	\$0
Bell County	4/26/2010	52	0	0	\$1,400	\$0
City of Troy	4/26/2010	56	0	0	\$8,200	\$0
City of Killeen	5/17/2010	55	0	0	\$6,800	\$0
City of Temple	5/17/2010	52	0	0	\$40,700	\$0
Bell County	2/1/2011	47	0	0	\$16,100	\$0
Bell County	5/11/2011	52	0	0	\$13,100	\$0
Bell County	5/11/2011	56	0	0	\$2,600	\$0
City of Temple	5/11/2011	56	0	0	\$19,700	\$0
City of Belton	9/26/2011	52	0	0	\$6,500	\$0
City of Temple	9/26/2011	56	0	0	\$19,600	\$0

SECTION 14: THUNDERSTORM WIND

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Temple	9/26/2011	58	0	0	\$2,600	\$0
Bell County	6/12/2012	52	0	0	\$11,600	\$0
City of Temple	6/12/2012	43	0	0	\$6,500	\$0
City of Rogers	6/20/2012	50	0	0	\$9,000	\$0
Bell County	2/10/2013	48	0	0	\$6,400	\$0
Bell County	2/10/2013	56	0	0	\$3,800	\$0
City of Temple	2/10/2013	65	0	0	\$63,800	\$0
Bell County	2/25/2013	47	0	0	\$95,700	\$0
Bell County	5/9/2013	63	0	0	\$25,400	\$0
Bell County	5/10/2013	52	0	0	\$6,400	\$0
City of Belton	5/21/2013	56	0	0	\$38,100	\$0
City of Belton	10/26/2013	55	0	0	\$12,700	\$0
City of Belton	10/26/2013	52	0	0	\$1,300	\$0
Bell County	3/28/2014	58	0	0	\$3,800	\$0
City of Belton	3/28/2014	56	0	0	\$18,800	\$0
City of Temple	3/28/2014	52	0	0	\$6,300	\$0
Bell County	5/8/2014	51	0	0	\$7,500	\$0
City of Belton	10/2/2014	50	0	0	\$1,200	\$0
Bell County	6/18/2015	51	0	0	\$1,200	\$0
Bell County	6/18/2015	51	0	0	\$600	\$0
Bell County	8/25/2015	40	0	0	\$8,700	\$0
City of Temple	8/25/2015	40	0	0	\$9,900	\$0
Bell County	3/8/2016	43	0	0	\$8,700	\$0
City of Belton	6/19/2019	55	0	0	\$11,600	\$0
City of Belton	6/19/2019	56	0	0	\$4,600	\$0
City of Bartlett	4/9/2020	55	0	0	\$1,700	\$0
Village of Salado	4/9/2020	52	0	0	\$1,200	\$0
City of Temple	4/29/2020	56	0	0	\$3,500	\$0

SECTION 14: THUNDERSTORM WIND

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Temple	5/27/2020	61	0	0	\$5,800	\$0
City of Troy	4/8/2021	56	0	0	\$5,500	\$0
City of Troy	4/8/2021	56	0	0	\$1,100	\$0
Bell County	6/21/2021	56	0	0	\$10,900	\$0
City of Killeen	7/19/2021	50	0	0	\$2,200	\$0
Bell County	9/28/2021	60	0	0	\$10,800	\$0
Bell County	9/28/2021	56	0	0	\$2,200	\$0
Bell County	10/24/2022	61	0	0	\$10,500	\$0
Bell County	4/2/2023	65	0	0	\$7,200	\$0
Bell County	6/10/2023	61	0	4	\$10,300	\$0
TOTALS		(MAX EXTENT)	0	12	\$11,769,200	\$0

Table 14-4. Summary of Historical Events by Jurisdiction, 1957-2023

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	152	89	0	11	\$5,429,700	\$0
City of Bartlett	7	57	0	0	\$49,900	\$0
City of Belton	28	74	0	0	\$1,212,100	\$0
City of Harker Heights	1	0	0	0	\$102,800	\$0
City of Holland	3	61	0	0	\$900	\$0
City of Killeen	27	80	0	0	\$2,041,600	\$0
City of Little River Academy	1	65	0	0	\$478,500	\$0
City of Morgan's Point Resort	-	-	-	-	-	-
City of Nolanville	7	52	0	0	\$303,600	\$0
City of Rogers	6	60	0	0	\$62,100	\$0
Village of Salado	12	65	0	0	\$445,900	\$0
City of Temple	36	78	0	1	\$1,525,400	\$0
City of Troy	8	70	0	0	\$116,700	\$0

SECTION 14: THUNDERSTORM WIND

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
CTCOG	0	-	-	-	-	-
TOTALS	288	(MAX EXTENT)	0	12	\$11,769,200	

Based on the list of historical thunderstorm wind events for the Bell County planning area, 14 events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

June 27, 1995 – Bell County

During the early evening hours on June 27th, severe thunderstorms developed across the south-central portion of north Texas along an outflow boundary. One of these severe storms moved across Fort Cavazos and into Bell County producing large hail and up to 90 mph winds resulting in extensive wind damage. Property damage from this event was estimated at \$2,913,200 (2023 dollars).

November 7, 1996 – City of Killeen

During the late evening hours on November 7th, severe thunderstorms developed across Bell County. Wind gusts estimated at 80 mph damaged homes, lifted the roof off one home, and blew down trees and power lines. Wind gusts measured at 92 mph at the Killeen Municipal Airport destroyed a hangar and two planes within the hangar. Reports estimated property damage at \$840,300 (2023 dollars).

April 20, 2006 – Bell County

During the early evening hours on the 20th, severe thunderstorms developed in Bell County. Winds exceeding 80 mph led to at least 20 mobile homes being damaged or destroyed, with several being rolled off of their foundations and virtually disintegrated. Numerous barns and outbuildings were also destroyed. Total property damage was estimated at \$1,469,800 (2023 dollars). In addition to the property damages, four people were injured during this thunderstorm wind event.

June 20, 2012 – City of Rogers

Scattered afternoon thunderstorms developed in a moisture rich and unstable environment. Penny and nickel sized hail was reported in Robertson County, and thunderstorm winds damaged a manufactured home in Bell County. Strong thunderstorm winds damaged a manufactured home near the City of Rogers. Part of the siding of the home was ripped off and part of the metal roof was peeled back. In Bell County, property damage was estimated at \$9,000 (2023 dollars).

October 26, 2013 – City of Belton

Severe thunderstorms developed as a strong shortwave and cold front moved into the region. Approximately half of the trees in Yettie Polk State Park were uprooted or heavily damaged by thunderstorm winds, and the park had to be closed. Crews from the public works department worked overnight to remove debris from roadways. Power lines were also knocked down in the park. Two event reports for this event were made for Bell County, and in total these reports estimated at \$14,000 (2023 dollars).

SECTION 14: THUNDERSTORM WIND

June 19, 2019 – City of Belton

A hot and unstable airmass assisted in the formation of strong to severe thunderstorms as a cold front worked its way south of the Red River on the afternoon and evening of June 19th. The primary severe occurrence was large hail, followed by damaging winds and flash flooding as storms moved southeast into the overnight hours. Broadcast media reported wind damage to a restaurant in the City of Belton. Two different reports were recorded for the City of Belton for this event, and the total property damage estimated between them was \$16,200 (2023 dollars).

June 10, 2023 – Bell County

A complex of storms in the Plains sent an outflow boundary south into North Texas the morning of Saturday June 10. The outflow boundary served as focus for thunderstorm development later that afternoon and evening. Parts of Central Texas experienced winds of 70-80 mph. At Fort Cavazos, a wind gust of 70 mph damaged several tents belonging to a military unit that was in the field. Four soldiers sustained injuries when the tents were damaged; all the injuries were minor and the soldiers were returned to duty. Damages were estimated at \$10,300 (2023 dollars) for this thunderstorm wind event.

PROBABILITY OF FUTURE EVENTS

Most thunderstorm winds occur during the spring and fall seasons and during the months of March, April, May, and September. Based on available records of historic events, there have been a total of 288 events in a 67-year reporting period, which provides a probability of four to five events every year. Even though the intensity of thunderstorm wind events is not always damaging for the Bell County planning area, the frequency of occurrence for a thunderstorm wind event is “Highly Likely.” This means that an event is probable within the next year for the Bell County planning area, including all participating jurisdictions and the CTCOG. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since thunderstorm wind events can occur at different strength levels, in random locations, and can create relatively narrow paths of destruction. Due to the randomness of these events, all existing and future structures, and facilities within the Bell County planning area, including all participating jurisdictions and the CTCOG, could potentially be impacted and remain vulnerable to possible injury and property loss from strong winds.

Trees, power lines and poles, signage, manufactured housing, radio towers, concrete block walls, storage barns, windows, garbage receptacles, brick facades, and vehicles, unless reinforced, are vulnerable to thunderstorm wind events. More severe damage involves windborne debris; in some instances, patio furniture and other lawn items have been reported to have been blown around by wind and, very commonly, debris from damaged structures in turn have caused damage to other buildings not directly impacted by the event. In numerous instances roofs have been reported as having been torn off of buildings. The portable buildings typically used at schools and construction sites would be more vulnerable to thunderstorm wind events than typical site-built structures and could potentially pose a greater risk for wind-blown debris.

According to the American Community Survey (ACS) five-year estimates for 2022, a total of 9,516 manufactured homes are located in the Bell County planning area (6 percent of total housing stock). In addition, 30 percent (approximately 45,058 structures) of the housing units were built

SECTION 14: THUNDERSTORM WIND

before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events. The CTCOG has no manufactured buildings and one structures on site built before 1980. Based on 2022 ACS five-year estimates, the cities of Temple and Killeen are the participating jurisdictions which have the highest reported number of single-family residences built before 1980, indicating greater vulnerability in terms of at-risk structures.

Table 14-5. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Bell County	45,058	9,516
City of Bartlett	469	57
City of Belton	2,992	361
City of Harker Heights	6,087	1,448
City of Holland	248	39
City of Killeen	16,684	1,882
City of Little River Academy	394	142
City of Morgan's Point Resort	384	164
City of Nolanville	274	727
City of Rogers	332	99
Village of Salado	230	20
City of Temple	13,425	988
City of Troy	276	27
CTCOG	1	0

While all citizens are vulnerable to the impacts of thunderstorm wind, forced relocation and disaster recovery disproportionately impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 15 percent of the planning area population live below the poverty level (Table 14-6). While warning times for these types of hazard events should be substantial enough for these individuals to seek shelter, the elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. CTCOG does not currently

SECTION 14: THUNDERSTORM WIND

have any employees who work outdoors, and therefore do not face elevated risk of exposure to thunderstorm winds during working hours.

Table 14-6. Populations at Greatest Risk by Jurisdiction⁴

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375
City of Harker Heights	3,280	1,906	4,632	3,931	5,934
City of Holland	210	111	178	179	60
City of Killeen	11,467	14,603	20,953	24,593	33,510
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

Table 14-7. Outdoor Operating Employees by Participating Special District

PARTICIPANT	EMPLOYEES OPERATING OUTDOORS
CTCOG	0

The Bell County Planning Team identified the following critical facilities (Table 14-8) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by thunderstorm wind events. The critical infrastructure with the greatest vulnerability to thunderstorms are power and communications facilities. Failures of these facilities can result in a loss of service and cascading impacts such as posing enormous risk to individuals

⁴ US Census Bureau 2022 data for Bell County.

SECTION 14: THUNDERSTORM WIND

dependent on electricity as a medical necessity. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 14-8. Critical Facilities Vulnerable to Thunderstorm Wind Event

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> • Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. • Emergency vehicles can be damaged by falling trees or flying debris. • Power outages could disrupt communications, delaying emergency response times. • Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. • Debris/downed trees can impede emergency response vehicle access to areas. • Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. • First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> • Structures can be damaged by falling trees or flying debris. • Power outages could disrupt critical care. • Backup power sources could be damaged. • Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. • Evacuations may be necessary due to extended power outages, gas line ruptures, or structural damage to facilities. • Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. • Temporary break in operations may significantly inhibit post event evacuations. • Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none"> • Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. • Essential supplies like medicines, water, food, and equipment deliveries may be delayed. • Economic disruption due to power outages and fires negatively impact airport services as well as area businesses reliant on airport operations.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> • Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. • Emergency vehicles can be damaged by falling trees or flying debris.

SECTION 14: THUNDERSTORM WIND

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
	<ul style="list-style-type: none"> • Power outages could disrupt communications, delaying emergency response times. • Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. • Debris/downed trees can impede emergency response vehicle access to areas. • Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.

A thunderstorm wind event can also result in traffic disruptions, injuries and in rare cases, fatalities. Generally, the impacts of thunderstorm wind events would be considered Limited, with less than 10 percent of property expected to be destroyed and critical facilities shut down for less than 24-hours. However, with 12 injuries, the impact is considered “Major” for the Bell County planning area, including all participating jurisdictions and the CTCOG, with multiple injuries resulting in permanent disability possible depending on the severity of the event. Overall, in the past 67 years there has been a total of \$11,769,200 damages (in 2023 dollars) in the Bell County planning area due to thunderstorm wind events. The estimated average annual loss from a thunderstorm wind event is \$175,700.

Table 14-8. Estimated Annualized Losses by Participating Jurisdiction⁵

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Bell County	\$5,429,700	\$81,000
City of Bartlett	\$49,900	\$700
City of Belton	\$1,212,100	\$18,100
City of Harker Heights	\$102,800	\$1,500
City of Holland	\$900	Negligible
City of Killeen	\$2,041,600	\$30,500
City of Little River Academy	\$478,500	\$7,100
City of Morgan’s Point Resort	-	-
City of Nolanville	\$303,600	\$4,500
City of Rogers	\$62,100	\$900
Village of Salado	\$445,900	\$6,700

⁵ Discrepancies in calculations may occur due to rounding of damage estimates when inflating to 2023 dollars.

SECTION 14: THUNDERSTORM WIND

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
City of Temple	\$1,525,400	\$22,800
City of Troy	\$116,700	\$1,700
CTCOG	\$0	-
PLANNING AREA	\$11,769,200	\$175,500

ASSESSMENT OF IMPACTS

Thunderstorm wind events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. Thunderstorm wind conditions can be frequently associated with a variety of impacts, including:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- Thunderstorm wind events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning, as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Critical staff may be unable to report for duty, limiting response capabilities.
- Private sector entities that residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Some businesses not directly damaged by thunderstorm wind events may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Older structures, specifically those built before 1980 (30 percent of the planning area), were built to less stringent building codes may suffer greater damage as they are typically more vulnerable to thunderstorm winds. In addition, the CTCOG has one building on site that was built before 1980.
- Recreational areas such as community parks and green spaces may be damaged or inaccessible due to downed trees or debris, causing temporary impacts to associated businesses in the area.

SECTION 14: THUNDERSTORM WIND

- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are 74 historical sites listed on the National Register of Historic Places for Bell County.

The economic and financial impacts of thunderstorm winds on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any thunderstorm wind event.

CLIMATE CHANGE CONSIDERATIONS

The impacts on the frequency and severity of severe thunderstorm wind events due to climate change are unclear. According to the Texas A&M 2021 Climate Report Update, changes in severe thunderstorm reports over time have been more closely linked to changes in population than changes in the hazard event. At this time there is low confidence of an ongoing trend in the overall frequency and severity of thunderstorm events, due to the lack of climate data records for severe thunderstorms. Based on climate models that are available, the environmental conditions needed for severe thunderstorms are estimated to become more likely, resulting in an overall increase in the number of days capable of producing a severe thunderstorm event.⁶

⁶ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 Update.



SECTION 15 **TORNADO**

SECTION 15: TORNADO

Hazard Description	1
Location	1
Extent.....	2
Historical Occurrences.....	4
Significant Events	8
Probability of Future Events.....	8
Vulnerability and Impact.....	9
Assessment of Impacts	13
Climate Change Considerations	15

HAZARD DESCRIPTION



Tornadoes are among the most violent storms on the planet. A tornado is a rapidly rotating column of air extending between, and in contact with, a cloud and the surface of the earth. The most violent tornadoes are capable of tremendous destruction and have wind speeds of 250 miles per hour (mph) or more. In extreme cases, winds may approach 300 mph. Damage paths can be in excess of one mile wide and 50 miles long.

The most powerful tornadoes are produced by “Supercell Thunderstorms.” These thunderstorms are created when horizontal wind shears (winds moving in different directions at different altitudes) begin to rotate the storm. This horizontal rotation can be tilted vertically by violent updrafts, and the rotation radius can shrink, forming a vertical column of very quickly swirling air. This rotating air can eventually reach the ground, forming a tornado.

Table 15-1. Variations among Tornadoes

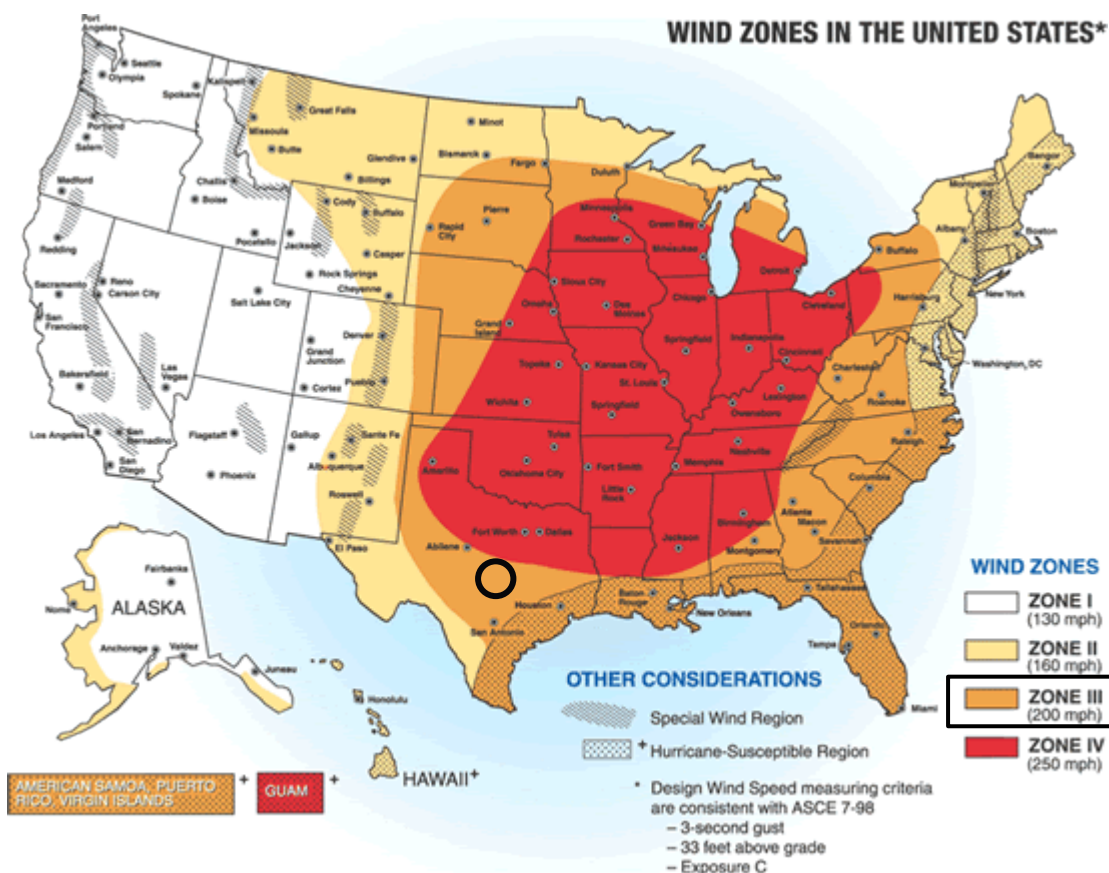
WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
<ul style="list-style-type: none">• 69% of all tornadoes• Less than 5% of tornado deaths• Lifetime 1-10+ minutes• Winds less than 110 mph	<ul style="list-style-type: none">• 29% of all tornadoes• Nearly 30% of all tornado deaths• May last 20 minutes or longer• Winds 110 – 205 mph	<ul style="list-style-type: none">• 2% of all tornadoes• 70% of all tornado deaths• Lifetime can exceed one hour• Winds greater than 205 mph

LOCATION

Tornadoes do not have any specific geographic boundary and can occur throughout the county uniformly. It is assumed that the entire Bell County planning area, including all participating jurisdictions and the CTCOG, is uniformly exposed to tornado activity. The entire Bell County planning area is in Wind Zone III (Figure 15-1), where tornado winds can be as high as 200 mph.

SECTION 15: TORNADO

Figure 15-1. FEMA Wind Zones in the United States¹



EXTENT

The destruction caused by tornadoes ranges from light to inconceivable, depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, such as residential homes (particularly mobile homes).

Tornado magnitudes prior to 2007 were determined using the traditional version of the Fujita Scale, which estimated tornado wind speeds based on the damage caused by an event. Since February 2007, the Enhanced Fujita Scale has been utilized to classify tornadoes, which included improvements to the original scale. The original Fujita scale had limitations, such as a lack of damage indicators, no account for construction quality and variability, and no definitive correlation between damage and wind speed. These limitations led to some tornadoes being rated in an inconsistent manner and, in some cases, an overestimate of tornado wind speeds. The Enhanced Fujita scale retains the same basic design and six strength categories as the previous scale. The newer scale reflects more refined assessments of tornado damage surveys, standardization, and damage consideration to a wider range of structures. Table 15-2 includes both scales for reference when analyzing historical tornadoes since tornado events prior to 2007 will follow the original Fujita Scale.

¹ Bell County is indicated by the circle

SECTION 15: TORNADO

Table 15-2. The Fujita and Enhanced Fujita Tornado Scale²

Enhanced Fujita Scale				Fujita Scale			
Category	Wind Speed	Damage Level	Damage	Category	Wind Speed	Intensity	Damage
EF0	65-85 MPH	Gale	The environment sustained minor damage: tree branches are broken, some shallow-rooted trees are uprooted, and some chimneys are damaged.	F0	45-78 MPH	Gale	Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
EF1	86-110 MPH	Weak	The environment sustained moderate damage: mobile homes are tipped over, windows are broken, roof tiles may be blown off, and some tree trunks have snapped.	F1	79-117 MPH	Moderate	Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
EF2	111-135 MPH	Strong	The environment sustained considerable damage: mobile homes are destroyed, roofs are damaged, debris flies in the air, and large trees are snapped or uprooted.	F2	118-161 MPH	Significant	Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165 MPH	Severe	The environment sustained severe damage: roofs and walls are ripped off buildings, small buildings are destroyed, and most trees are uprooted.	F3	162-209 MPH	Severe	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
EF4	166-200 MPH	Devastating	The environment sustained devastating damage: well-built homes are destroyed, buildings are lifted off their foundations, cars are blown away, and large debris flies in the air.	F4	210-261 MPH	Devastating	Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated.
EF5	200+ MPH	Incredible	The environment sustained incredible damage: well-built homes are lifted from their foundations, reinforced concrete buildings are damaged, the bark is stripped from trees, and car-sized debris flies through the air.	F5	262-317 MPH	Incredible	Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

² Source: <http://www.tornadoproject.com/fscale/fscale.htm>

SECTION 15: TORNADO

Both the Fujita Scale and Enhanced Fujita Scale should be referenced in reviewing previous occurrences since tornado events that occurred before 2007 will follow the original Fujita Scale. The greatest magnitude reported within the planning area is an F2 (an EF2 or EF3 when converted to the on the Enhanced Fujita Scale, depending on exact wind speed), a strong to severe tornado. Based on the planning area's location in Wind Zone III, the planning area has the potential to experience anywhere from an EF0 to an EF5 depending on the wind speed. Previous tornado events in the Bell County planning area (converted from the Fujita Scale) have been between EF0 and EF3 (Figure 15-2).

HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration (NOAA). The NCEI is the largest archive available for historic storm events data; however, it is important to note that only incidents recorded in the NCEI have been factored into this risk assessment unless otherwise noted. It is likely that a high number of occurrences have gone unreported over time. Historical tornado data for the CTCOG indicates no events reported separate and apart from the reported county events.

Figure 15-2 identifies the locations of previous occurrences in the Bell County planning area from 1955 through 2023. A total of 69 events have been recorded by NOAA's Storm Prediction Center and the NCEI Storm Events databases for the Bell County planning area. One of the strongest events reported in the planning area was an EF3 tornado on April 12, 2022, which caused 23 injuries. Other strong F3 events have occurred in 1876, 1990, and 1997. Only those events with reported damages are listed in Table 15-4.

It is important to note that the City of Temple experienced a significant tornado event at the time of drafting this plan. On May 22, 2024, two tornadoes, an EF1 and an EF2, hit the City of Temple damaging hundreds of homes, buildings, and businesses. According to the National Weather Service, 30 people were injured. Bell County was included in a disaster declaration (FEMA-4781-DR) on May 29, 2024, which includes this tornado event. Currently, reports of damages are not comprehensive, and this event has not yet been recorded in the NCEI database. Therefore, additional details of the events and associated impacts will not be included in this analysis but will be detailed in the next plan update.

SECTION 15: TORNADO

Figure 15-2. Spatial Historical Tornado Events, 1955-2023³

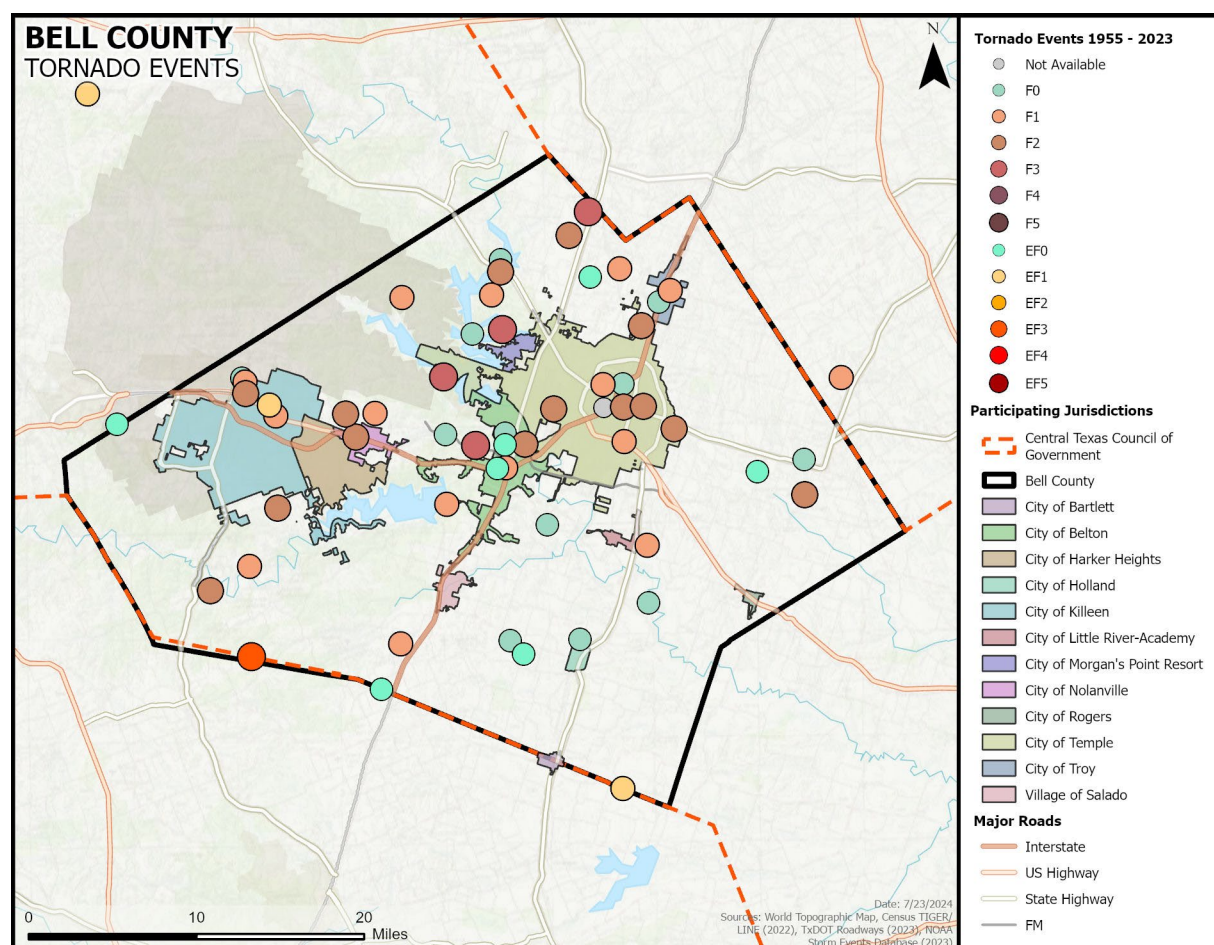


Table 15-4. Historical Tornado Events, 1955-2023⁴

JURISDICTION	DATE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	3/20/1955	F1	0	1	\$0	\$0
Bell County	3/21/1955	F2	0	0	\$27,700	\$0
Bell County	5/6/1955	F2	1	1	\$2,773,100	\$0
Bell County	3/21/1956	F1	0	0	\$27,600	\$0
Bell County	4/24/1957	F0	0	0	\$26,500	\$0
Bell County	8/3/1958	F1	0	0	\$300	\$0
Bell County	4/28/1963	F2	0	3	\$242,800	\$0

³ Source: NOAA Storm Prediction Center

⁴ Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2023 dollars.

SECTION 15: TORNADO

JURISDICTION	DATE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	4/13/1967	F2	0	0	\$22,400	\$0
Bell County	8/14/1969	F1	0	0	\$200,100	\$0
Bell County	8/14/1969	F2	0	0	\$2,001,200	\$0
Bell County	8/14/1969	F2	0	0	\$2,001,200	\$0
Bell County	4/16/1971	F1	0	0	\$18,500	\$0
Bell County	8/26/1971	F1	0	0	\$1,800	\$0
Bell County	5/1/1972	F1	0	0	\$178,000	\$0
Bell County	10/21/1972	F2	0	0	\$175,000	\$0
Bell County	5/23/1973	F2	0	0	\$168,700	\$0
Bell County	5/7/1975	F2	0	2	\$1,391,800	\$0
Bell County	5/5/1976	F2	0	0	\$13,100	\$0
Bell County	5/26/1976	F3	2	7	\$13,104,900	\$0
Bell County	5/9/1981	F1	0	0	\$82,500	\$0
Bell County	11/13/1981	F1	0	2	\$79,000	\$0
Bell County	5/17/1986	F1	0	0	\$6,800	\$0
Bell County	11/15/1987	F1	0	0	\$641,600	\$0
Bell County	1/25/1989	F1	0	3	\$611,400	\$0
Bell County	3/14/1990	F3	0	0	\$575,300	\$0
Bell County	4/12/1996	F2	0	0	\$113,700	\$0
City of Temple	3/1/1997	F1	0	0	\$74,000	\$0
Bell County	5/27/1997	F1	0	0	\$37,000	\$0
City of Belton	5/27/1997	F3	0	0	\$1,664,900	\$0
City of Belton	9/22/1997	F0	0	0	\$36,700	\$0
City of Killeen	2/22/2000	F0	0	0	\$26,200	\$0
Village of Salado	5/6/2001	F0	0	0	\$25,000	\$0
City of Killeen	3/25/2003	F0	0	0	\$128,600	\$0
City of Holland	11/23/2004	F0	0	0	\$23,300	\$0
City of Troy	1/12/2007	F0	0	0	\$58,500	\$0

SECTION 15: TORNADO

JURISDICTION	DATE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Killeen	5/25/2007	EF1	0	0	\$71,200	\$0
City of Belton	4/10/2008	EF0	0	0	\$689,300	\$0
Bell County	5/16/2021	EF0	0	0	\$55,000	\$0
City of Bartlett	3/21/2022	EF1	0	0	\$2,200	\$0
Bell County	4/12/2022	EF3	0	23	\$0	\$0
Bell County	4/28/2023	EF1	0	2	\$2,000,000	\$0
TOTALS		(MAX EXTENT)	3	44	\$29,376,900	0

Table 15-5. Summary of Historical Tornado Events, 1955-2023

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	51	F3	3	44	\$26,577,000	\$0
City of Bartlett	1	EF1	0	0	\$2,200	\$0
City of Belton	7	F3	0	0	\$2,390,900	\$0
City of Harker Heights	0	-	-	-	-	-
City of Holland	2	F0	0	0	\$23,300	\$0
City of Killeen	4	EF1	0	0	\$226,000	\$0
City of Little River Academy	0	-	-	-	-	-
City of Morgan's Point Resort	0	-	-	-	-	-
City of Nolanville	0	-	-	-	-	-
City of Rogers	0	-	-	-	-	-
Village of Salado	1	F0	0	0	\$25,000	\$0
City of Temple	1	F1	0	0	\$74,000	\$0
City of Troy	2	F3	0	0	\$58,500	\$0
CTCOG	0	-	-	-	-	-
TOTALS	69	(MAX EXTENT)	3	44	\$29,376,900	

SECTION 15: TORNADO

Bell County has experienced the greatest number of tornado events (51) based on the NCEI records, with the City of Belton reporting the second greatest number of events (7), following the City of Killen (4). Based on the list of historical tornado events for the Bell County planning area, including all participating jurisdictions and the CTCOG, there have been six recorded events since the 2018 Plan.

SIGNIFICANT EVENTS

April 12, 2022

Thunderstorms developed along a dryline and into North and Central Texas, producing all modes of severe weather. This storm system caused major hail with a record-breaking hailstone in the Village of Salado. Two tornadoes also occurred across Central Texas in Bell County.

The first tornado, which began in northern Williamson County, entered extreme southern Bell County north of the junction between Bell County Road 231 and FM 2843. At least 15-20 damaged homes were reported on both sides of FM 2843, with the most significant damage concentrated near the junction of FM 2843 and Buttermilk Road. In this vicinity, at least 10 structures suffered EF2 to EF3 intensity damage, with a small cluster of homes experiencing estimated peak tornado wind speeds of 150 to 165 mph. These structures had all or most of their roofs removed, and some of them had one or more exterior walls collapsed. Two churches along FM 2843 in the vicinity of Buttermilk Road were seriously damaged, with roofing material removed and multiple walls collapsed. Numerous vehicles in the area had significant damage consistent with being rolled or having flying projectiles thrown into them. Many trees and powerlines were also uprooted and damaged. Twenty-three people were injured but no fatalities occurred during this tornado event.

The second tornado was visually confirmed by storm chasers, but only scattered and broken tree branches were found. This occurred near the intersection of Seaton Road and Big Elm Creek. The tornado lifted over Twister Road shortly after crossing FM 437.

April 28, 2023

A supercell tracked across Coryell County producing an EF1 tornado with maximum winds around 105 mph. The tornado then moved onto the property of Fort Cavazos (formerly known as Fort Hood) in Bell County, just northwest of the City of Killeen. There are reports of damage to trees and power lines. This tornado caused the collapse of a cell phone tower and at least one home lost its roof. There are two reported injuries from this tornado and this event caused \$2,000,000 in property damages.

PROBABILITY OF FUTURE EVENTS

Tornadoes can occur at any time of year and at any time of day, but they are typically more common in the spring months during the late afternoon and evening hours. A smaller, high frequency period can emerge in the fall during the brief transition between the warm and cold seasons. With 69 historical events over a 69-year reporting period, the Bell County planning area can anticipate a tornado touchdown approximately once every year. This frequency supports an “Highly Likely” probability of future events for the Bell County planning area, including all participating jurisdictions and the CTCOG.

SECTION 15: TORNADO

VULNERABILITY AND IMPACT

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities, and populations in the entire Bell County planning area, including participating jurisdictions, are considered to be exposed to this hazard and could potentially be impacted. The damage caused by a tornado is typically a result of high wind velocity, wind-blown debris, lightning, and large hail.

The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Consequently, vulnerability of humans and property is difficult to evaluate since tornadoes form at different strengths, in random locations, and create relatively narrow paths of destruction. Although tornadoes strike at random, making all buildings vulnerable, three types of structures are more likely to suffer damage:

- Manufactured Homes;
- Homes built of peer and beam construction (more susceptible to lift); and
- Buildings with large spans, such as shopping malls, gymnasiums, and factories.

Tornadoes can cause a significant threat to people as they could be struck by flying debris, falling trees / branches, utility lines, and poles. Blocked roads could prevent first responders from responding to calls. Tornadoes commonly cause power outages which could cause health and safety risks to residents and visitors, as well as to patients in hospitals.

The Bell County planning area features mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to tornado events than typical site-built structures. In addition, manufactured homes are located sporadically throughout the planning area, which would also be more vulnerable. The U.S. Census data indicates a total of 9,516 (6 percent of total housing stock) manufactured homes located in the Bell County planning area. In addition, 30 percent (approximately 45,058 structures) of the housing structures in the Bell County planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events (Table 15-6). causing these jurisdictions to potentially sustain more structural damage due to a tornado event.

Table 15-6. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Bell County	45,058	9,516
City of Bartlett	469	57
City of Belton	2,992	361
City of Harker Heights	6,087	1,448
City of Holland	248	39
City of Killeen	16,684	1,882

SECTION 15: TORNADO

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
City of Little River Academy	394	142
City of Morgan's Point Resort	384	164
City of Nolanville	274	727
City of Rogers	332	99
Village of Salado	230	20
City of Temple	13,425	988
City of Troy	276	27
CTCOG	1	N/A

While all citizens are at risk to the impacts of a tornado, forced relocation and disaster recovery disproportionately impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. The elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Bell County planning area is estimated at 11 percent of the total population and children under the age of 5 are estimated at 8 percent. The population with a disability is estimated at 14 percent of the total population. In addition, an estimated 15 percent of the planning area population live below the poverty level and 18 percent of the populations speaks a language other than English (Table 15-7).

Table 15-7. Populations at Greater Risk by Participating Jurisdiction⁵

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375
City of Harker Heights	3,280	1,906	4,632	3,931	5,934

⁵ U.S. Census Bureau 2022 data for Bell County

SECTION 15: TORNADO

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
City of Holland	210	111	178	179	60
City of Killeen	11,467	14,603	20,953	24,593	33,510
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

The Bell County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by tornado events (Table 15-8). The critical infrastructure with the greatest vulnerability to tornadoes are power and communications facilities. Failures of these facilities can result in a loss of service and cascading impacts such as posing enormous risk to individuals dependent on electricity as a medical necessity. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 15-8. Critical Facilities Vulnerable to Tornado Event

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency vehicles can be damaged by falling trees or flying debris. Power outages could disrupt communications, delaying emergency response times. Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. Debris/downed trees can impede emergency response vehicle access to areas. Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.

SECTION 15: TORNADO

CRITICAL FACILITIES	POTENTIAL IMPACTS
	<ul style="list-style-type: none"> • First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions. • Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> • Structures can be damaged by falling trees damaged by lightning. • Power outages could disrupt critical care. • Backup power sources could be damaged. • Evacuations may be necessary due to extended power outages, fires, or other associated damage to facilities. • Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. • Temporary break in operations may significantly inhibit post event evacuations. • Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.
Commercial Supplier (Food, fuel, etc.)	<ul style="list-style-type: none"> • Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. • Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed. • Additional emergency responders and critical aid workers may not be able to reach the area for days.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> • Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. • Emergency vehicles can be damaged by falling trees or flying debris. • Power outages could disrupt communications, delaying emergency response times. • Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. • Debris/downed trees can impede emergency response vehicle access to areas. • Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. • First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions. • Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

The total loss estimate due to tornado events is \$29,376,900 (in 2023 dollars), having an approximate average annual loss estimate of \$425,800. Due to reported injuries, fatalities, and infrastructure loss, the impact of tornadoes in Bell County, including all participating jurisdictions

SECTION 15: TORNADO

and the CTCOG, is considered “Substantial” with multiple deaths possible, the complete shutdown of facilities for 30 days or more, and more than 50 percent of property destroyed or with major damage.

Table 15-9. Estimated Average Annual Losses by Jurisdiction

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Bell County	\$26,577,000	\$385,200
City of Bartlett	\$2,200	\$0
City of Belton	\$2,390,900	\$34,700
City of Harker Heights	-	-
City of Holland	\$23,300	\$300
City of Killeen	\$226,000	\$3,300
City of Little River Academy	-	-
City of Morgan’s Point Resort	-	-
City of Nolanville	-	-
City of Rogers	-	-
Village of Salado	\$25,000	\$400
City of Temple	\$74,000	\$1,100
City of Troy	\$58,500	\$800
CTCOG	-	-
Planning Area	\$29,376,900	\$425,800

ASSESSMENT OF IMPACTS

Tornadoes have the potential to pose a significant risk to the population and can create dangerous situations. Often, providing and preserving public health and safety is difficult. The impact of climate change could produce larger, more severe tornado events, exacerbating the current tornado impacts. More destructive tornado conditions can be frequently associated with a variety of impacts, including:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Manufactured homes (6 percent of total housing stock) may suffer substantial damage as they would be more vulnerable than typical site-built structures.

SECTION 15: TORNADO

- Portable classrooms may also suffer substantial damage as they would be more vulnerable than other classroom structures.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- Tornadoes often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outages can result in an increase in structure fires and/or carbon monoxide poisoning as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Tornadoes can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.
- First responders must enter the damage area shortly after the tornado passes to begin rescue operations and to organize cleanup and assessments efforts, therefore they are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities, loss of communications, and damaged emergency vehicles and equipment.
- Private sector entities such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue, especially if damage is sustained to major employers within the planning area.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, and normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures destroyed by a tornado may not be rebuilt for years, reducing the tax base for the community.
- Large or intense tornadoes may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable, and tourism can be unappealing for years following a large tornado, devastating directly related local businesses.
- Tornadoes may destroy or degrade endangered species habitat.

SECTION 15: TORNADO

- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. The Bell County planning area has 74 historical properties.

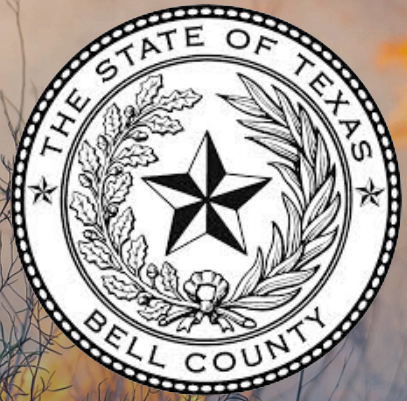
The economic and financial impacts of a tornado event on the community will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a tornado event.

CLIMATE CHANGE CONSIDERATIONS

The impacts on the frequency and severity of tornado events due to climate change are unclear. According to the Texas A&M 2021 Climate Report Update, the most robust trend in tornado activity in Texas is a likelihood for a greater number of tornadoes in large outbreaks, although the factors contributing to this trend are not expected to continue. Tornadoes spawn from less than 10 percent of thunderstorms, usually supercell thunderstorms that are in a wind shear environment that promotes rotation.⁶ Based on climate models that are available, the environmental conditions needed for severe thunderstorm events are estimated to become more likely, resulting in an overall increase in the number of days capable of producing a severe thunderstorm event and potential tornadoes to develop from these storms.⁷

⁶ Treisman, Rachel. *The exact link between tornadoes and climate change is hard to draw. Here's why*. NPR. December 13, 2021. <https://www.npr.org/2021/12/13/1063676832/the-exact-link-between-tornadoes-and-climate-change-is-hard-to-draw-heres-why>

⁷ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.



SECTION 16 **WILDFIRE**

SECTION 16: WILDFIRE

Hazard Description	1
Location	2
Extent.....	16
Historical Occurrences.....	33
Significant Events	36
Probability of Future Events.....	37
Vulnerability and Impact.....	37
Assessment of Impacts	59
Climate Change Considerations	60

HAZARD DESCRIPTION

Wildfire is an unplanned fire burning in natural or wildland areas such as forests, shrub lands, grasslands, or prairies.¹ Texas is one of the fastest growing states in the Nation, with much of this growth occurring adjacent to metropolitan areas. This increase in population across the state will impact counties and communities that are located within the Wildland Urban Interface (WUI). The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfire. In Texas nearly 85 percent of wildfires occur within two miles of a community. The Bell County planning area has an estimated 51 percent of the total planning area population that live within the WUI.²

Wildfires have the potential to spread quickly given the right environmental conditions, particularly within the wildland urban interface and intermix. Most ignition sources for wildfires are a result of human activities, such as an electrical line sparking dry grasses, an improperly discarded cigarette, burning debris, or arson.

Development has increased drastically in central Texas, resulting in more populated areas within the wildland interface / intermix. Additionally, the area is experiencing hotter, drier climatic conditions. These factors combine to make central Texas at risk from wildfires. While the planning area is continually at some risk for wildfires, that risk is elevated during two periods each year: the winter wildfire season (February through April) and the summer wildfire season (August through October).³

The Bell County population is expected to increase over time following population trends over the last few decades. Continued housing development in the WUI will put more people at a greater risk of catastrophic wildfire and put more pressure on land managers and fire department personnel to mitigate fire risk.

¹ Source: FEMA: <https://hazards.fema.gov/nri/wildfire>

² Source: Texas A&M Forest Service, Texas Wildfire Risk Assessment Summary Report, Bell County: <https://texaswildfirerisk.com/>

³ Austin American Statesman, "Winter wildfire risk is rising in Central Texas. Here's what you should know." January 2023: <https://www.statesman.com/story/news/environment/2023/01/30/wildfire-risk-is-rising-in-central-texas-what-you-should-know/69845234007/>

SECTION 16: WILDFIRE

Wildfires spread based on the type and quantity of fuel that surrounds it. Fuel can include everything from trees, underbrush and dry grassy fields to homes. The amount of flammable material that surrounds a fire is referred to as the fuel load. Conditions in the weather and environment, such as drought, winds and extreme heat, can cause a fire to spread more quickly.⁴ A wildfire event often begins unnoticed and spreads quickly, lighting brush, trees, and homes on fire. For example, a wildfire may be started by a campfire that was not doused properly, a tossed cigarette, burning debris, or arson.

Texas has seen a significant increase in the number of wildfires in the past 30 years, which included wildland, urban interface, or intermix fires. Wildland fires are fueled almost exclusively by natural vegetation, while interface or intermix fires are urban / wildland fires in which vegetation and the built environment provide the fuel.

LOCATION

A wildfire incident can face devastating consequences due to human activities, drought conditions, lightning, or wind event, if the conditions allow. Wildfires can vary greatly in terms of size, location, intensity, and duration. While wildfires are not confined to any specific geographic location, they are most likely to occur in open grasslands.

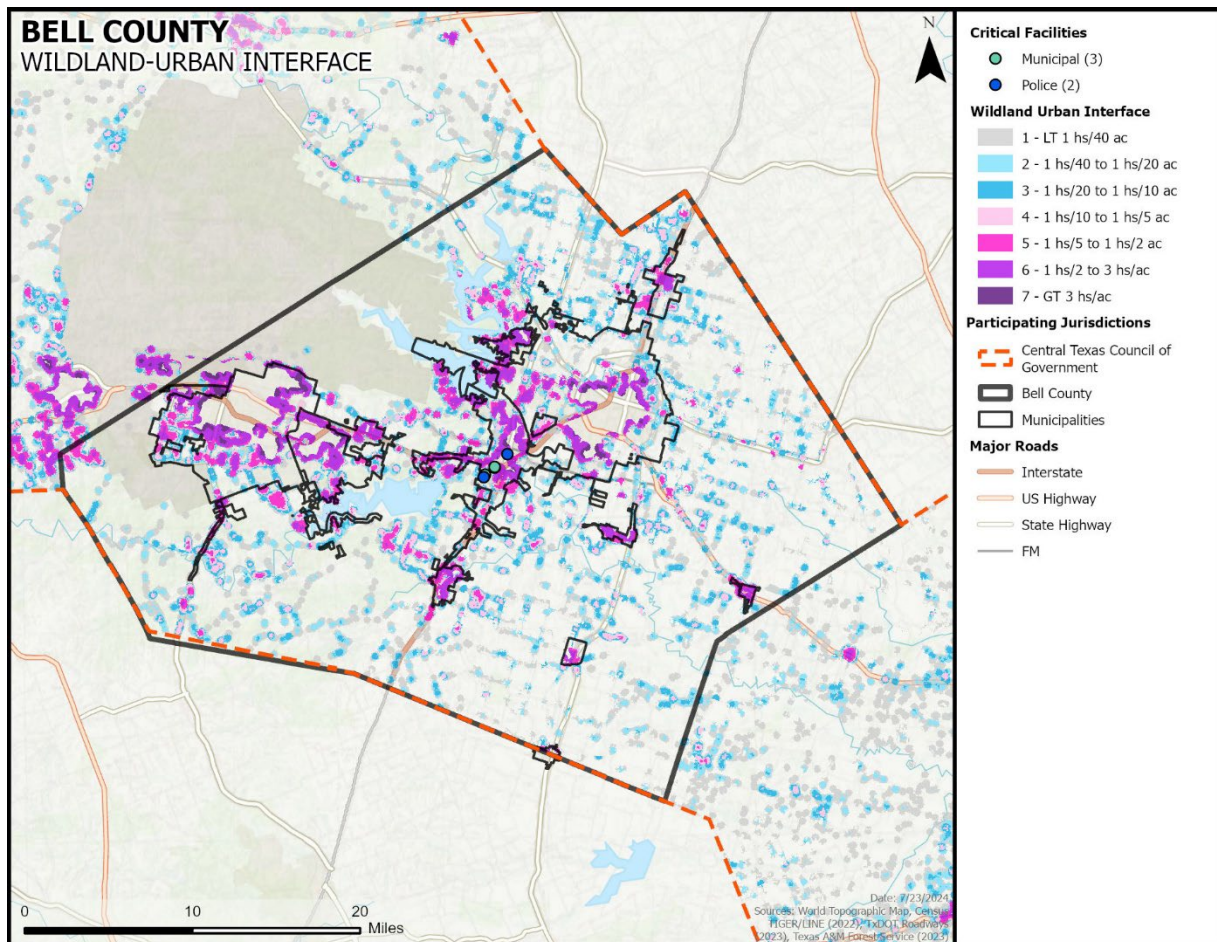
The Texas A&M Forest Service Wildfire Risk Assessment Portal (TxWRAP) provides historical wildfire data for Texas counties along with mapping resources that includes data layers on the WUI, ignition density, and fire intensity scales for communities throughout the Bell County planning area, along with multiple tips, recommendations and mitigation solutions for communities and residents. The TxWRAP portal was utilized to produce the maps found in this profile.

The threat to people and property from a wildfire event is greater in the fringe areas where developed areas meet open grass lands, such as the Wildland Urban Interface (WUI) (Figures 16-1 through 16-14). It is estimated that 51 percent of the total population in the Bell County planning area live within the WUI. However, the entire planning area is at some risk for wildfires.

⁴ NOAA Weather Forecasting: <https://scijinks.gov/wildfires/>

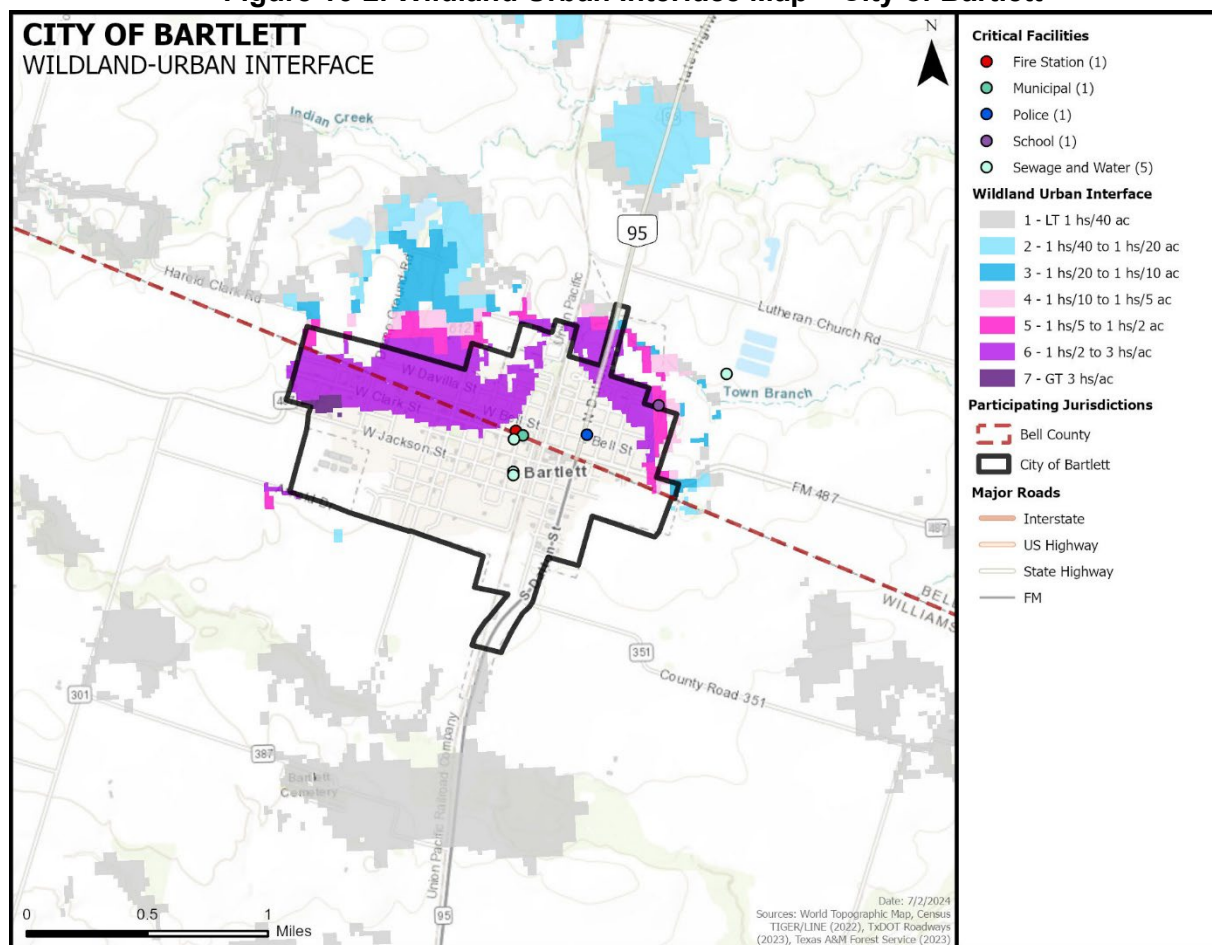
SECTION 16: WILDFIRE

Figure 16-1. Wildland Urban Interface Map – Bell County



SECTION 16: WILDFIRE

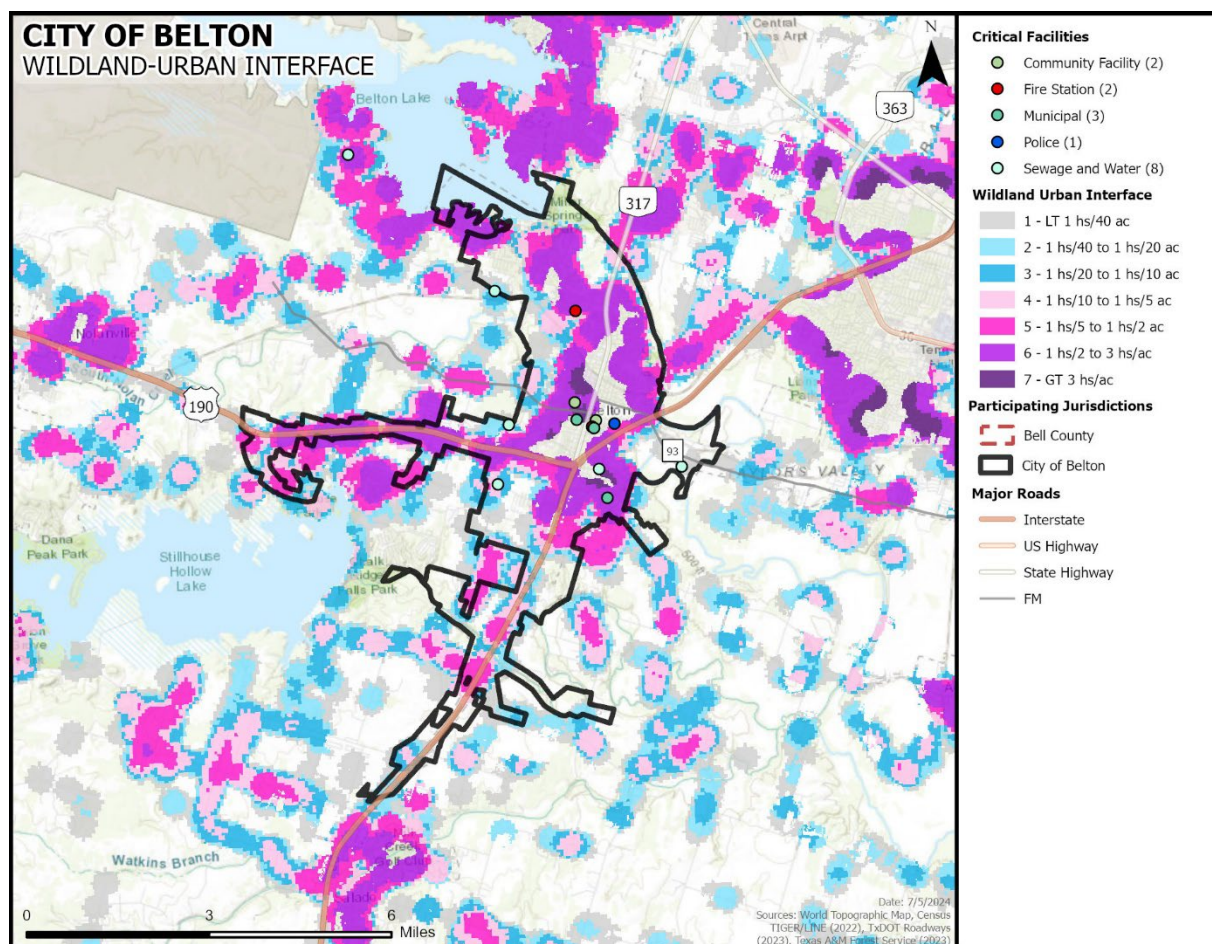
Figure 16-2. Wildland Urban Interface Map – City of Bartlett



It is estimated that 15 percent of the total population in the City of Bartlett live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

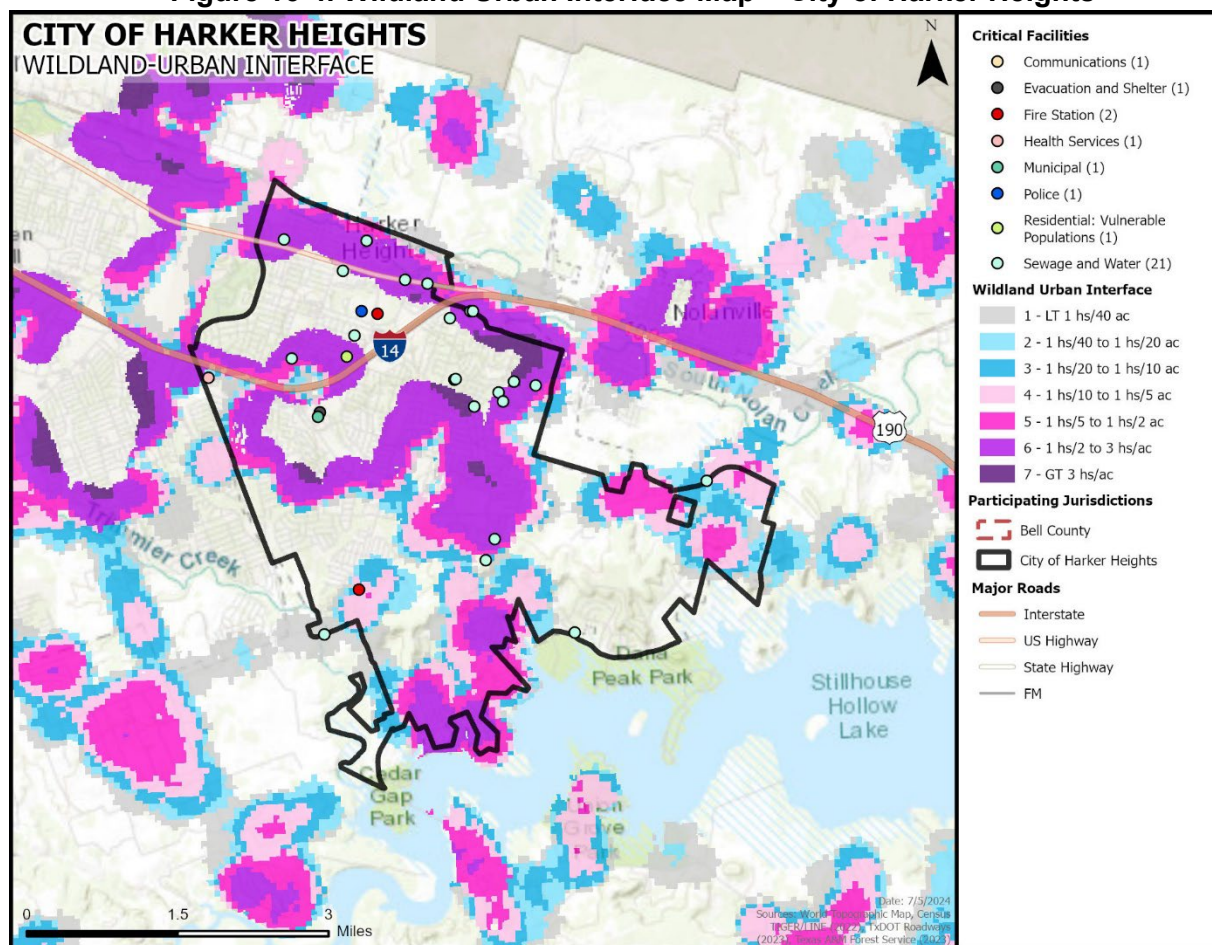
Figure 16-3. Wildland Urban Interface Map – City of Belton



It is estimated that 75 percent of the total population in the City of Belton live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

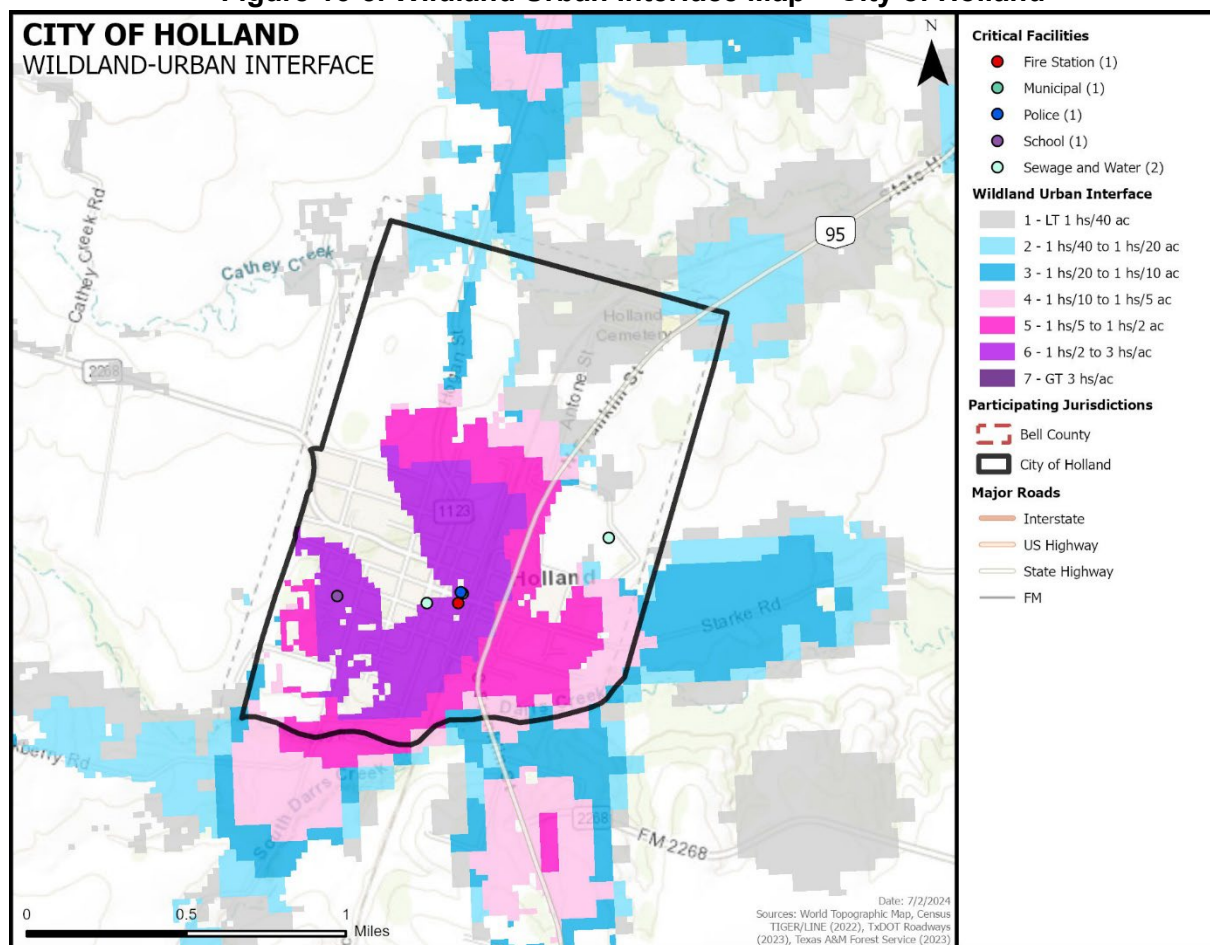
Figure 16-4. Wildland Urban Interface Map – City of Harker Heights



It is estimated that 53 percent of the total population in the City of Harker Heights live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

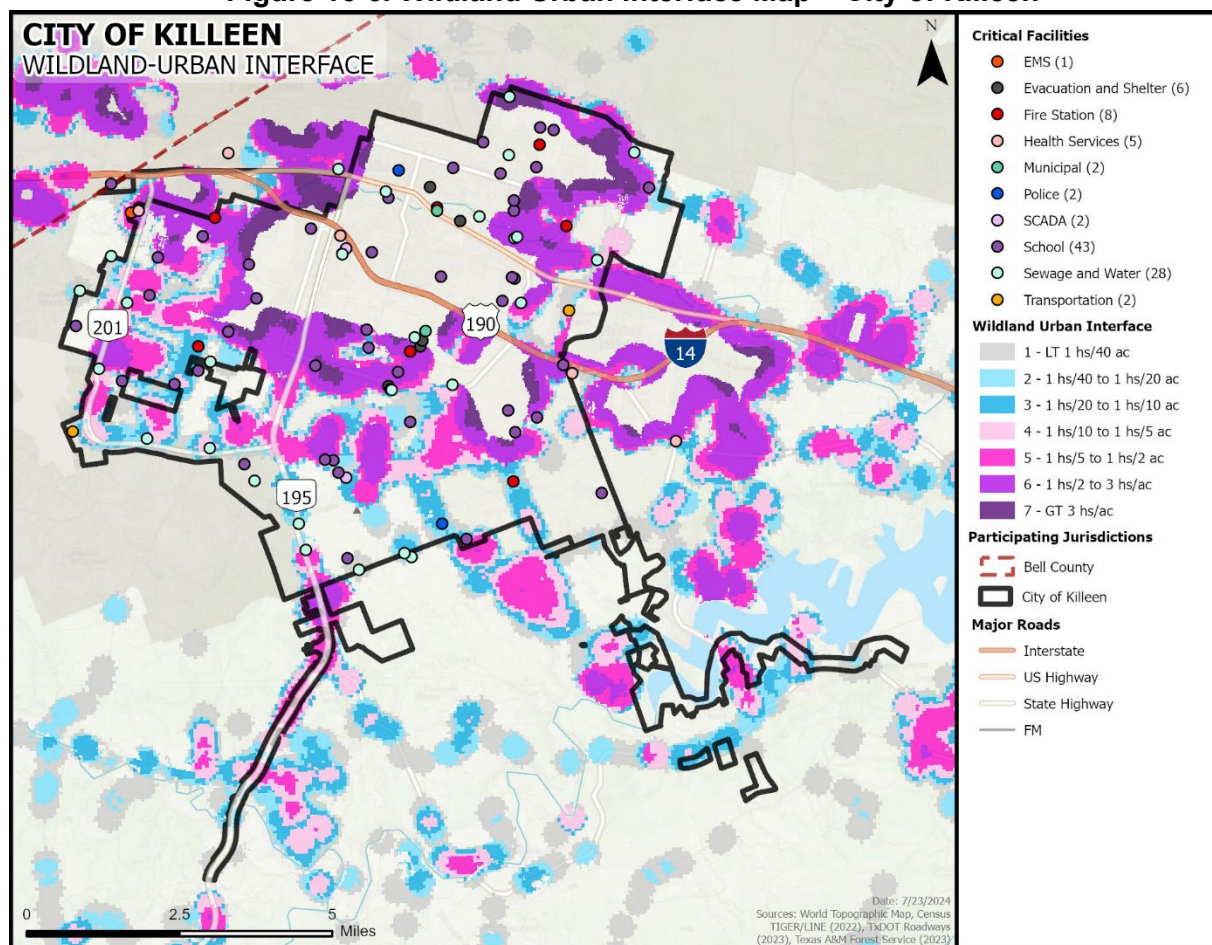
Figure 16-5. Wildland Urban Interface Map – City of Holland



It is estimated that 56 percent of the total population in the City of Holland live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

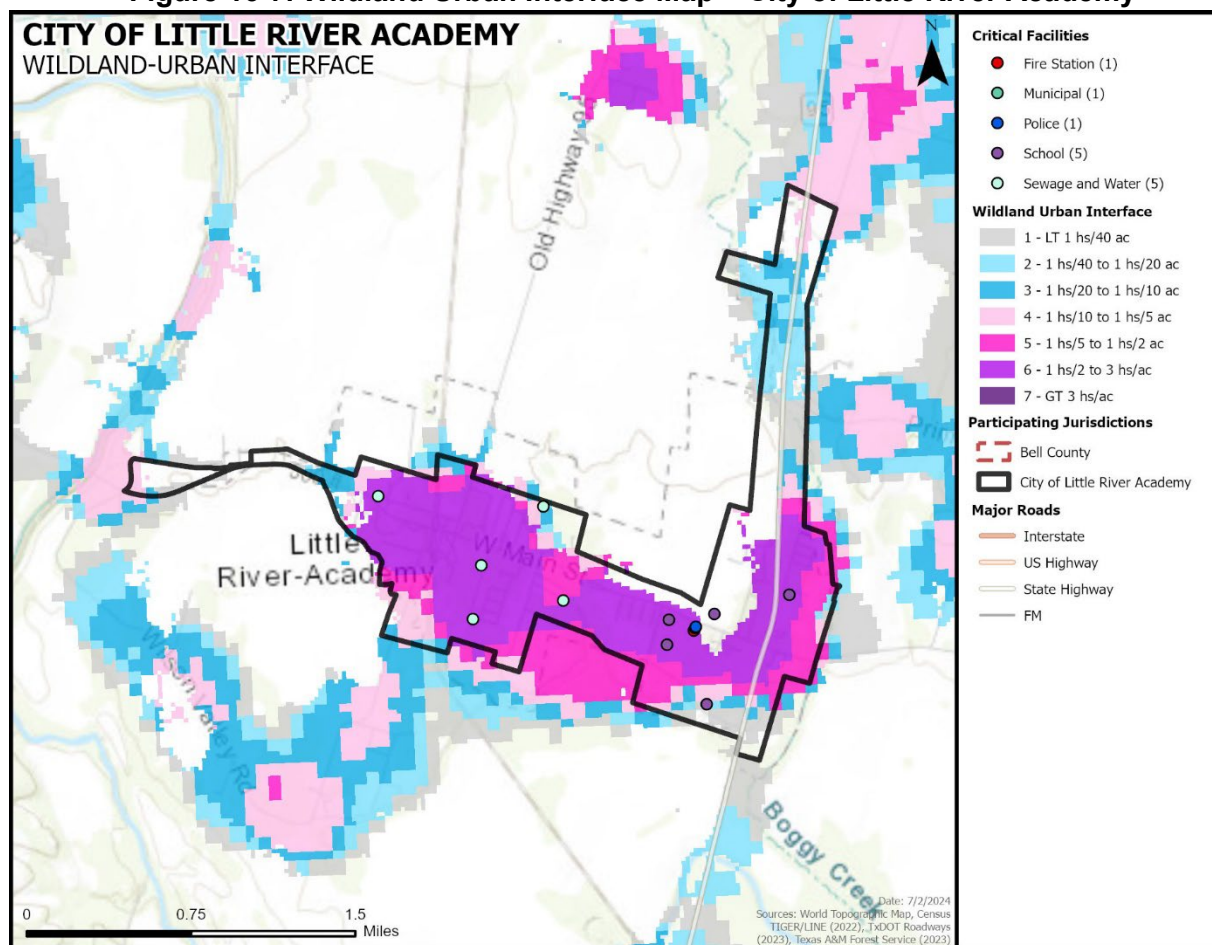
Figure 16-6. Wildland Urban Interface Map – City of Killeen



It is estimated that 35 percent of the total population in the City of Killeen live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

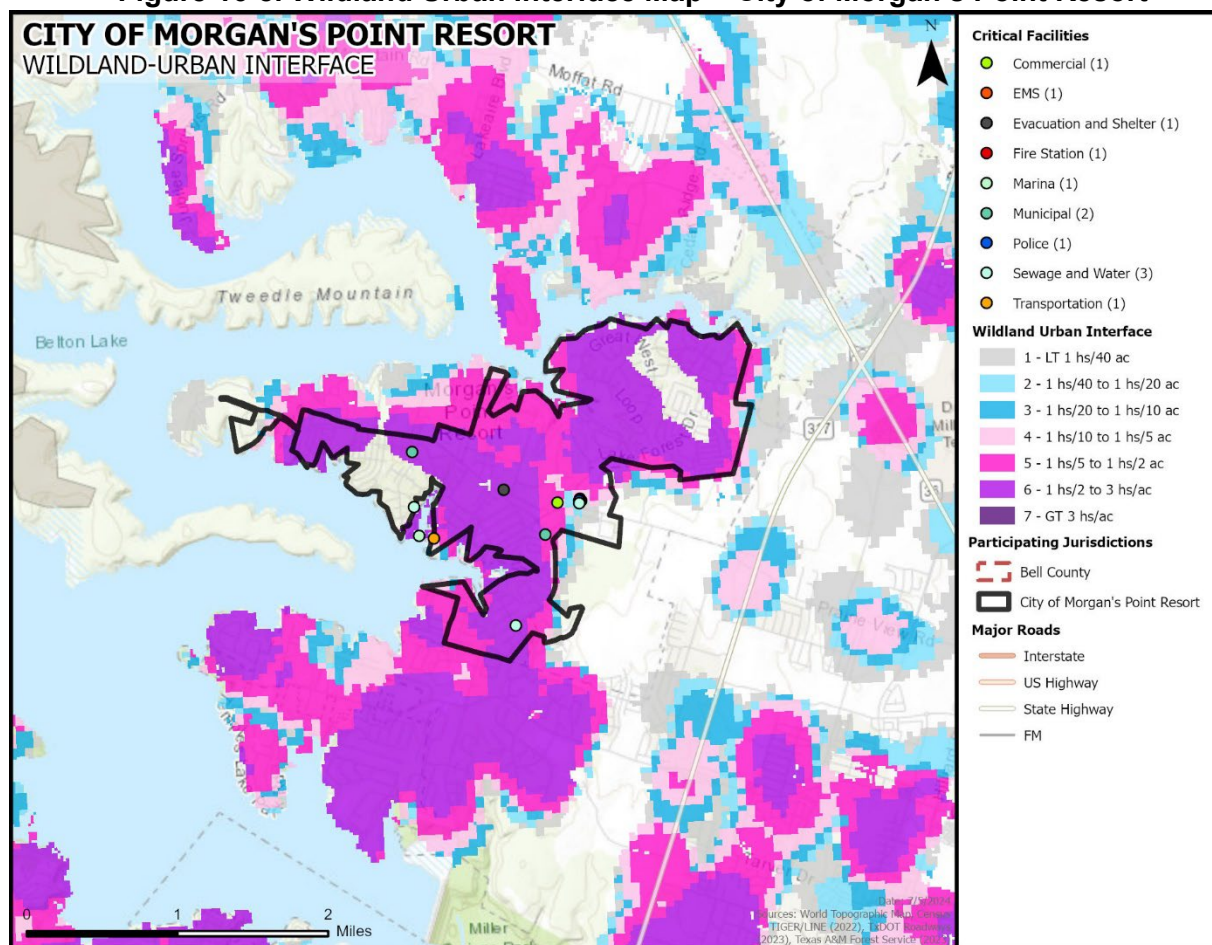
Figure 16-7. Wildland Urban Interface Map – City of Little River Academy



It is estimated that 93 percent of the total population in the City of Little River Academy live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

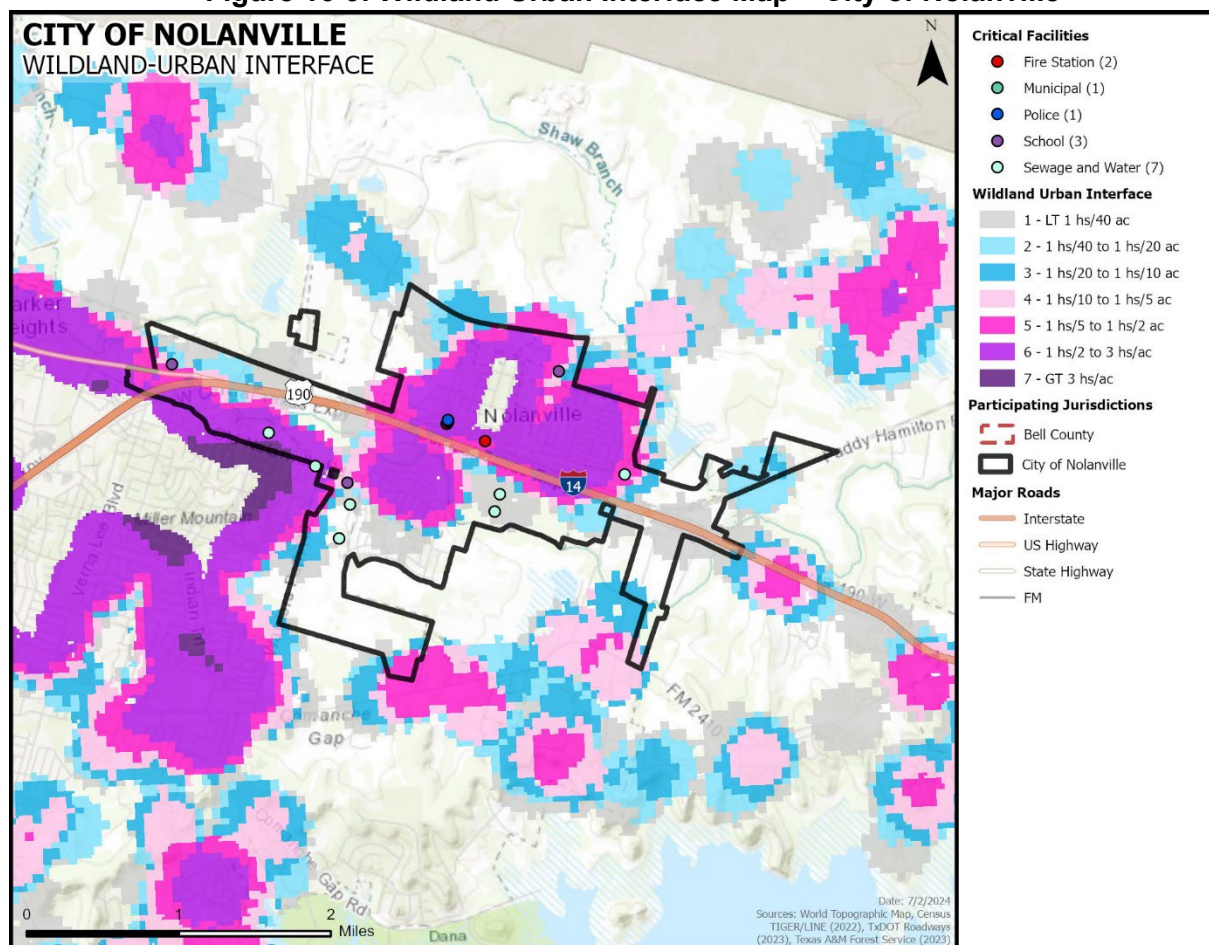
Figure 16-8. Wildland Urban Interface Map – City of Morgan's Point Resort



It is estimated that 79 percent of the total population in the City of Morgan's Point Resort live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

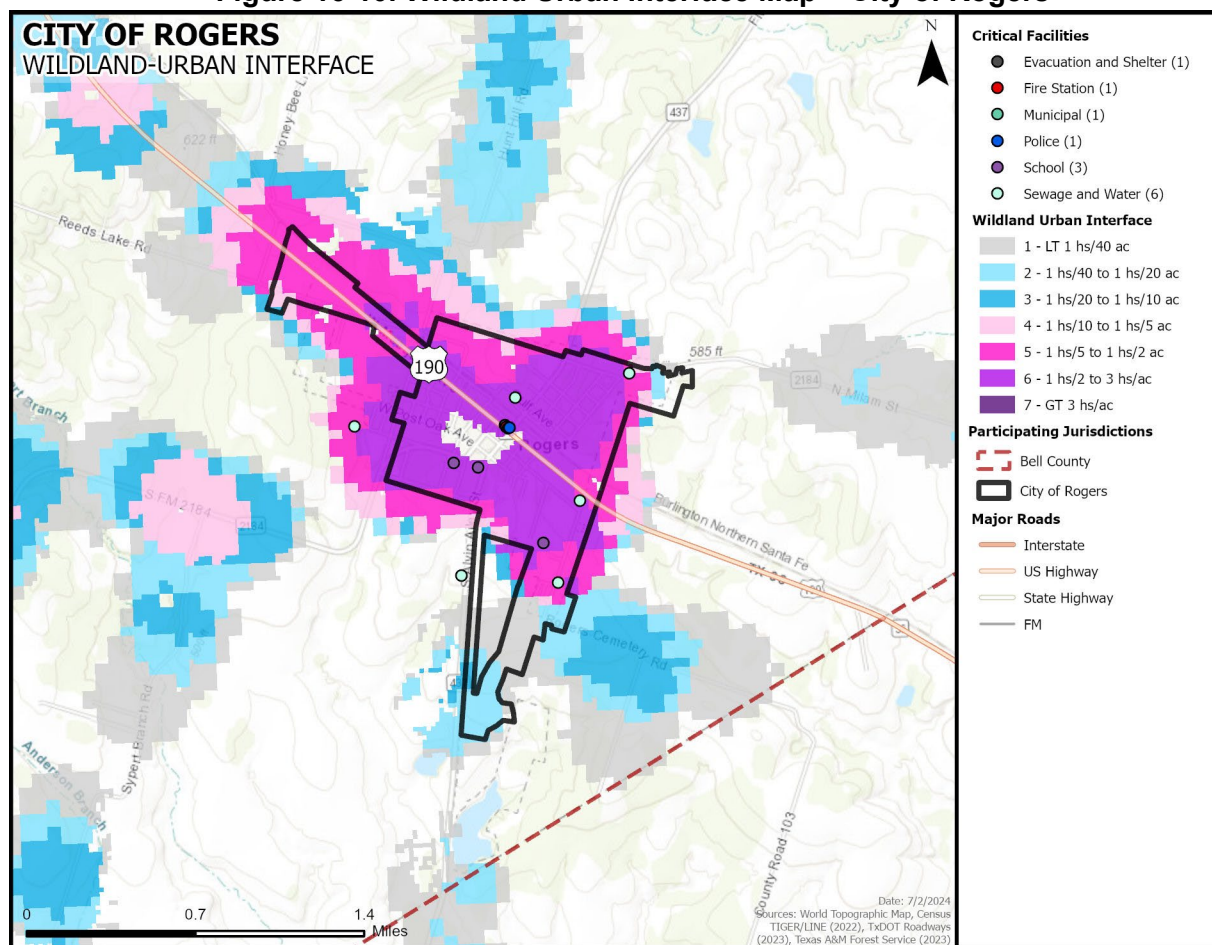
Figure 16-9. Wildland Urban Interface Map – City of Nolanville



It is estimated that 93 percent of the total population in the City of Nolanville live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

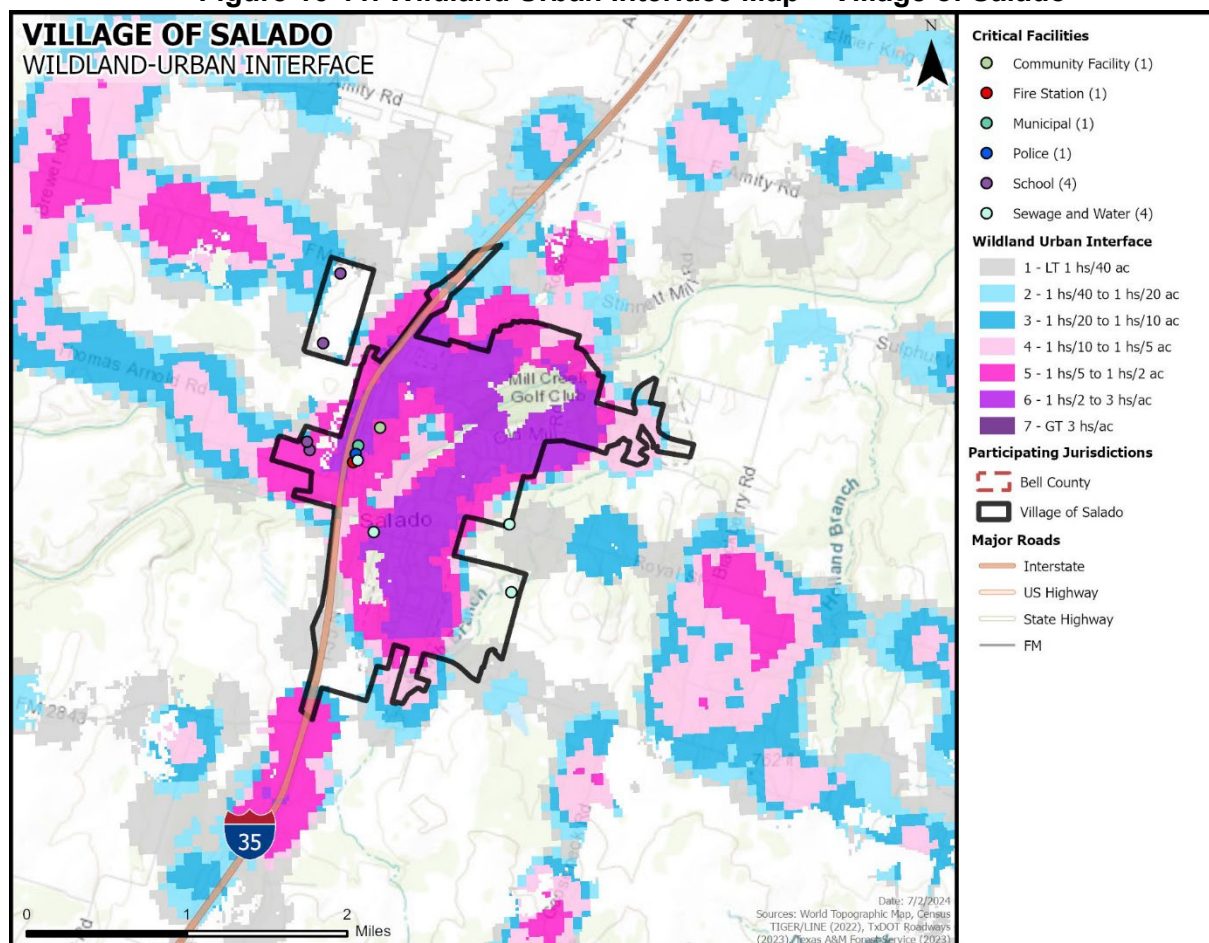
Figure 16-10. Wildland Urban Interface Map – City of Rogers



It is estimated that 89 percent of the total population in the City of Rogers live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

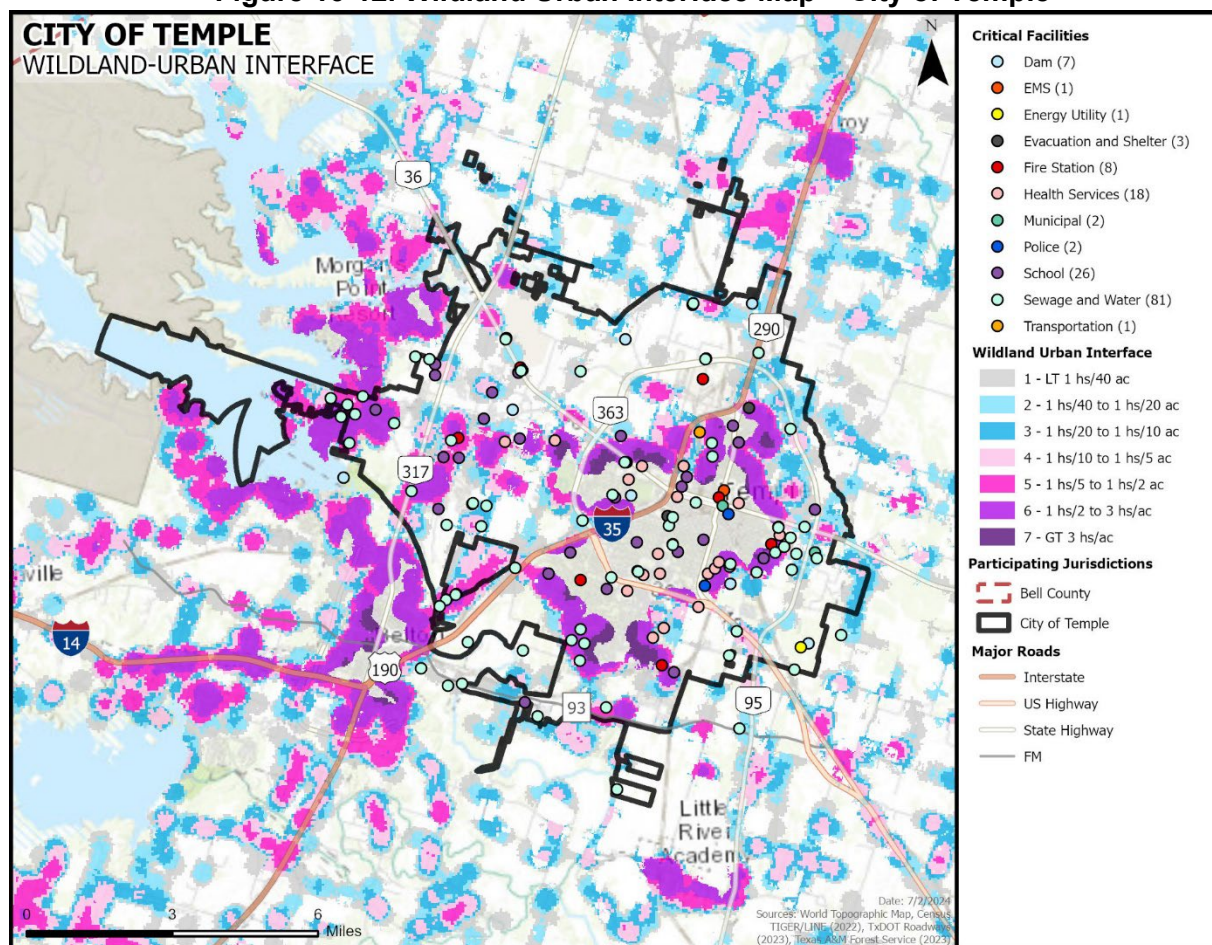
Figure 16-11. Wildland Urban Interface Map – Village of Salado



It is estimated that 95 percent of the total population in the Village of Salado live within the WUI. However, the entire Village is at some risk for wildfires.

SECTION 16: WILDFIRE

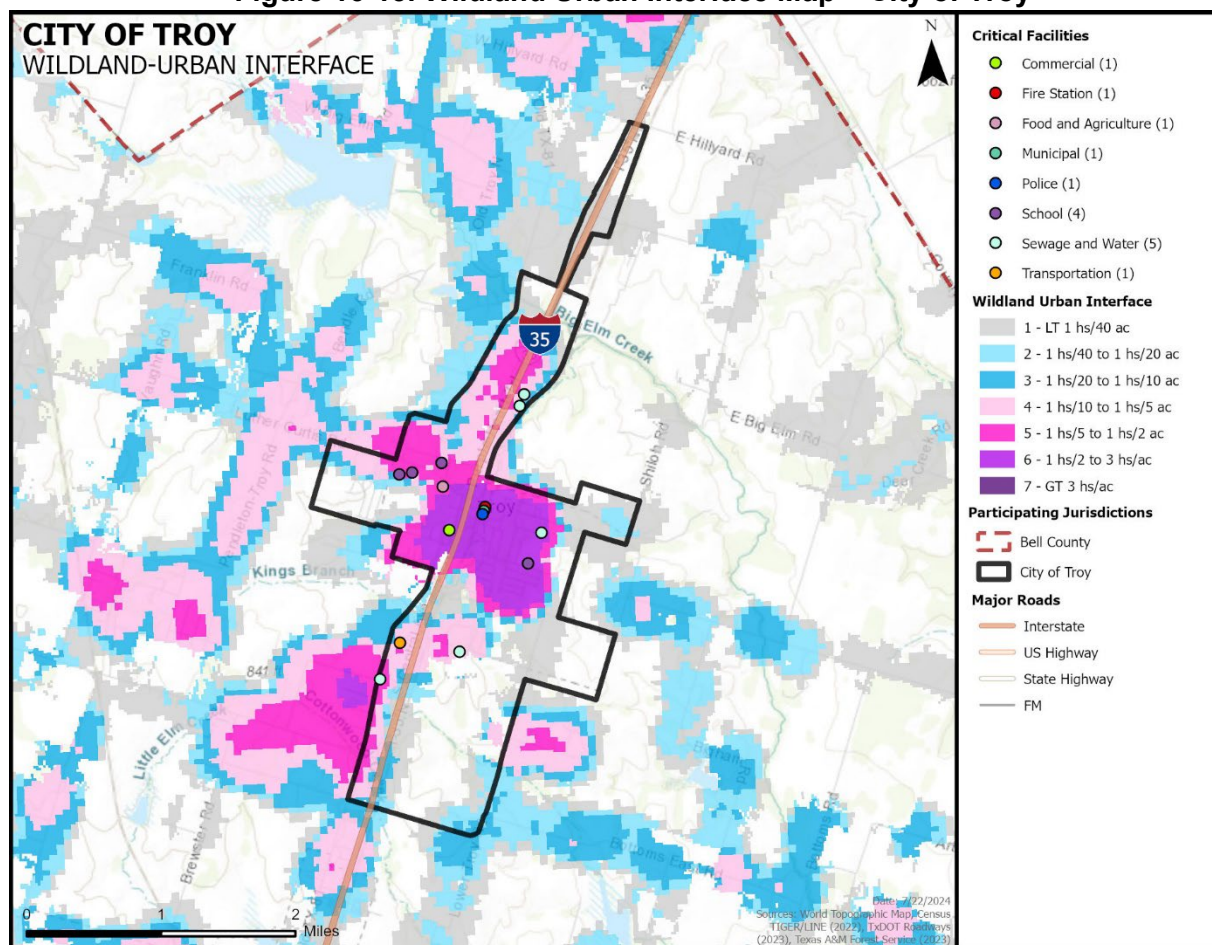
Figure 16-12. Wildland Urban Interface Map – City of Temple



It is estimated that 43 percent of the total population in the City of Temple live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

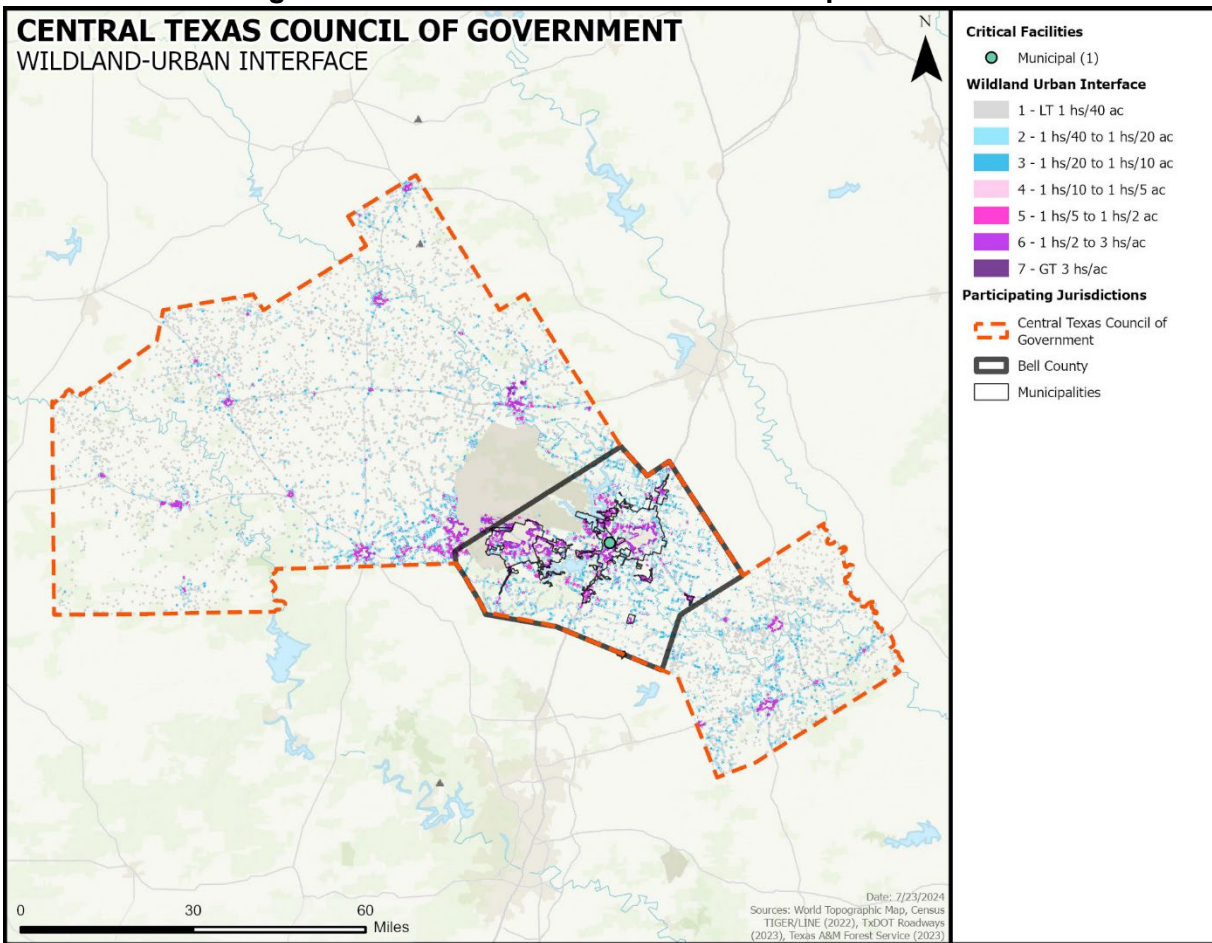
Figure 16-13. Wildland Urban Interface Map – City of Troy



It is estimated that 99 percent of the total population in the City of Troy live within the WUI. However, the entire City is at some risk for wildfires.

SECTION 16: WILDFIRE

Figure 16-14. Wildland Urban Interface Map – CTCOG



The CTCOG has one facility within the WUI.

EXTENT

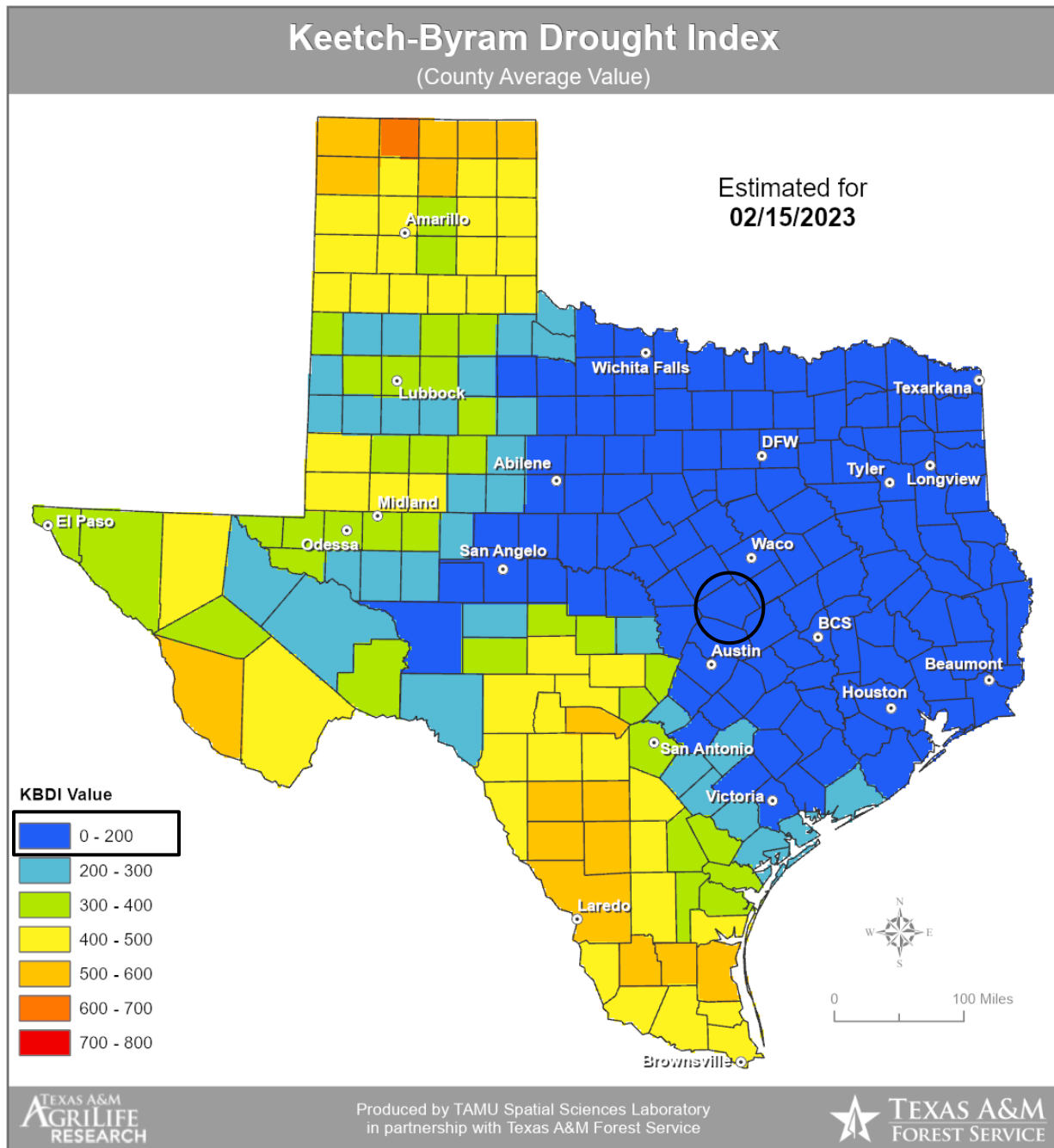


Risk for a wildfire event is measured in terms of magnitude and intensity using the Keetch Byram Drought Index (KBDI), a mathematical system for relating current and recent weather conditions to potential or expected fire behavior. The KBDI determines forest fire potential based on a daily water balance, derived by balancing a drought factor with precipitation and soil moisture (assumed to have a maximum storage capacity of eight inches), and is expressed in hundredths of an inch of soil moisture depletion.

The planning area has experienced a full range of KBDI values at various dates as indicated in Figures 16-15 and 16-16. The drought index ranges from 0 to 800. A drought index of 0 represents no moisture depletion, and a drought index of 800 represents absolutely dry conditions.

SECTION 16: WILDFIRE

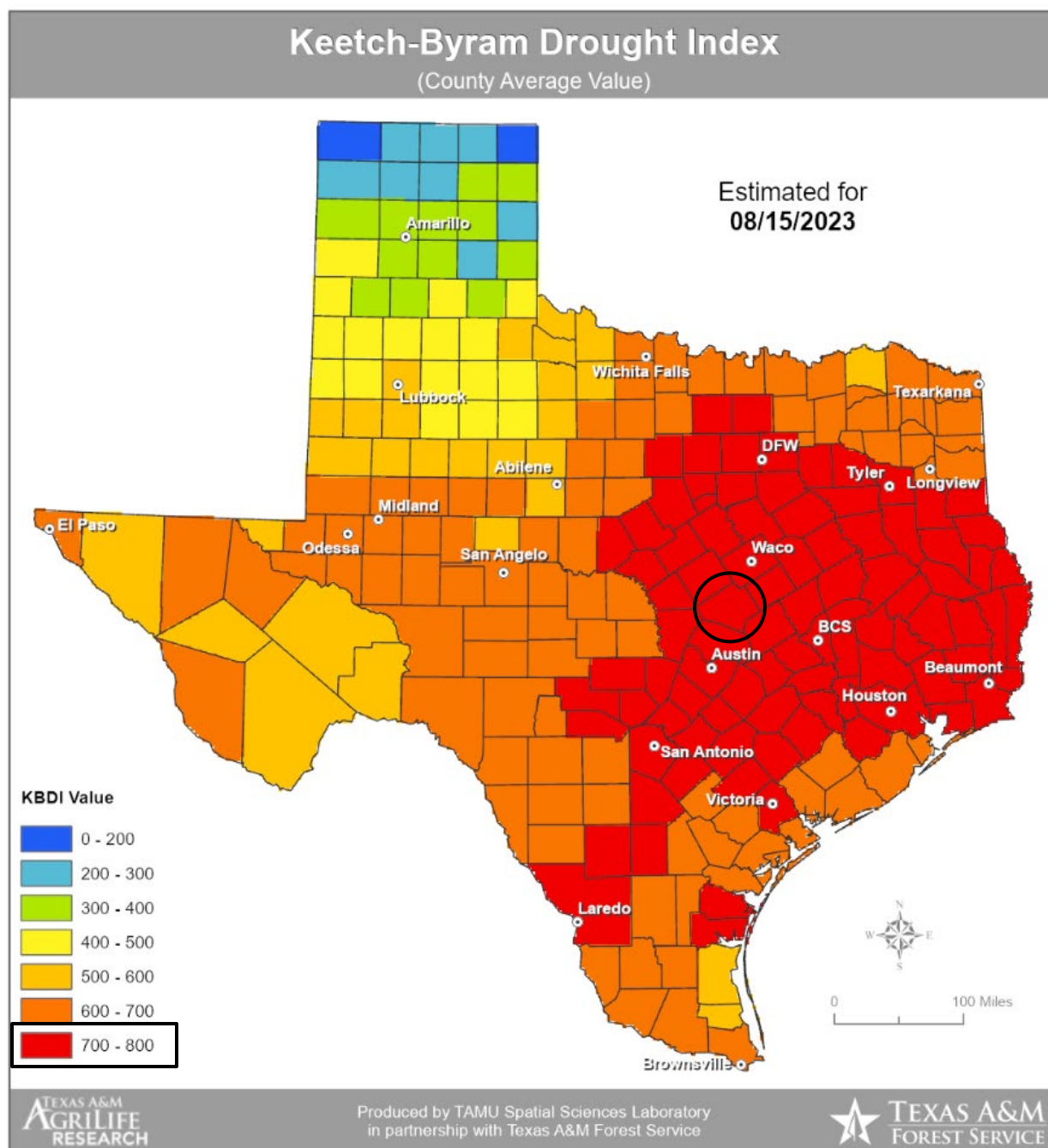
Figure 16-15. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2/15/2023⁵



⁵ Bell County planning area is located within the black circle.

SECTION 16: WILDFIRE

Figure 16-16. Keetch-Byram Drought Index (KBDI) for the State of Texas, 8/15/2023



Fire behavior can be categorized at four distinct levels on the KBDI:

- **0 -200:** Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
- **200 -400:** Fires more readily burn and will carry across an area with no gaps. Heavier fuels will not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.

SECTION 16: WILDFIRE

- **400 -600:** Fires intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
- **600 -800:** Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

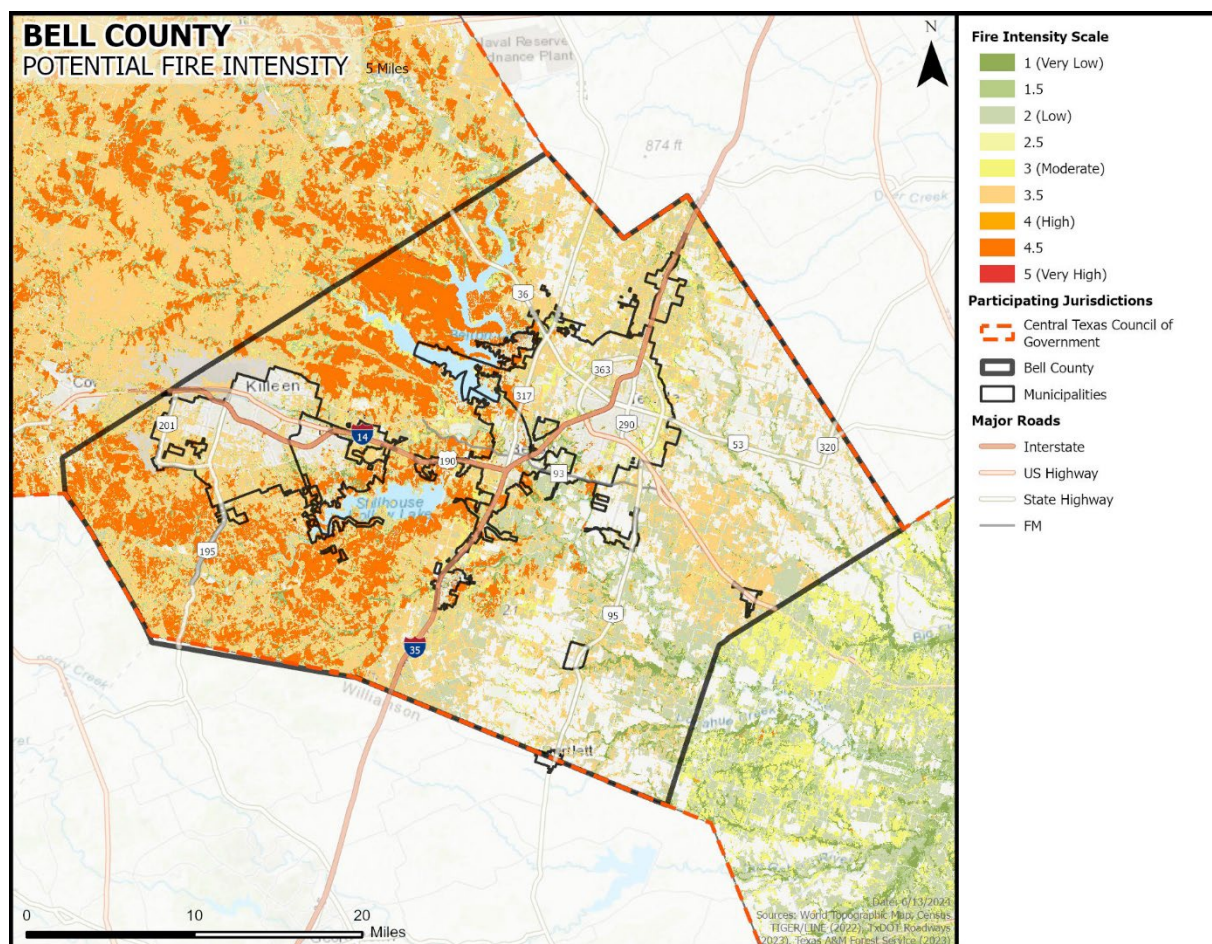
The KBDI is a good measure of the readiness of fuels for a wildfire event. It should be referenced as the area experiences changes in precipitation and soil moisture, while caution should be exercised in dryer, hotter conditions.

The range of intensity for the Bell County planning area, including all participating jurisdictions and the CTCOG, in a wildfire event, is within 700 to 800. The average extent to be mitigated for the planning area is a KBDI of 726. Based on historical occurrences and readily available fuel, the planning area can anticipate a KBDI range from 0 to 800. At the high end of this range fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

The Texas Forest Service's Fire Intensity Scale identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on weighted average of four percentile weather categories. The Bell County planning area has a potential for a full range of wildfire intensities. Figure 16-17 through 16-30 identifies the wildfire intensity for the planning area.

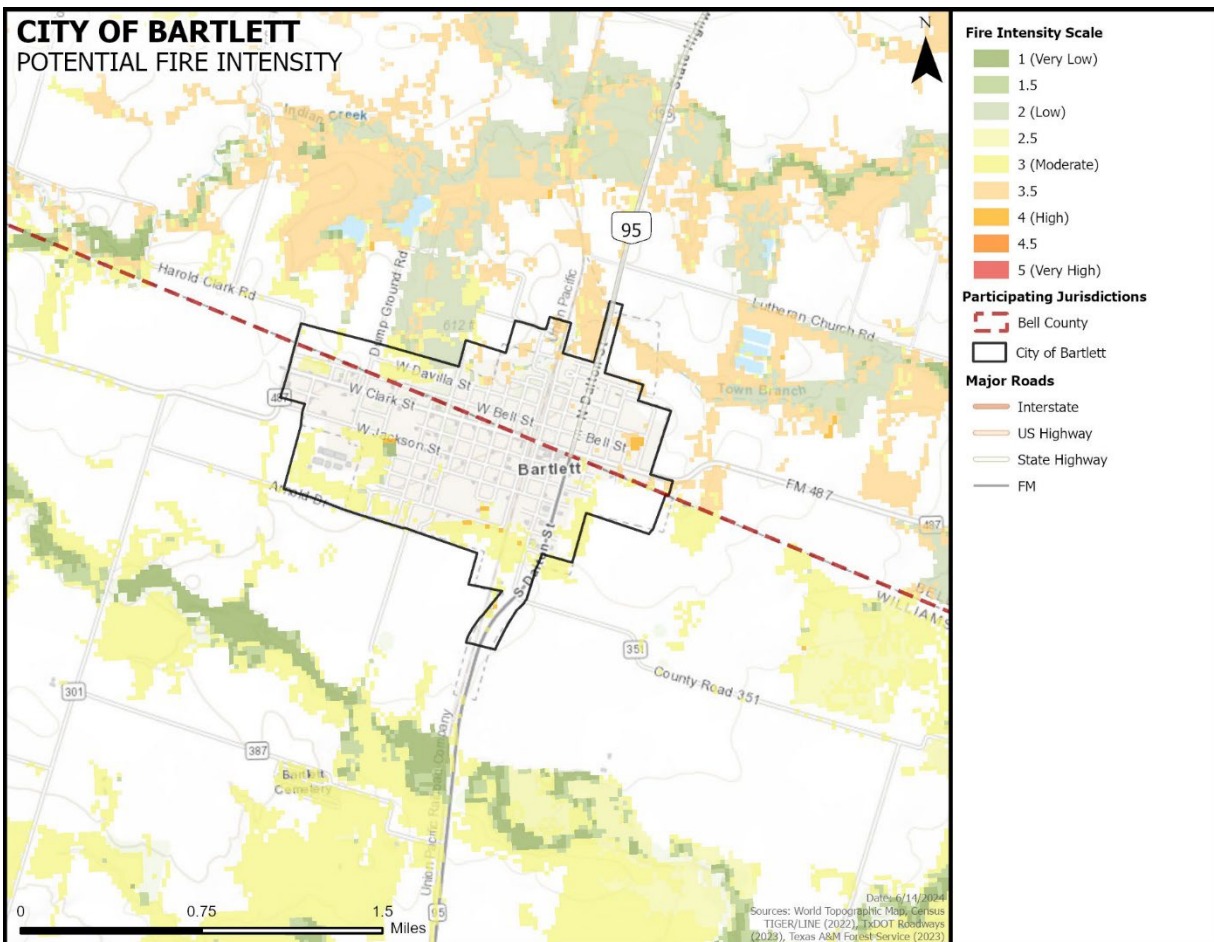
SECTION 16: WILDFIRE

Figure 16-17. Fire Intensity Scale Map – Bell County



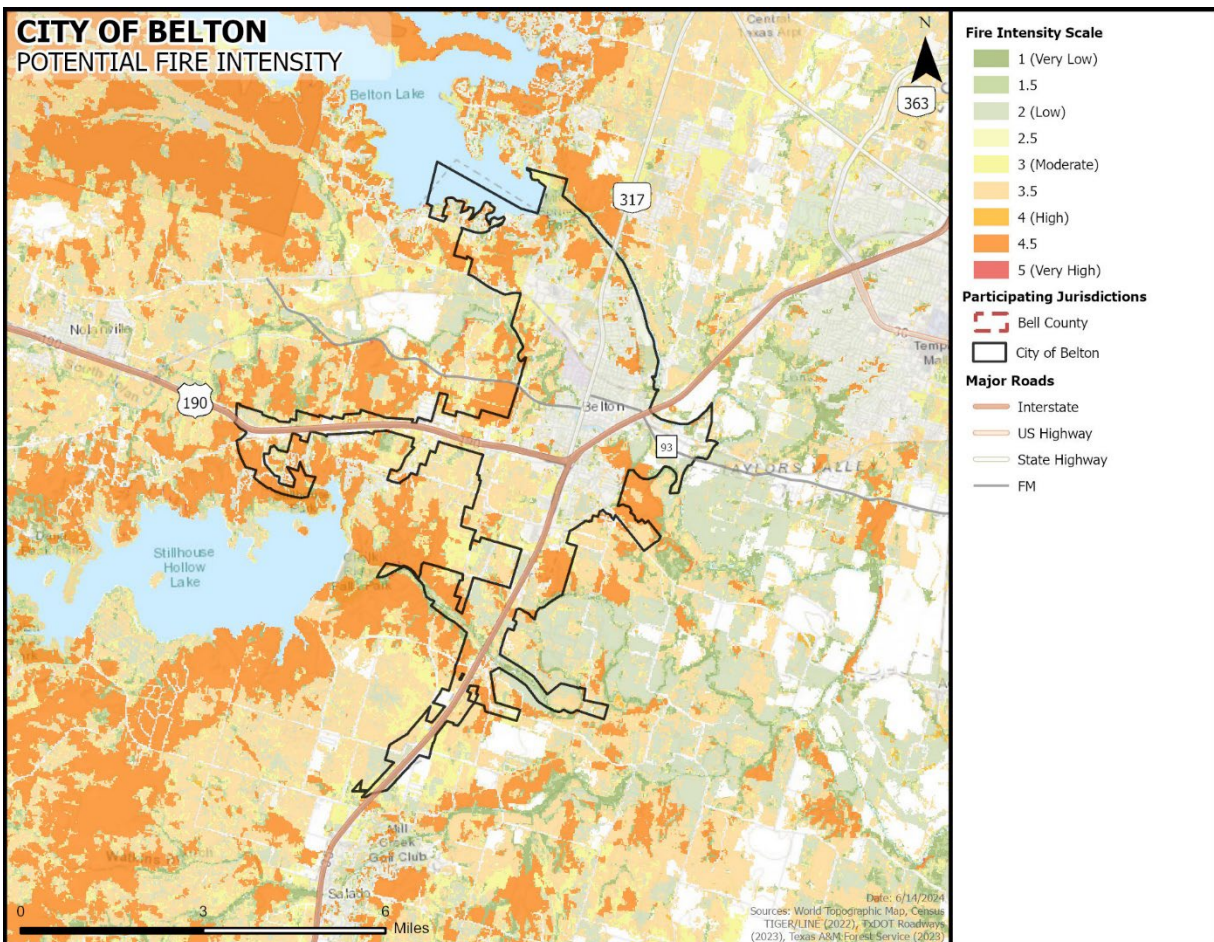
SECTION 16: WILDFIRE

Figure 16-18. Fire Intensity Scale Map – City of Bartlett



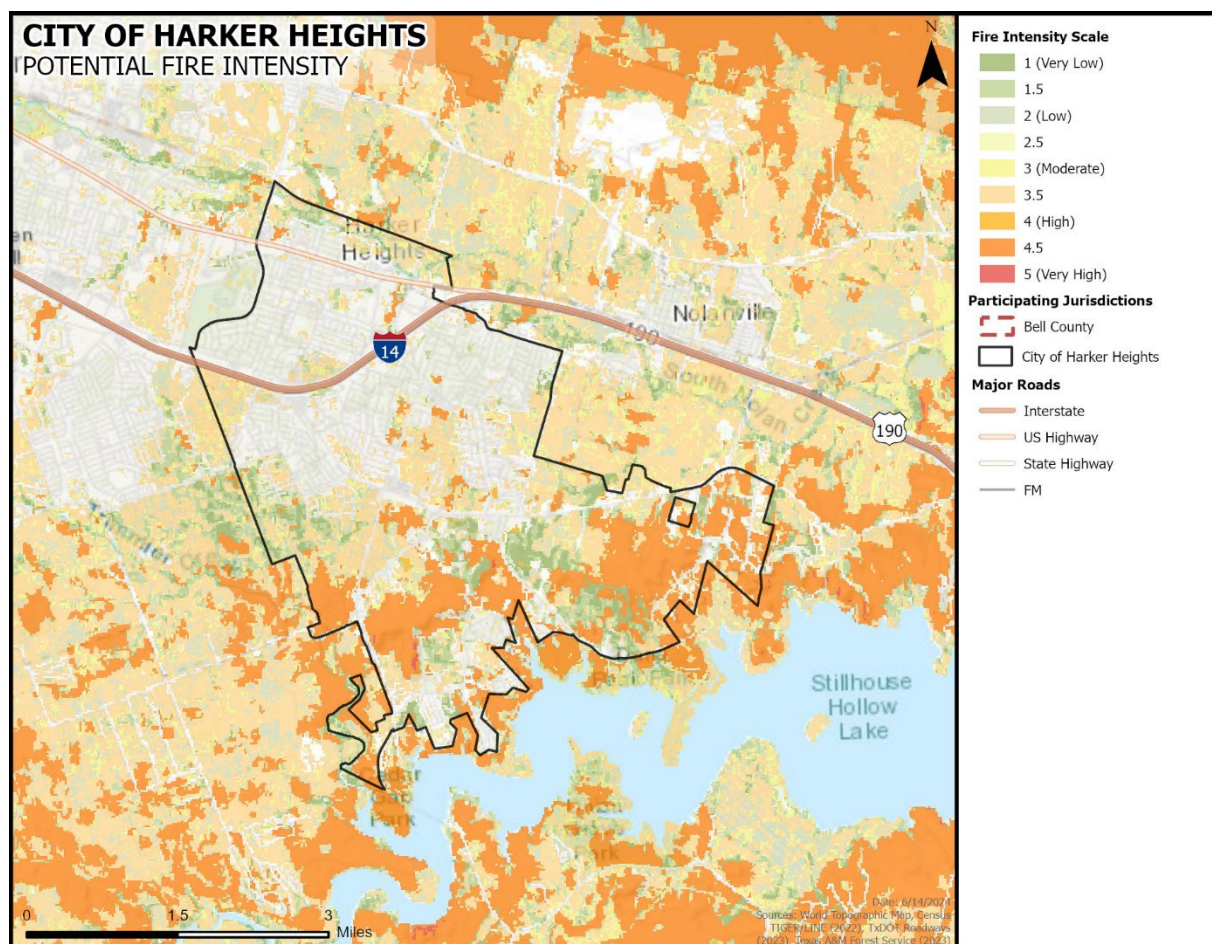
SECTION 16: WILDFIRE

Figure 16-19. Fire Intensity Scale Map – City of Belton



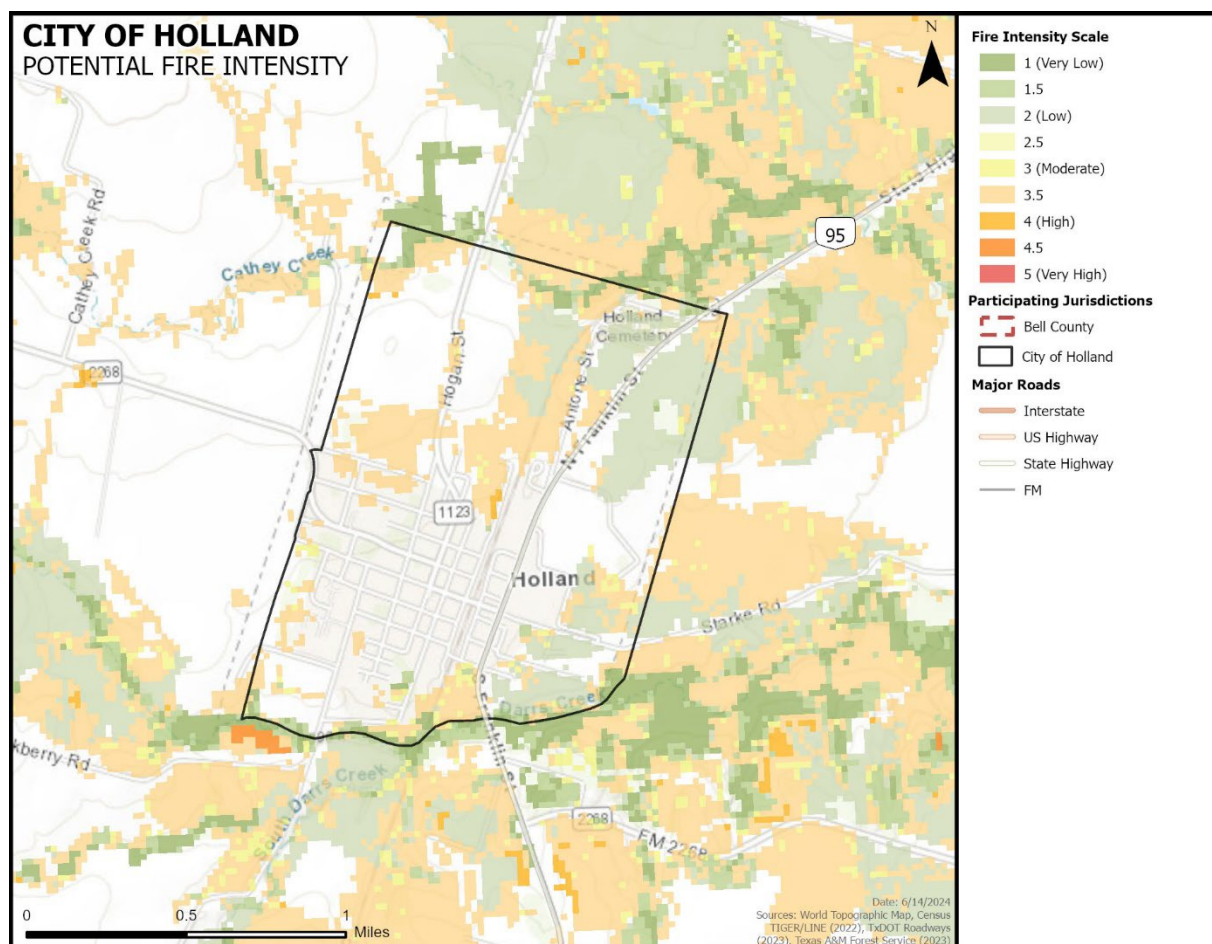
SECTION 16: WILDFIRE

Figure 16-20. Fire Intensity Scale Map – City of Harker Heights



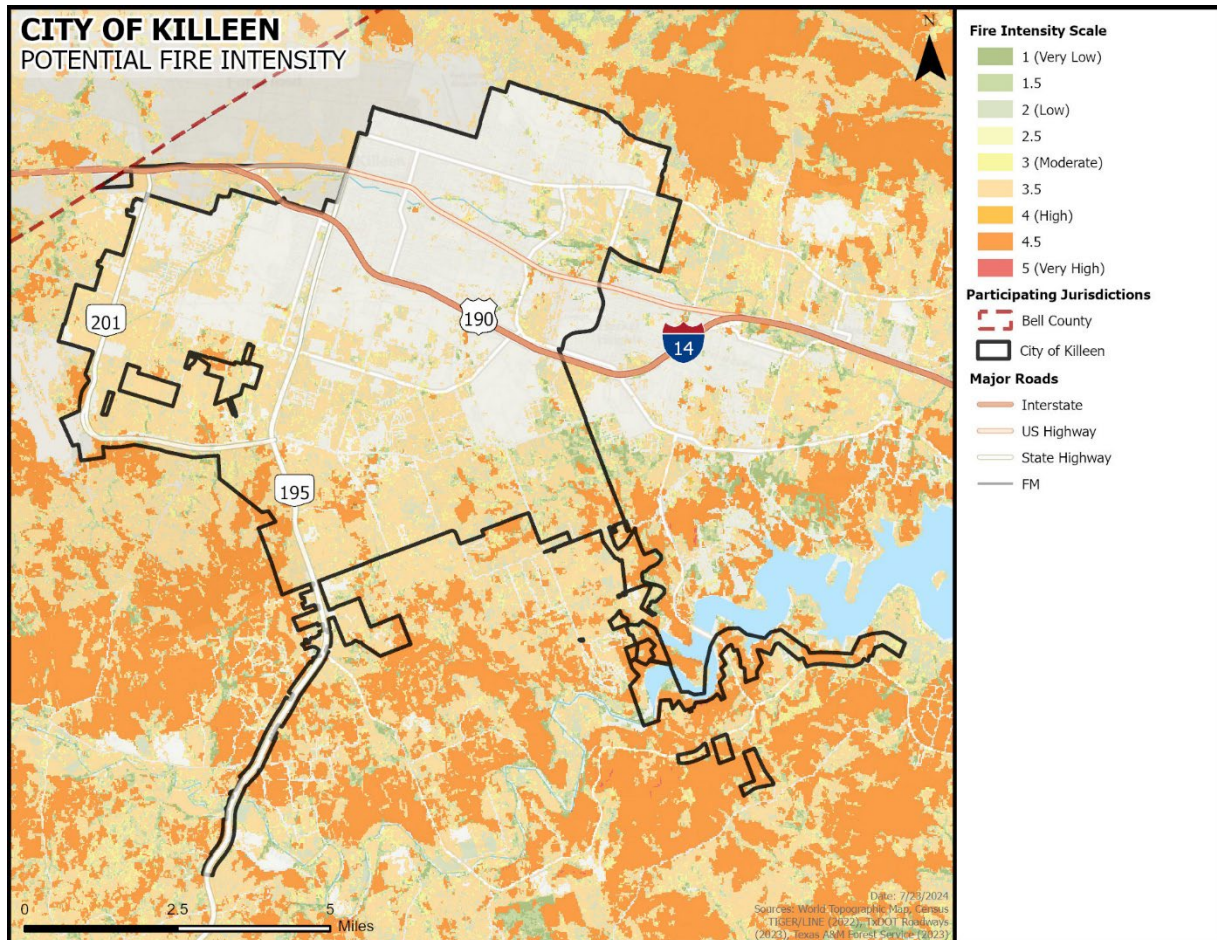
SECTION 16: WILDFIRE

Figure 16-21. Fire Intensity Scale Map – City of Holland



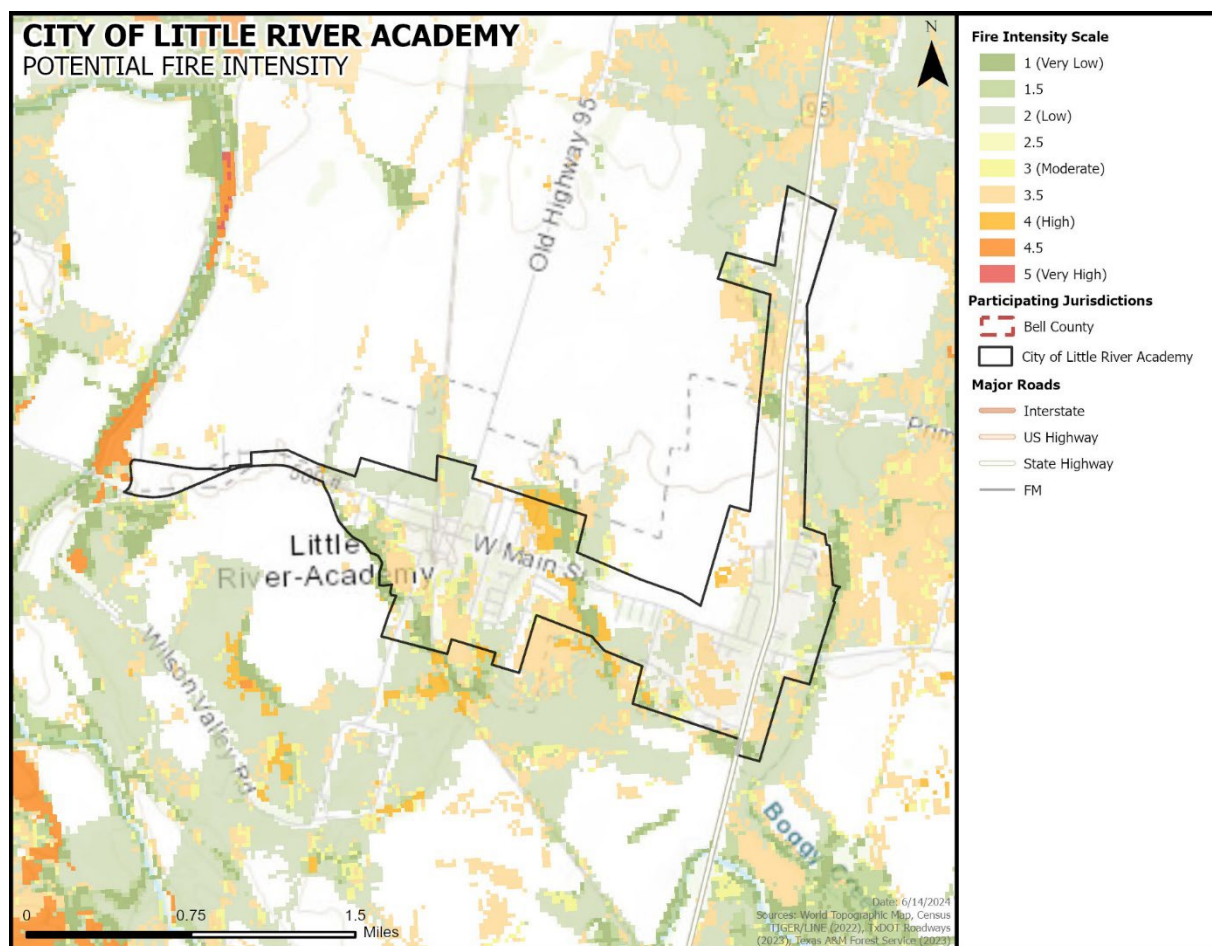
SECTION 16: WILDFIRE

Figure 16-22. Fire Intensity Scale Map – City of Killeen



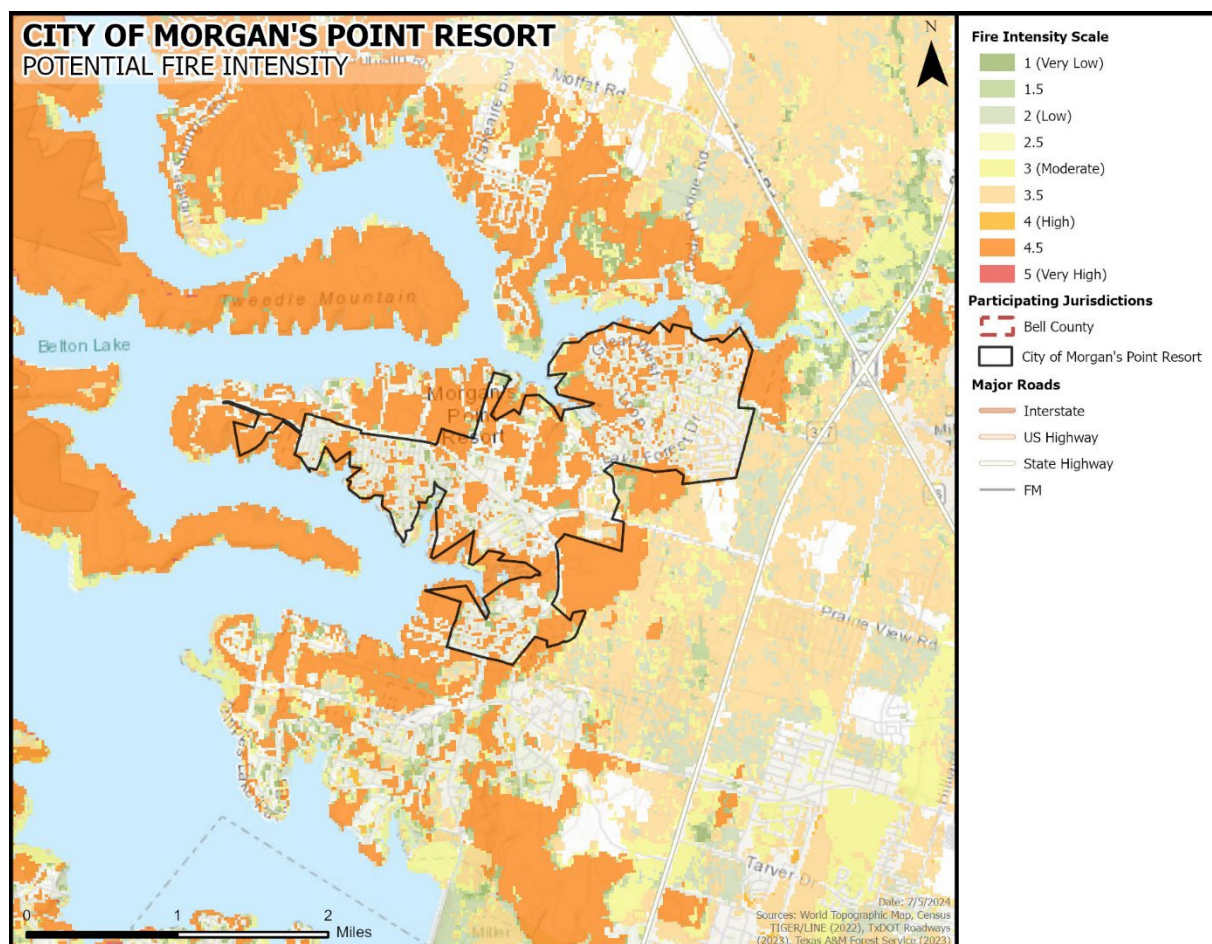
SECTION 16: WILDFIRE

Figure 16-23. Fire Intensity Scale Map – City of Little River Academy



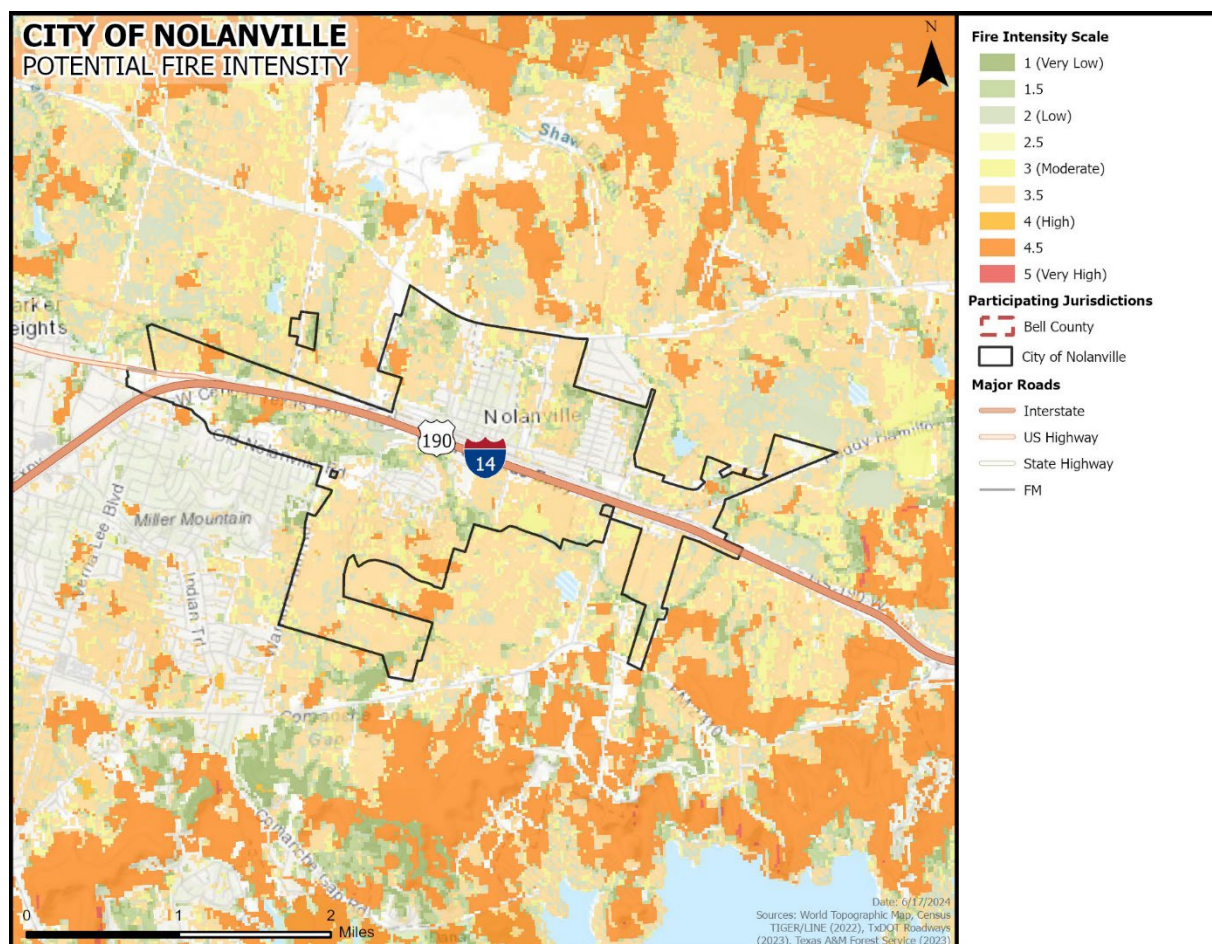
SECTION 16: WILDFIRE

Figure 16-24. Fire Intensity Scale Map – City of Morgan's Point Resort



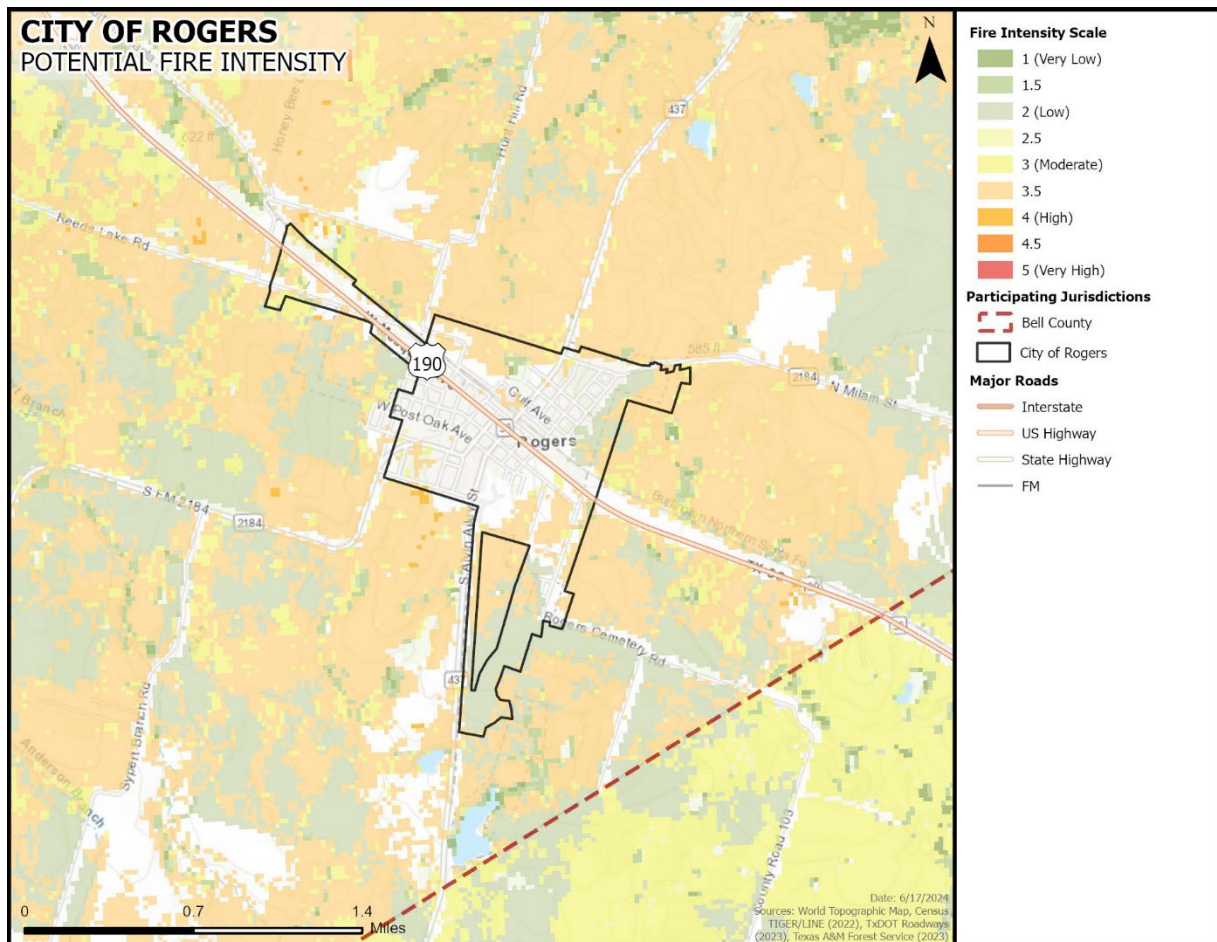
SECTION 16: WILDFIRE

Figure 16-25. Fire Intensity Scale Map – City of Nolanville



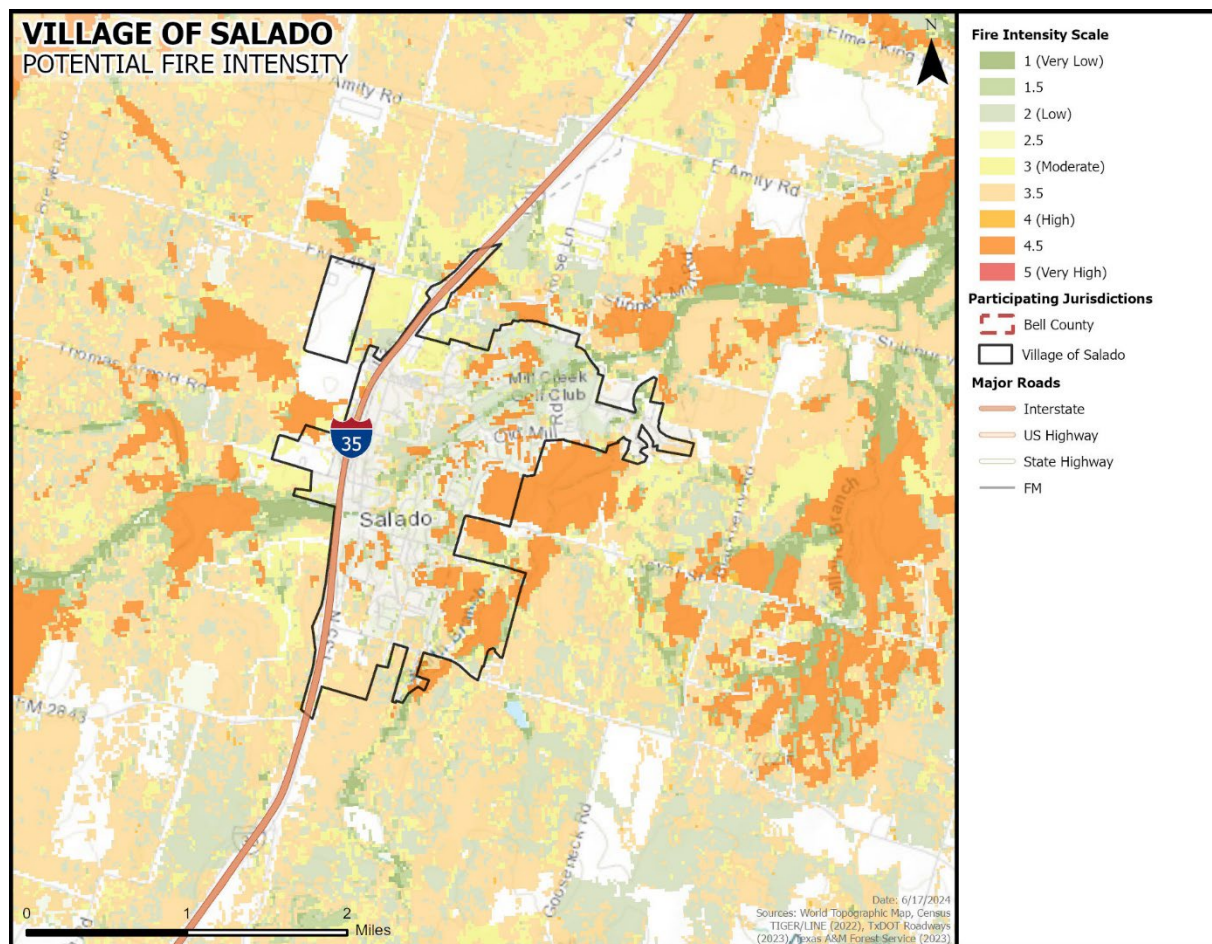
SECTION 16: WILDFIRE

Figure 16-26. Fire Intensity Scale Map – City of Rogers



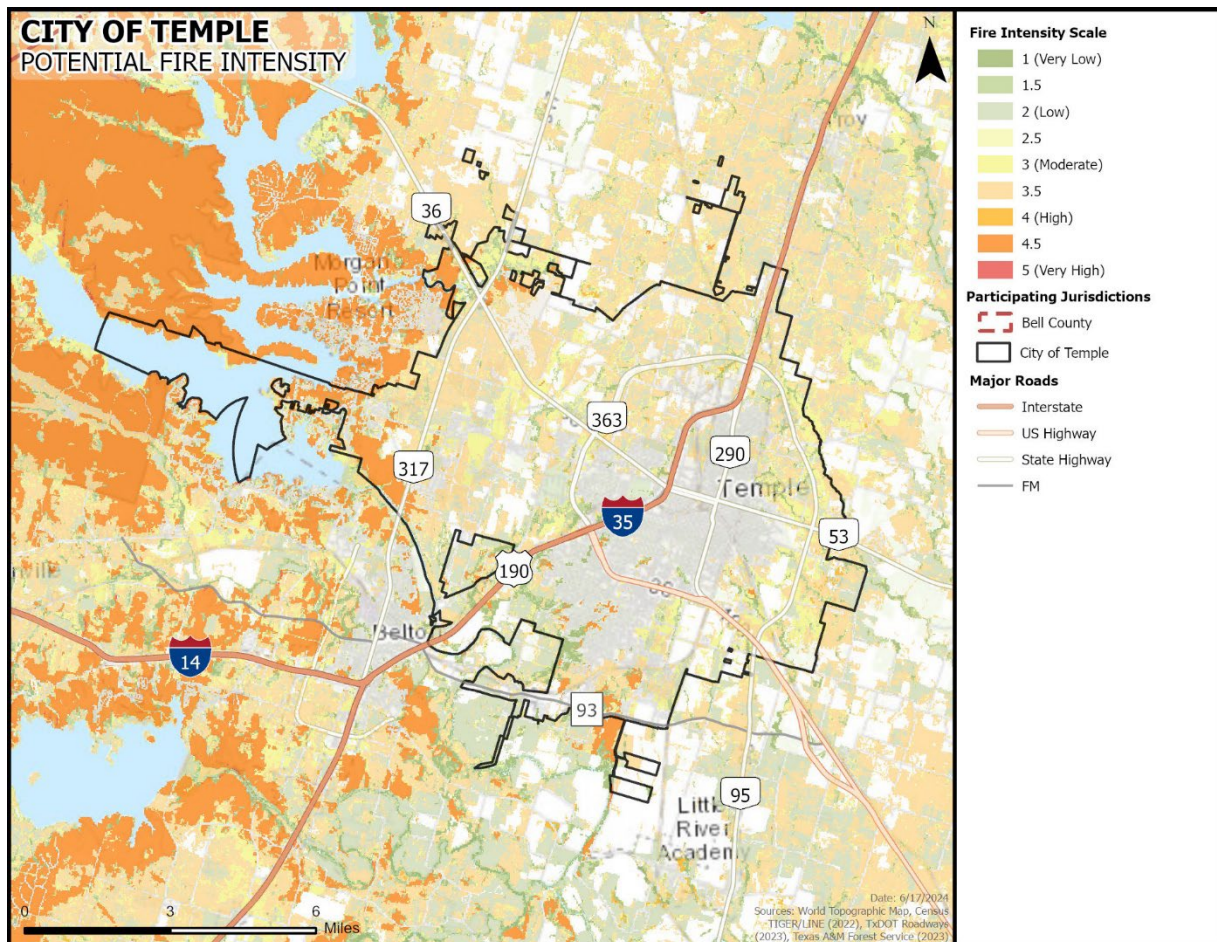
SECTION 16: WILDFIRE

Figure 16-27. Fire Intensity Scale Map – Village of Salado



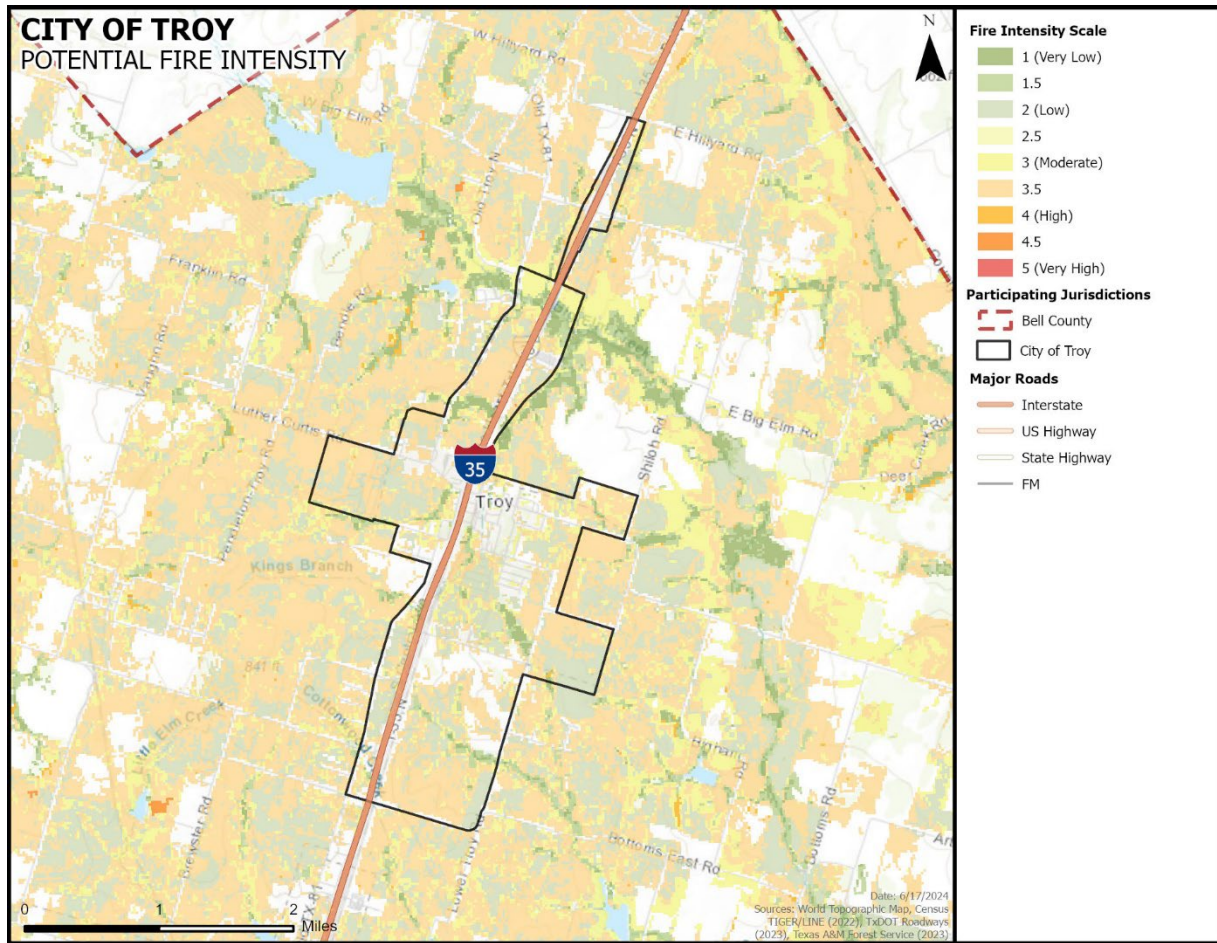
SECTION 16: WILDFIRE

Figure 16-28. Fire Intensity Scale Map – City of Temple



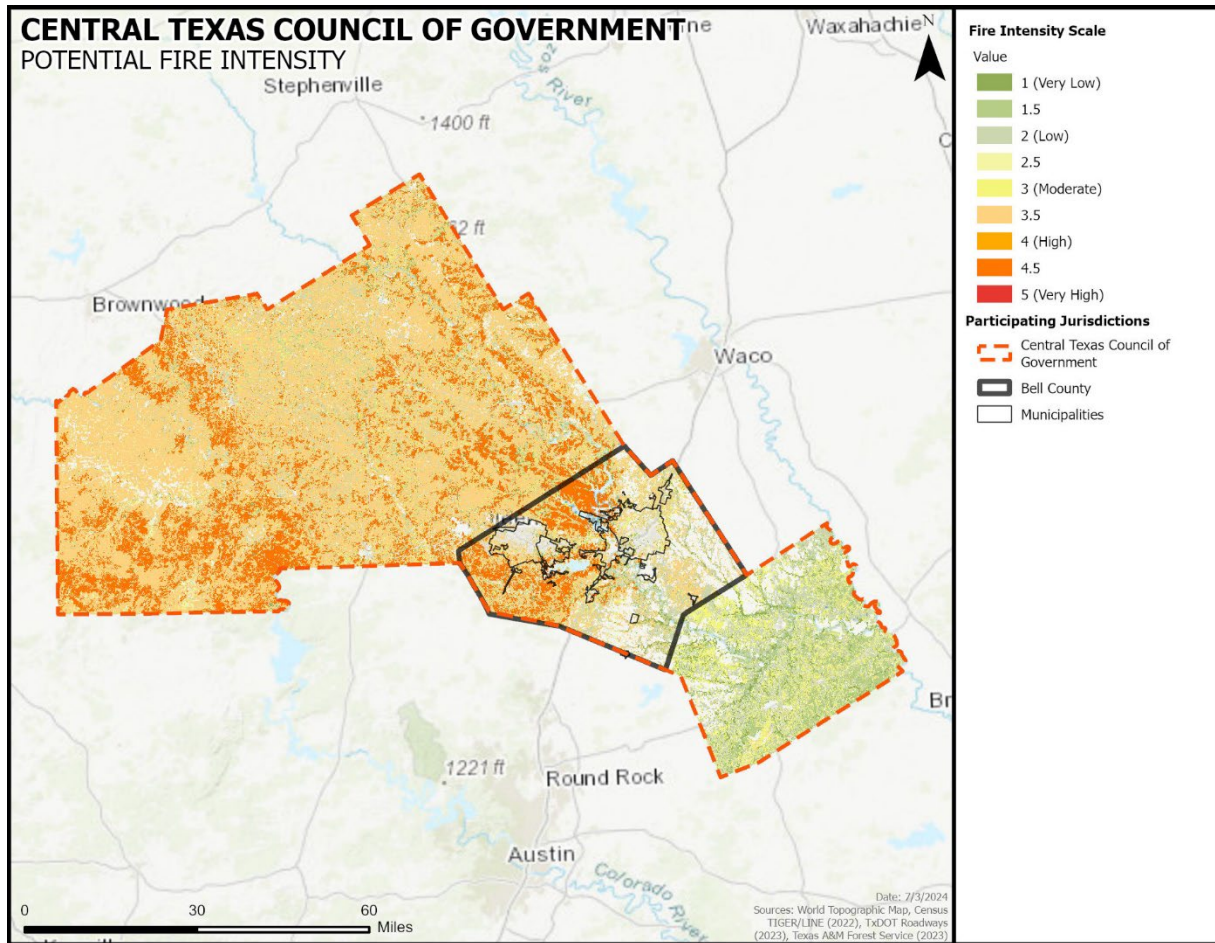
SECTION 16: WILDFIRE

Figure 16-29. Fire Intensity Scale Map – City of Troy



SECTION 16: WILDFIRE

Figure 16-30. Fire Intensity Scale Map – CTCOG



HISTORICAL OCCURRENCES

The Texas Forest Service reported 3,995 wildfire events for the Bell County planning area between 2005 and 2021. The NCEI Storm Events Database includes eight records of wildfire events from 1996 through 2023. Four of these events took place in 2011, and one event each during the years of 2007, 2012, 2013, and 2014. These wildfires resulted in an estimated \$493,800 in damages. The Texas A&M Forest Service (TFS) started collecting wildfire reported by volunteer fire departments in 2005. Due to a lack of recorded data for wildfire events prior to 2005 and after 2021, frequency calculations are based on a 17-year reporting period, using only data from recorded years. The map below shows approximate locations of wildfires, which can be grass or brushfires of any size (Figure 16-29). Tables 16-1 through 16-3 identify the number of wildfires and total acreage burned each year within the county boundaries.

Historical wildfire data for the CTCOG is provided within the reported jurisdiction in which they are located as they do not have events reported separate and apart from the events reported to the TFS. There have been no reported losses as a result of wildfire events for the CTCOG.

SECTION 16: WILDFIRE

Figure 16-31. Location and Historic Wildfire Events in Bell County

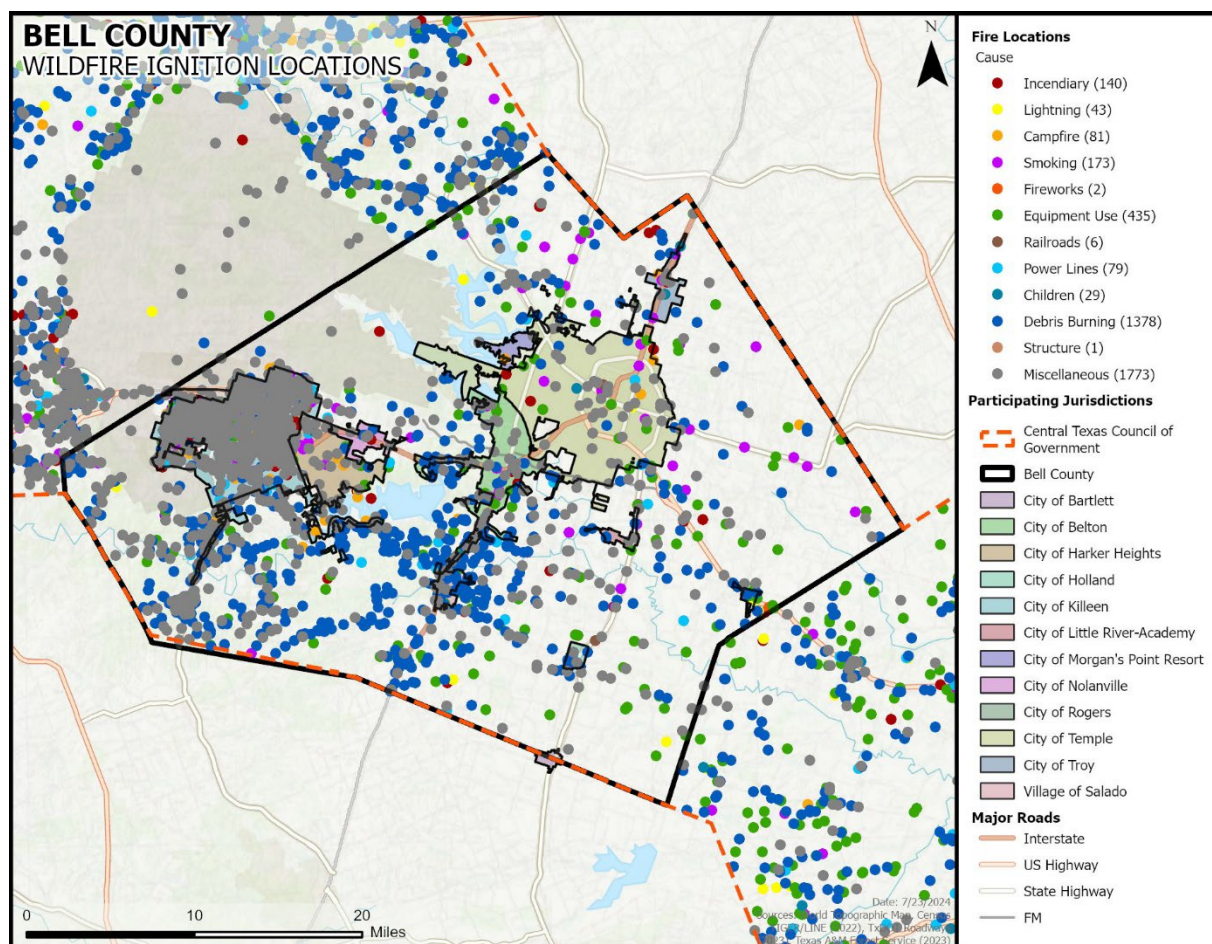


Table 16-1. Historical Wildfire Events Summary, 2005 - 2021⁶

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Bell County	2,451	21,870
City of Bartlett	3	1
City of Belton	75	462
City of Harker Heights	45	248
City of Holland	14	137
City of Killeen	1,272	2,751
City of Little River Academy	8	21
City of Morgan's Point Resort	2	8

⁶ Source: Texas A&M Forest Service

SECTION 16: WILDFIRE

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
City of Nolanville	9	1,032
City of Rogers	9	218
Village of Salado	11	72
City of Temple	86	783
City of Troy	10	10
CTCOG	0	-

Table 16-2. Historical Wildfire Events by Year

YEAR	Bell County	City of Bartlett	City of Belton	City of Harker Heights	City of Holland	City of Killeen	City of Little River Academy	City of Morgans Point Resort	City of Nolanville	City of Rogers	Village of Salado	City of Temple	City of Troy
2005	55	0	2	0	2	10	1	0	1	0	0	4	1
2006	249	2	22	8	7	55	2	0	1	2	4	11	5
2007	95	0	0	0	0	79	0	0	0	0	0	0	0
2008	357	0	7	8	2	196	3	0	0	0	1	2	0
2009	350	0	20	1	0	125	1	0	0	1	1	7	2
2010	121	1	4	2	1	80	0	0	1	0	0	1	1
2011	245	0	20	12	1	81	0	0	0	4	0	12	0
2012	126	0	0	1	1	62	0	0	0	0	3	2	0
2013	102	0	0	0	0	70	0	0	0	0	0	0	0
2014	133	0	0	7	0	93	1	0	1	0	0	2	1
2015	135	0	0	2	0	97	0	0	3	0	0	0	0
2016	53	0	0	1	0	37	0	0	0	0	0	0	0
2017	71	0	0	0	0	56	0	1	0	2	2	0	0
2018	63	0	0	0	0	9	0	0	0	0	0	32	0
2019	103	0	0	3	0	75	0	1	1	0	0	2	0
2020	119	0	0	0	0	83	0	0	1	0	0	11	0
2021	74	0	0	0	0	64	0	0	0	0	0	0	0
Total	2,451	3	75	45	14	1,272	8	2	9	9	11	86	10

SECTION 16: WILDFIRE

Based on the list of historical wildfire events for the Bell County planning area (Table 16-2), 103 events have occurred since the 2018 plan.

Table 16-3. Acreage of Suppressed Wildfire by Year

YEAR	Bell County	City of Bartlett	City of Belton	City of Harker Heights	City of Holland	City of Killeen	City of Little River Academy	City of Morgans Point Resort	City of Nolanville	City of Rodgers	Village of Salado	City of Temple	City of Troy
2005	1,700	0	1	0	21	5	1	0	1,002	0	0	100	2
2006	4,412	0	28	8	5	601	0	0	17	8	60	5	3
2007	129	0	0	0	0	72	0	0	0	0	0	0	0
2008	3,603	0	5	104	5	1,380	16	0	0	0	1	2	0
2009	4,707	0	205	0	0	196	0	0	0	5	0	38	5
2010	121	1	3	1	1	16	0	0	0	0	0	1	0
2011	3,500	0	220	9	100	75	0	0	0	155	0	369	0
2012	426	0	0	100	5	41	0	0	0	0	3	2	0
2013	711	0	0	0	0	16	0	0	0	0	0	0	0
2014	196	0	0	16	0	22	4	0	0	0	0	2	0
2015	350	0	0	5	0	81	0	0	11	0	0	0	0
2016	45	0	0	1	0	12	0	0	0	0	0	0	0
2017	172	0	0	0	0	16	0	5	0	50	8	0	0
2018	1,070	0	0	0	0	110	0	0	0	0	0	243	0
2019	142	0	0	4	0	58	0	3	1	0	0	0	0
2020	475	0	0	0	0	28	0	0	1	0	0	21	0
2021	111	0	0	0	0	22	0	0	0	0	0	0	0
Total	21,870	1	462	248	137	2,751	21	8	1,032	218	72	783	10

SIGNIFICANT EVENTS

There have been 7 declared disasters related to wildfire in Bell County between 1996 and 2023 (Table 16-4). Additional details on certain wildfire events are described below.

SECTION 16: WILDFIRE

Table 16-4. Disaster Declarations for Wildfire, 1996-2023

YEAR	DECLARATION TITLE	DECLARATION TYPE	DISASTER NO.
1996	Texas Fire Emergency	EM	EM-3117-TX
1999	Texas Reese Creek Fire	FSA	FSA-2270-TX
1999	Texas Extreme Fire Hazards	EM	EM-3142-TX
2006	Texas Rosewood Fire	FM	FM-2610-TX
2006	Extreme Wildfire Threat in Texas	DR	DR-1624-TX
2008	Wildfires in Texas	EM	EM-3284-TX
2008	Texas Rein Street Fire	FM	FM-2767-TX

February 24, 2007

At least two grass fires were fanned by strong winds associated with a strong low-pressure system. Winds were reported to be between 20 and 40 mph with gusts between 50 and 60 mph. One fire caused 6,500 soldiers and family members to be evacuated from Fort Hood (now known as Fort Cavazos). Another hundred people were evacuated from a grass fire in a City of Killeen neighborhood. The fire burned twenty-four backyard storage sheds and slightly damaged six homes. Three firefighters and two police officers were treated for smoke inhalation and minor injuries.

PROBABILITY OF FUTURE EVENTS

Wildfires can occur at any time of the year. As Bell County communities move into wildland, the potential area of occurrence of wildfire increases. With 3,995 events in a 17-year reporting period, an event within the Bell County planning area is “Highly Likely”, meaning an event is probable within the next year. According to NOAA, research shows that changes in climate create warmer, drier conditions, leading to longer and more active fire seasons, indicating an increase in the frequency and severity of events in the planning area going forward. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Periods of drought, dry conditions, high temperatures, and low humidity are factors that contribute to the occurrence of a wildfire event. Less developed areas, such as along interstates or in more remote areas where fuels are more prevalent have an increased risk of being affected by wildfire.

The more heavily populated areas of the planning area are not highly likely to experience large, sweeping fires. Unoccupied buildings and open spaces that have not been maintained have the greatest vulnerability to wildfire. The overall level of concern for wildfires is located across the county where wildland and urban areas interface. Figures 16-32 through 16-45⁷ illustrates the areas that are the most vulnerable to wildfire throughout the Bell County planning area.

⁷ Source: TxWRAP portal at the following site: <https://texaswildfirerisk.com/>

SECTION 16: WILDFIRE

The Bell County Planning Team identified the following critical facilities (Table 16-5) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by wildfire events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 16-5. Critical Facilities/Critical Services Vulnerable to Wildfire Events

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<p>Bell County: 2 Police City of Belton: 1 Fire City of Harker Heights: 1 Fire, 1 Health Services City of Holland: 1 Fire, 1 Police City of Killeen: 1 EMS, 5 Fire Stations, 1 Police, 1 SCADA, 3 Health Services City of Little River Academy: 1 Fire, 1 Police City of Morgan's Point Resort: 1 EMS, 1 Fire, 1 Police City of Nolanville: 2 Fire, 1 Police City of Rogers: 1 Fire, 1 Police City of Temple: 5 Fire, 7 Health Services City of Troy: 1 Fire, 1 Police Village of Salado: 1 Fire, 1 Police</p>	<ul style="list-style-type: none"> Emergency services may be disrupted during a wildfire if facilities are impacted, roadways are inaccessible, or personnel are unable to report for duty. First responders are at greater risk of injury when in close proximity to the hazard while extinguishing flames, protecting property, or evacuating residents in the area. Critical city departments may not be able to function and provide necessary services depending on the location of the fire and the structures or personnel impacted. Roadways in or near the WUI could be damaged or closed due to smoke and limited visibility, slowing or preventing access for emergency response vehicles. Fire suppression costs can be substantial, exhausting the financial resources of the community. First responders can experience heart disease, respiratory problems, and other long-term related illnesses from prolonged exposure to smoke, chemicals, and heat. Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Power outages could disrupt communications, delaying emergency response times. Structures can be damaged or destroyed in the path of the wildfire. Power outages could disrupt critical care. Backup power sources could be damaged or destroyed. Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.

SECTION 16: WILDFIRE

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<p>Bell County: 3 Municipal</p> <p>City of Bartlett: 1 School</p> <p>City of Belton: 1 Municipal, 1 Community Facility</p> <p>City of Harker Heights: 1 Nursing Home</p> <p>City of Holland: 1 School, 1 Municipal, 1 School</p> <p>City of Killeen: 3 Evacuation Shelters, 2 Transportation, 24 Schools</p> <p>City of Little River Academy: 1 Municipal, 4 Schools</p> <p>City of Morgan's Point Resort: 1 Evacuation Shelter, 1 Marina, 2 Municipal</p> <p>City of Nolanville: 1 Municipal, 3 Schools</p> <p>City of Rogers: 1 Evacuation Shelter, 1 Municipal, 3 Schools</p> <p>City of Temple: 1 Transportation, 2 Evacuation and Shelter, 1 Municipal, 15 Schools</p> <p>City of Troy: 1 Municipal, 1 Transportation, 4 Schools</p> <p>Village of Salado: 1 Community facility, 2 Schools, 1 Municipal</p> <p>CTCOG: 1 Municipal</p>	<ul style="list-style-type: none"> Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed. Additional emergency responders and critical aid workers may not be able to reach the area for days. Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations.

SECTION 16: WILDFIRE

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Commercial Supplier (food, fuel, etc.)	City of Morgan's Point Resort: 1 Commercial City of Troy: 1 Commercial, 1 Food and Agriculture	<ul style="list-style-type: none"> Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. Essential supplies like medicines, water, food, and equipment deliveries may be delayed. Economic disruption due to power outages and fires negatively impact services as well as area businesses reliant on commercial suppliers.
Utility Services and Infrastructure (electric, water, wastewater, communications)	City of Belton: 7 Sewage and Water City of Harker Heights: 13 Sewage and Water City of Holland: 1 Sewage and Water City of Killeen: 21 Sewage and Water City of Little River Academy: 5 Sewage and Water City of Morgan's Point Resort: 2 Sewage and Water City of Nolanville: 2 Sewage and Water City of Rogers: 5 Sewage and Water City of Temple: 2 dams, 53 Sewage and Water Village of Salado: 3 Sewage and Water City of Troy: 4 Sewage and Water	<ul style="list-style-type: none"> Wastewater and drinking water facilities and infrastructure may be damaged or destroyed resulting in service disruption or outage for multiple days or weeks. Disruptions and outages impact public welfare as safe drinking water is critical. A break in essential and effective wastewater collection and treatment is a health concern, potentially spreading disease. Exposure to untreated wastewater is harmful to people and the environment. Any service disruptions can negatively impact or delay emergency management operations. Power losses

Within the Bell County planning area, a total of 3,395 fire events were reported from 2005 through 2021 by Texas A&M Forest Service. All events were suspected wildfires. Historic acreage losses and annualized estimates of acres burned due to wildfires are presented in Table 16-6 below. The average annual frequency is approximately 235 events every year.

SECTION 16: WILDFIRE

Table 16-6. Average Annualized Acreage Losses⁸

JURISDICTION	TOTAL ACRES BURNED	AVERAGE ANNUAL ACRE LOSSES
Bell County	21,870	1,286
City of Bartlett	1	0
City of Belton	462	27
City of Harker Heights	248	15
City of Holland	137	8
City of Killeen	2,751	162
City of Little River Academy	21	1
City of Morgan's Point Resort	8	0
City of Nolanville	1,032	61
City of Rogers	218	13
Village of Salado	72	4
City of Temple	783	46
City of Troy	10	1
CTCOG	N/A	N/A
TOTAL	27,613	1,624

Wildfire Ignition Density shows the likelihood of a wildfire starting based on historical ignition patterns. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. The ignition rate is measured in the number of fires per year per 1,000 acres. Wildfire Ignition Density is a key input into the calculation of the Wildfire Threat output. With most Texas fires being human caused, there is a repeatable spatial pattern of fire ignitions over time. This pattern identifies areas where wildfires are most likely to ignite, and prevention efforts can be planned accordingly.⁹

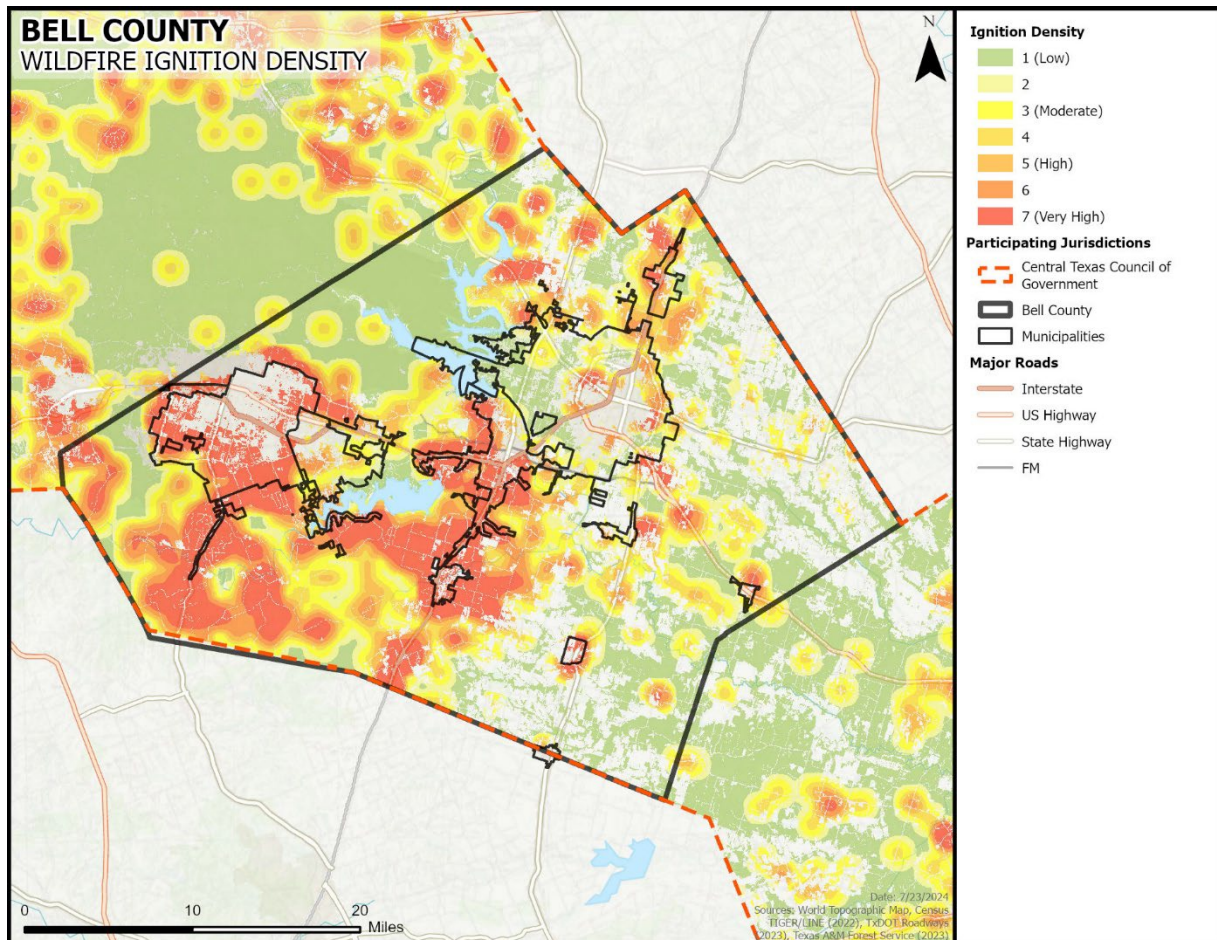
Figures 16-32 through 16-45 show the threat of wildfire to the Bell County planning area.

⁸ Events divided by 17 years of data.

⁹ Source: TxWRAP portal at the following site: <https://texaswildfirerisk.com/>

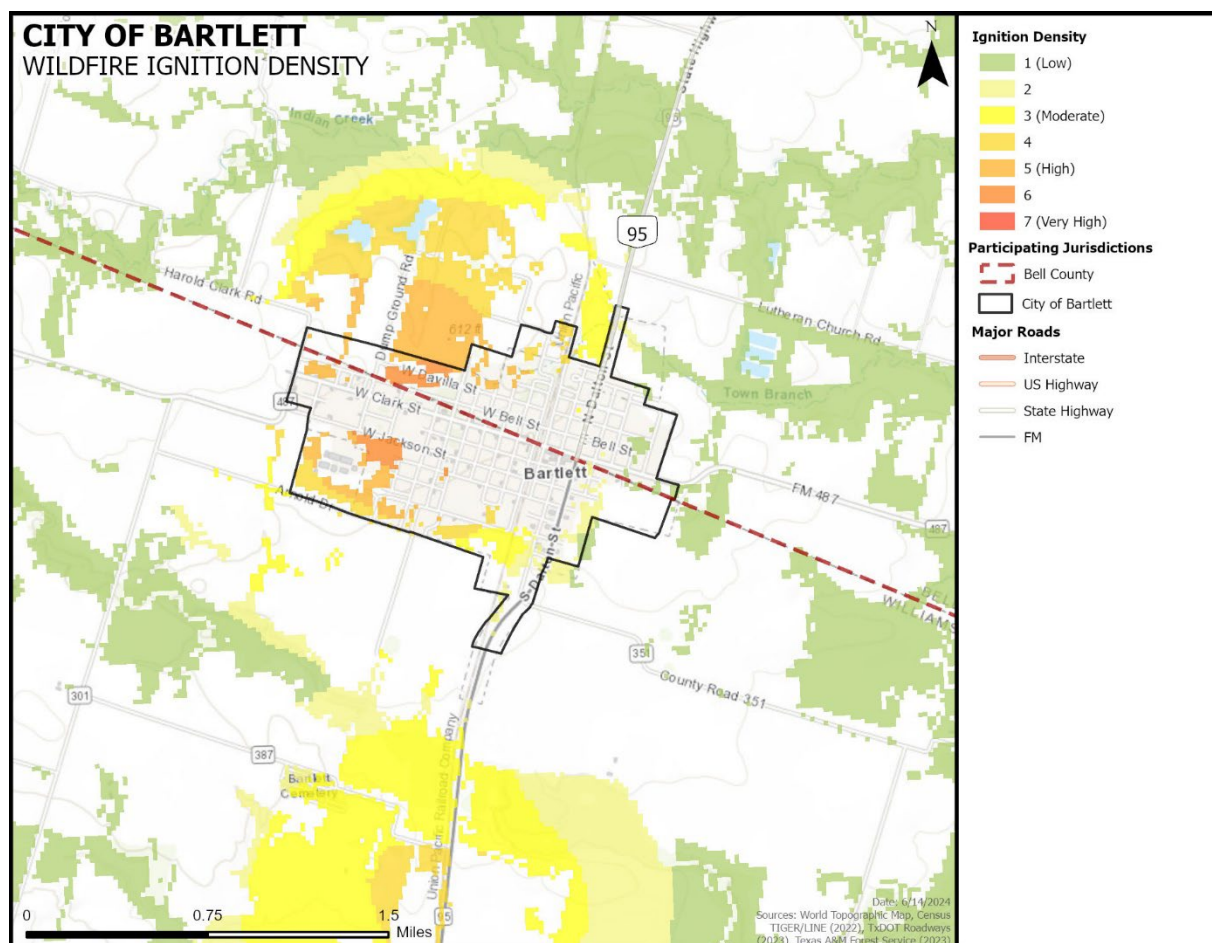
SECTION 16: WILDFIRE

Figure 16-32. Wildfire Ignition Density – Bell County



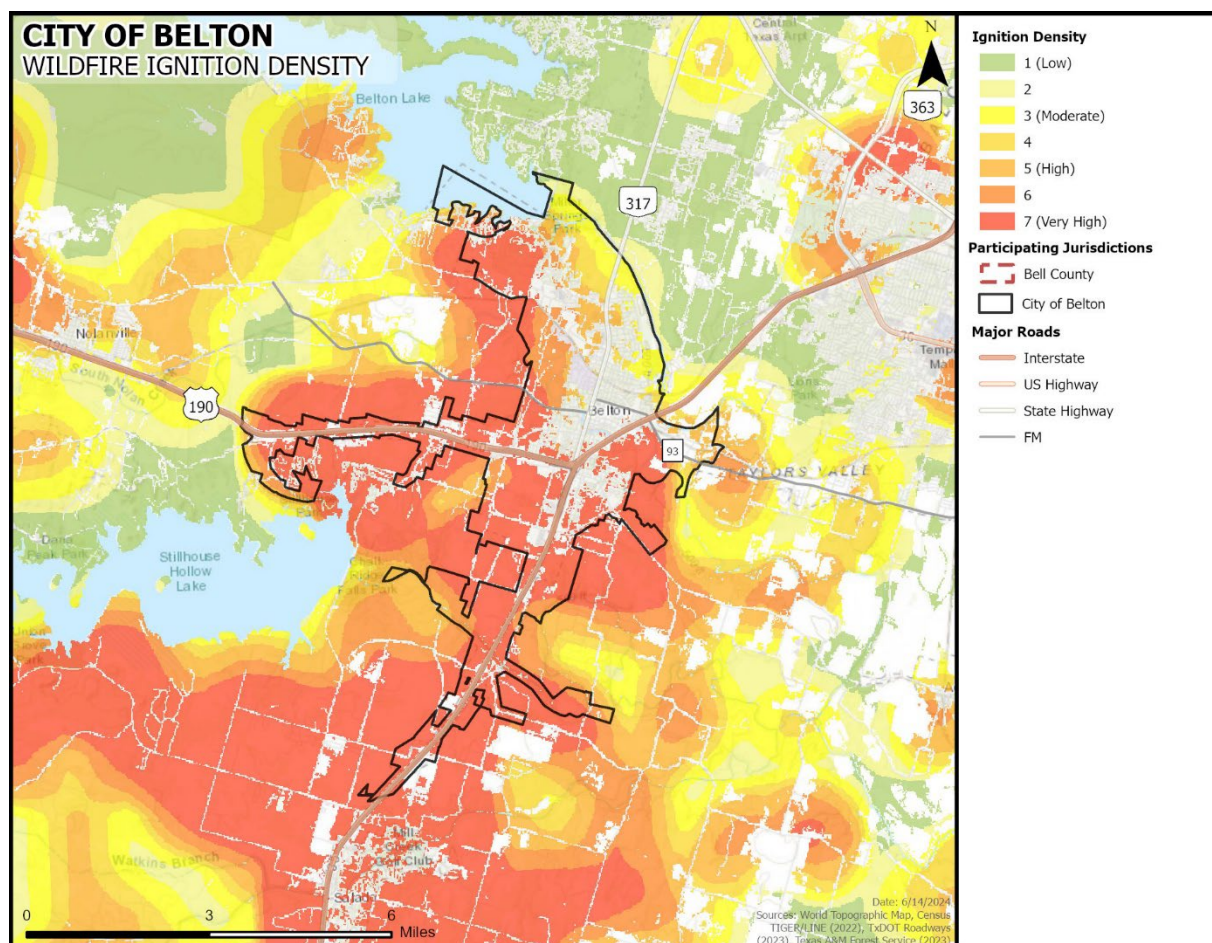
SECTION 16: WILDFIRE

Figure 16-33. Wildfire Ignition Density – City of Bartlett



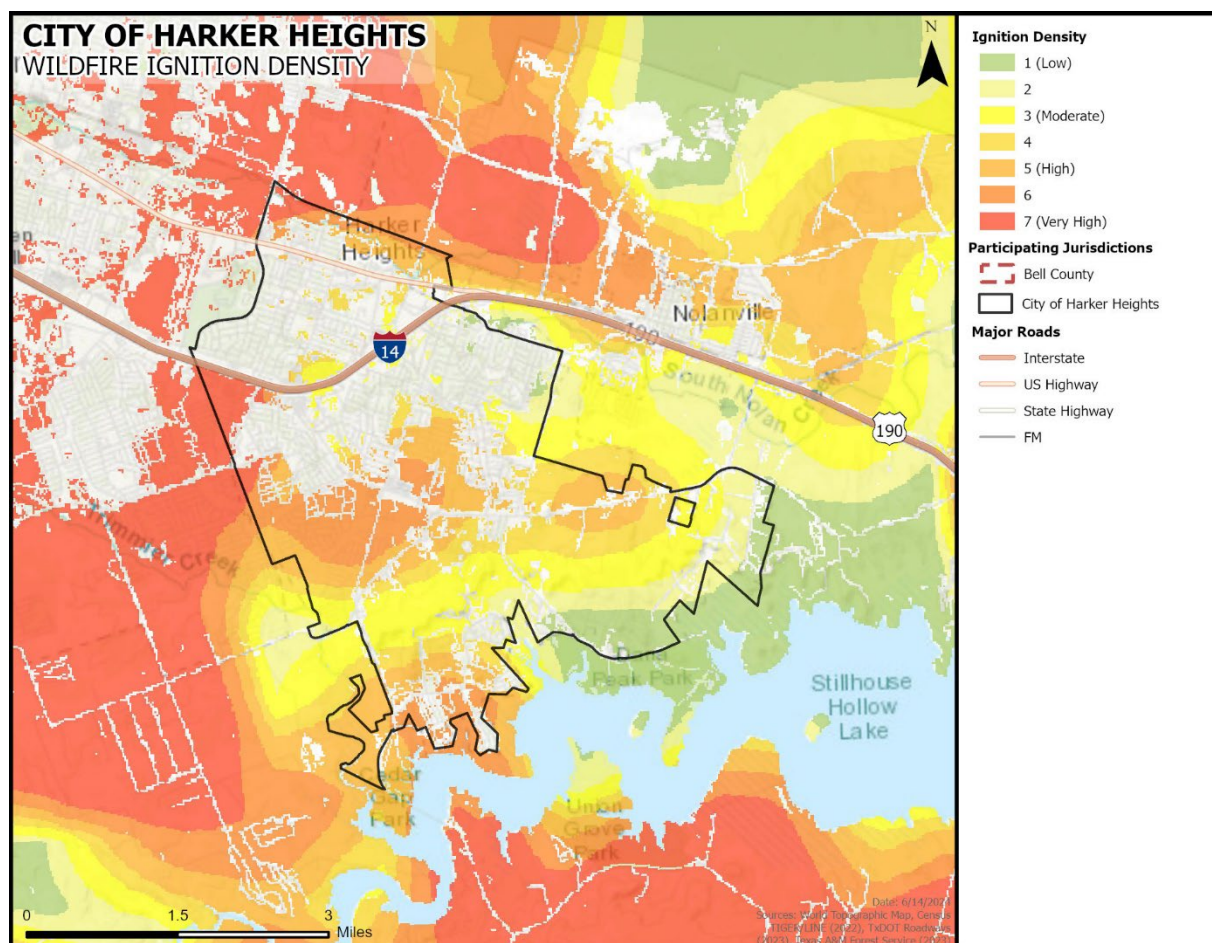
SECTION 16: WILDFIRE

Figure 16-34. Wildfire Ignition Density – City of Belton



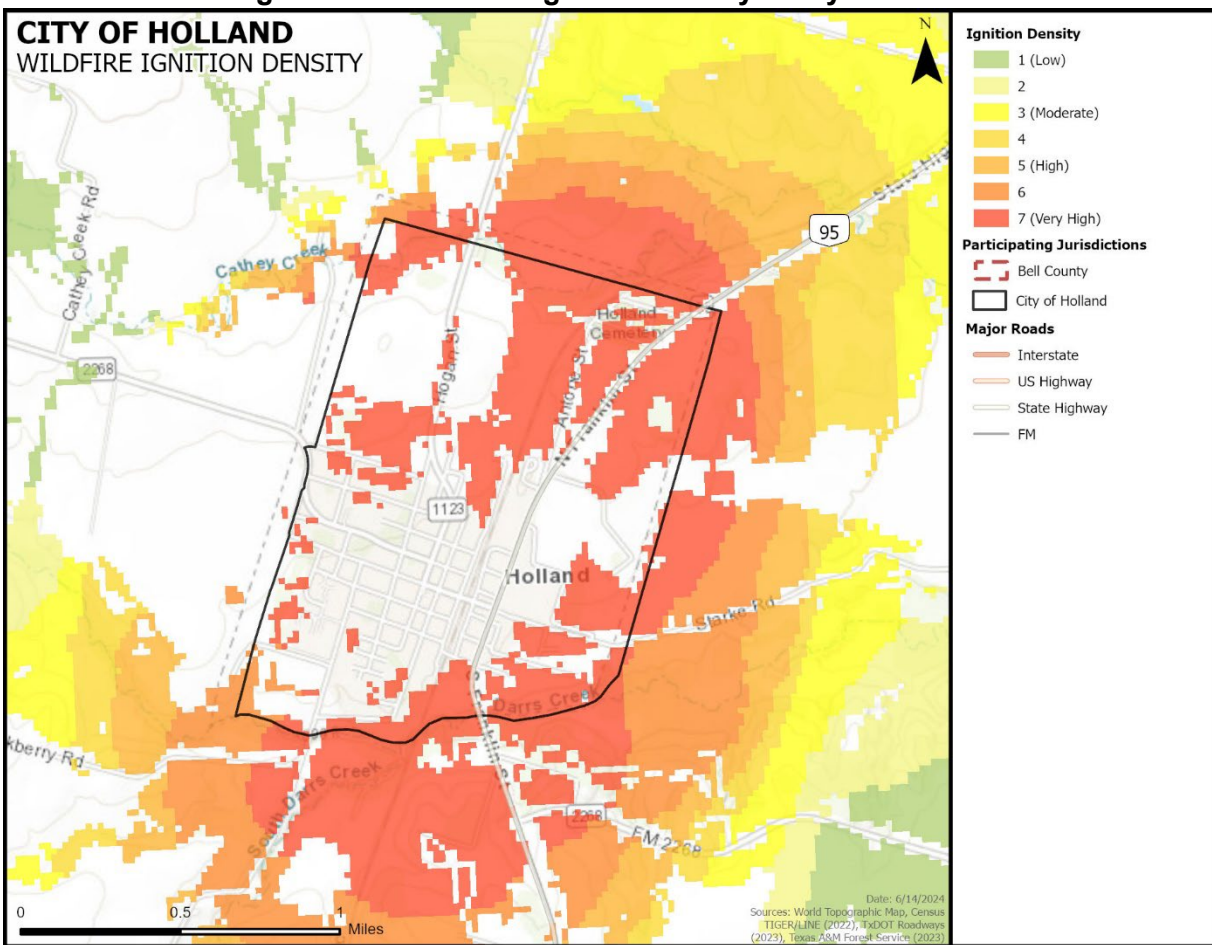
SECTION 16: WILDFIRE

Figure 16-35. Wildfire Ignition Density – City of Harker Heights



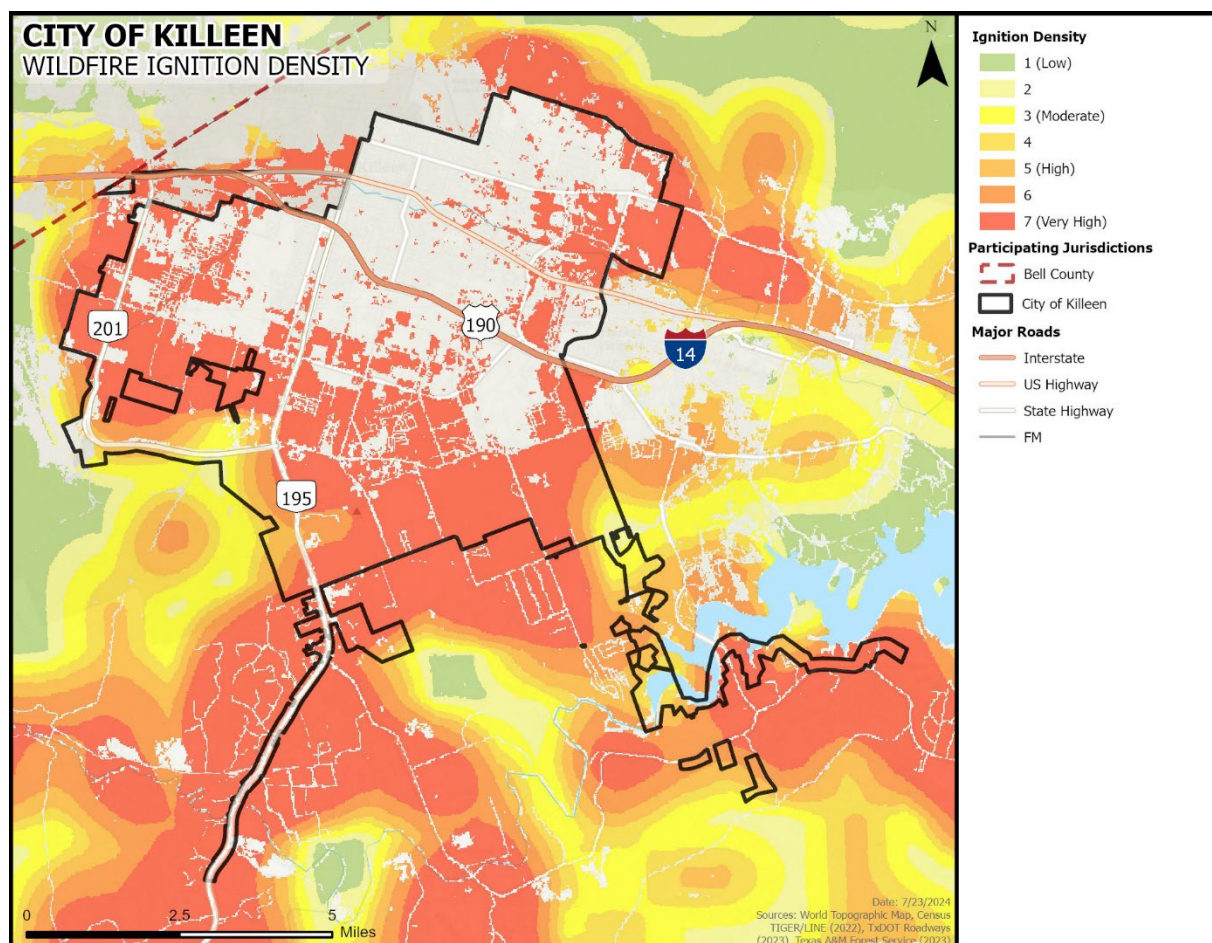
SECTION 16: WILDFIRE

Figure 16-36. Wildfire Ignition Density – City of Holland



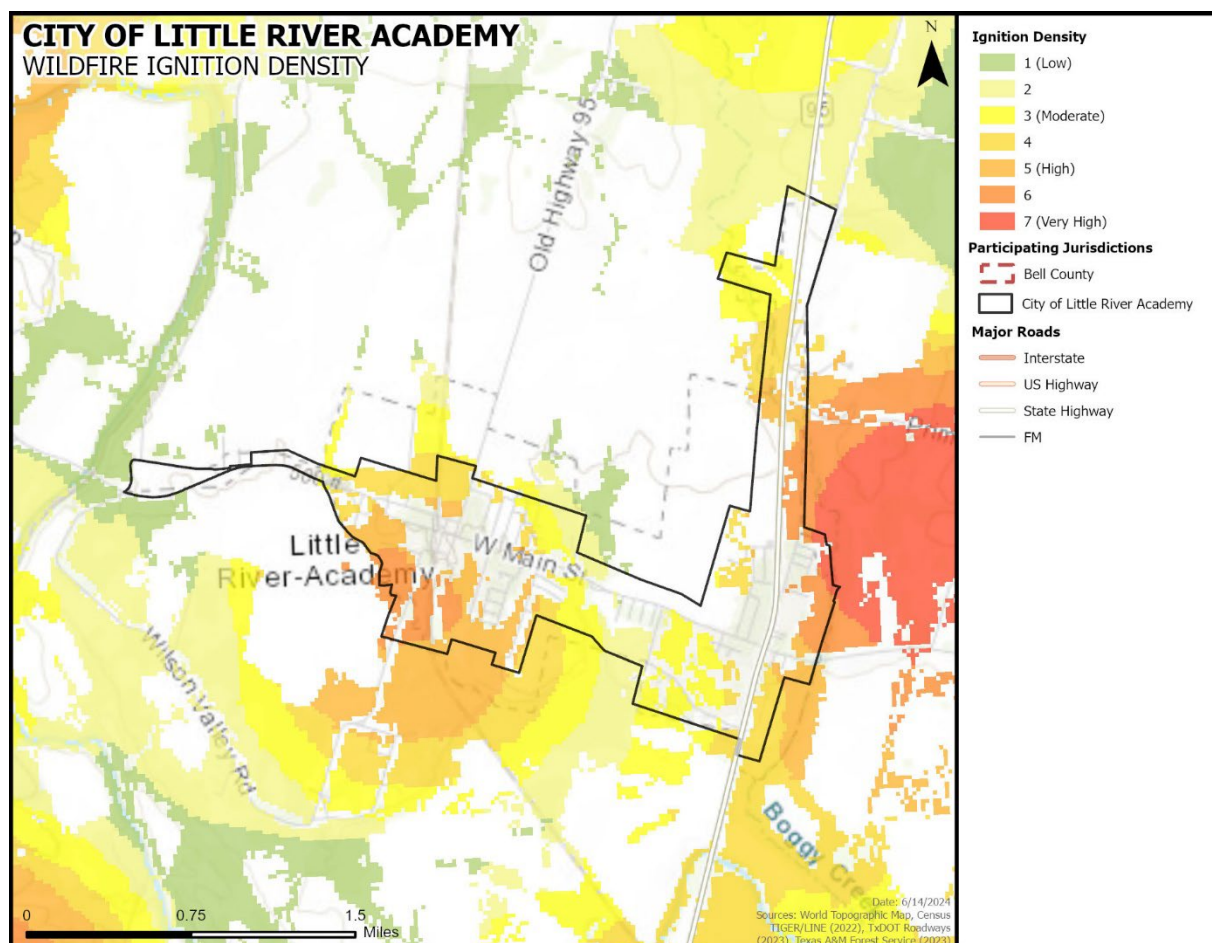
SECTION 16: WILDFIRE

Figure 16-37. Wildfire Ignition Density – City of Killeen



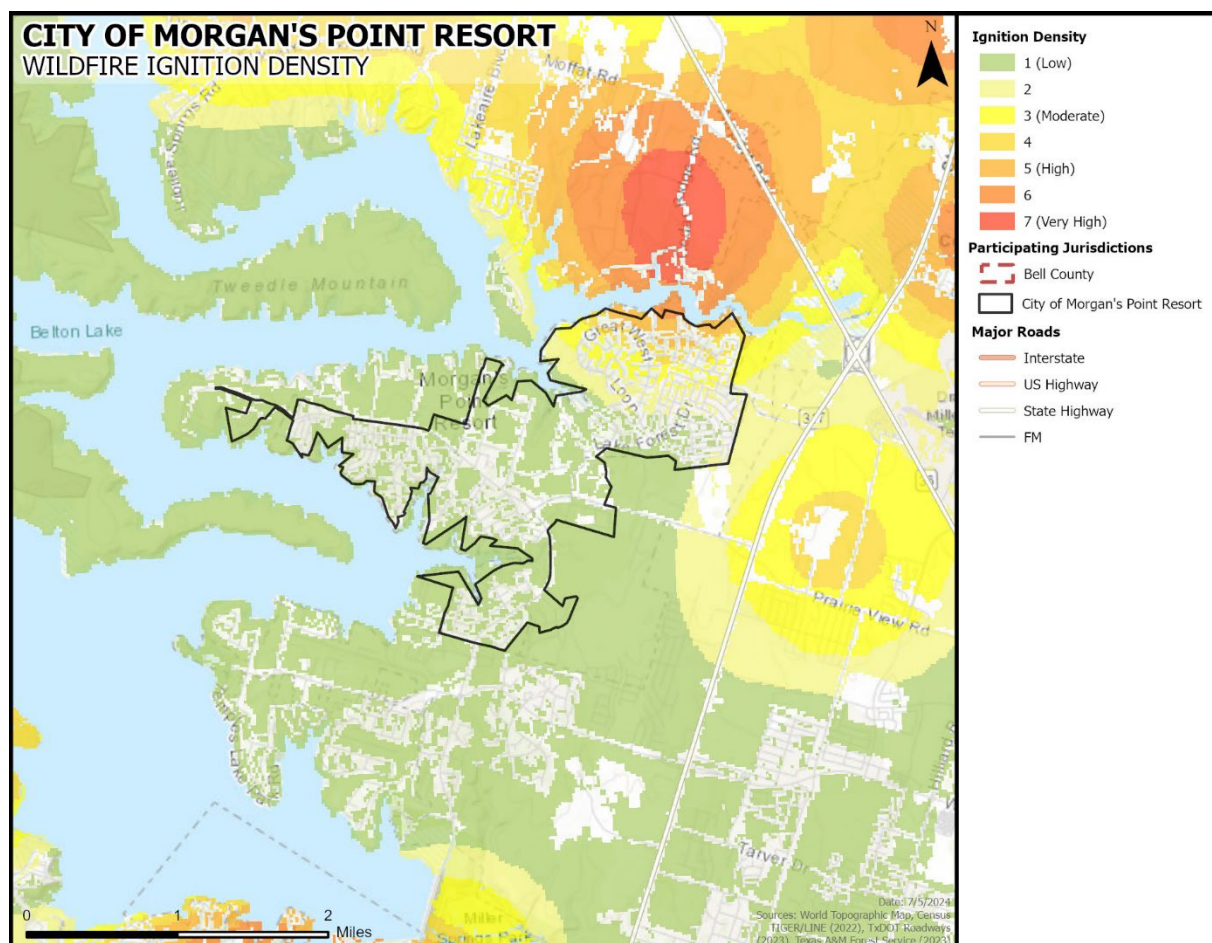
SECTION 16: WILDFIRE

Figure 16-38. Wildfire Ignition Density – City of Little River Academy



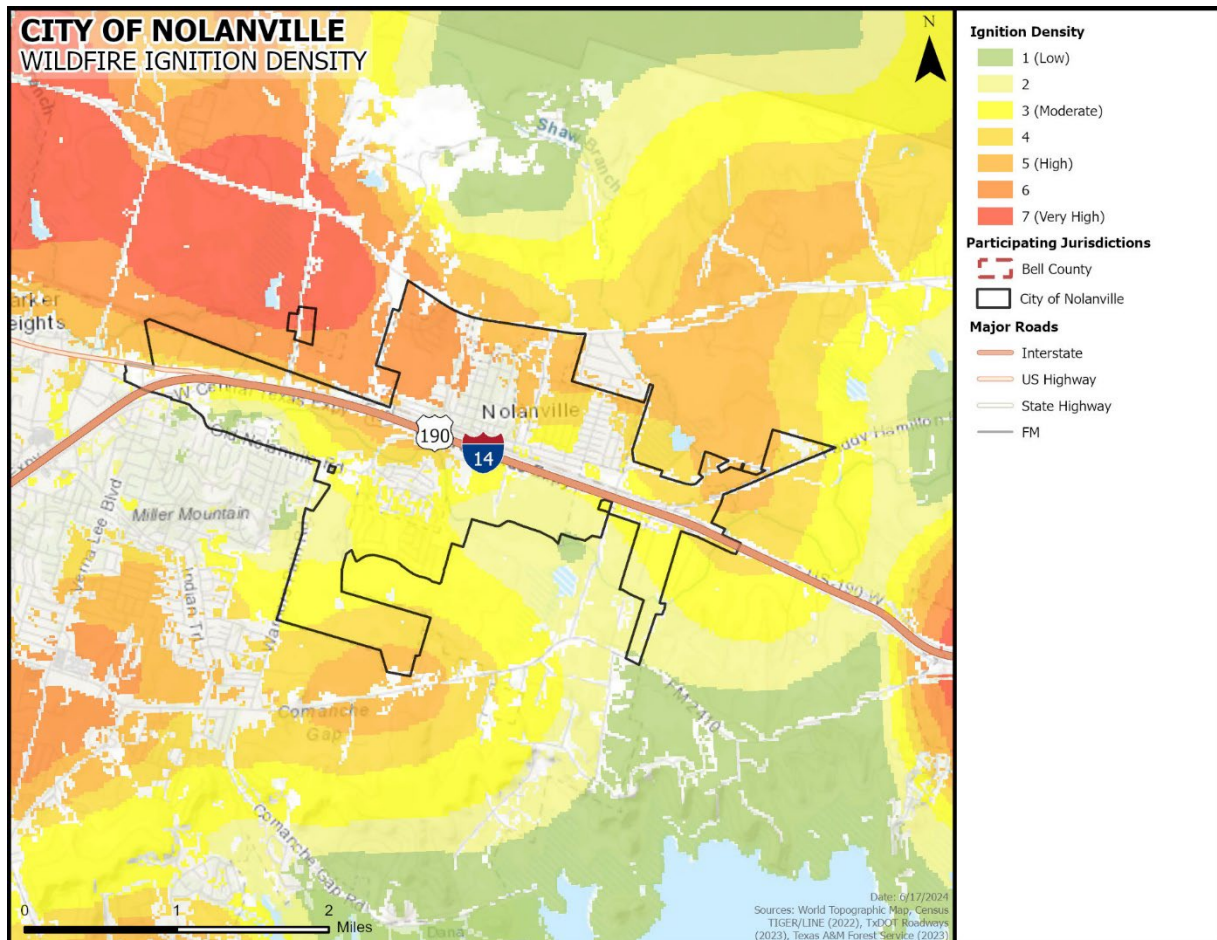
SECTION 16: WILDFIRE

Figure 16-39. Wildfire Ignition Density – City of Morgan's Point Resort



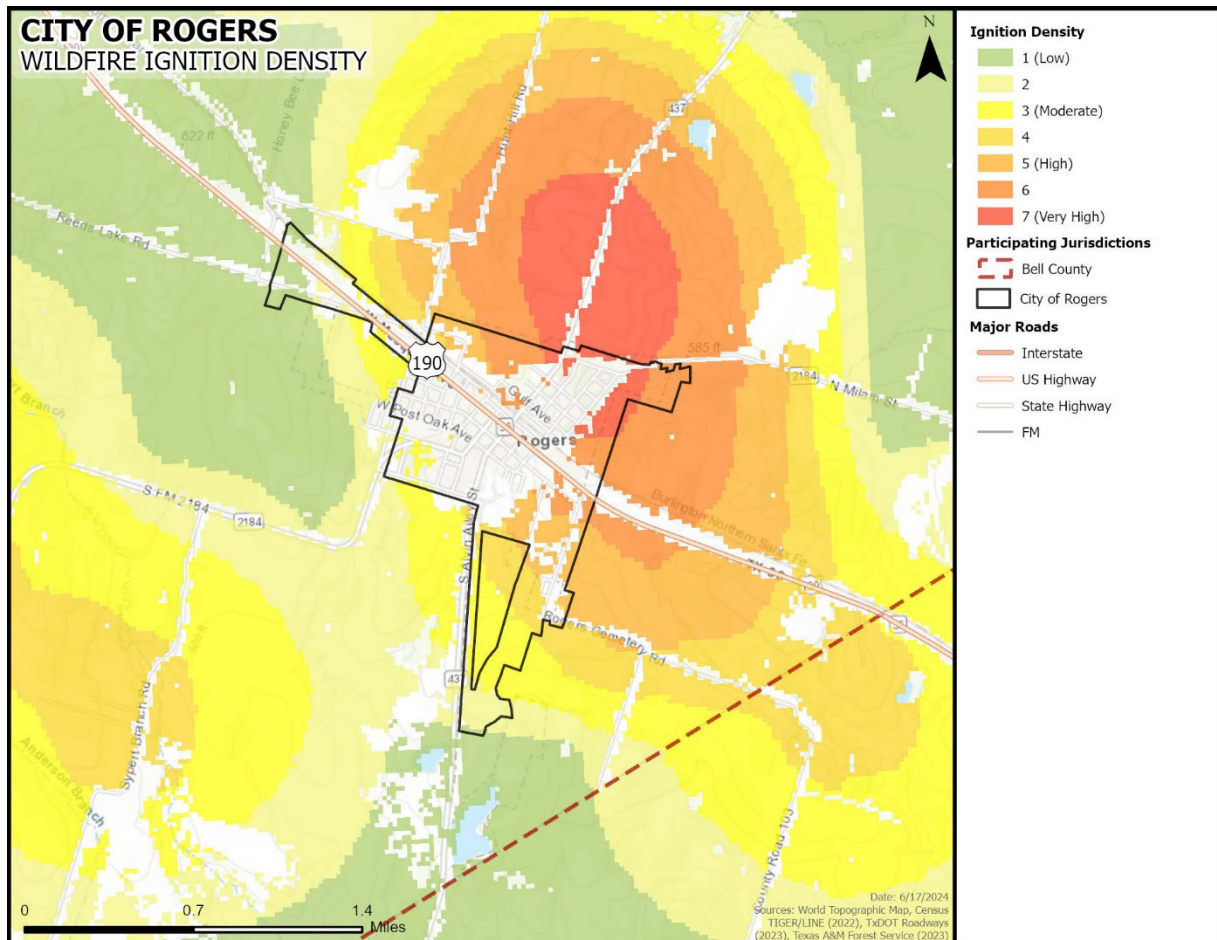
SECTION 16: WILDFIRE

Figure 16-40. Wildfire Ignition Density – City of Nolanville



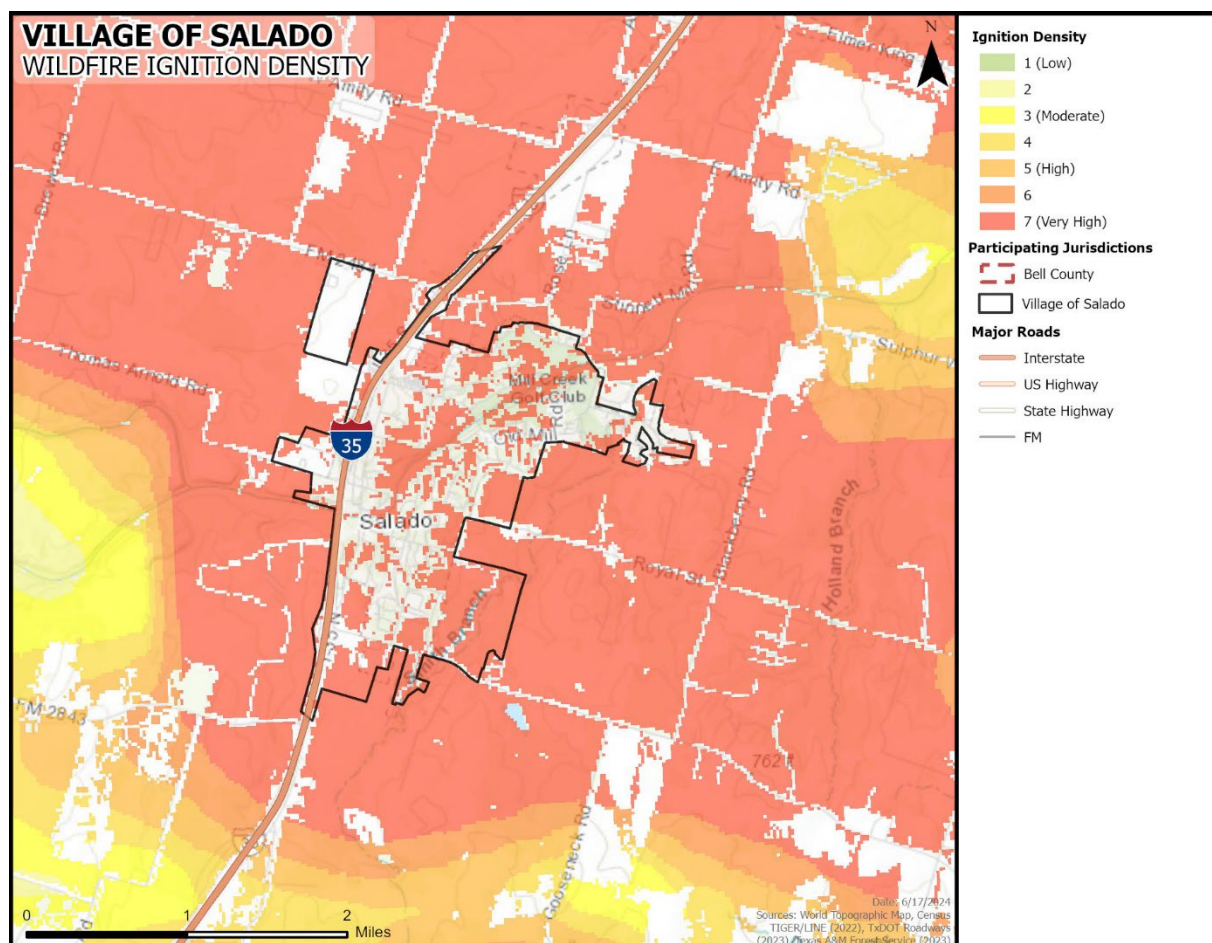
SECTION 16: WILDFIRE

Figure 16-41. Wildfire Ignition Density – City of Rogers



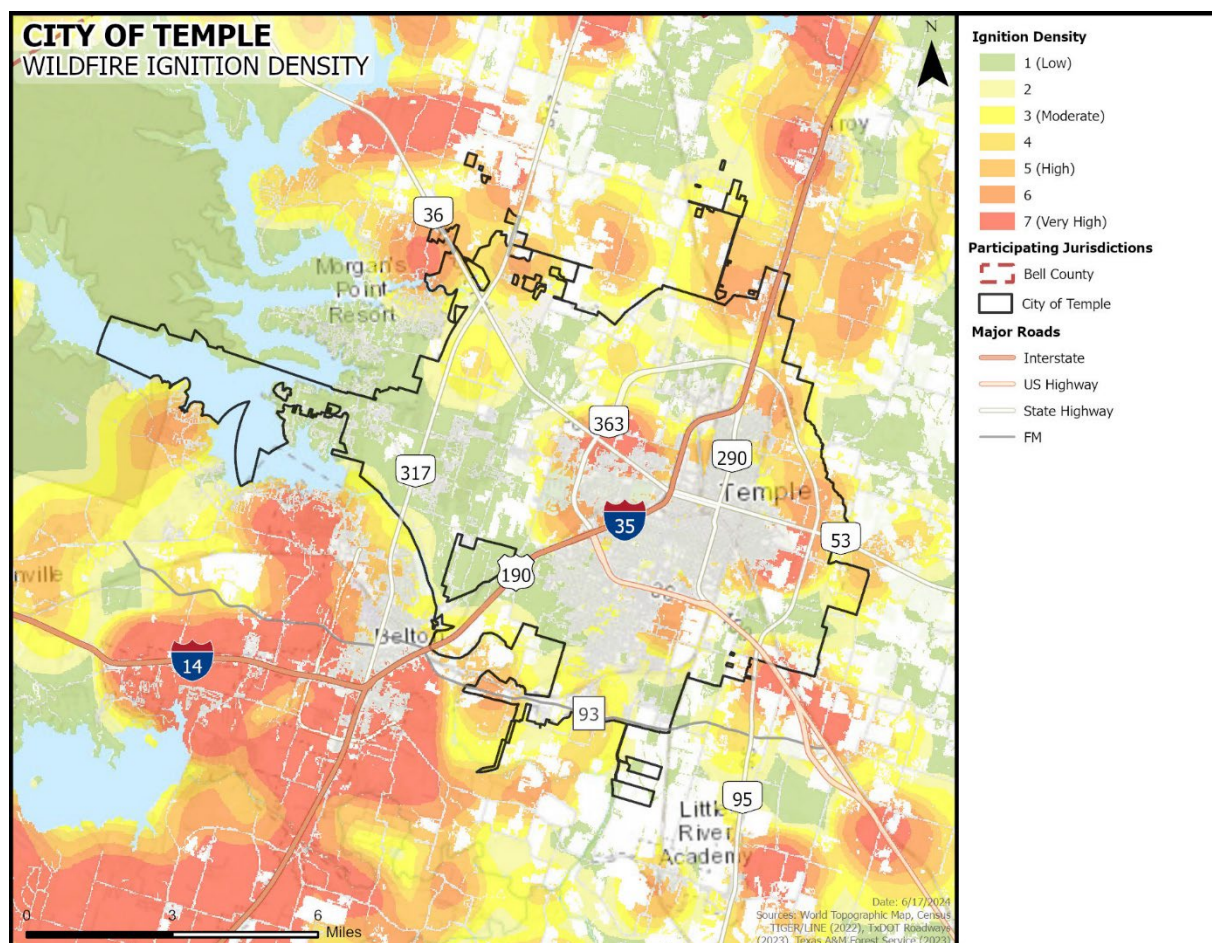
SECTION 16: WILDFIRE

Figure 16-42. Wildfire Ignition Density – Village of Salado



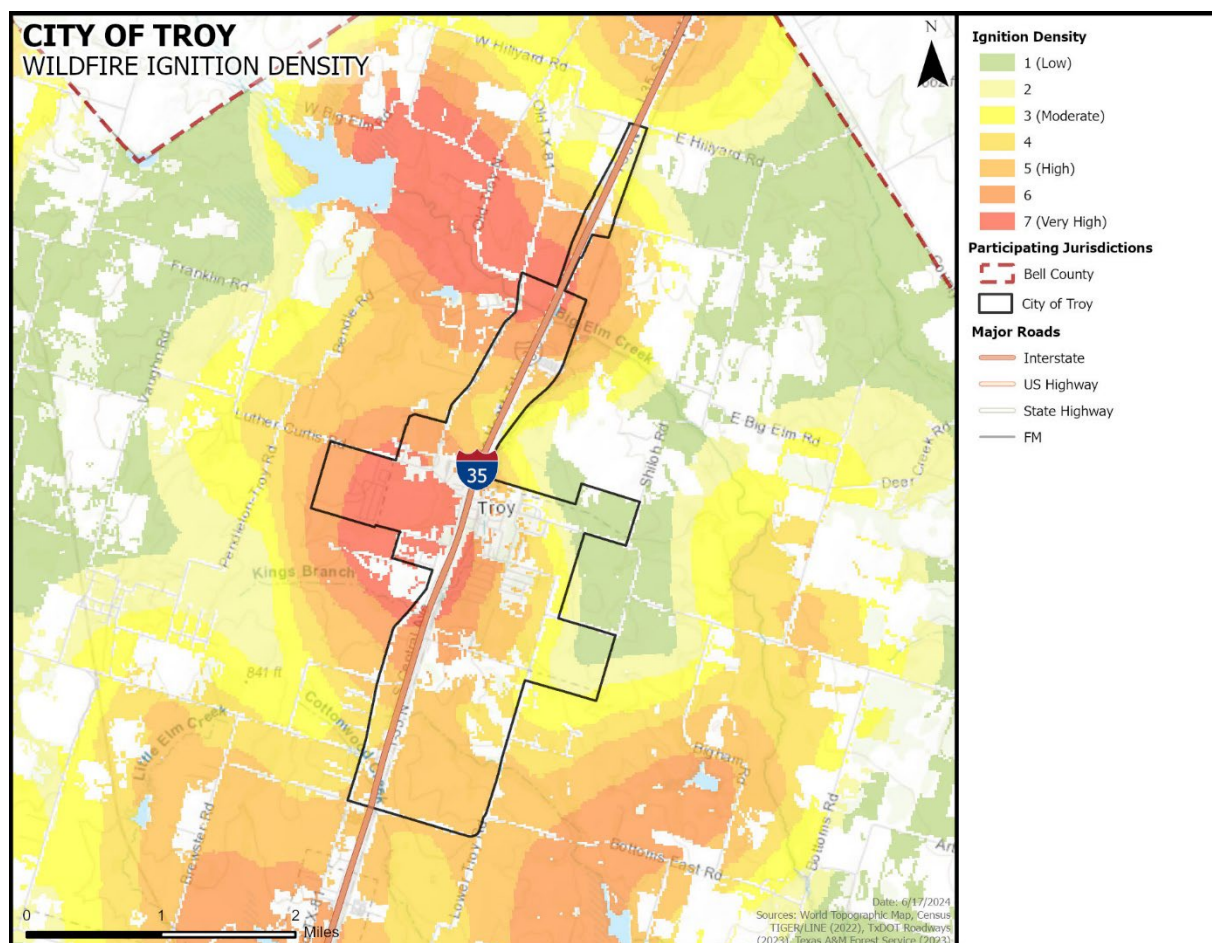
SECTION 16: WILDFIRE

Figure 16-43. Wildfire Ignition Density – City of Temple



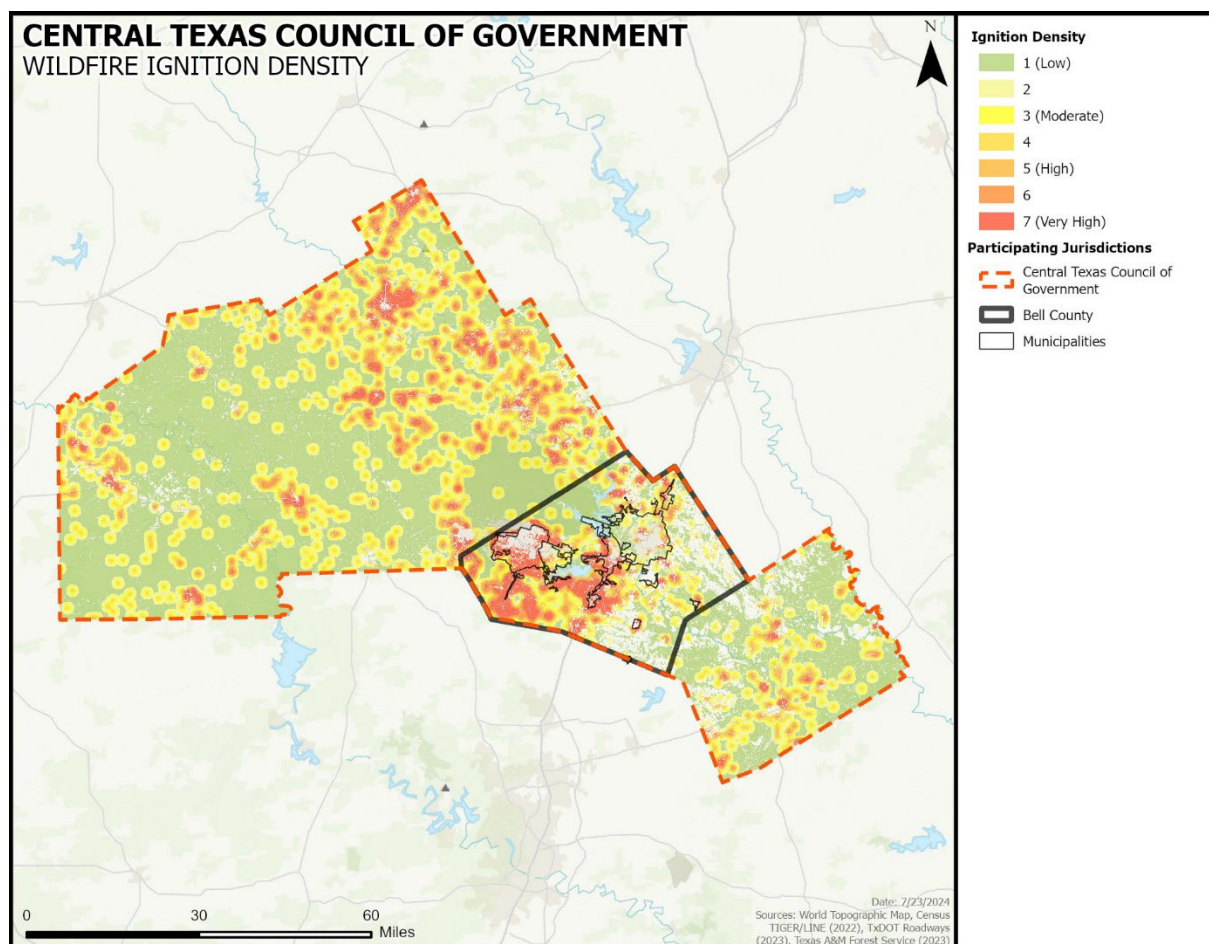
SECTION 16: WILDFIRE

Figure 16-44. Wildfire Ignition Density – City of Troy



SECTION 16: WILDFIRE

Figure 16-45. Wildfire Ignition Density – CTCOG



Diminished air quality is an environmental impact that can result from a wildfire event and pose a potential health risk. The smoke plumes from wildfires can contain potentially inhalable carcinogenic matter. Fine particles of invisible soot and ash that are too small for the respiratory system to filter can cause immediate and possibly long-term health effects. The elderly or those individuals with compromised respiratory systems may be more vulnerable to the effects of diminished air quality after a wildfire event.

Climatic conditions such as severe freezes and drought can significantly increase the intensity of wildfires since these conditions kill vegetation, creating a prime fuel source for wildfires. The intensity and rate at which wildfires spread are directly related to wind speed, temperature, and relative humidity.

The severity of impact from major wildfire events can be substantial. Such events can cause multiple deaths, shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. Severity of impact is gauged by acreage burned, homes and structures lost, and the number of resulting injuries and fatalities.

For the Bell County planning area including the CTCOG, the impact from a wildfire event can be considered "Minor," meaning injuries and/or illnesses do not result in permanent disability, complete shutdown of facilities and services for more than one week and more than 10 percent

SECTION 16: WILDFIRE

of property is destroyed or with major damage. Severity of impact is gauged by acreage burned, homes and structures lost, injuries and fatalities.

Table 16-7. Impact for Bell County

JURISDICTION	IMPACT	DESCRIPTION
Bell County	Minor	Bell County has an estimated 51% of the total population that live within the Wildland Urban Interface (WUI). The housing density is most commonly 3 houses per 1 acre. County residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Bartlett	Minor	Within the City of Bartlett, it is estimated that 15% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that result in permanent disability. Critical facilities could be shut down for at least two weeks, and more than 25 percent of total property could be damaged.
City of Belton	Minor	Within the City of Belton, it is estimated that 75% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Harker Heights	Minor	Within the City of Harker Heights, it is estimated that 53% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.

SECTION 16: WILDFIRE

JURISDICTION	IMPACT	DESCRIPTION
City of Holland	Minor	Within the City of Holland, it is estimated that 56% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Killeen	Minor	Within the City of Killeen, it is estimated that 35% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Little River Academy	Minor	Within the City of Little River Academy, it is estimated that 93% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Morgan's Point Resort	Minor	Within the City of Morgan's Point Resort, it is estimated that 79% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Nolanville	Minor	Within the City of Nolanville, it is estimated that 93% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.

SECTION 16: WILDFIRE

JURISDICTION	IMPACT	DESCRIPTION
City of Rogers	Minor	Within the City of Rogers, it is estimated that 89% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
Village of Salado	Minor	Within the Village of Salado, it is estimated that 94% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. Village residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Temple	Minor	Within the City of Temple, it is estimated that 43% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Troy	Minor	Within the City of Troy, it is estimated that 99% of the total population live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that do not result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
CTCOG	Minor	The CTCOG has one facility located within the WUI and has a moderate risk to wildfire. Staff could be injured or suffer illnesses, but not permanent disability. Critical facilities could be shut down for a week, and 10 percent or more of total property could be damaged.

SECTION 16: WILDFIRE

ASSESSMENT OF IMPACTS

A Wildfire event poses a potentially significant risk to public health and safety, particularly if the wildfire is initially unnoticed and spreads quickly. The impacts associated with a wildfire are not limited to direct damage. Significant wildfire events can be frequently associated with a variety of impacts, including:

- The Bell County planning area contains numerous open space areas. Wildfire may adversely affect or destroy endangered species habitat, reduce air quality, increase erosion and risk of flash flooding, contribute to increased local temperatures, and disrupt other ecological functions.
- Recreation activities throughout county and city parks may be unavailable and tourism can be unappealing for years following a large wildfire event, devastating directly related local businesses and negatively impacting economic recovery.
- Persons, pets, and wildlife in the area at the time of the fire are at risk for injury or death from burns and/or smoke inhalation. First responders are at greater risk of physical injury when in close proximity to the hazard while extinguishing flames, protecting property, or evacuating residents in the area.
- First responders can experience heart disease, respiratory problems, and other long-term related illnesses from prolonged exposure to smoke, chemicals, and heat.
- Emergency services may be disrupted during a wildfire if facilities are impacted, roadways are inaccessible, or personnel are unable to report for duty.
- Critical county and city departments may not be able to function and provide necessary services depending on the location of the fire and the structures or personnel impacted.
- Non-critical businesses may be directly damaged, suffer loss of utility services, or be otherwise inaccessible, delaying normal operations and slowing the recovery process.
- Displaced residents may not be able to immediately return to work, slowing economic recovery.
- Roadways in or near the WUI could be damaged or closed due to smoke and limited visibility.
- Older homes are generally exempt from modern building code requirements, which may require fire suppression equipment in the structure. An estimated 30 percent (approximately 45,058 structures) of homes in the planning area were built before 1980. Similarly, historic buildings may lack fire mitigation materials or measures due to their historic status. There are 74 historical sites listed on the National Register of Historic Places for Bell County.
- Some high-density neighborhoods feature small lots with structures close together, increasing the potential for fire to spread rapidly.
- Air pollution from smoke may exacerbate respiratory problems of vulnerable residents.
- Charred ground after a wildfire cannot easily absorb rainwater, increasing the risk of flooding and potential mudflows.
- Wildlife may be displaced or destroyed.
- Historical or cultural resources may be damaged or destroyed.
- Tourism can be significantly disrupted, further delaying economic recovery for the area.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.

SECTION 16: WILDFIRE

- Fire suppression costs can be substantial, exhausting the financial resources of the community.
- Residential structures lost in a wildfire may not be rebuilt for years, reducing the tax base for the community.
- Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground delivery lines, and soil erosion or debris deposits into waterways after the fire.

The economic and financial impacts of a wildfire event on local government will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a wildfire event.

CLIMATE CHANGE CONSIDERATIONS

Wildfires require the alignment of a number of factors, including temperature, humidity, and the lack of moisture in fuels, such as trees, shrubs, grasses, and forest debris. All these factors have strong direct or indirect ties to climate variability and climate change. 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 human--caused climate change have increased aridity of forest fuels during the fire season.¹⁰

Vapor pressure deficit, an indicator of the ability of moisture to evaporate, is projected to increase as temperatures rise and carbon dioxide fertilization reduces transpiration, leading to both lower humidity and increased surface dryness. Overall, increased dryness should extend the wildfire season in places where the fire season is presently constrained by low levels of aridity, such as eastern Texas.¹¹

Additionally, it is projected that future changes to Bell County will include increased temperatures, which according to the U.S. Climate Explorer, the planning area may experience a 6°F increase in the average extreme heat temperatures. Historically, extreme temperatures averaged 100°F in Bell County, but between 2035 and 2064 the average will be 106°F, increasing the severity and frequency of extreme heat events, contributing to favorable wildfire conditions.

Extreme heat and extended periods of drought contribute to wildfire risk in the planning area. Extreme temperatures and periods of drought destroy vegetation in the area, contributing to available fuels that spread wildfires. Additional climate change impacts from drought and extreme heat are discussed in Sections 6 and 9 of this Plan. The projected increases in favorable wildfire conditions, including drought and extreme heat, indicate an increase in favorable wildfire conditions. Additional information and studies are needed to determine the degree and rate of any increased wildfire risk.

¹⁰ NOAA Wildfire Climate Connection, August 2022: wildfire-climate-connection.

¹¹ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.



SECTION 17 **WINTER STORM**

SECTION 17: WINTER STORM

Hazard Description	1
Location	3
Extent.....	3
Historical Occurrences.....	5
Significant Events	7
Probability of Future Events.....	7
Vulnerability and Impact.....	8
Assessment of Impacts	11
Climate Change Considerations	12

HAZARD DESCRIPTION



A severe winter storm event is identified as a storm with snow, ice, or freezing rain. This type of storm can cause significant problems for area residents. Winter storms are associated with freezing or frozen precipitation such as freezing rain, sleet, snow, and the combined effects of winter precipitation and strong winds. Wind chill is a function of temperature and wind. Low wind chill is a product of high winds and freezing temperatures.

Winter storms that threaten the Bell County planning area usually begin as powerful cold fronts that push south from central Canada. Although the county is at risk of ice hazards, extremely cold temperatures, and snow, the effects and frequencies of winter storm events are generally mild and short-lived.

As indicated in Figure 17-1, the Bell County planning area is located in USDA Hardiness Zone 8b and 9a, with annual minimum temperatures between 15°F and 25°F. During times of ice and snow accumulation, response times will increase until public works road crews are able to make major roads passable. Table 17-1 describes the types of winter weather possible in the Bell County planning area.

SECTION 17: WINTER STORM

Figure 17-1. Annual Minimum Temperature¹

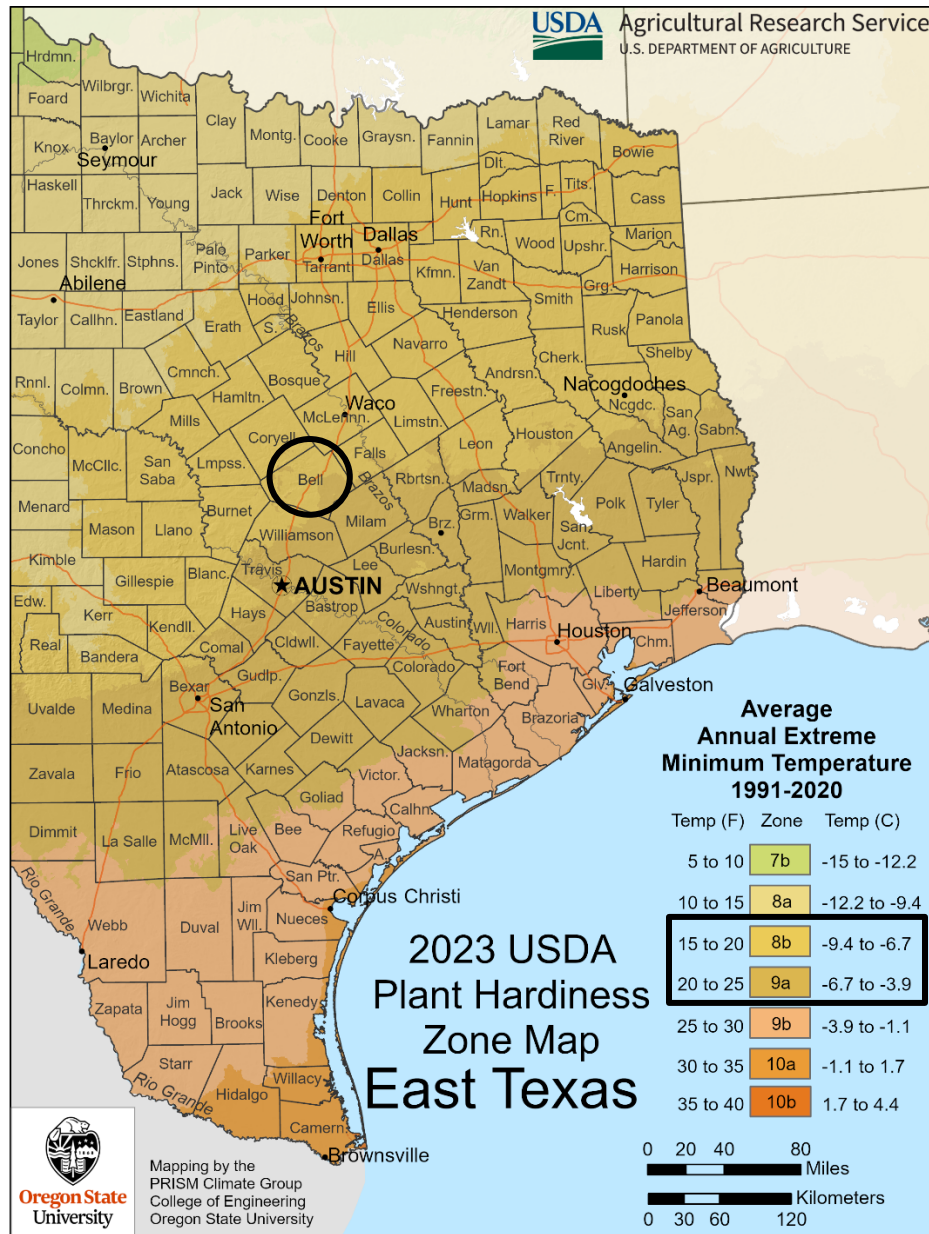


Table 17-1. Types of Winter Weather

TYPE OF WINTER WEATHER	DESCRIPTION
Freezing Rain or Freezing Drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.

¹ USDA

SECTION 17: WINTER STORM

TYPE OF WINTER WEATHER	DESCRIPTION
Blizzard	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/Freeze	Below freezing temperatures are expected and may cause significant damage to plants, crops, and fruit trees.
Wind Chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.

LOCATION

Winter storm events are not confined to specific geographic boundaries. Therefore, all existing and future buildings, facilities, and populations in the Bell County planning area, including all participating jurisdictions and the CTCOG, are vulnerable to a winter storm hazard and could potentially be impacted.

EXTENT

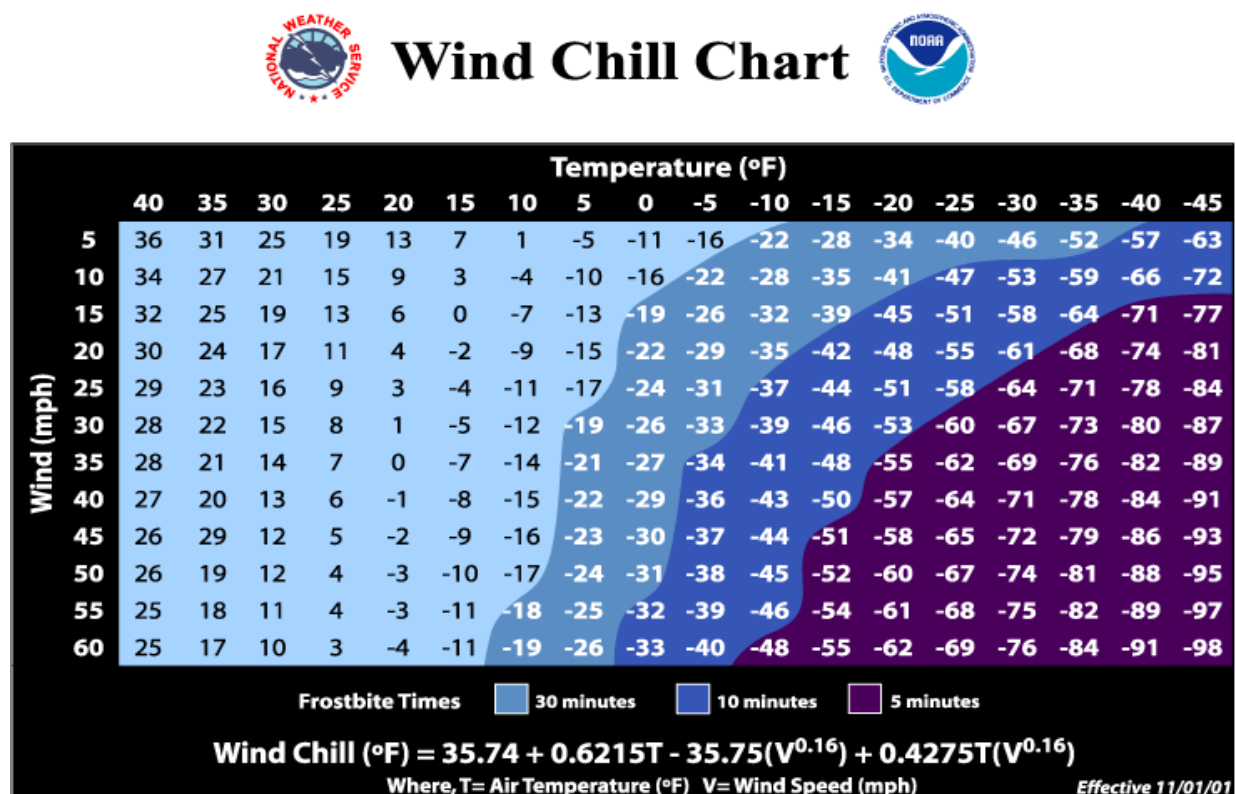
The extent or magnitude of a severe winter storm is measured in intensity based on the temperature and level of accumulations as shown in Table 17-2. Table 17-2 should be read in conjunction with the wind-chill factor described in Figure 17-2 to determine the intensity of a winter storm. The chart is not applicable when temperatures are over 50°F or winds are calm. This is an index developed by the National Weather Service.

Table 17-2. Magnitude of Severe Winter Storms

INTENSITY	TEMPERATURE RANGE (Fahrenheit)	EXTENT DESCRIPTION
Mild	40° – 50°	Winds less than 10 mph and freezing rain or light snow falling for short durations with little or no accumulations
Moderate	30° – 40°	Winds 10 – 15 mph and sleet and/or snow up to 4 inches
Significant	25° – 30°	Intense snow showers accompanied with strong gusty winds between 15 and 20 mph with significant accumulation
Extreme	20° – 25°	Wind driven snow that reduces visibility, heavy winds (between 20 to 30 mph), and sleet or ice up to 5 millimeters in diameter
Severe	Below 20°	Winds of 35 mph or more and snow and sleet greater than 4 inches

SECTION 17: WINTER STORM

Figure 17-2. Wind Chill Chart



Wind chill temperature is a measure of how cold the wind makes real air temperature feel to the human body. Since wind can dramatically accelerate heat loss from the body, a blustery 30°F day would feel just as cold as a calm day with 0°F temperatures. The Bell County planning area has 35 previous occurrences recorded from 1996 through 2023 in the National Centers for Environmental Information (NCEI) Storm Events Database. The planning area has never experienced a blizzard, but it has been subject to ice storm, sleet, and winter storms.

The average number of cold days is similar for the entire planning area. Therefore, the intensity or extent of a winter storm event to be mitigated for the area ranges from mild to moderate according to the definitions at Table 17-2. The Bell County planning area can expect anywhere between 0.1 to 4.0 inches of ice and snow during a winter storm event, and temperatures between 15°F and 25°F with winds ranging from 0 to over 35 mph.

The National Weather Service issues a winter storm watch, advisory or warning in advance of an event in order to give people enough time to prepare for an event. Bell County could be under any of these warning types in advance of a winter storm event. Table 17-3 describes when each warning type would be issued.

Table 17-3. Winter Storm Watch, Advisory, Warning Descriptions

TYPE OF WINTER WEATHER	DESCRIPTION
Winter Weather Advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.

SECTION 17: WINTER STORM

TYPE OF WINTER WEATHER	DESCRIPTION
Winter Storm Watch	Severe winter weather conditions may affect your area (freezing rain, sleet, or heavy snow may occur separately or in combination).
Winter Storm Warning	Severe winter weather conditions are imminent.
Freezing Rain or Freezing Drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/Freeze	Below freezing temperatures are expected and may cause significant damage to plants, crops, and fruit trees.
Wind Chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.

HISTORICAL OCCURRENCES

According to historical records and the best available data there have been 35 recorded winter storm events in Bell County planning area. Historical winter storm information, as provided by the NCEI, identifies winter storm activity across a multi-county forecast area for each event. The appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event, when appropriate. Historical winter storm data for the planning area, including the CTCOG, is provided on a County-wide basis per the NCEI database. Table 17-4 shows historical incident information for the planning area.

Table 17-4. Historical Winter Storm Events, 1996-2023²

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	11/24/1996	0	0	\$0	\$0
Bell County	1/7/1997	0	0	\$0	\$0
Bell County	1/12/1997	0	0	\$0	\$0
Bell County	12/22/1998	0	0	\$0	\$0
Bell County	1/25/2000	0	0	\$0	\$0
Bell County	12/12/2000	0	0	\$0	\$0
Bell County	12/25/2000	0	0	\$0	\$0
Bell County	12/31/2000	0	0	\$0	\$0

² Values are in 2023 dollars.

SECTION 17: WINTER STORM

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Bell County	1/1/2001	0	0	\$0	\$0
Bell County	11/28/2001	0	0	\$0	\$0
Bell County	2/24/2003	0	0	\$0	\$0
Bell County	12/22/2004	0	0	\$0	\$0
Bell County	12/7/2005	0	0	\$0	\$0
Bell County	2/18/2006	0	0	\$0	\$0
Bell County	1/14/2007	0	0	\$43,900	\$0
Bell County	1/17/2007	0	0	\$14,600	\$0
Bell County	4/7/2007	0	0	\$50,200	\$0
Bell County	12/15/2008	0	0	\$0	\$0
Bell County	1/5/2009	0	0	\$7,000	\$0
Bell County	1/27/2009	0	0	\$0	\$0
Bell County	12/24/2009	0	0	\$13,700	\$0
Bell County	1/7/2010	0	0	\$0	\$0
Bell County	2/23/2010	0	0	\$341,600	\$0
Bell County	12/6/2013	0	0	\$12,700	\$0
Bell County	1/23/2014	0	0	\$0	\$0
Bell County	2/7/2014	0	0	\$126,100	\$0
Bell County	1/10/2015	0	0	\$0	\$0
Bell County	12/6/2017	0	0	\$0	\$0
Bell County	12/31/2017	0	0	\$60,100	\$0
Bell County	2/11/2018	0	0	\$0	\$0
Bell County	2/12/2018	0	0	\$0	\$0
Bell County	1/10/2021	0	0	\$0	\$0
Bell County	2/11/2021	0	0	\$0	\$0
Bell County	2/13/2021	0	0	\$0	\$0
Bell County	2/1/2023	0	0	\$0	\$0
TOTALS		0	0	\$669,900	

Table 13-5. Historical Winter Storm Events Summary, 1996-2023

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGES	CROP DAMAGES
Bell County	35	0	0	\$669,900	\$0

SECTION 17: WINTER STORM

Based on the list of historical winter storm events for the Bell County planning area, four of the events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

February 24, 2010

An upper-level disturbance moved through north and central Texas. The precipitation initially began as rain, but as colder temperatures filtered into the region, the rain transitioned to snow. An average of 3 to 5 inches of snow fell across Bell County. The local COOP observer in the City of Troy recorded 4 inches of snow. There were more than 20 vehicle accidents throughout the planning area due to the hazardous driving conditions. About 2,000 customers in the City of Belton lost power for a brief period of time. Almost all flights at the Killeen-Ft. Hood Regional airport were canceled, and several streets and bridges throughout the planning area were closed before sand trucks were able to treat the roadways. This event caused \$341,600 (2023 dollars) in damages.

February 13-17, 2021 – Winter Storm Uri (DR-4586)

Winter Storm Uri was one of the most impactful winter events in the state's history. The winter storm event lasted a week and brought snow, sleet, and freezing rain to the Southeast region. The presence of the storm began on February 10, 2021, when a cold front brought a surge of cold air to the Area. On February 13th, the winter storm hit the region, including Bell County, and many areas were placed under a Winter Storm Warning.

Fatalities across the state were attributed to hypothermia, vehicle accidents, carbon monoxide poisoning, and chronic medical conditions complicated by a lack of electricity over several days. Statewide, more than 69 percent of households lost power at some point during the event, with average disruptions lasting 42 hours, 21 of which were consecutive. Water service was also disrupted, with 49 percent of households losing running water with an average disruption of 52 hours.³

In Bell County, the first round of winter weather during this period (February 13-15) resulted in snow accumulations of 4-7 inches of snow. The second round of winter weather (February 16-17) resulted in up to 1/2 inch of ice. While the winter precipitation did have an impact on the county and transportation, the bigger impacts were from the extreme cold and wind chills.

PROBABILITY OF FUTURE EVENTS

According to historical records, the Bell County planning area can expect to experience approximately one to two winter storm events each year. The probability of a future winter storm event affecting the Bell County planning area, including all participating jurisdictions and the CTCOG, is considered "Highly Likely", with a winter storm likely to occur within the next year. The end of this section addresses climate change and its impacts on future winter storms in the planning area.

³ Donald, Jess. "Winter Storm Uri. The Economic Impact of the Storm". October 2021. Fiscal Notes. Texas Comptroller of Public Accounts. <https://comptroller.texas.gov/economy/fiscal-notes/2021/oct/winter-storm-impact.php>

SECTION 17: WINTER STORM

VULNERABILITY AND IMPACT

During periods of extreme cold and freezing temperatures, water pipes can freeze and crack, and ice can build up on power lines, causing them to break under the weight or causing tree limbs to fall on the lines. These events can disrupt electric service for long periods.

An economic impact may occur due to increased consumption of heating fuel, which can lead to energy shortages and higher prices. House fires and resulting deaths tend to occur more frequently from increased and improper use of alternate heating sources. Fires during winter storms also present a greater danger because water supplies may freeze and impede firefighting efforts.

The Bell County Planning Team identified the following critical facilities (Table 17-6) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by winter storm events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 17-6. Critical Facilities Vulnerable to Winter Storm Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none">• Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications.• Exposure to extreme cold can cause illnesses in first responders if exposed for a period of time.• Roads may become impassable due to snow and/or ice impacting response times by emergency services.• Extended power outages due to increased usage may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none">• Power outages due to increased usage could disrupt critical care.• Backup power sources could be damaged.• Increased number of patients due to exposure to cold temperatures could lead to a strain on staff.• Water pipes can freeze and burst leading to flooding within facilities.• Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.• Essential supplies like medicines, water, food, and equipment deliveries may be delayed.• Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations.• Exposure risks to outdoor workers.
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none">• Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable.

SECTION 17: WINTER STORM

CRITICAL FACILITIES	POTENTIAL IMPACTS
	<ul style="list-style-type: none"> Essential supplies like medicines, water, food, and equipment deliveries may be delayed.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications. Roads may become impassable due to snow and/or ice impacting response times by emergency services. Power outages due to increased usage could disrupt critical care. Backup power sources could be damaged. Water pipes can freeze and burst leading to flooding within facilities.

People and animals are subject to health risks from extended exposure to cold air (Table 17-7). Elderly people are at greater risk of death from hypothermia during these events, especially in the neighborhoods with older housing stock. According to the U.S. Center for Disease Control, every year hypothermia kills about 600 Americans, half of whom are 65 years of age or older.

Due to factors like limited mobility, communication difficulties, medical needs, sensitivity to cold temperatures, reliance on support services, transportation challenges, housing accessibility issues, and possible shortages in emergency shelter accommodations, people with disabilities are particularly vulnerable to winter storms. Inclusive measures are crucial to address these vulnerabilities and ensure their safety during severe weather events.

Populations living below the poverty level may not be able to afford to run heat on a regular basis or extend period of time. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Bell County planning area is estimated at 11 percent of the total population and children under the age of 5 are estimated at 8 percent. The population with a disability is estimated at 14 percent of the total population. An estimated 15 percent of the planning area population live below the poverty level and 18 percent of the populations speaks a language other than English.⁴

Table 17-7. Populations at Greater Risk of Winter Storm Events

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375

⁴ US Census Bureau, American Community Survey Five-Year Estimates

SECTION 17: WINTER STORM

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
City of Harker Heights	3,280	1,906	4,632	3,931	5,934
City of Holland	210	111	178	179	60
City of Killeen	11,467	14,603	20,953	24,593	33,510
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

Older homes tend to be more vulnerable to the impacts of winter storm events. An estimated 30 percent (approximately 45,058 structures) of the housing structures in the Bell County planning area were built before 1980.

Table 17-8. Structures at Greater Risk of Winter Storm Events

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
Bell County	45,058
City of Bartlett	469
City of Belton	2,992
City of Harker Heights	6,087
City of Holland	248
City of Killeen	16,684
City of Little River Academy	394
City of Morgan's Point Resort	384

SECTION 17: WINTER STORM

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
City of Nolanville	274
City of Rogers	332
Village of Salado	230
City of Temple	13,425
City of Troy	276
CTCOG	1

Winter Storms have been known to cause injury to humans and occasionally have been fatal. Overall, the loss estimate of property and crops in the planning area over the 28-year reporting period is considered \$669,900 with an average annualized loss of \$23,900. Based on historic loss and damages, the impact of winter storm damages on the Bell County planning area, including all participating jurisdictions and the CTCOG, can be considered “Limited” in severity of impact, meaning minor quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed or with major damage.

Table 17-9. Winter Storm Event Damage Totals, 1996-2023

JURISDICTION	PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Bell County	\$669,900	\$23,900

ASSESSMENT OF IMPACTS

The greatest risk from a winter storm hazard is to public health and safety. The impact of climate change could produce longer, more intense winter storm events, exacerbating the current winter storm impacts. Worsening winter storm conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (11 percent of total population), children under 5 (8 percent of total population), and those with a disability (14 percent of total population), can face serious or life-threatening health problems from exposure to extreme cold including hypothermia and frostbite.
- Loss of electric power or other heat source can result in increased potential for fire injuries or hazardous gas inhalation because residents burn candles for light or use fires or generators to stay warm.
- Response personnel, including utility workers, public works personnel, debris removal staff, tow truck operators, and other first responders, are subject to injury or illness resulting from exposure to extreme cold temperatures.
- Response personnel would be required to travel in potentially hazardous conditions, elevating the life safety risk due to accidents and potential contact with downed power lines.

SECTION 17: WINTER STORM

- Operations or service delivery may experience impacts from electricity blackouts due to winter storms.
- Power outages are possible throughout the planning area due to downed trees and power lines and/or rolling blackouts.
- Critical facilities without emergency backup power may not be operational during power outages.
- Emergency response and service operations may be impacted by limitations on access and mobility if roadways are closed, unsafe, or obstructed.
- Hazardous road conditions will likely lead to increases in automobile accidents, further straining emergency response capabilities.
- Depending on the severity and scale of damage caused by ice and snow events, damage to power transmission and distribution infrastructure can require days or weeks to repair.
- Winter storms can reduce the efficacy of shaded fuel breaks for wildfire mitigation as treated areas were more likely to have downed trees and limbs than untreated areas.
- Winter storms can result in damage to endangered species habitat and increased fuel loads within forested habitats.
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to impacts of winter storm events. Approximately 30 percent of homes in the County were built before 1980. Similarly, historic buildings and sites are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are 74 historical sites listed on the National Register of Historic Places for Bell County.
- Schools may be forced to shut early due to treacherous driving conditions.
- Exposed water pipes may be damaged by severe or late season winter storms at both residential and commercial structures, causing significant damages.

The economic and financial impacts of winter weather on the community will depend on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of a winter storm event.

CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to reduce the number of extreme cold events statewide but increase in the variability of events.⁵ Extreme cold events will continue to be possible but overall winters are becoming milder, and the frequency of extreme winter weather events are decreasing due to the warming of the Arctic and less extreme cold air coming from that region.⁶ A trend that is expected to continue with winter extremes estimated to be milder by 2036 compared to extremes in the historic record.⁷

⁵ Fourth National Climate Assessment. Chapter 23 Southern Great Plains. U.S. Global Change Program. 2018.

⁶ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.

⁷ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.



SECTION 18

CYBER ATTACK

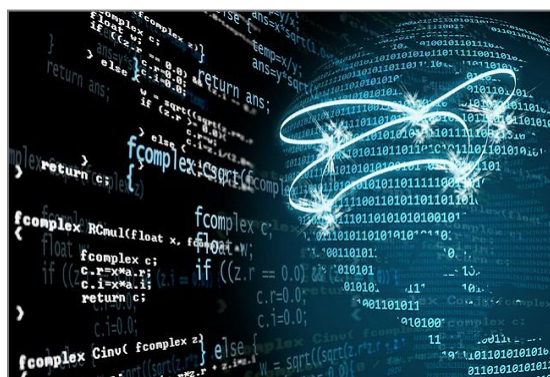
SECTION 18: CYBER ATTACK

Hazard Description	1
Hazards	2
Denial of Service Attacks	2
Data Loss/Leakage	2
Infrastructure Loss/Failure	2
Insider Threats	2
Organized Cybercrime, State-Sponsored Hackers Espionage	2
Third Party Mismanagement	3
Advance Persistent Threats	3
Civil Disorder	3
Location	3
Extent	3
Historical Occurrences	4
Probability of Future Events	5
Vulnerability and Impact	7
Climate Change Considerations	8

HAZARD DESCRIPTION

A cyber-attack is any type of offensive maneuver employed by individuals or organizations that targets computer information systems, infrastructures, computer networks, and personal computer devices by various means of malicious acts. The malicious act usually originates from an anonymous source that either steals, alters, or destroys a specified target by hacking into a susceptible system.

Cyberspace and its underlying infrastructure are vulnerable to a wide range of risk including both physical and cyber threats and hazards. Sophisticated cyber actors and nation-states exploit vulnerabilities to steal information and money and can develop capabilities to disrupt, destroy, or threaten the delivery of essential services. Various crimes are perpetrated through cyberspace including the production and distribution of child pornography and child exploitation conspiracies, banking and financial fraud, intellectual property violations, and other crimes, all of which have substantial human and economic consequences.



Cyberspace is particularly difficult to secure from cyber-attack events, due to a number of factors including the ability of malicious actors to operate from anywhere in the world, the links between cyberspace and physical systems, and the difficulty of reducing vulnerabilities and consequences in complex cyber networks. Of growing concern is the cyber threat to critical infrastructure, which is increasingly subject to sophisticated cyber intrusions that pose new risks. As information

SECTION 18: CYBER ATTACK

technology becomes increasingly integrated with physical infrastructure operations, there is increased risk for wide scale or high-consequence events that could cause harm or disrupt services upon which our economy and the daily lives of millions of Americans depend. In light of the risk and potential consequences of cyber events, strengthening the security and resilience of cyberspace has become an important homeland security mission.¹

Bell County has experienced growth over the past decade, which means a larger amount of data and more residents who may suffer in the event of a cyber-attack within the planning area. The County takes steps to safeguard the integrity of its data and to prevent unauthorized access to information that is maintained in their computer systems. These measures are designed and intended to prevent corruption of data, block unauthorized access, and to ensure the integrity of information. Among these measures is cybersecurity training for County and City / Village employees, the use of unified threat management devices, and multifactor authentication and password protection protocols for accessing internal systems and data. This section reviews the hazards to the cybersecurity assets for the Bell County planning area.

HAZARDS

DENIAL OF SERVICE ATTACKS

A denial of service attack (DoS) is the attempt to make a computer or network resource unavailable to its intended users. A DoS attack may come from one or several computers, while a distributed denial of service attack (DDoS) will be launched from many, often thousands of computers. While DoS attacks may occur frequently and typically can be handled by the County's equipment, a DDoS attack can overload the Bell County's network or computer resources resulting in extended downtime. Often these attacks rely on lower-level network vulnerabilities.

DATA LOSS/LEAKAGE

Data loss can result from a variety of reasons, both intentional and unintentional. Data loss may result from a failure to properly backup or have disaster recovery equipment and processes, employees improperly handling sensitive data, and criminal activities such as espionage, theft, sabotage, and other malicious acts.

INFRASTRUCTURE LOSS/FAILURE

Loss of computer and network resources may result from a variety of natural and human-caused disasters including tornadoes, hurricanes, and explosions due to accidents, power loss, terrorism, and fire.

INSIDER THREATS

Insider threats are malicious threats to the planning area that come from Bell County employees, contractors, and volunteers who have access to the County's computers, networks, and data. An insider can initiate a DoS attack, leak or steal data, and sabotage the infrastructure and data.

ORGANIZED CYBERCRIME, STATE-SPONSORED HACKERS ESPIONAGE

Organized cybercrime, which may include state-sponsored cybercrime, are attacks on the Bell County's computers, network, and data by criminal organizations. These criminals may be motivated by money or political reasons. Often these attacks are well planned out, difficult to identify due to their more limited scope, and can result in extensive damage.

¹ Source: Department of Homeland Security

SECTION 18: CYBER ATTACK

THIRD PARTY MISMANAGEMENT

Reliance on third parties for cyber services implies acceptance of the risk that the third party will properly protect the cyber resources from loss or unavailability. Hazards from the use of third parties include DoS, DDoS, data loss and leakage, infrastructure loss and failure, insider threats, and organized cybercrime.

ADVANCE PERSISTENT THREATS

An advanced persistent threat (APT) is a stealthy and continuous attack on Bell County over a long period of time. The "advanced" process signifies sophisticated techniques using malware to exploit vulnerabilities in systems. The "persistent" process suggests that an external command and control system is continuously monitoring and extracting data from a specific target. The "threat" process indicates human involvement in orchestrating the attack.

CIVIL DISORDER

Civil disorder may impact the cybersecurity of the planning area by directly or indirectly impacting Bell County's ability to support its computers, networks, and data. Civil disorder can result in the planning area not having resources due to direct impact to the computers and networks, and indirectly by limiting the resources necessary to run the computers and networks.

LOCATION

Cyberwar is deceptive, invisible to most, and fought out of sight. It takes place in cyberspace, a location that cannot be seen, touched, or felt. Physical instruments, such as computers, routers, and cables can be seen; however, these instruments interact in cyberspace, a virtual and unseen realm. Thus, the source of the hazard can extend from one part of the world to attacks on public or private sector entities in another part of the world, and the perpetrator can remain unknown in a legally provable sense. The entire Bell County planning area, including all participating jurisdictions and the CTCOG, can be affected by a cyber-attack.

EXTENT

Currently an official index for measuring the extent of a cyber-attack does not exist. The extent, nature, and timing of cyber-attack events are impossible to predict. There may or may not be any warning. Some cyber-attack events take a long time (weeks, months, or years) to be discovered and identified.² Therefore, the Bell County planning area, including all participating jurisdictions and the CTCOG, is vulnerable to all types of cyber-attack, and can occur anywhere, and at any time.

The extent of damages is based on historical incidents in the Bell County planning area are classified as low, medium, and high; third party information regarding the impact; and if the planning area has experienced an occurrence of the incident.

Denial of service attacks: Low

A DoS and DDoS attack could result in an extended cyber-outage in the planning area. The outage, although impacting the daily business of the planning area, would not have a substantial economic impact to the county.

² Source: <http://www.ready.gov/cyber-attack>

SECTION 18: CYBER ATTACK

Data loss/leakage: High

Data loss and leakage experienced by the planning area could result in costly remediation efforts to ensue. For example, if personally identifiable information (PII) is leaked, the county may be required to pay for credit protection services. Since Bell County manages a large quantity of sensitive information, the possibility of costly remediation efforts is high.

Infrastructure loss/failure: High

Loss of a cyber-processing facility could result in very high expenses to remediate, repair, and recover from the loss.

Insider threats: Medium

Insider threats can result in substantial impacts to the organization, depending on what data the insider has accessed. Bell County has remediated insider threats by using the industry standard separation of duties, and performing background checks of its employees, contractors, and volunteers.

Organized cybercrime, state-sponsored hackers' espionage: High

The planning area is a moderate target for organized criminals and state-sponsored hackers due to its political environment and the size of the organization. Due to the potential extent of attacks by organized criminals, the possibility and severity of resulting damages are great.

Third party mismanagement: Low

Since each vendor is isolated to the service it performs, the damages from one third party's mismanagement are fairly low.

Advanced persistent threats: High

The impact of an APT to the planning area can be severe because a large number of systems can be affected and the remediation of such an attack could be expensive to recover from.

Civil disorder: High

The impacts of civil disorder on cybersecurity could be extensive due to the typical physical nature of the attacks.

HISTORICAL OCCURRENCES

It's been reported that the electric grid is attacked every four days either physically or through cyber threats.³ The numbers of attacks are accelerating and becoming more sophisticated. The Texas Governor announced that websites belonging to state agencies have seen an increase in attempted cyber-attacks coming out of Iran (about 10,000 per minute) in the time since Iranian general Qassem Soleimani was killed in a U.S. drone strike.⁴ While the majority of attacks to gather data are not successful, Bell County's technology security team remains on high alert. The Electric Reliability Council of Texas (ERCOT) reportedly has a team of professionals and a series of procedures they utilized to protect the planning area systems from cyber-attacks.

³ Source: USA Today, March 2015, website: <https://www.usatoday.com/story/news/2015/03/24/power-grid-physical-and-cyber-attacks-concern-security-experts/24892471/>

⁴ Statesman News Network, January 2020, Website: <https://www.statesman.com/news/20200110/austin-on-guard-after-texas-hit-with-increased-cyberattacks-from-iran>

SECTION 18: CYBER ATTACK

Based on available data, multiple minor cyber-attack events have targeted participating jurisdictions within the Bell County planning area over the past 20 years. Between 2007 and 2021, six known cyber-attack events occurred in the City of Harker Heights. In 2007, an employee brought malware on a personal USB drive which spread through 10 Windows XP systems and a file server; these systems were down for approximately 48 hours before they were restored. In 2009, a virus imbedded in a downloaded screensaver led to 20 Windows XP systems being down for 48 hours before being restored. In 2010, a “CryptoLocker” ransomware event led to a single server in Harker Heights going down for approximately 4 hours. In 2011, an attack on several website forms led to intermittent connection issues which were resolved in a few hours. Most recently, two email account takeover instances stemming from phishing emails occurred in 2020 and 2021, however no information from these accounts was found to be compromised and downtime was only two hours in each instance. A known ransomware incident also occurred in the City of Belton in 2017, however the attack attempt was caught by the City’s technology department before it could take effect. Based on the best available data, all previous instances of cyber-attacks within the planning area were limited in severity, with the most severe events leading to a contained number of computer systems going down for 48 hours before being restored.

Even though cyber-attack events are virtually impossible to predict, the Bell County planning area, including all participating jurisdictions and the CTCOG, has the potential of an occurrence happening at any time.

PROBABILITY OF FUTURE EVENTS

The probability of occurrence based on historical incidents in the planning area are classified as low, medium, and high; as well as third party information regarding the likelihood of incidents if the county has not had an occurrence of the incident.

Denial of service attacks: Medium

The planning area has frequent DOS attack attempts which are not severe enough to impact Bell County’s service levels. The planning area has had no DDoS attacks over the last year which successfully impacted services. Although there have been attempts for service disruptions through phishing emails, a fraudulent attempt to obtain sensitive information has not been successful. Even so, there have been several known DOS attacks historically in the planning area which did have some minor impacts on City personnel’s ability to access and use computer systems for short periods. In the past, significant bad actors were identified by the U.S. Federal Government as Russia, Iran, and North Korea who historically attempt to disrupt or corrupt systems by damaging or gaining sensitive information through software. Participating jurisdictions within Bell County employs vendor software, such as network monitoring software, which supports critical infrastructure.

Data loss/leakage: Low

The planning area is subject to several compliance requirements which specifically address data loss and leakage. These compliance standards include but are not limited to:

- Payment Card Industry Security Standard (PCI DSS)
- Health Insurance Portability and Accountability Act of 1996 (HIPAA)
- Criminal Justice Information Services Division (CJIS)

SECTION 18: CYBER ATTACK

Bell County had no instances of data loss over the last year which resulted in the County having to remediate the situation.

Infrastructure loss/failure: Low

The planning area has multiple data centers which are hardened in various ways to minimize the possibility of outage. Resilience and redundancy are continuously being reviewed and addressed to reduce the risk of loss or failure. Historically, the infrastructure has had few outages that were extended. A prime example of potentially affected infrastructure would be health care systems within the planning area.

Insider threats: Low

Jurisdictions in the Bell County planning area require anyone who has access to government network and resources to have gone through a background check, which is regularly reviewed. Although several known cyber-attack incidents in the planning area began due to employee activity on computer systems, there is no available evidence that these actions were intentional or malicious. Therefore, there have been no known instances of insider attacks in Bell County.

Organized cybercrime, state-sponsored hackers' espionage: Medium

Over the last five years, many organized cyberattack attempts may have been made on Bell County and participating jurisdictions, as DDoS and malware attacks have become more and more frequent across the globe. One instance, a 2007 ransomware attack targeting the City of Belton, was unsuccessful in impacting the City's operations as it was caught by City personnel before impacting any cyber systems. It is not known whether this ransomware attack attempt was linked to any organized or state-sponsored campaigns.

Third party mismanagement: Low

Jurisdictions within the Bell County planning area utilize third parties for implementing certain cybersecurity measures, such as network monitoring, endpoint protection, and advanced threat protection. There have not been any recorded instances of third-party mismanagement in Bell County to date.

Advanced persistent threats (APT): Low

APTs are defined as a highly sophisticated threat actor with the resources and knowledge needed to stage a long-term attack campaign and remain undetected for extended periods of time. APTs may use a wide variety of techniques to attack their targets, including malware and ransomware strains. Bell County jurisdictions maintain systems which monitor symptoms of APT. Of the previous attacks in the Bell County planning area, no official records indicate that these attacks were part of larger APT attack campaigns.

Civil disorder: Low

Nationally, civil disorder events have been correlated or followed up by a cyber-attack to critical infrastructure, and national trends indicate a general rise in such events. However, Bell County has relatively low civil disorder events historically, and there have been no cyber-attacks tied into civil disturbance events within the last five years. Local, state, and federal officials monitor such events and establish lines of communication in the event that a cyber incident may unfold. The probability of following this national trend is low for the planning area.

Overall, cyber-attacks of all kinds are impossible to predict, but attack attempts have continuously risen across the country in recent years. Based on these global trends and historical evidence,

SECTION 18: CYBER ATTACK

the Bell County planning area, including all participating jurisdictions and the CTCOG, is vulnerable to a range of cyber threats, and the probability of future attempted or successful cyber-attacks is considered “Highly Likely,” meaning an event is probable in the next year.

VULNERABILITY AND IMPACT

With the internet being largely open and unregulated, it leaves the planning area vulnerable to cyber-attacks and threats. The attack can be on information systems resulting in a data breach, or the spread of a virus. With the growing dependence on digital interconnectivity even a small incident may have widespread and damaging consequences.



Transportation, public safety, and utility services are all critical, and highly dependent on information technology. The motive behind such disruptions can be driven by religious, political, and other objectives.

A cyber-attack can last a few minutes to a couple of days, although large-scale events and their impacts can last much longer. Cyber-attacks differ by motive, type, vector, and perpetrator profile.

Cybersecurity involves protecting infrastructure by preventing, detecting, and responding to cyber-attack incidents. Unlike physical threats that prompt immediate action, such as “stop, drop, and roll,” in the event of a fire; cyber threats are often difficult to identify and comprehend. Among these dangers are viruses erasing entire systems, intruders breaking into systems and altering files, intruders using a computer or device to attack others, and intruders stealing confidential information. The spectrum of cyber-attack risks is limitless. Threats of cyber-attack can have wide-ranging effects on the individual, community, organizational, and national level. Risks from cyber-attack include:

- Organized cybercrime, state-sponsored hackers, and cyber espionage, which can pose national security risks to our country.
- Transportation, power, and other services may be disrupted by large scale cyber incidents, and the extent of the disruption is highly uncertain as it will be determined by many unknown factors including the target and size of the incident.
- Vulnerability to data breach and loss increases if an organization’s network is compromised, and therefore information about a company, its employees, and its customers can be at risk.
- Individually-owned devices such as computers, tablets, mobile phones, and gaming systems that connect to the Internet are vulnerable to intrusion, and therefore personal information may be at risk without proper security.⁵

Based on historical events, the potential impact of the most severe cyber-attacks for the entire Bell County planning area, including all participating jurisdictions and the CTCOG, can be considered “Major” due to the critical facilities that can be indirectly impacted by an attack. While deaths, injuries or damages to the built environment are not directly caused by a cyber-attack, the secondary or cascading effects of an attack could be devastating.

⁵ Source: <http://www.ready.gov/cyber-attack>

SECTION 18: CYBER ATTACK

CLIMATE CHANGE CONSIDERATIONS

As a non-natural hazard, climate change has no direct impact on the future occurrences of cyber-attack incidents. However, climate change is associated with an increase in severe weather. If severe weather events occur concurrently with a cyber-attack, the stress on emergency services, critical infrastructure, and the community may be compounded. Research and data regarding the impact of climate change on non-natural events is minimal and limited.



SECTION 19 **HAZARDOUS MATERIALS**

SECTION 19: HAZARDOUS MATERIALS

Hazard Description	1
Location	2
Extent.....	5
Historical Occurrences.....	6
Probability of Future Events.....	6
Vulnerability and Impact.....	7
Assessment of Impacts	9
Climate Change Considerations	9

HAZARD DESCRIPTION



Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.

Chemicals are found everywhere. They purify drinking water, increase crop production, and simplify household chores. But chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. You and your community are at risk if a chemical is used unsafely or released in harmful amounts into the environment where you live, work, or play.

In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. This profile focuses on fixed sites. Weather conditions will directly affect how the hazard develops.

The Toxics Release Inventory (TRI) is a publicly available database from the federal Environmental Protection Agency (EPA) which contains information on toxic chemical releases and other waste management activities that are reported annually by certain covered industry groups federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to the EPA and their state or tribal entity. A facility must report if it meets the following three criteria:

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; Resource Conservation and Recovery Act (RCRA) Subtitle C Treatment, Storage and Disposal (TSD) facilities; and solvent recovery services.
- Have ten or more full-time employee equivalents.
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, Bio-accumulative and

SECTION 19: HAZARDOUS MATERIALS

Toxic (PBT) chemicals are subject to different thresholds of ten pounds, 100 pounds or 0.1 grams depending on the chemical.

Submission of a Tier II form is required under Section 312 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). Under EPCRA, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the Texas Department of State Health Services (DSHS), Local Emergency Planning Committees (LEPCs), and local fire departments. The Texas Tier II Report contains facility identification information and detailed chemical data about hazardous chemicals stored at the facility.

A facility must report if it meets the following criteria:

- Any company using chemicals that could present a physical or health hazard must report them if the quantities of those chemicals exceed Tier II threshold limits.
- If an industry has an Occupational Safety and Health Administration (OSHA) deemed hazardous chemical that exceeds the appropriate threshold at a certain point in time, then the chemical must be reported. These chemicals may be on the list of 355 Extremely Hazardous Substances (EHS) or could be one of the 650,000 reportable hazardous substances (not on the EHS list). This reporting format is for a "snapshot in time." EHS chemicals must be reported if the quantity is greater than 500 pounds or the Threshold Planning Quantity (TPQ) amount, if the TPQ is less than 500 pounds. Chemicals not considered to be EHS must be reported if their quantity is 10,000 pounds or greater.

LOCATION

A hazardous material spill occurring along railroad tracks and major highways near populated areas in the Bell County planning area is of concern to the planning team. Trains and trucks can carry a variety of materials that would, in large quantity, threaten the health and safety of people and the natural environment in the vicinity of a spill.

All major highways, railroads, and the surrounding areas are at risk of a HAZMAT incident. In the Bell County planning area, the major north-south roads are Interstate Highway 35 and State highways 195, 95, and 317. U.S. Highway 190 and State Highway 36 are the major roads crossing the county east and west. Bell County is also served by the Burlington Northern Santa Fe and Union Pacific railroads. Locations in the county where these rail lines run parallel to major roadways are particularly vulnerable to hazardous material spills that could impact both trains and motorists traveling through the area.

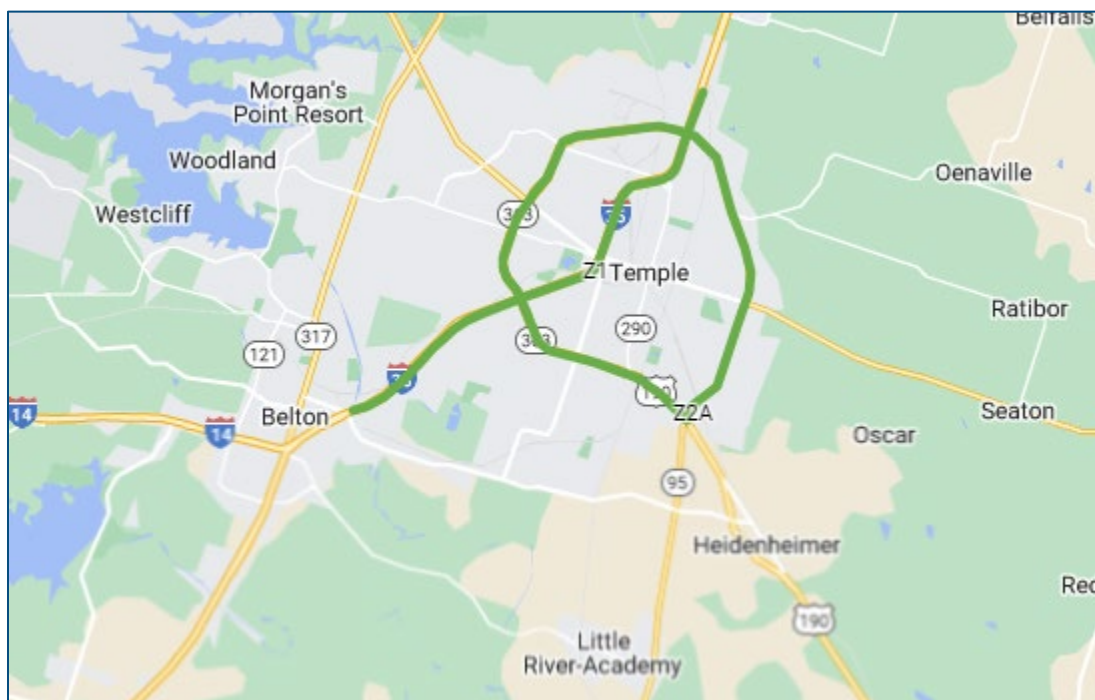
Several participating jurisdictions have one or more of these major roadways and railroads converging or running through them. These municipalities are particularly vulnerable to hazardous materials incidents as they are densely populated areas with higher likelihoods of hazardous materials being transported through their jurisdiction. Among these jurisdictions are the City of Temple, City of Belton, City of Nolanville, City of Rogers, City of Killeen, and the Village of Salado.

The National Hazardous Materials Route Registry (NHMRR) lists, as reported by States and Tribal governments, all designated and restricted roads and preferred highway routes for transportation of highway route-controlled quantities of Class 7 radioactive materials and non-radioactive hazardous materials. According to NHMRR data, Bell County contains designated

SECTION 19: HAZARDOUS MATERIALS

routes for the transportation of these hazardous materials. These routes primarily follow Texas State Highway Loop 363 in or near the City of Temple, as well as a stretch of Interstate Highway 35 which runs from the northern city limits of the City of Temple and extends to the southwest city limits towards the City of Belton. Figure 19-1 illustrates these designated hazardous materials routes through the Bell County planning area, outlined in green.¹

Figure 19-1. NHMRR Hazardous Materials Designated Routes in Bell County



Under the Community Right-to-Know program laws upheld at the state and federal level, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the state, with Local Emergency Planning Committees (LEPCs), and with local fire departments.

Figure 19-2 shows the locations of available georeferenced TRI toxic sites in and around the Bell County planning area. Only toxic sites that have georeferenced data available were analyzed; 500-meter and 2500-meter circle buffers are also drawn around each hazardous material site.

There are 46 TRI toxic sites in the Bell County planning area in total, with 41 sites reporting previous toxic releases according to the EPA's database. Of those, 27 sites had reporting available for chemicals released into the planning area in 2022. No toxic releases or waste was reported for 5 of the 27 sites, and US Army Fort Cavazos Range Facility accounted for the largest amount of chemicals (179,522 lbs.) released into the planning area in 2022, according to TRI data. Table 19-1 lists the names, locations, and hazardous chemicals associated of available TRI toxic sites in and around the Bell County planning area that reported toxic releases for 2022.

¹ Source: <https://www.fmcsa.dot.gov/regulations/hazardous-materials/national-hazardous-materials-route-registry-state>

SECTION 19: HAZARDOUS MATERIALS

Figure 19-2. EPA 2022 Toxic Release Inventory (TRI) Facility Locations

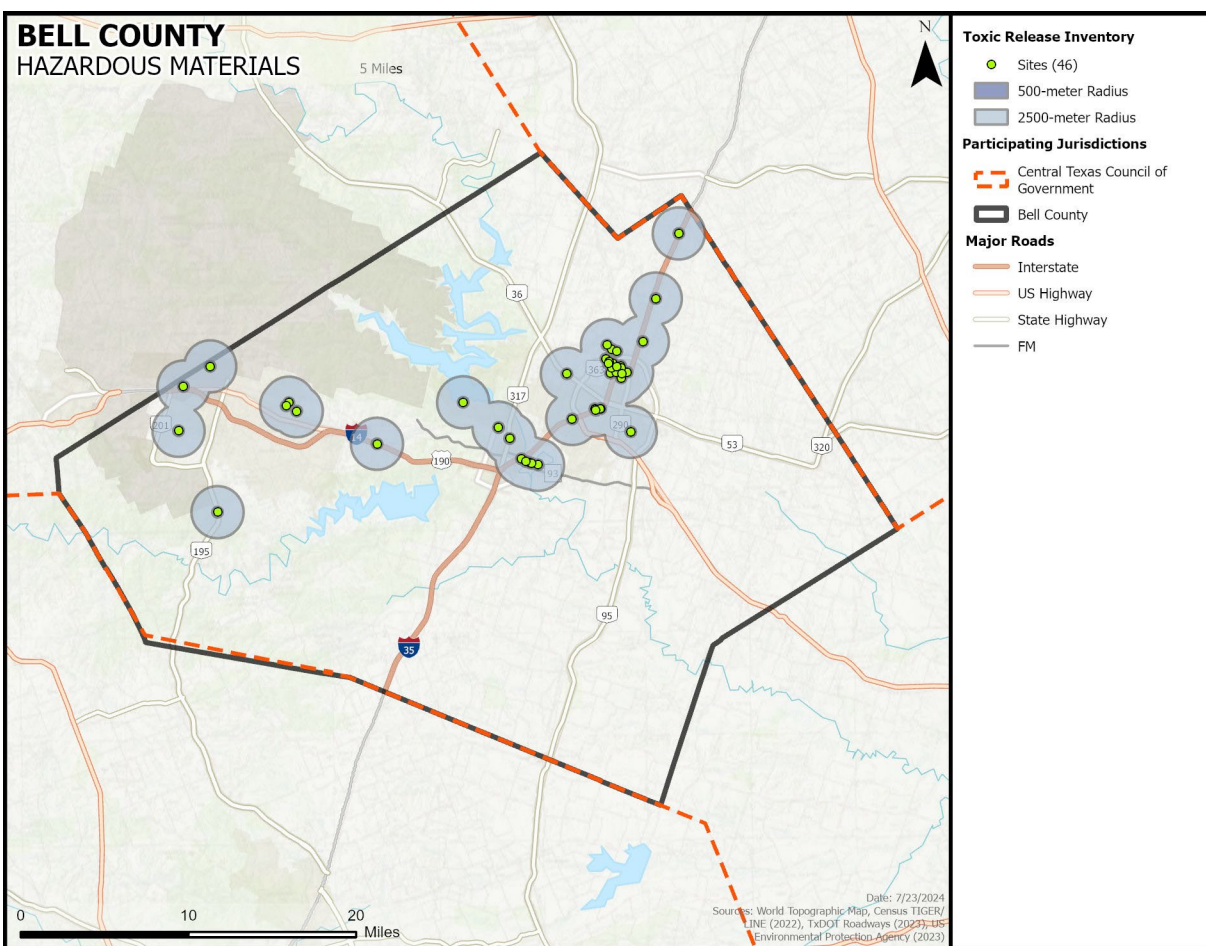


Table 19-1. EPA 2022 Toxic Release Inventory (TRI) for Bell County²

TRI FACILITY NAME	LOCATION	ASSOCIATED CHEMICALS
American Spincast Inc	City of Belton	Chromium and chromium compounds; Manganese and manganese compounds; Nickel and nickel compounds
Artco Bell Corp	City of Temple	Manganese and manganese compounds; Nickel and nickel compounds
Belton Ready Mix	City of Belton	Lead and lead compounds
Centrifugal Castings	City of Temple	Chromium and chromium compounds; Manganese and manganese compounds; Nickel and nickel compounds

² Only TRI sites with reported chemical releases for 2022 are listed. Source: <https://www.epa.gov/toxics-release-inventory-tri-program>

SECTION 19: HAZARDOUS MATERIALS

TRI FACILITY NAME	LOCATION	ASSOCIATED CHEMICALS
Delta Centrifugal LLC	City of Temple	Chromium and chromium compounds; Cobalt and cobalt compounds; Nickel and nickel compounds
Engineered Composite Systems	City of Belton	Styrene
Er Carpenter LP	City of Temple	Diisocyanates; Toluene diisocyanate (mixed isomers)
Ergon Asphalt & Emulsions Inc. - Temple	City of Temple	Benzo[g,h,i]perylene; Polycyclic aromatic compounds
Fiber Glass Systems LP	City of Belton	Styrene
Killeen Marble Inc	City of Killeen	Styrene
Lide Industries-Troy Fiberglass	City of Troy	Copper and copper compounds; Manganese and manganese compounds; Nickel and nickel compounds
MGC Pure Chemicals America Inc	City of Killeen	Ammonia
Nortech Lubricant Distribution Solutions Inc	City of Temple	Ethylene glycol; Zinc and zinc compounds
Palladio Industries Inc.	City of Temple	Acrylamide; Acrylic acid; Acrylonitrile
Ppg Architectural Coatings Liquid Nails Adhesives	City of Temple	Certain glycol ethers; Cyclohexane; Ethylbenzene; Ethylene glycol; Xylene (mixed isomers); n-Hexane
Temple Ready Mix	City of Temple	Lead and lead compounds
Transit Mix Killeen Plant Plant #1151	City of Killeen	Lead and lead compounds
TTS Distribution Inc	City of Temple	Methanol; Toluene; Xylene (mixed isomers); n-Hexane
Us Army Fort Cavazos Range Facility	Fort Cavazos	Copper and copper compounds; Dinitrotoluene (mixed isomers); Lead and lead compounds
Viron International Corp	City of Temple	Methyl methacrylate; Styrene
Wilsonart LLC Temple North	City of Temple	Formaldehyde; Methanol; Phenol
Wilsonart LLC-Adhesive Div	City of Temple	Toluene; n-Hexane

EXTENT

The extent of a hazardous material release will depend on whether it is from a mobile or fixed site and the size of impact. The range of intensity will vary greatly depending on the circumstances. These factors and conditions include the material, toxicity, duration of the release, and environmental conditions such as the wind and precipitation.

SECTION 19: HAZARDOUS MATERIALS

Hazardous materials or toxic releases can have a substantial impact on communities. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions would directly affect how the hazard develops. The micro-meteorological effects on buildings and terrain can alter travel patterns and duration of agents. Shielding in the form of permanent shelter can protect people from harmful effects. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features can substantially increase damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

HISTORICAL OCCURRENCES

Hazardous materials are substances that if released or misused can cause death, serious injury, long-lasting health effects, and damage to infrastructure and the environment. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

A total of 610 spill incidents have been reported in Bell County between 2003 and June 2024 according to the Texas Commission on Environmental Quality (TCEQ) Emergency Response Spills database.³ This includes chemical spills reported to and investigated by TCEQ. A large number of these incidents were related to relatively small diesel fuel and oil spills. Damages, injuries, and fatalities are not reported in this database, and a spill's inclusion in this dataset does not necessarily indicate significant damage to public health, property, or the natural environment occurred. However, the frequency of these events does indicate a significant level of risk for the planning area.

PROBABILITY OF FUTURE EVENTS

Hazardous material spills are usually the result of human error and/or accidents, which cannot be predicted. However, given the amount of traffic through the planning area and its large network of transportation, it is probable that an incident will occur in any given year. Most spills will not lead to negative health or safety impacts and will not cause substantial negative impacts on the air, soil, or groundwater. The probability of a spill threatening the health of thousands and of having long-term negative environmental consequences is low, based on previous events in the planning area.

Based on the historic incident records and team input, the frequency of occurrence for typical hazardous material incidents would be considered highly likely. However, many of the previous spill incidents were minor and related to vehicle accidents resulting in fuel and oil spills. Based on the best available data, as well as factors including the prevalence of TRI toxic sites, major roadways and rail lines, and a NHMRR designated hazardous materials route within the planning area, the frequency of occurrence for more significant hazardous material incidents is considered "Likely", meaning an event is probable in the next three years for the Bell County planning area, including all participating jurisdictions and the CTCOG.

³ Source: https://data.texas.gov/dataset/Texas-Commission-on-Environmental-Quality-Emergency-Response-Spills/about_data

SECTION 19: HAZARDOUS MATERIALS

VULNERABILITY AND IMPACT

Based on the prevalence and geographic proximity of hazardous materials transportation routes, most of the Bell County planning area, including all participating jurisdictions and the CTCOG, is minimally vulnerable to the impacts of a HAZMAT incident. The City of Temple is the most vulnerable region of the planning area, due to its dense population, proximity to major roadways and rail lines including a designated hazardous materials route, and 13 TRI facilities with recently reported toxic releases being located within its boundary. Additionally, participating jurisdictions and populations near Fort Cavazos are particularly vulnerable, as the US Army Fort Cavazos Range Facility accounted for the largest toxic release of all facilities in the planning area in 2022. Participating jurisdictions nearest to Fort Cavazos include the cities of Killeen, Harker Heights, Morgan's Point Resort, and Nolanville.

Public health and environmental impacts are the most common effects of a hazardous materials incident. The release of toxic chemicals can pose immediate health effects including respiratory problems, chemical burns, poisoning, and long-term illnesses such as cancer. Vulnerable populations including children and the elderly may be more susceptible to health impacts. The population over 65 and under the age of 5 in the Bell County planning area is estimated at 19 percent of the total population or an estimated total of 71,638 potentially vulnerable residents in the planning area based on age.

In extreme cases, an evacuation may be ordered to remove people from the hazardous area. Evacuating areas affected by HAZMAT incidents can be difficult, especially for those who live below the poverty level and lack transportation and financial resources. An estimated 15 percent of the planning area population live below the poverty level. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. An estimated 18 percent of the planning area speaks a language other than English.

Table 19-2. Populations at Greater Risk of HAZMAT Incidents⁴

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
Bell County	42,044	29,594	51,891	54,805	66,219
City of Bartlett	216	106	237	230	426
City of Belton	2,652	1,353	2,999	4,142	4,375
City of Harker Heights	3,280	1,906	4,632	3,931	5,934
City of Holland	210	111	178	179	60
City of Killeen	11,467	14,603	20,953	24,593	33,510

⁴ U.S. Census Bureau, American Community Survey, 2022

SECTION 19: HAZARDOUS MATERIALS

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	POPULATION SPEAKS LANGUAGE OTHER THAN ENGLISH
City of Little River Academy	263	265	301	147	371
City of Morgan's Point Resort	733	187	794	345	380
City of Nolanville	528	322	1,094	1,043	590
City of Rogers	183	80	249	319	157
Village of Salado	634	247	279	184	298
City of Temple	12,448	6,943	12,483	14,020	12,346
City of Troy	332	259	340	234	202
CTCOG	N/A	N/A	N/A	N/A	N/A

Hazardous materials can have significant and long-term environmental impacts due to the release of toxic chemicals into the environment. Spills or leaks of chemicals may contaminate the soil, making it unsuitable for agriculture, which is a significant industry in the Bell County planning area. Hazardous material incidents can also cause water pollution. The toxic substances can be carried by rainwater or runoff into nearby water bodies, which can harm aquatic life, disrupt ecosystems, and pose a public health risk if contamination occurs to drinking water sources. Gaseous releases can lead to air pollution, which can become widespread. HAZMAT incidents can also disrupt the local ecosystem, harming animals, and insects, leading to the displacement of native species.

While the best available data does not provide historical dollar loss amounts, hazardous material incidents can also be costly and impact the local economy. Emergency containment, clean up, and disposal may strain local resources and budgets. HAZMAT incidents can also lead to property damage, most commonly to industrial facilities and transportation networks. Based on best available data, the impact of hazardous materials incidents in Bell County planning area, including all participating jurisdictions and the CTCOG, is considered "Limited" meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property is destroyed or with major damage.

Critical facilities in the planning area are vulnerable to a range of direct and indirect impacts caused by HAZMAT incidents. Many of the impacts to critical facilities identified by the Bell County Planning Team are similar to the impacts listed in Sections 5 through 17. For a comprehensive list by participating jurisdiction, please see Appendix C.

As outlined in the City of Killeen's Fire Department Master Plan, adopted in 2021, Killeen's Fire Department maintains a robust hazardous materials response program, comprised of 58 Hazmat Technicians, who are also certified Hazmat Safety Officers. Almost all personnel are trained to the Hazmat operations level, and nine personnel are certified Hazmat Incident Commanders. The Department maintains a Hazardous Materials Unit, which is extensively equipped to perform the following functions during an uncontrolled hazardous materials release: identify and secure a

SECTION 19: HAZARDOUS MATERIALS

perimeter, test and identify (or categorize) a substance and related hazards; safely confine, contain, stop, or neutralize a release and substance; and safely decontaminate personnel and equipment and contain runoff.

The City of Temple also maintains a HazMat Team within the Temple Fire Department. The Fire Department has 121 total personnel operating out of eight fire stations and maintains two dedicated rescue/hazmat vehicles.

These capabilities already in place in the cities of Killeen and Temple help mitigate the extent to which a hazardous materials incident can affect their jurisdictions and nearby communities within the planning area. For a comprehensive list of the capabilities already in place for each participating jurisdiction, please see Appendix F.

ASSESSMENT OF IMPACTS

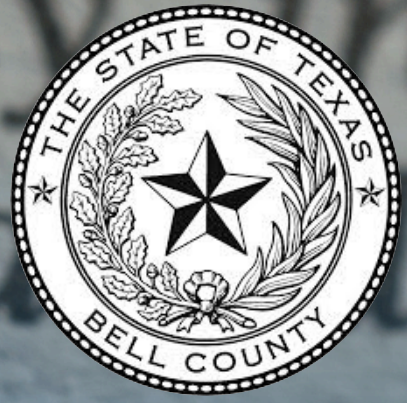
HAZMAT incidents have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. HAZMAT incidents can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (11 percent of total population) and children under 5 (8 percent of total population), can face serious or life-threatening health problems from exposure to toxic chemicals.
- Transportation disruptions and road closures can result in emergency response vehicles being unable to access areas of the community.
- First responders are exposed to toxic chemicals, hazardous materials, and generally unsafe conditions, which could result in sickness and long-term health impacts.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Evacuations, shelter in place orders, or the closure of transportation routes can lead to the disruption of critical facilities, businesses, and schools.
- The environment may experience significant damage leading to air and water contamination, loss of wildfire, agriculture, and tourism.
- Populations experiencing homelessness at the time of a hazmat event may not have the ability to relocate or find appropriate shelter to avoid exposure to toxic materials.

The economic and financial impacts of hazardous material incidents on the area will depend entirely on the scale of the event, where the event occurs, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any HAZMAT incident.

CLIMATE CHANGE CONSIDERATIONS

As a non-natural hazard, climate change has no direct impact on the future occurrences of hazardous material incidents. However, climate change is associated with an increase in severe weather. Severe weather events may cause damage to the storage of hazardous materials and can lead to an increase in chemical spills, leaks, or fires. Research and data regarding the impact of climate change on non-natural events is minimal and limited.



SECTION 20 **TERRORISM**

SECTION 20: TERRORISM

Hazard Description	1
Location	1
Extent.....	2
Historical Occurrences.....	3
Probability of Future Events.....	4
Vulnerability and Impact.....	5
Assessment of Impacts	5
Climate Change Considerations	5

HAZARD DESCRIPTION

The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as one of two types—domestic terrorism or international terrorism. Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction. International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside of the United States, or whose activities transcend their national boundaries.

A terrorist attack can take several forms, depending on the technological means available to the terrorist, the nature of issue motivating the attack, and the points of weakness of the terrorist's target. Bombings are the most frequently used terrorist method in the United States. A terrorist using a chemical or biological weapon is of particular concern to officials. Special training and equipment is needed in order to safely manage a Weapons of Mass Destruction incident.

Biological agents are infectious microbes or toxins used to produce illness or death in people, animals or plants. Biological agents can be dispersed as aerosols or airborne particles. Terrorists may use biological agents to contaminate food or water, as they are extremely difficult to detect.

Chemical agents kill or incapacitate people, destroy livestock, or ravage crops. Some chemical agents are odorless and tasteless and are therefore difficult to detect. These chemical agents can have an immediate effect (a few seconds to a few minutes) or a delayed effect (several hours to several days).

The Department of Defense estimates that as many as 26 nations may possess chemical agents and/or weapons, and an additional 12 may be seeking to develop them. The Central Intelligence Agency reports that at least 10 countries are believed to possess or are currently conducting research on biological agents for weaponization.

Terrorist incidents – as with other natural and technological disasters – involve the application of one or more modes of harmful force to the built environment. These modes include contamination (as in the case of chemical, biological radiological or nuclear hazards), energy (explosives, arson, and even electromagnetic waves), or denial of service (sabotage, infrastructure breakdown, and transportation service disruption).

LOCATION

There is no distinct geographic boundary to the threat of terrorism. An event is possible throughout the Bell County planning area, including all participating jurisdictions and the CTCOG. However,

SECTION 20: TERRORISM

it is important to note that high-risk targets for acts of terrorism include military and civilian government facilities, international airports, large cities, and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and corporate centers. Further, terrorists can spread fear by sending explosives or chemical and biological agents through the mail.

EXTENT

The Homeland Security Advisory System, issued by the U. S. Department of Homeland Security, previously used a color-coded terrorism warning system that identified five threat levels. In 2011, the Department of Homeland Security (DHS) replaced the color-coded alerts of the Homeland Security Advisory System (HSAS) with the National Terrorism Advisory System (NTAS), designed to more effectively communicate information about terrorist threats by providing timely, detailed information to the American public.

NTAS now consists of two types of advisories: Bulletins and Alerts. DHS has added Bulletins to the advisory system to be able to communicate current developments or general trends regarding threats of terrorism. As of June 2024, there has not been an active Bulletin since November 24, 2023. However, a Bulletin was active continuously from January 27, 2021, through November 24, 2023. NTAS Bulletins permit the Secretary to communicate critical terrorism information that, while not necessarily indicative of a specific threat against the United States, can reach homeland security partners or the public quickly, thereby allowing recipients to implement necessary protective measures. Because DHS may issue NTAS Bulletins in circumstances not warranting a more specific warning, NTAS Bulletins provide the Secretary with greater flexibility to provide timely information to stakeholders and members of the public.

When there is specific, credible information about a terrorist threat against the United States, DHS will share an NTAS Alert with the American public when circumstances warrant doing so. The Alert may include specific information, if available, about the nature of the threat, including the geographic region, mode of transportation, or critical infrastructure potentially affected by the threat, as well as steps that individuals and communities can take to protect themselves and help prevent, mitigate, or respond to the threat. The Alert may take one of two forms: Elevated, if there is credible threat information, but only general information about timing and target such that it is reasonable to recommend implementation of protective measures to thwart or mitigate against an attack; or Imminent, if the threat is believed credible, specific, and impending in the very near term. Terrorism Advisory System Alerts are described in Figure 20-1.¹

¹ Source: Department of Homeland Security, <https://www.dhs.gov/national-terrorism-advisory-system>

SECTION 20: TERRORISM

Figure 20-1. National Terrorism Advisory



Red Cross also issues Advisory System Recommendations for individuals, families, neighborhoods, schools and businesses for each alert level. These may be found at: www.redcross.org.

Heightened periods for terrorism risk are based on intelligence and other information. A potential terrorist event could devastate the community physically, economically and psychologically for many years to come. Warning time for terrorism may be minimal to none.

HISTORICAL OCCURRENCES

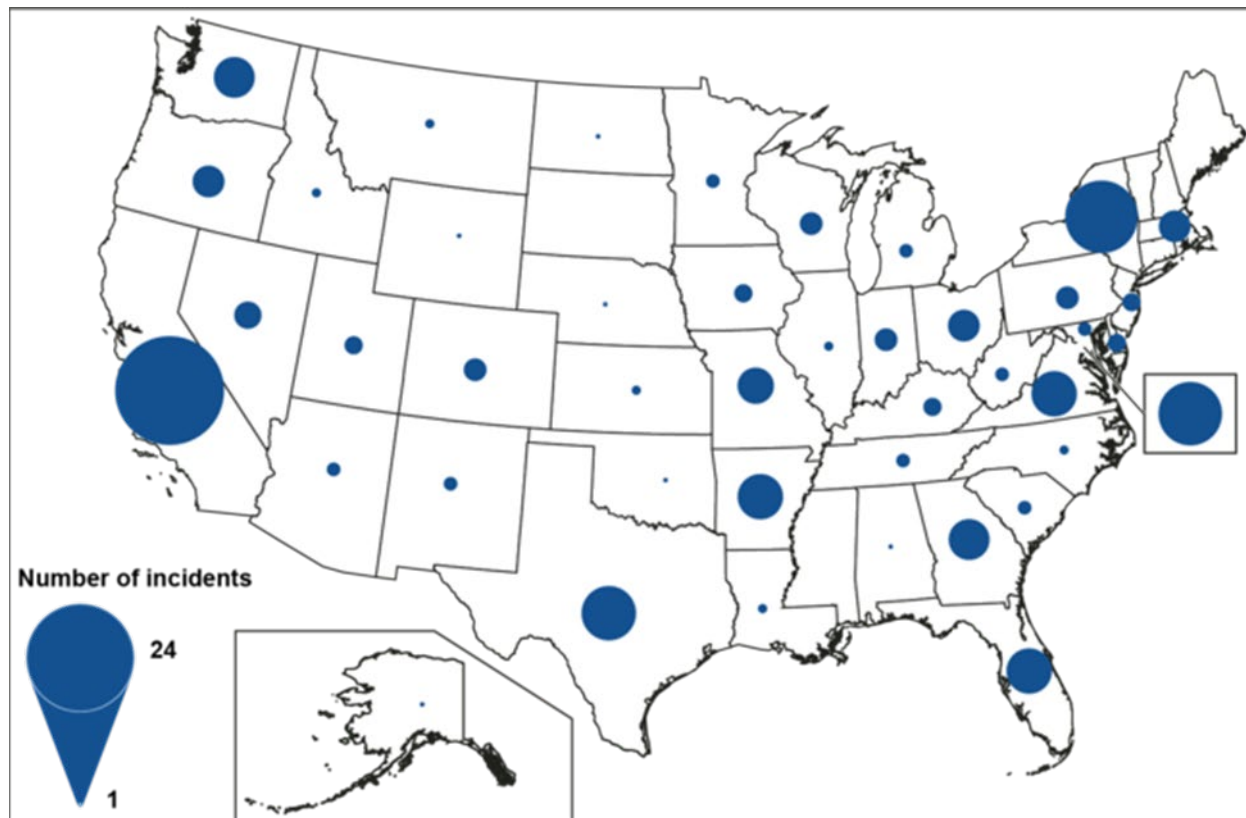
The history of terrorism on United States soil includes the attacks of September 11, 2001, on the World Trade Center in New York and the Pentagon in Washington, D.C. and the ensuing anthrax attacks; the 1995 bombing of the Murrah Federal Building in Oklahoma City; and the bombing of the World Trade Center in 1993; and the Boston Marathon Bombings in 2013.

However, the State of Texas has experienced a significant number of domestic terrorism events as shown in Figure 20-2. The United States Department of Homeland Security reported 231

SECTION 20: TERRORISM

domestic terrorism incidents between 2010 and 2021. These incidents occurred across the United States, but the greatest number of events occurred in states with major metropolitan areas such as California, New York, and Washington D.C.

Figure 20-2. National Terrorism Advisory



Source: GAO analysis of Department of Homeland Security Counterterrorism Mission Center data. | GAO-23-104720

None of these incidents occurred within the planning area, but surrounding communities have been impacted, and some of the nation's worst attacks have occurred within the state. While complete prevention of an attack may not be attainable, Bell County can lessen the likelihood and/or the potential effects of an incident. The County continues to improve its readiness to respond to a terrorist incident through participation in state and federal programs that provide training and equipment for agencies that would respond to a local terrorist incident, and in exercises that help to improve agency coordination and test local response plans.

PROBABILITY OF FUTURE EVENTS

The types, frequencies, and locations of many natural hazards are identifiable and, even in some cases, predictable, as the laws of physics and nature govern them. Malevolence, however, cannot be forecast with any accuracy. There is, therefore, some potential for most, if not all, types of intentional terrorist acts to occur anywhere and at any time. Reports also show that domestic terrorist incidents are on the rise in the United States, which indicates the slight possibility of an increased risk in the future. Based on best available data, it is "Unlikely" for a terrorist event to occur in the Bell County planning area, including all participating jurisdictions and the CTCOG, in the next ten years.

SECTION 20: TERRORISM

VULNERABILITY AND IMPACT

There is no defined geographic boundary for a terrorist event. All of the population, buildings, critical facilities, infrastructure and lifelines and hazardous materials facilities are considered exposed to the hazards of terrorism and could potentially be affected.

There are no past local events. Therefore, all assets and facilities are potentially at risk to damages that may, for the most part, be secondary.

Terrorist events can have a “Substantial” severity of impact, meaning multiple deaths, complete shutdown of facilities for 30 days or more, and more than 50 percent of affected properties destroyed or with major damage.

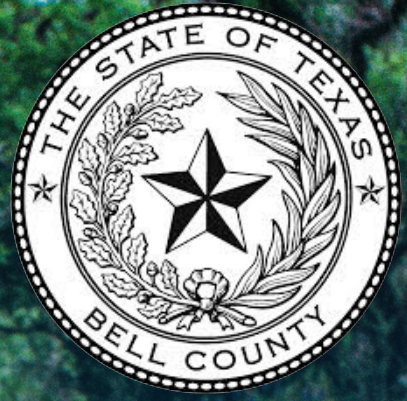
ASSESSMENT OF IMPACTS

Terrorist events have the potential to pose a significant risk to people, critical infrastructure and facilities, the economy, and built and natural environments. Due to the unforeseeable nature of terrorist attacks, as well as the broad variety of methods terrorist actors may utilize, the impacts of an event vary widely and are impossible to predict. Some of the potential impacts of a terrorist event include:

- Direct economic injury or destruction in the planning area can occur from terrorist attacks which target plants, machines, transportation systems, workers, or other smaller economic resources such as local businesses or restaurants.
- A terrorist attack can lead to community-wide mental health issues and trauma such as PTSD, depression, anxiety, a sense of helplessness, and substance abuse.
- Evacuations, shelter in place orders, or the closure of transportation routes can lead to the disruption of critical facilities, businesses, and schools.
- In the event of chemical or biological weapons being used, the environment may experience significant damage leading to air and water contamination, loss of wildfire, agriculture, and tourism.
- First responders are exposed to toxic chemicals, hazardous materials, and generally unsafe conditions, which could result in sickness and long-term health impacts.
- Vulnerable populations, particularly the elderly (11 percent of total population) and children under 5 (8 percent of total population), can face serious or life-threatening health problems from exposure to toxic chemicals.
- The population who speaks languages other than English (18 percent of total population) may have difficulty receiving urgent updates and safety guidance in the event of a terrorist attack.
- Terrorist attacks targeting critical facilities may result in the shutdown of essential services for extended periods of time. (See Appendix C for a comprehensive list of critical facilities in the Bell County planning area.)

CLIMATE CHANGE CONSIDERATIONS

As a non-natural hazard, climate change has no direct impact on the future occurrences of terrorism incidents. However, climate change is associated with an increase in severe weather. If severe weather events occur concurrently with a terrorist attack, the stress on emergency services, critical infrastructure, and the community may be compounded. Research and data regarding the impact of climate change on non-natural events is minimal and limited.



SECTION 21 MITIGATION STRATEGY

SECTION 21: MITIGATION STRATEGY

Mitigation Goals	1
Goal 1	1
Goal 2	1
Goal 3	2
Goal 4	2
Goal 5	2
Goal 6	2
Goal 7	3

MITIGATION GOALS

Based on the results of the risk and capability assessments, the Planning Team developed and prioritized the mitigation strategy. This involved utilizing the results of both assessments and reviewing the goals and objectives that were included in the previous 2018 Plan. At the Mitigation Workshop in December 2023, Planning Team members reviewed the mitigation strategy from the previous 2018 Plan. The consensus among all members present was that the strategy developed for the 2018 Plan required some changes including expanding on existing goals and the addition of a seventh goal around equity and vulnerable populations.

GOAL 1

Protect public health and safety.

OBJECTIVE 1.1

Advise the public about health and safety precautions to guard against injury and loss of life from hazards.

OBJECTIVE 1.2

Maximize utilization of the latest technology to provide adequate warning, communication, and mitigation of hazard events.

OBJECTIVE 1.3

Reduce the danger to, and enhance protection of, high risk areas during hazard events.

OBJECTIVE 1.4

Protect critical facilities and services.

GOAL 2

Build and support local capacity and commitment to continuously become less vulnerable to hazards.

OBJECTIVE 2.1

Build and support local partnerships to continuously become less vulnerable to hazards.

OBJECTIVE 2.2

Build a cadre of committed volunteers to safeguard the community before, during, and after a disaster.

SECTION 21: MITIGATION STRATEGY

OBJECTIVE 2.3

Build hazard mitigation concerns into county, city, village, and CTCOG planning and budgeting processes.

GOAL 3

Increase public understanding, support, and demand for hazard mitigation.

OBJECTIVE 3.1

Heighten public awareness regarding the full range of natural and man-made hazards the public may face.

OBJECTIVE 3.2

Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards and increase individual efforts to respond to potential hazards.

OBJECTIVE 3.3

Publicize and encourage the adoption of appropriate hazard mitigation measures.

GOAL 4

Protect new and existing properties.

OBJECTIVE 4.1

Reduce repetitive losses to the National Flood Insurance Program (NFIP).

OBJECTIVE 4.2

Use the most cost-effective approach to protect existing buildings and public infrastructure from hazards.

OBJECTIVE 4.3

Enact and enforce regulatory measures to ensure that future development will not put people in harm's way or increase threats to existing properties.

GOAL 5

Maximize the resources for investment in hazard mitigation.

OBJECTIVE 5.1

Maximize the use of outside sources of funding.

OBJECTIVE 5.2

Maximize participation of property owners in protecting their properties.

OBJECTIVE 5.3

Maximize insurance coverage to provide financial protection against hazard events.

OBJECTIVE 5.4

Prioritize mitigation projects, based on cost-effectiveness and sites facing the greatest threat to life, health, and property.

GOAL 6

Promote growth in a sustainable manner.

OBJECTIVE 6.1

Incorporate hazard mitigation activities into long-range planning and development activities.

SECTION 21: MITIGATION STRATEGY

OBJECTIVE 6.2

Promote beneficial uses of hazardous areas while expanding open space and recreational opportunities.

OBJECTIVE 6.3

Utilize regulatory approaches to prevent creation of future hazards to life and property.

GOAL 7

Promote equity and protect vulnerable populations and underserved communities through hazard mitigation activities.

OBJECTIVE 7.1

Allocate resources and funding to implement hazard mitigation activities that directly benefit vulnerable and underserved communities.

OBJECTIVE 7.2

Build and support local partnerships to leverage resources and expertise in addressing hazard related equity concerns.

OBJECTIVE 7.3

Establish internal decision-making processes that integrate equity into project selection.

OBJECTIVE 7.4

Monitor and evaluate the effectiveness of mitigation activities to ensure equitable outcomes and protection of vulnerable populations.



SECTION 22

PREVIOUS ACTIONS

SECTION 22: PREVIOUS ACTIONS

Summary.....	1
Bell County.....	2
City of Bartlett	20
City of Belton.....	31
City of Harker Heights	33
City of Holland.....	44
City of Killeen	51
City of Little River Academy.....	61
City of Nolanville	68
City of Rogers	78
Village of Salado	90
City of Temple.....	104
City of Troy.....	109
Central Texas Council of Governments (CTCOG).....	116

SUMMARY

This section includes analysis from the 2018 Bell County Hazard Mitigation Plan. Planning Team members were given copies of the previous mitigation actions submitted in the 2018 Bell County Plan at the mitigation workshop. Each participating jurisdiction reviewed the previous actions and provided an analysis as to whether the action had been completed, should be deferred as an ongoing activity, or be deleted from the Plan Update. The actions from the 2018 Plan are included in this section as they were written in 2018, with the exception of the “2024 Analysis” section. The following participating jurisdiction did not previously participate in a hazard mitigation plan, therefore they have no previous actions: City of Morgan’s Point Resort.

SECTION 22: PREVIOUS ACTIONS

BELL COUNTY

Bell County – Previous Action #1	
Proposed Action:	Acquire and install early warning system for Dam Failure.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Bell County Unincorporated, Belton, Killeen, & CTCOG
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk to residents and property through early warning.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and Defer to plan update. County utilizes OnSolve CodeRed reverse notification system for emergency notifications, status of dam conferred to OEM by dam managers.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #2	
Proposed Action:	Create a drainage ditch and channel maintenance program to maintain maximum flow capacity.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages through maintained capacity of drainage system.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (only Bell County, Belton, Killeen, & CTCOG), Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Engineer.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #3	
Proposed Action:	Identify households in the floodplain and dam inundation zones to include in Code Red notification system.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk to residents through early notification.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (only Bell County, Belton, Killeen, & CTCOG), Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	County Emergency Management
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed. Maps provided by USACE for Belton Dam and Stillhouse Hollow Dam; flood plain development permitting established; Bell County Engineer; https://www.bellcountytexas.com/departments/engineer/floodplain_management.php

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #4	
Proposed Action:	Build community safe rooms; Utilize safe rooms as local community center as well as cooling and heating center during extreme temperatures; Educate public of the safe room locations and operating procedures.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Countywide: Build site near the Expo Center
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents by providing shelter during extreme events.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure (Tornado, Hurricane) Education and Awareness (Extreme Heat, Winter Storm)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hurricane, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to new structure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Bonds, HMGP, PDM
Lead Agency/Department Responsible:	County Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #5	
Proposed Action:	Harden/retrofit Justice Complex against impacts from wind, lightning, hail, and wildfire.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Bell County Unincorporated: Bell County Justice Center
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages to Justice Center; Ensure continuity of emergency services; Protect lives.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Bonds, HMGP, PDM
Lead Agency/Department Responsible:	County Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. On-going construction at Justice Center and Jail, Bell County Sheriff's Department

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #6	
Proposed Action:	Review and update the Bell County MS4 Permit 5 Year Plan.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Establish guidance for stormwater conveyance and discharge into US waters without combined sewer conveyance.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$20,000
Potential Funding Sources:	Bonds, State and Federal Grants
Lead Agency/Department Responsible:	County Engineer Office
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan

2024 ANALYSIS:
Defer to plan update. Permit expired 12/13/2018. Update to reflect Bell County Engineer https://www.bellcountytexas.com/departments/engineer/storm_water_management.php

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #7	
Proposed Action:	Review and update the basin-wide stormwater drainage plan (expires in 2019).
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Promote low impact development in the drainage basin.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Bonds, State and Federal Grants
Lead Agency/Department Responsible:	County Engineer Office
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	MS4 Plan

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Engineer. https://www.bellcountytexas.com/departments/engineer/storm_water_management.php

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #8	
Proposed Action:	Revise/update flood drainage prevention ordinance to include higher standards above minimum NFIP requirements; Join the Community Rating System.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages through building restrictions and safer development standards; Reduce flood insurance premiums.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	County and City Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

2024 ANALYSIS:
Defer to plan update. County to review and update existing ordinance. Update to reflect Bell County Engineer and Commissioners Court.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #9	
Proposed Action:	Install culverts at low water crossings; upgrade undersized culverts; Install bridges as needed to increase flow capacity and improve ingress/ egress routes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages through improved damage capacity; Reduce road damages at low water crossings; Protect lives; Ensure access of emergency services; Reduce structure and infrastructure flood damages due to inadequate drainage.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County and City Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plans

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Engineer and Commissioners Court.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #10	
Proposed Action:	Install generators with hard wired quick connects at all critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide: Critical Facilities including but not limited to wastewater treatment plants, Police Stations, Fire Stations, and EMS (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and protect lives through continuity of emergency services.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (Dam Failure (only Bell County, Belton, Killeen, & CTCOG), Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000 (per location)
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County and City Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Facility Services and Emergency Management.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #11	
Proposed Action:	Acquire and install flood gauges throughout the county to provide early flood warning.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect lives and property through early warning systems.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000 (per site)
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County and City Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Engineer and Emergency Management, Area Water District Managers.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #12	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, mail flyers, etc. to educate citizens of hazards that can threaten the area, flood insurance availability, and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (Dam Failure (only Bell County, Belton, Killeen, & CTCOG), Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000 (per jurisdiction)
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	County and City Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Emergency Management and PIO.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #13	
Proposed Action:	Implement a hazardous fuels reduction program in high hazard areas with emphasis on the Wildland Urban Interface (WUI); Partner with USACE for Fuels reduction around area lakes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through fuels reduction in high risk areas.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Revenue, Texas Forest Service, Federal Grants
Lead Agency/Department Responsible:	County and City Fire Department, USACE
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Emergency Management and Fire Marshal.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #14	
Proposed Action:	Become a Stormready community.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Lightning, Thunderstorm Wind, Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000 (per jurisdiction)
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Emergency Management and city EMC's.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #15	
Proposed Action:	Adopt and implement water conservation measures at public facilities; Plant drought tolerant landscaping at public facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce water usage during periods of drought.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000 (per jurisdiction)
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	County and City Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Delete Action. County has no political authority over unincorporated areas and independent water districts.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #16	
Proposed Action:	Install or improve lightning protection devices on radio towers and emergency communication systems.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide locations (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to infrastructure; Maintain emergency communication systems to aid in emergency response and protect residents.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Effect on New/Existing Buildings:	Reduce risk to existing critical equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update. County to update existing lightning protection devices. Update to reflect Bell County Emergency Management and Communications Center and Technology Services.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #17	
Proposed Action:	Construct covered parking structure for emergency vehicles.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide locations (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to emergency response vehicles and equipment.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing critical equipment
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000 (per jurisdiction)
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Delete Action. County no longer wishes to pursue project.

SECTION 22: PREVIOUS ACTIONS

Bell County – Previous Action #18	
Proposed Action:	Implement an individual safe room rebate program.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of injury or loss of life to area residents through safe room construction at residential structures and small businesses.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$4,000-\$8,000 (per safe room)
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. Update to reflect Bell County Emergency Management and Commissioners Court.

SECTION 22: PREVIOUS ACTIONS

CITY OF BARTLETT

City of Bartlett – Previous Action #1	
Proposed Action:	Develop/enhance cooperation agreements with Donahoe Watershed Conservation District.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce loss of life and property.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Bartlett City Administration in coordination with Water Conservation District
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Action Plan

2024 ANALYSIS:
Delete Action. The city does not have dams within city-limits.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #2	
Proposed Action:	Develop MOUs with other agencies who might be affected by dam failure (Bell County, Belton, Killeen, and CTCOG)
BACKGROUND INFORMATION	
Jurisdiction/Location:	Bell County, Belton, Killeen, CTCOG: Bell County dam sites at risk
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce loss of life and property
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Bartlett City Administration in coordination with Bell County and local jurisdictions
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Action Plan

2024 ANALYSIS:
Delete Action. City does not have dams within city-limits.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #3	
Proposed Action:	Develop and implement a water conservation plan; Adopt and implement water restrictions at public facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce aquifer depletion and ensure continuity of critical services during periods of drought.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Bartlett Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Action Plan; Water Conservation Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #4	
Proposed Action:	Upgrade water supply infrastructure to prevent leaks; Implement water monitoring program for early warning.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce water loss through leaks; Improve water quality; Provide early warning for proactive conservation.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Revenues, State and Federal Grants
Lead Agency/Department Responsible:	Bartlett Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Water Contingency Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #5	
Proposed Action:	Assist vulnerable populations during extreme temperatures; Collect and distribute fans and electric heaters to vulnerable populations ahead of extreme heat events or winter storms.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide vulnerable populations
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevent illness or loss of life among vulnerable populations during extreme temperatures.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Bartlett City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. Update action description to reflect <i>“Establish MOU with local non-profit organization such as Red Cross to assist vulnerable populations during extreme weather events”</i> .

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #6	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue (staff time), State and Federal Grants
Lead Agency/Department Responsible:	Bartlett City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and Defer to plan update. On-going.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #7	
Proposed Action:	Adopt higher NFIP standards in the Bartlett Flood Damage Prevention Ordinance to reduce flood damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood damages through improved construction requirements.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new or substantially improved structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Bartlett City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Floodplain Ordinance

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #8	
Proposed Action:	Upgrade undersized drainage channels and culverts in flood prone areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide flood hazard areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Increase flow capacity; Reduce risk of damages to structures and infrastructure through improved drainage; Reduce risk to residents.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new or existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Bartlett Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #9	
Proposed Action:	Harden critical facilities to protect against damages; Acquire and install an emergency back-up generator with permanent quick connections for city critical facilities to ensure the continuity of emergency services.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide Critical Facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to critical structures; Ensure continuity of emergency services.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Flood, Hurricane, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Bartlett City Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Completed and defer to plan update. On-going.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #10	
Proposed Action:	Implement a safe room rebate program for residential structures.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents through storm shelter construction program.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane, Thunderstorm Wind, Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000-\$8,000 (per safe room)
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Bartlett City Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Delete Action. The city no longer deems this action a priority.

SECTION 22: PREVIOUS ACTIONS

City of Bartlett – Previous Action #11	
Proposed Action:	Adopt and enforce ordinance to ensure regulations for tie-downs on installation of mobile homes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents through storm shelter construction program.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane, Thunderstorm Wind, Tornado
Effect on New/Existing Buildings:	Reduce risk of existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Bartlett City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Completed.

SECTION 22: PREVIOUS ACTIONS

CITY OF BELTON

City of Belton – Previous Action #1	
Proposed Action:	Upgrade/expand early warning system for natural hazards such as flood; Update and implement early warning protocols and procedures.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide early notification to residents in known hazard areas so they have sufficient time to protect property and if necessary evacuate. Reduces the cost of personal losses and insurance claims as well as risk of injuries or fatalities.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Hail, Hurricane, Lightning, Thunderstorm Win, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	General Budget Funds, State and Federal Grants
Lead Agency/Department Responsible:	Belton Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed. Replaced radios and batteries at each of the outside warning sirens in 2022.

SECTION 22: PREVIOUS ACTIONS

City of Belton – Previous Action #2	
Proposed Action:	Utilize media and social media outlets to educate citizens on risks to the community, mitigation measures to reduce property damages, and health and safety tips to reduce injuries or illness due to natural hazards.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to lives and property through all hazards education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	General Budget Funds, State and Federal Grants
Lead Agency/Department Responsible:	Belton Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Completed. The city is now utilizing Code Red and Ring as digital warning devices.

SECTION 22: PREVIOUS ACTIONS

CITY OF HARKER HEIGHTS

City of Harker Heights – Previous Action #1	
Proposed Action:	Evaluate current Mutual Aid Agreements and develop MOU where absent with the City of Belton in an effort to outline a response plan from the City of Harker Heights in the event of a Dam Failure.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Stillhouse Lake Dam – 3740 FM 1670, Belton, TX 76513 Belton Lake Dam – Temples Lake Park, Belton, TX 76513
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce disaster response times.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	Believed to be less than \$500 to develop agreements
Potential Funding Sources:	Local General Fund
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Hazard Mitigation Plan

2024 ANALYSIS:
Defer to plan update. This plan has been reviewed by the new administration and will be continued in the coming months.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #2	
Proposed Action:	Partner with City of Belton and/or other local agencies for the development of a consortium to address potential response to a dam failure or flooding.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Stillhouse Lake Dam – 3740 FM 1670, Belton, TX 76513 Belton Lake Dam – Temples Lake Park, Belton, TX 76513
Risk Reduction Benefit (Current Cost/Losses Avoided):	An effort to identify impact locations as well as response to dam failure and flooding as well as how regions could be impacted when these types of events occur. In addition, to identify the need for calling for evacuations.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flooding
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	Less than \$500
Potential Funding Sources:	Local General Fund
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Hazard Mitigation Plan

2024 ANALYSIS:
Defer to plan update. This plan has been reviewed by the new administration and will be continued in the coming months.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #3	
Proposed Action:	Implement a public education program to inform citizens on the Code Red program and the services it provides during emergencies; Educate citizens on mitigation measures that can reduce damages and prevent injury or illness during hazard events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	When citizens are enrolled in Code Red, they stand a greater chance of knowing when a significant event is potentially going to occur. This in turn gives them the opportunity to lessen their exposure to the elements during these events. Furthermore, it can provide details of water or utility outages occurring in our city and potential durations.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$1,000
Potential Funding Sources:	HMGP, Local General Fund
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and defer to plan update. Code Red is a continued community investment in public safety notifications. There is currently no standing notification policy or practice for the listed Hazard(s) Addressed. This will be continued through completion by the new department administration.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #4	
Proposed Action:	Educate the citizens on the city's drought contingency plan in preparation for extended periods of limited or no rainfall; Provide public with mitigation measures to reduce water usage during drought.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Understanding processes for the citizens assists them in reducing water usage during droughts and will also provide them with materials to know what areas become more important during these times.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Less than \$1,000
Potential Funding Sources:	Local General Fund
Lead Agency/Department Responsible:	Harker Heights Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and defer to plan update. Harker Heights drought response and water conservation efforts were committed by the City's public works, parks and recreation, and library departments. The EMC will be more involved in taking appropriate efforts to also communicate the notification and education actions as detailed in this initiative.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #5	
Proposed Action:	Identify vulnerable population as it pertains to extreme heat and winter storm events. Establish cooling center locations such as the public library or other community oriented locations to utilize during events. Collect and distribute fans and electric heaters to vulnerable populations.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	The citizens that are typically affected by extreme temperature situations are the elderly who have limited family and/or resources to assist them during these times. This program will provide a database of potential citizens and assist in taking preemptive measures to mitigate these types of emergencies and the need for medical assistance.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local General Fund, HMGP
Lead Agency/Department Responsible:	Police Department Health Homes Program
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed. The HHPD Healthy Homes Program is a robust and successful initiative that continues to meet the objectives of this action plan. No further action is necessary to continue this initiative.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #6	
Proposed Action:	Acquire and install an emergency back-up generator with permanent quick connections for critical facilities including (but not limited to) the water pump station (North Mary Jo Drive) and city evacuation shelters to ensure continuity of emergency services.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide Critical Facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Continue the essential services including providing shelter services in the event of a power outage.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Flood, Thunderstorm Wind, Tornado, Wildfire, Hurricane, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	HMGP, Local General Fund
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. Texas legislation changes have required emergency generators at all pump and lift stations in municipal water supply systems. Harker Heights is currently in the process of fitting all of these required generators in the place over the course of the current fiscal year.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #7	
Proposed Action:	Update and/or enhance current agreement with Bell County as it pertains to the sheltering of our sister community, Brazoria County's, citizens.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	An event such as a hurricane is disruptive to say the least but when the requirement arises to evacuate your home and community to a different city it is imperative that we as hosts be prepared to handle the masses that are likely to be coming to our community. This will in-turn provide a friendlier atmosphere for those evacuating once they arrive.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$500
Potential Funding Sources:	Local General Funds if necessary
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 6 months of plan adoption
Incorporation into Existing Plans:	Evacuation Plan

2024 ANALYSIS:
Defer to plan update. This plan has been reviewed by the new administration and will be continued in the coming months.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #8	
Proposed Action:	Implement public education program regarding the dangers of lightning and its effects to homes and business locations. Educate citizens on mitigation measures to reduce loss of life and safety tips to avoid injury or loss of life.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	This measure will provide valuable information to the public through the data provided from NOAA and their lightning safety tips and resources. This will better prepare citizens in the protection of themselves and their homes during these events thus lessening their exposure.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$500
Potential Funding Sources:	HMGP, Local General Fund
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. This plan has been reviewed by the new administration and will be continued in the coming months.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #9	
Proposed Action:	Implement a tree trimming program that routinely cleans tree limbs hanging in right-of-ways.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Throughout City proper
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	The creation of this program will assist in keeping tree limbs from being affected during severe weather events that cause limbs to fall onto power lines, right-of-ways, and create hazardous conditions and result in subsequent power outages.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado, Hurricane, Lightning, Hail, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local General Fund
Lead Agency/Department Responsible:	Harker Heights Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update. The City currently reactively responds to reports of downed trees. Defer to plan update for program expansion. Update cost of program to \$10,000. This plan has been reviewed by the new administration and will be continued in the coming months. Update risk reduction benefit clause. The creation of this program will assist in keeping tree limbs from being affected during severe weather events that cause limbs to fall onto power lines, fall into rights-of-ways, create hazardous conditions and result in subsequent power outages.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #10	
Proposed Action:	Increase risk awareness of hail and tornado through education systems as NWS Skywarn through City Emergency Management webpage as well as during public relations events. Educate public on mitigation measures to reduce damages as well as health and safety tips to prevent injury.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	The awareness of the educational opportunities prepares our citizens up-to-date and pertinent information that can and will bring about a reduction of loss of life and injury during such weather events.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$500
Potential Funding Sources:	HMGP, Local General Fund
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. This plan has been reviewed by the new administration and will be continued in the coming months.

SECTION 22: PREVIOUS ACTIONS

City of Harker Heights – Previous Action #11	
Proposed Action:	Conduct a public education program on fire risks and wildfire mitigation with the assistance of the Texas A&M Forest Services.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Wildfire prone subdivisions within the City – the Ridge and Comanche Hills Utility District
Risk Reduction Benefit (Current Cost/Losses Avoided):	The education of citizens in these areas will provide an enhanced understanding to the dangers of wildland fires and the need to create natural breaks between their homes and wildland urban interfaces. This will in-turn reduce the potential for their homes catching on fire in the event of a wildland fire in those areas.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$1,000
Potential Funding Sources:	HMGP, Local General Fund, Texas A&M Forest Service Grant, Army Corp of Engineers
Lead Agency/Department Responsible:	Harker Heights Fire Department
Implementation Schedule:	Within 6 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update. This plan has been reviewed by the new administration and will be continued in the coming months. Additionally, this project has been identified as a critical element to the new administration's 5-Year Strategic Plan.

SECTION 22: PREVIOUS ACTIONS

CITY OF HOLLAND

City of Holland – Previous Action #1	
Proposed Action:	Utilize media and social media on a regular schedule to educate citizens with information about mitigation activities to reduce risk to property and life from all hazards that pose a risk to the city.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Holland Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. The city will implement a regular schedule of social media notifications. Staff turn-over has made these notifications inconsistent.

SECTION 22: PREVIOUS ACTIONS

City of Holland – Previous Action #2	
Proposed Action:	Develop and implement a program to regularly clean and clear drainage ditches and culverts to maintain drainage capacity and reduce flooding.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flooding in high risk areas by maintaining maximum drainage capacity.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Maintenance Plan

2024 ANALYSIS:
Completed and defer to plan update. Drainage ditch cleaning is on-going. Multiple culverts have partially collapsed and need replacing. Future funding needed to replace aging culverts.

SECTION 22: PREVIOUS ACTIONS

City of Holland – Previous Action #3	
Proposed Action:	Acquire and install back-up generators with permanent quick connection wiring for critical facilities (including police, fire, water and sewer services).
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide Critical Facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries; Ensure continuity of critical services.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and defer to plan update. Generator is being installed at water plant. Lift station generators have been serviced and exercised.

SECTION 22: PREVIOUS ACTIONS

City of Holland – Previous Action #4	
Proposed Action:	Expand early warning system to include sirens or reverse 911 system to reach citizens without internet access.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries through comprehensive early warning system.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Holland Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed. Warning siren has been repaired and is operational.

SECTION 22: PREVIOUS ACTIONS

City of Holland – Previous Action #5	
Proposed Action:	Upgrade/improve undersized drainage system to increase capacity and reduce flooding.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages and injuries through increased drainage capacity and reduction in flood events.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update. A drainage master plan is needed to determine adequate bridge, culvert and ditch sizes. City will continue to locate funding for drainage study and infrastructure improvements.

SECTION 22: PREVIOUS ACTIONS

City of Holland – Previous Action #6	
Proposed Action:	Implement tree trimming program around power lines.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of power outages resulting from downed trees or limbs.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and defer to plan update. Tree trimming is on-going.

SECTION 22: PREVIOUS ACTIONS

City of Holland – Previous Action #7	
Proposed Action:	Install drought tolerant landscaping at all public buildings.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide public buildings
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce water usage at public facilities during periods of drought.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Completed and defer to plan update. A large portion of landscaping has been modified to meet specifications. Additional modifications will be on-going.

SECTION 22: PREVIOUS ACTIONS

CITY OF KILLEEN

Killeen – Previous Action #1	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Killeen City Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. Amend action to high propriety, change estimated cost to \$500,000, change lead agency to Killeen OHSEM. OHSEM started an AmeriCorps Disaster Education program in January 2023. As of 2020, the city uses social media and websites with more education on all hazards.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #2	
Proposed Action:	Implement a fuels reduction program within city right-of-way and other high-risk areas such as the Wildland Urban Interface (WUI).
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of wildfire and wildfire spread through fuels reduction program in high-risk areas.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Killeen Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update. Amend action to Local Plans and Regulations type, change estimated cost to \$500,000, and add all applicable existing plans.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #3	
Proposed Action:	Adopt and implement program for planting of native, drought-tolerant plants at city parks and public buildings.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce water usage during periods of drought through drought tolerant landscaping.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update. Amend the action to change the estimated cost to \$250,000, change the lead department to Parks & Recreation, and add all applicable existing plans. This action was incorporated into the 2023 Parks Master Plan for new build parks.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #4	
Proposed Action:	Upgrade undersized drainage system throughout the city to increase storm water capacity and reduce flooding.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide (where needed)
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk of flooding through increase/improved storm water capacity in high risk areas.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update. Amend action to increase the estimated cost, change lead agency to Killeen Development Services Department, and add all applicable existing plans.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #5	
Proposed Action:	Acquire and install an emergency back-up generator with permanent quick connections for city critical facilities to ensure continuity of emergency services.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide Critical Facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Continue essential services in the event of a power outage.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Flood, Hurricane, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. Amend action to increase the estimated cost to \$500,000 per facility, change lead department to All Departments, and add all applicable existing plans.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #6	
Proposed Action:	Install covered parking structures to protect emergency vehicles and equipment during severe weather events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to emergency vehicles and equipment.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing emergency vehicles and equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. Amend action to increase the estimated cost to \$250,000, change lead agency to Killeen Police Department & Fire Department, and add all applicable existing plans.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #7	
Proposed Action:	Strengthen zoning ordinance to limit development in known high hazard areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents through improved construction practices.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Wildfire
Effect on New/Existing Buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update. Amend action to increase the estimated cost to \$500,000, change lead agency to Killeen Development Services Department, and add all applicable existing plans.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #8	
Proposed Action:	Purchase and install automated high-water warning signs at known flood areas. This includes vehicle and pedestrian crossings.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of loss of life to residents. City staff can be notified of the high-water and close the road early.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$225,000
Potential Funding Sources:	Local revenue, state and federal grants
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Public Affairs Office/Public Works, Flood Response

2024 ANALYSIS:
Defer to plan update. Amend action to increase the estimated cost to \$500,000 and add all applicable existing plans.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #9	
Proposed Action:	Purchase and install combined stream/rain gauges along South Nolan Creek and its tributaries.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Citywide (where needed)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood impacts with a stream monitoring and notification system.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local revenue, state and federal grants
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Public Works

2024 ANALYSIS:
Defer to plan update. Amend action to increase the estimated cost to \$500,000 and add all applicable existing plans. The 2024 Capital Improvement Plan included staff gauges and an early flood warning system as an unfunded item.

SECTION 22: PREVIOUS ACTIONS

Killeen – Previous Action #10	
Proposed Action:	Develop and implement an ordinance requiring all new subdivisions to contribute to a fund to install outdoor warning sirens to cover newly developed areas including outdoor gathering areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Citywide – primarily the southern half which is heavy with new developments extending beyond the current siren system.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents with access to an Early Warning System (sirens).
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local plans and regulations Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Lightning, Flood, Hurricane, Thunderstorm Wind, Tornado, Wildfire, Dam Failure
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$300,000
Potential Funding Sources:	Local Revenue, State and Federal Grants, Private Partnerships
Lead Agency/Department Responsible:	Planning and Development
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Public Information & Warning Plan

2024 ANALYSIS:
Defer to plan update. Amend action to increase the estimated cost to \$500,000, change lead agency to Killeen Development Services Department, and add all applicable existing plans.

SECTION 22: PREVIOUS ACTIONS

CITY OF LITTLE RIVER ACADEMY

City of Little River Academy – Previous Action #1	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Little River Academy – Previous Action #2	
Proposed Action:	Implement a fuels reduction program within city right-of-way and other high risk areas such as the Wildland Urban Interface (WUI).
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of wildfire and wildfire spread through fuels reduction program in high risk areas.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Little River Academy Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Little River Academy – Previous Action #3	
Proposed Action:	Adopt and implement program for planting of native, drought-tolerant plants at city parks and public buildings.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce water usage during periods of drought through drought tolerant landscaping.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Little River Academy – Previous Action #4	
Proposed Action:	Upgrade undersized drainage system throughout the city to increase storm water capacity and reduce flooding.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide (where needed)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flooding through increased/improved storm water capacity in high risk areas.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Little River Academy – Previous Action #5	
Proposed Action:	Acquire and install an emergency back-up generator and weather sirens with permanent quick connections for city critical facilities to ensure continuity of emergency services.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Community Critical Facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Continue essential services in the event of a power outage.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Flood, Hurricane, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Little River Academy – Previous Action #6	
Proposed Action:	Install covered parking structures to protect emergency vehicles and equipment during severe weather events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to emergency vehicles and equipment.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing emergency vehicles and equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Little River Academy – Previous Action #7	
Proposed Action:	Strengthen zoning ordinance to limit development in known high hazard areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents through improved construction practices.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire
Effect on New/Existing Buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CITY OF NOLANVILLE

City of Nolanville – Previous Action #1	
Proposed Action:	Purchase and install early (weather) warning system to enhance city's ability to notify the public during extreme weather events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	At the EOC (100 N Main Street, Nolanville TX 76559) and specified locations throughout the city
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk to residents and provide additional warning of hazardous events.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Flood, Tornado, Wildfire, Thunderstorm Wind
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$65,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update. The city is lacking funding to maintain.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #2	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through education and awareness
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and defer to plan update. On-going.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #3	
Proposed Action:	Purchase and install emergency generators with permanent wired quick connections to critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	101 N Main Street (EOC), and 100 N Main Street (Fire Department)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and ensure continuity of emergency services.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$80,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville Emergency Management and City Manager
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update. The Water Department has completed state mandated, but this is maintained for City Hall Functions, not completed due to lack of funding.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #4	
Proposed Action:	Upgrade/replace bridges over main roadways including Levi Crossing, and Old Nolanville Road.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Levi Crossing and Old Nolanville Road
Risk Reduction Benefit (Current Cost/Losses Avoided):	Increase flow capacity at these critical roadways; Reduce damages at these sites due to inadequate or undersized bridges; Ensure emergency access to isolated parts of the city.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20,000,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan; Land Use Plan

2024 ANALYSIS:
Defer to plan update. In-progress. Old Nolanville Road received emergency repairs in 2021, extensive repairs begin September 2023 with TXDOT grant funding.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #5	
Proposed Action:	Purchase and install Automated High-Water Warning Signs at known flood areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Old Nolanville Road and Levi's Crossing
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk or loss of life to residents; Alerts emergency services that water is about to wash over roadway; Emergency services can close roads prior to loss of life.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$15,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update. City lacks funding to complete and limitations on TWDB grants.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #6	
Proposed Action:	Expand retention pond.
BACKGROUND INFORMATION	
Jurisdiction/Location:	10 th Street inside the city limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Increase retention capacity of flood waters; Reduce flooding damages to city streets, structures and infrastructure; Protect residents from injury or potential loss of life and property.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update. In-progress. Amend action to say, "Expand retention pond to increase the capacity to hold flood and stormwater." Received TCEQ grant that will start this work in October 2024.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #7	
Proposed Action:	Reroute, clean and clear existing drainage system to restore maximum flow capacity.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Numerous areas within the city and the surrounding area.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Re-direct runoff from entering city streets and reduce potential loss of roadway during flood event; Increase flow capacity within drainage system to reduce flood damages.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Completed and defer to plan update. Completed for the Woodlands, 10th Street in underway. Macs has ownership issues related to the drainage channel, retain in the event that property acquisition funding becomes available.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #8	
Proposed Action:	Purchase and install warning signs for high water, flood, and other caution signage.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Numerous areas within the city and the surrounding area
Risk Reduction Benefit (Current Cost/Losses Avoided):	Early warning and possible prevention of potential loss of life at high risk areas.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$19,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. City lacks funding to complete and limitations on alert equipment in remote areas.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #9	
Proposed Action:	Purchase and installation of culvert.
BACKGROUND INFORMATION	
Jurisdiction/Location:	FM 439 Spur
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve availability of emergency and public services due to non-evacuation requirements; Reduce loss of life and property due to inaccessibility; Reduce infrastructure damages.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$19,000
Potential Funding Sources:	HMGP, PDM, Local Revenue
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update. Amend action to say, "Purchase and install a culvert in high risk area." Related to egress of Macs trailer park, not completed due to ownership and funding.

SECTION 22: PREVIOUS ACTIONS

City of Nolanville – Previous Action #10	
Proposed Action:	Adopt ordinance to require drought tolerant landscaping at public buildings.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide public buildings
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce water usage at public buildings through drought tolerant landscaping techniques.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Nolanville City Manager
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update. The city has presented the landscaping ordinance to planning and zoning with public hearing to be held in August of 2024.

SECTION 22: PREVIOUS ACTIONS

CITY OF ROGERS

City of Rogers – Previous Action #1	
Proposed Action:	Update, expand and improve (current) drought management and water conservation plans. Adopt water restriction measure to implement during significant drought events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve water conservation during periods of drought.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funding (staff time), State and Federal Grants if needed
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Completed and defer to plan update. Follow Central Texas Water Supply. We are not implementing anything outside of their recommendations.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #2	
Proposed Action:	Adopt and implement drainage ordinance to review and require permits for culverts and other drainage work.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve drainage capacity while protecting downstream development; ensure adequate drainage improvement/capacity; reduce flood damages.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #3	
Proposed Action:	Adopt and enforce 2' freeboard in existing Flood Damage Prevention Ordinance.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to life and property through improved floodplain management regulations.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #4	
Proposed Action:	Construct covered parking facilities or garage to house/protect public works and police vehicles and equipment.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City police and public works facilities
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Vehicle damage reduced.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Extreme Heat, Hurricane, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	City of Rogers Public Works and Police Department
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. In-progress. The city has a pole barn but needs additional structure space.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #5	
Proposed Action:	Clear debris from drainage systems and upgrade undersized culverts with new culverts and necessary repaving as a result of culvert work.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide drainage system
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce flooding to structures through improved drainage capacity; Protect lives and property.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	City of Rogers Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Completed and defer to plan update. On-going. The city has updated some culverts, but is in-progress on other areas within the city.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #6	
Proposed Action:	Install surge protectors at local critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of structure fire or equipment damage due to lightning.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funding, HMA Grants
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. In-Progress.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #7	
Proposed Action:	Update City Webpage on a regular schedule with education information about mitigation activities to reduce risk to property and life from all hazards that pose a risk to the City.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide (city website)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Completed and defer to plan update. On-going. City has been posting regularly and posting on social media outlets.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #8	
Proposed Action:	Implement a hazardous fuels reduction program for schools and local critical facilities at risk for wildfire.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide including schools and City critical facilities at risk for wildfire
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of wildfires as well as the spread of wildfires through fuels reduction near critical facilities; Ensure continuity of services.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	City of Rogers Fire Department
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #9	
Proposed Action:	Construct/designate or retrofit structures for Winter Storm and Extreme Heat (cooling and heating centers), as well as Tornado and Hurricane Shelters.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide, various locations as deemed appropriate/ feasible
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by designating locations for relief from extreme temperatures as well as shelter from extreme storms.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm, Extreme Heat, Tornado, Hurricane
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and defer to plan update. On-going. Amend action to say “Construct/designate or retrofit community shelters for Winter Storm and Extreme Heat (cooling and heating centers), as well as other severe weather events.” A new roof was added but more updates need to be made.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #10	
Proposed Action:	Develop inter-local agreements between the City of Rogers and Bell County for repair and regular maintenance of water lines.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Rogers Extra-Territorial Areas
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk of flood damages and water loss during and after flood events through inter-local agreement.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	County and City of Rogers Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. Action would need to be updated to the Central Texas Water Supply.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #11	
Proposed Action:	Bury power lines.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of power outages and infrastructure damage during extreme weather events through improved power grid development.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Revenue, Bonds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rogers Public Works
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Rogers – Previous Action #12	
Proposed Action:	Expand and improve wastewater retention pond.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Rogers wastewater treatment facility
Risk Reduction Benefit (Current Cost/Losses Avoided):	Current retention pond overflows into the nearby creek. Improvements will prevent environmental contamination of water during flood events.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500,000
Potential Funding Sources:	Local Revenue, Bonds, TWDB, State and Federal Grants
Lead Agency/Department Responsible:	City of Rogers Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed and defer to plan update. In-progress. One pond has been improved.

SECTION 22: PREVIOUS ACTIONS

VILLAGE OF SALADO

Village of Salado – Previous Action #1	
Proposed Action:	Adopt a landscape ordinance (selection and planting guidelines) that include drought tolerant landscaping to reduce the demand on groundwater supply.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce water usage and impacts to groundwater supply during an event through drought tolerant landscaping techniques.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	None
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Defer to plan update. Amend action to increase cost to \$1,000 and change funding source to staff time. Landscape ordinance is being developed. Expected to be adopted and implemented in calendar year 2026.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #2	
Proposed Action:	Adopt land use regulations including development restrictions in high risk areas, as well as density controls throughout the city.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages in high risk areas including floodplains and Wildland Urban Interface; Minimize risk of wildfire and imposition of water use restrictions in times of drought.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Wildfire, Flood
Effect on New/Existing Buildings:	Reduce risk to future structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Defer to plan update. The village is preparing a comprehensive review of its land use regulations. Expected to be completed and changes adopted and implemented in calendar year 2026.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #3	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, mail flyers, etc. to educate citizens of hazards that can threaten the area, flood insurance availability, and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Completed. Campaign was implemented in calendar year 2023, focusing on social media and the building permitting process.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #4	
Proposed Action:	Organize outreach to vulnerable populations and establish and promote accessible heating/ cooling centers in the community.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Salado Community Center & Salado ISD Junior High School
Risk Reduction Benefit (Current Cost/Losses Avoided):	Ensure vulnerable populations are protected from impacts of extreme temperatures.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed. Shelters were designated and equipped in the calendar year of 2023. Shelters have not yet been used.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #5	
Proposed Action:	Identify and install stream and rain gauges at critical sites; Upgrade gauges at established sites where necessary; Coordinate installation requests.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Salado Creek Watershed
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide early warning so as to protect life and property from the impact of flooding; Improve vulnerability assessment.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	USGS, TWDB, Bell County and Village of Salado
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. Efforts in the calendar year of 2023 to secure funding for a gauge program were not successful. Another attempt to secure funding for such a program will be made in the calendar year of 2025.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #6	
Proposed Action:	Revise floodplain ordinance to incorporate freeboard requirements and cumulative substantial damage requirements.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk of property damage and loss of life from flooding.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

2024 ANALYSIS:
Defer to plan update. Floodplain ordinance will be reviewed, and changes implemented in calendar 2025.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #7	
Proposed Action:	Elevate low lying bridges.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Low water crossings on Main Street and Old Mill Road
Risk Reduction Benefit (Current Cost/Losses Avoided):	Enhance emergency access during times of flood to allow for the protection of life and property; Reduce damage to infrastructure; Increase flow capacity at crossings and reduce scour.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funding, HMGP, State and Federal Grants
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan; Capital Improvement Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #8	
Proposed Action:	Revise and update regulatory floodplain maps.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Minimize the risk of life and property loss from flooding; Enhance vulnerability assessment.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$200,000
Potential Funding Sources:	USGS, TWDB, Bell County and Village of Salado
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

2024 ANALYSIS:
Defer to plan update. Attempts were made in the calendar year of 2023 to secure federal funding for a map update but were unsuccessful. Will submit another funding request in the calendar year of 2025.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #9	
Proposed Action:	Revise building requirements to include measures such as structural bracing, shutters, laminated glass in window panes, and hail-resistant roof coverings or flashing in building design to minimize damage; Require manufactured housing be securely anchored to permanent foundations; Develop and implement a Wildland Urban Interface Code.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Minimize the risk of property damages during extreme weather events.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane, Thunderstorm Wind, Tornado, Wildfire
Effect on New/Existing Buildings:	Reduce risk to new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Building Codes; Subdivision Ordinance

2024 ANALYSIS:
Defer to plan update. Research on this effort was conducted in the calendar year of 2023. The Village plans to update its building codes in calendar year 2024 and the changes outlined in the proposed action will be incorporated into the code as part of that update.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #10	
Proposed Action:	Adopt and implement a tree trimming program along electrical power lines and right-of-ways.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce the risk of power outages due to downed trees or limbs during extreme weather events; Reduce risk of roadway blockage.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Revenue; State and Federal Grants
Lead Agency/Department Responsible:	Village of Salado
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Completed and defer to plan update. Village and ONCOR performed extensive tree trimming in calendar year 2023. More trimming activities are planned in the calendar year of 2024 and 2025.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #11	
Proposed Action:	Install lightning detection systems, lightning rods, and warning signage at local parks.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Pace Park and Sirena Park
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce the risk to individuals of lightning strikes.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Department of Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update. Installation will occur in Village parks in the calendar year of 2026.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #12	
Proposed Action:	Participate in Firewise Program.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce the risk of property damage and loss of life from wildfire.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update. Village will consider participation in the calendar year of 2025 and subsequent years.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #13	
Proposed Action:	Planning for and maintaining adequate road and debris clearing capabilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Minimize risk of road blockage and ensuring emergency access.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Local Plans and Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Completed. The village developed and implemented a road and debris clearing program in the calendar year of 2023 and will continue to implement as an on-going priority.

SECTION 22: PREVIOUS ACTIONS

Village of Salado – Previous Action #14	
Proposed Action:	Purchase and install emergency generators with permanent wired quick connections to critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Village-wide Critical Facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and ensure continuity of emergency services.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Revenue (staff time); HMGP, PDM
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CITY OF TEMPLE

City of Temple – Previous Action #1	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, mail flyers, etc. to educate citizens of hazards that can threaten the area, flood insurance availability, and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Numerous locations within city to be determined
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Educate our citizens on the emergency situations and preparedness actions which can be taken prior to events to minimize loss of life, injuries, damage to property as well as facilitate recovery.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	City budget process, HMA, PDM, State or Federal Grants
Lead Agency/Department Responsible:	Fire Department / Emergency Management
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Temple – Previous Action #2	
Proposed Action:	Increase/expand tree trimming program near public right-of-ways and utility lines to reduce falling limbs during severe weather events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce cost of repairs; Increase safety of citizens and utility workers; Decrease the number of calls/response for utility line issues.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Winter Storm, Flood, Tornado, Hail, Hurricane, Lightning
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Utility company, Budgeting process
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Utilities services operating procedures

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Temple – Previous Action #3	
Proposed Action:	Upgrade drainage channels within the city to reduce flooding to residential and commercial structures.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide drainage channels
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce intermediate flooding to residents living next to drainage channels; Reduce property damage; Prevent soil erosion, Reduce health and safety risks to area residents.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	HMGP, PDM, Budgeting process
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Temple – Previous Action #4	
Proposed Action:	Upgrade and coordinate technology and communications equipment used by fire, police, EMS, and public works to be compatible and uniform; Install lightning devices to protect upgraded equipment.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Increase the ability to communicate during disaster operations, meeting the federal P25 requirement; Reduce loss of communications equipment due to lightning.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project (Lightning) Preparedness (Thunderstorm Wind, Winter Storm, Flood, Tornado, Hail, Hurricane)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning, Thunderstorm Wind, Winter Storm, Flood, Tornado, Hail, Hurricane
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,200,000
Potential Funding Sources:	Budgeting process, AFG
Lead Agency/Department Responsible:	Fire Department and Information Technologies
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations / Response Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Temple – Previous Action #5	
Proposed Action:	Develop and implement a Community Wildfire Protection Plan with local and state assistance; Implement fuels reduction program based on identified risk.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and first responders; Allow for cooperative efforts from many entities; Minimize cost of recovery.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection Local Plan and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$400,000
Potential Funding Sources:	Texas Forest Service, TEEX
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations; Response Plan; CWPP

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CITY OF TROY

City of Troy – Previous Action #1	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. To educate citizens of hazards that can threaten the areas and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents and property through education and awareness.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Troy City Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Completed and defer to plan update. Action is an on-going process using bulletins and media.

SECTION 22: PREVIOUS ACTIONS

City of Troy – Previous Action #2	
Proposed Action:	Implement a fuels reduction program within city right-of-way and other high risk areas such as the Wildland Urban Interface (WUI).
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk of wildfire and wildfire spread through fuels reduction program in high risk areas.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Troy Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update. City plans to pursue but the funding is limiting.

SECTION 22: PREVIOUS ACTIONS

City of Troy – Previous Action #3	
Proposed Action:	Adopt and implement program for planting of native, drought-tolerant plants at city parks and public buildings.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce water usage during periods of drought through drought tolerant landscaping.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update. Currently the city is not planting anything new because of the on-going drought conditions.

SECTION 22: PREVIOUS ACTIONS

City of Troy – Previous Action #4	
Proposed Action:	Upgrade undersized drainage system throughout the city to increase storm water capacity and reduce flooding.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide (where needed)
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk of flooding through increase/improved storm water capacity in high risk areas.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update. The city has not yet pursued due to limited funding.

SECTION 22: PREVIOUS ACTIONS

City of Troy – Previous Action #5	
Proposed Action:	Acquire and install an emergency back-up generator with permanent quick connections for city critical facilities to ensure continuity of emergency services.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide Critical Facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Continue essential services in the event of a power outage.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Flood, Hurricane, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing emergency vehicles and equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update. The City submitted HMGP 4485 Texas Covid-19 Pandemic grant application and is pending insight from FEMA on grant application/award.

SECTION 22: PREVIOUS ACTIONS

City of Troy – Previous Action #6	
Proposed Action:	Install covered parking structures to protect emergency vehicles and equipment during severe weather events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to emergency vehicles and equipment.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing emergency vehicles and equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Delete Action. The City no longer deems this action a priority.

SECTION 22: PREVIOUS ACTIONS

City of Troy – Previous Action #7	
Proposed Action:	Strengthen zoning ordinance to limit development in known high hazard areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents through improved construction practices.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire
Effect on New/Existing Buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Completed. Plans for residential areas are reviewed as they are developed.

SECTION 22: PREVIOUS ACTIONS

CENTRAL TEXAS COUNCIL OF GOVERNMENTS (CTCOG)

CTCOG – Previous Action #1	
Proposed Action:	Provide public education and risk disaster awareness / preparedness to the CTCOG seven county region; Educate employees and citizens on mitigation measures to reduce property damages or potential injury or illness.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Central Texas Council of Governments: Bell County, Milam County, Coryell County, Lampasas County, Hamilton County, Mills County, San Saba County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Avoid loss of life and property through all hazards mitigation education.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$30,000
Potential Funding Sources:	HMA Grants, Local Funding
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CTCOG – Previous Action #2	
Proposed Action:	Implement a Home Shelter (Safe Room Rebate) program for the 7-county COG Region based on 50/50 match.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Central Texas Council of Governments
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Avoid loss of life.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Hurricane
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CTCOG – Previous Action #3	
Proposed Action:	Improve wildfire fighting water delivery capabilities by the purchase of one large, mobile fifth-wheel water trailer to be strategically placed around the region.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Central Texas Council of Governments: Bell County, Milam County, Coryell County, Lampasas County, Hamilton County, Mills County, San Saba County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Avoid loss of life.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Effect on New/Existing Buildings:	Minimize fire damages to all structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000 - \$175,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	VFD and Regular Fire Departments within CTCOG region
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CTCOG – Previous Action #4	
Proposed Action:	Assist communities in implementing development of a plan to relocate repetitive flood loss structures out of Special Flood Hazard Areas (SFHAs) to minimize flooding of structures and restore natural floodplain areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Central Texas Council of Governments: Bell County, Milam County, Coryell County, Lampasas County, Hamilton County, Mills County, San Saba County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Avoid loss of life.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Structure and Infrastructure Project Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator and County EMCs
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CTCOG – Previous Action #5	
Proposed Action:	Purchase a mobile recovery trailer for first responders to utilize during regional disasters. Trailer will disseminate first aid, water and other supplies.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Central Texas Council of Governments: Bell County, Milam County, Coryell County, Lampasas County, Hamilton County, Mills County, San Saba County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Avoid loss of life.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Drought, Flood, Hail, Wildfire, Extreme Heat, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$300,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CTCOG – Previous Action #6	
Proposed Action:	Harden/retrofit CTCOG facility to protect against natural hazards; Acquire and install generator with permanent hard wired quick connections to facility.
BACKGROUND INFORMATION	
Jurisdiction/Location:	CTCOG Facility
Risk Reduction Benefit (<i>Current Cost/Losses Avoided</i>):	Reduce risk of damages to facility and protect employees.
Type of Action (<i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i>)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Extreme Heat, Hail, Hurricane, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$100,000
Potential Funding Sources:	HMA Grants, Local Funding
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

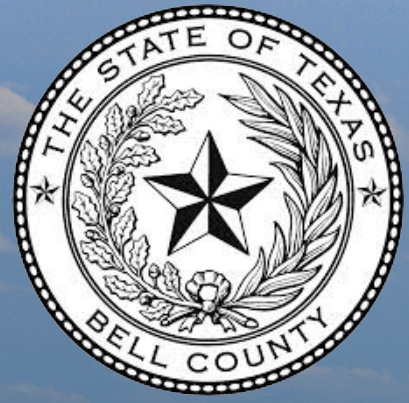
2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

CTCOG – Previous Action #7	
Proposed Action:	Plant drought tolerant landscaping around CTCOG facility; Plant additional trees near building, sidewalk and parking lot to reduce heat island effect on facility and provide shade for employees.
BACKGROUND INFORMATION	
Jurisdiction/Location:	CTCOG Facility
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce water usage through drought tolerant landscaping; Reduce risk to employees by providing shaded areas; Reduce extreme heat impacts on building and infrastructure.
Type of Action (Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)	Natural Systems Protection (Drought) Local Plans and Regulations (Extreme Heat)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$3,000
Potential Funding Sources:	General Funds
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.



SECTION 23 MITIGATION ACTIONS

SECTION 23: MITIGATION ACTIONS

Summary.....	1
Bell County.....	4
City of Bartlett	21
City of Belton.....	37
City of Harker Heights	49
City of Holland.....	68
City of Killeen	81
City of Little River Academy.....	131
City of Morgan’s Point Resort	145
City of Nolanville	154
City of Rogers	172
Village of Salado	196
City of Temple.....	213
City of Troy.....	226
Central Texas Council of Governments (CTCOG).....	234

SUMMARY

As discussed in Section 2, at the mitigation workshop the planning team and stakeholders met to develop mitigation actions for each of the natural hazards included in the Plan Update. Each of the actions in this section were prioritized based on FEMA’s Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria necessary for the implementation of each action.

As part of the economic evaluation of the STAPLEE analysis, jurisdictions analyzed each action in terms of the overall costs, measuring whether the potential benefit to be gained from the action outweighed costs associated with it. As a result of this exercise, priority was assigned to each mitigation action by marking them as High (H), Moderate (M), or Low (L). An action that is ranked as “High” indicates that the action will be implemented as soon as funding is received. A “Moderate” action is one that may not be implemented right away depending on the cost and number of residents served by the action. Actions ranked as “Low” indicate that they will not be implemented without first seeking grant funding and after “High” and “Moderate” actions have been completed.

Within each mitigation action worksheet, the Planning Team considered all potential funding sources that could be utilized to implement the proposed project. To ensure all potential funding resources are considered and are not limited to those sources identified within the action worksheet, please see appendix G for a list of all available State and Federal grant programs as of 2024. The Planning Team will continue to seek out other available funding sources during the 5-year cycle as notices of funding opportunity (NOFO) are released.

All mitigation actions created by Planning Team members are presented in this section in the form of Mitigation Action Worksheets. More than one hazard is sometimes listed for an action, if appropriate. Actions presented in this section represent a comprehensive range of mitigation

SECTION 23: MITIGATION ACTIONS

actions per current State and FEMA Guidelines, including one action, per hazard, and at least two different types for each participating jurisdiction. The term county-wide action refers to Bell County, City of Bartlett, City of Belton, City of Harker Heights, City of Holland, City of Killeen, City of Little River Academy, City of Nolanville, City of Rogers, Village of Salado, City of Temple, and City of Troy. County-wide does not include CTCOG.

Table 23-1 Bell County Mitigation Action Matrix

TYPE OF ACTION	
Action #1 – Plans/Regulations (Blue)	Action #3 – Natural Systems Protections (Green)
Action #2 – Education/Awareness (Red)	Action #4 – Structural (Orange)
	Action #5 – Preparedness (Black)

JURISDICTION	Dam Failure	Drought	Earthquake	Expansive Soils	Extreme Heat	Flood	Hail	Hurricane/Tropical Storm	Lightning	Thunderstorm Wind	Tornado	Wildfire	Winter Storm
Bell County	●●	●●	●●	●●	●●	●●●	●●	●●	●●	●●	●●	●●●●	●●
City of Bartlett	N/A	●●●	●●	●●	●●	●●●	●●	●●	●●	●●	●●	●●●	●●
City of Belton	●●●	●●	●●	●●	●●●	●●	●●	●●	●●	●●	●●	●●	●●
City of Harker Heights	N/A	●●●	●●	●●	●●	●●●●	●●	●●●	●●	●●	●●●	●●●●	●●●
City of Holland	N/A	●●●	●●	●●	●●	●●●	●●	●●	●●	●●	●●	●●	●●
City of Killeen	●●●	●●●●	●●●	●●●●	●●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●●	●●●
City of Little River Academy	N/A	●●●	●●	●●	●●	●●●	●●	●●	●●	●●	●●	●●●●	●●
City of Morgan's Point Resort	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●●●	●●
City of Nolanville	●●●	●●●	●●●	●●	●●	●●●●	●●●	●●●	●●●	●●●	●●●	●●●●	●●●
City of Rogers	N/A	●●●	●●	●●	●●	●●●●	●●	●●	●●	●●	●●	●●●●	●●
Village of Salado	●●	●●●	●●	●●	●●	●●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●
City of Temple	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●●●	●●
City of Troy	●●	●●●●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●●●	●●

SECTION 23: MITIGATION ACTIONS

JURISDICTION	Dam Failure	Drought	Earthquake	Expansive Soils	Extreme Heat	Flood	Hail	Hurricane/Tropical Storm	Lightning	Thunderstorm Wind	Tornado	Wildfire	Winter Storm	
Central Texas Council of Governments (CTCOG)	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>

SECTION 23: MITIGATION ACTIONS

BELL COUNTY

Bell County– Action #1	
Proposed Action:	Acquire and install an early warning system for Dam Failure events.
BACKGROUND INFORMATION	
Site and Location:	Bell County unincorporated areas, City of Belton, City of Killeen, & CTCOG
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communications
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Bell County– Action #2	
Proposed Action:	Create a drainage ditch and channel maintenance program to maintain maximum flow capacity.
BACKGROUND INFORMATION	
Site and Location:	Bell County, City of Belton, City of Killeen, & CTCOG
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood damages through maintained capacity of drainage system.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Engineer's Office
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #3	
Proposed Action:	Build community safe rooms; Utilize safe rooms as local community center as well as cooling and heating center during extreme temperatures; Educate public of the safe room locations and operating procedures.
BACKGROUND INFORMATION	
Site and Location:	County-wide: Build site near the Expo Center.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents by providing shelter during extreme events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hurricane / Tropical Storm, Tornado, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new structure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Bell County– Action #4	
Proposed Action:	Harden / retrofit Justice Complex against impacts from wind, lightning, hail, and wildfire.
BACKGROUND INFORMATION	
Site and Location:	Bell County unincorporated area: Bell County Justice Center.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to critical facilities; Ensure continuity of emergency services; Prevent injuries and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Bell County Sheriff
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Bell County– Action #5	
Proposed Action:	Review and update the Bell County MS4 Permit 5 Year Plan.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood damages through improved drainage capacity / stormwater diversion; Reduce risk of injuries to residents; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Engineer's Office
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #6	
Proposed Action:	Review and update the basin-wide stormwater drainage plan.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood damages and risk of injuries or fatalities through regulated development; Reduce the amount of stormwater runoff in densely developed areas during flood events; Reduce the risk of downstream flooding.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Engineer's Office
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	MS4 Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #7	
Proposed Action:	Revise / update flood drainage prevention ordinance to include higher standards above minimum NFIP requirements; Join the Community Rating System.
BACKGROUND INFORMATION	
Site and Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood damages through building restrictions and safer development standards; Reduce flood insurance premiums.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	County Engineer's Office and Commissioners Court
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #8	
Proposed Action:	Install culverts at low water crossings; upgrade undersized culverts; Install bridges as needed to increase flow capacity and improve ingress/ egress routes.
BACKGROUND INFORMATION	
Site and Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood damages through improved damage capacity; Reduce Road damages at low water crossings; Protect lives; Ensure access of emergency services; Reduce structure and infrastructure flood damages due to inadequate drainage.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Engineer's Office and Commissioners Court
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plans

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #9	
Proposed Action:	Install generators with hard wired quick connects at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	County-wide: Critical Facilities including but not limited to wastewater treatment plants, Police Stations, Fire Stations, and EMS (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000 (per location)
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Facility Services and Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #10	
Proposed Action:	Acquire and install flood gauges throughout the county to provide early flood warning.
BACKGROUND INFORMATION	
Site and Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Protect lives and property through early warning systems.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000 (per site)
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Engineer's Office, Emergency Management, and Area Water District Managers
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #11	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, mail flyers, etc. to educate residents of hazards that can threaten the area, flood insurance availability, and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000 (per jurisdiction)
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	County Emergency Management and PIO
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #12	
Proposed Action:	Implement a hazardous fuels reduction program in high hazard areas with emphasis on the Wildland Urban Interface (WUI); Partner with USACE for Fuels reduction around area lakes.
BACKGROUND INFORMATION	
Site and Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through fuels reduction in high-risk areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Management and Fire Marshal
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Bell County– Action #13	
Proposed Action:	Become a StormReady community.
BACKGROUND INFORMATION	
Site and Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000 (per jurisdiction)
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

Bell County– Action #14	
Proposed Action:	Install or improve lightning protection devices on radio towers and emergency communication systems.
BACKGROUND INFORMATION	
Site and Location:	County-wide locations (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	Reduce risk to existing critical equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Management and Communications Center and Technology Services
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Bell County– Action #15	
Proposed Action:	Implement an individual safe room rebate program.
BACKGROUND INFORMATION	
Site and Location:	County-wide (including all participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents by providing in-home safe rooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$4,000-\$8,000 (per safe room)
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Management and Commissioners Court
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Bell County – Action #16	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	County-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Management and Commissioners Court
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Bell County – Action #17	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	County-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Management and Commissioners Court
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

Bell County – Action #18	
Proposed Action:	Develop a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Participating jurisdictions that do not have an active CWPP: Bell County, Bartlett, Harker Heights, Killeen, Little River Academy, Nolanville, Rogers, Salado, Temple, Troy
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfires. Reduce risk of damages, and injuries.
Type of Action: (Safety/Security, Food, Water Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Management and Commissioners Court
Implementation Schedule:	Within 12 - 36 months, pending plan adoption and available funding
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CITY OF BARTLETT

City of Bartlett – Action #1		
	Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
	BACKGROUND INFORMATION	
	Site and Location:	Fire Station, Well, 2 Lift Stations
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvements Plan

COMMENTS:
Grant management firm is submitting application in 2024 for this project.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #2	
Proposed Action:	Make upgrades to the City Hall building so that it can act as a fully functional and effective Emergency Operations Center.
BACKGROUND INFORMATION	
Site and Location:	City Hall
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvements Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #3	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels. Including implementing backup power at community warming shelters.
BACKGROUND INFORMATION	
Site and Location:	City-wide, Community Church Warming Shelters
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #4	
Proposed Action:	Equip sewer manholes with watertight covers and inflow guards.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood water contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #5	
Proposed Action:	Bury existing utility lines.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of critical services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #6	
Proposed Action:	Undertake a comprehensive study of flood risk and reduction alternatives. Implement feasible alternatives for flood reduction.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication, Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #7	
Proposed Action:	Adopt and implement routine fire hydrant maintenance plan and proactively implement repairs crucial for ensuring optimal functioning of the firefighting infrastructure.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfires through routine maintenance of fire hydrants; Reduce risk of injury or damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new or existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #8	
Proposed Action:	Develop and implement a water conservation plan; Adopt and implement water restrictions at public facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote water conservation; Ensure continuity of critical services during periods of drought.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Bartlett Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Action Plan; Water Conservation Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #9	
Proposed Action:	Upgrade water supply infrastructure to prevent leaks; Implement water monitoring program for early warning.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce water loss through leaks; Improve water quality; Provide early warning for proactive conservation.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems, Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Bartlett Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Water Contingency Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #10	
Proposed Action:	Assist vulnerable populations during extreme temperatures; Collect and distribute fans and electric heaters to vulnerable populations ahead of extreme heat events or winter storms; Establish MOU with local non-profit organization such as Red Cross to assist vulnerable populations during extreme weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide vulnerable populations
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Prevent illness or loss of life among vulnerable populations during extreme temperatures.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #11	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. to educate residents of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #12	
Proposed Action:	Adopt higher NFIP standards in the Bartlett Flood Damage Prevention Ordinance to reduce flood damages.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood damages through improved construction requirements.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new or substantially improved structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Floodplain Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #13	
Proposed Action:	Upgrade undersized drainage channels and culverts in flood prone areas.
BACKGROUND INFORMATION	
Site and Location:	City-wide flood hazard areas
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Increase flow capacity; Reduce risk of damages to structures and infrastructure through improved drainage; Reduce risk to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new or existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Bartlett Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #14	
Proposed Action:	Harden critical facilities to protect against damages; Acquire and install an emergency back-up generator with permanent quick connections for city critical facilities to ensure the continuity of emergency services.
BACKGROUND INFORMATION	
Site and Location:	City-wide Critical Facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to critical structures; Ensure continuity of emergency services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Flood, Hurricane / Tropical Storm, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents. Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #15	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Bartlett – Action #16	
Proposed Action:	Develop a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Participating jurisdictions that do not have an active CWPP: Bell County, Bartlett, Harker Heights, Killeen, Little River Academy, Nolanville, Rogers, Salado, Temple, Troy
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfires. Reduce risk of damages, and injuries.
Type of Action: (Safety/Security, Food, Water Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12 - 36 months, pending plan adoption and available funding
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CITY OF BELTON

City of Belton – Action #1	
Proposed Action:	Evaluate current Mutual Aid Agreements and develop MOU where absent in an effort to outline a response plan from the City of Belton in the event of a Dam Failure.
BACKGROUND INFORMATION	
Site and Location:	Lake Belton Dam
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures; Ensure continuity of critical services; Reduce risk of injuries to critical service employees.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/ Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$6,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	County Mutual Aid Plan, EMP

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #2	
Proposed Action:	Educate residents on the city’s drought contingency plan in preparation for extended periods of limited or no rainfall; Provide public with mitigation measures to reduce water usage during drought.
BACKGROUND INFORMATION	
Site and Location:	City-Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect residents from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Health/ Medical
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works/ Communications
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #3	
Proposed Action:	Build a cooperative between local businesses which addresses the local need for cooling sites for those without air conditioners and/ or the homeless population.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Education & Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Health/ Medical
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #4	
Proposed Action:	Implement a public education program to inform residents on the Code Red program and the services it provides during emergencies; Educate residents on mitigation measures that can reduce damages and prevent injury or illness during hazard events.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect residents from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/ Security, Health/ Medical, Communications
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Police Department
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #5	
Proposed Action:	Acquire and install an emergency back-up generator with permanent quick connections for critical facilities.
BACKGROUND INFORMATION	
Site and Location:	Public Works Office, Fleet Maintenance Building, Harris Community Center City Hall, and Finance Offices.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/ Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$750,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #6	
Proposed Action:	Utilize a National Education Program to increase Wildland Urban Interface awareness to decrease the impact of wildland fires.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of fire damage in the wildland urban interface areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/ Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$7,500
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #7	
Proposed Action:	Increase the City-Wide tree trimming efforts around powerlines.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural System Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane / Tropical Storm, Flood, Thunderstorm Wind, Hail, Lightning, Tornado, Winter Storm, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/ Fuel)
Effect on New/Existing Buildings:	Maintain Power
Priority (High, Moderate, Low):	High
Estimated Cost:	\$45,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #8	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate community members of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #9	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #10	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Belton – Action #11	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

CITY OF HARKER HEIGHTS

City of Harker Heights – Action #1	
Proposed Action:	Study, develop, seek funding, purchase and install early (weather) outdoor warning siren system to enhance the city's ability to notify the public during extreme weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide, an estimated 8-10 sites on city property
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$600,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	CoHH Fire Department
Implementation Schedule:	Within 48 months of plan adoption begin project.
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
Implementation schedule will be dependent upon funding availability.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #2	
Proposed Action:	Implement the Community Wildfire Protection Plan (CWPP) and identified projects including, but not limited to, creating a defensible space around high-risk structures, implement a fuels reduction program, provide fire prevention and wildfire education to residents, and retrofit structures with fire-resistant materials.
BACKGROUND INFORMATION	
Site and Location:	City-wide, Stillhouse Lake (Amry Corps of Engineers Property)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfire; Reduce risk of injury or damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	CoHH Fire Department, Texas Forestry Service, Army Corps of Engineers
Implementation Schedule:	Within 48 months of plan adoption begin project.
Incorporation into Existing Plans:	CWPP

COMMENTS:
Implementation schedule will be dependent upon funding availability.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #3	
Proposed Action:	Implement and enforce an ordinance prohibiting the use of fireworks in high-risk areas and in periods of drought.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfire; Reduce risk of injury or damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management, City Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local ordinances and codes

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #4	
Proposed Action:	Ensure the continuity of communication capabilities during disaster events by acquiring backup radio repeaters.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents through improved communications and early warning; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 48 months of plan adoption begin project.
Incorporation into Existing Plans:	N/A

COMMENTS:
Implementation schedule will be dependent upon funding availability.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #5	
Proposed Action:	Develop and implement a plan and program to disseminate emergency information during emergency events, to effectively manage crowds, safeguard critical facilities, effectively respond to riot situations, and to train law enforcement in riot control tactics.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of critical services during and after event; Reduce risk of injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Police Department
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #6	
Proposed Action:	Evaluate current Mutual Aid Agreements and develop MOU where absent with the City of Belton in an effort to outline a response plan from the City of Harker Heights in the event of a Dam Failure.
BACKGROUND INFORMATION	
Site and Location:	Stillhouse Lake Dam – 3740 FM 1670, Belton, TX 76513 Belton Lake Dam – Temples Lake Park, Belton, TX 76513
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries to residents; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000
Potential Funding Sources:	Local General Fund
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #7	
Proposed Action:	Partner with City of Belton and/or other local agencies for the development of a consortium to address potential response to a dam failure or flooding.
BACKGROUND INFORMATION	
Site and Location:	Stillhouse Lake Dam – 3740 FM 1670, Belton, TX 76513 Belton Lake Dam – Temples Lake Park, Belton, TX 76513
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries to residents; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	Less than \$500
Potential Funding Sources:	Local General Fund
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Hazard Mitigation Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #8	
Proposed Action:	Implement a public education program to inform residents on the Code Red program and the services it provides during emergencies; Educate residents on mitigation measures that can reduce damages and prevent injury or illness during hazard events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of hazards through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$1,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan
COMMENTS:	
When residents are enrolled in Code Red, they stand a greater chance of knowing when a significant event is potentially going to occur. This in turn gives them the opportunity to lessen their exposure to the elements during these events. Furthermore, it can provide details of water or utility outages occurring in our city and potential durations.	
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:	
Promotes public safety.	

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #9	
Proposed Action:	Educate residents on the city’s drought contingency plan in preparation for extended periods of limited or no rainfall; Provide public with mitigation measures to reduce water usage during drought.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Less than \$1,000
Potential Funding Sources:	Local General Fund
Lead Agency/Department Responsible:	Harker Heights Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #10	
Proposed Action:	Acquire and install an emergency back-up generator with permanent quick connections for critical facilities including (but not limited to) the water pump station (North Mary Jo Drive) and city evacuation shelters to ensure continuity of emergency services.
BACKGROUND INFORMATION	
Site and Location:	City-wide Critical Facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Project has begun. However, generators currently have a long lead time and may result in a delay to implementation schedule.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #11	
Proposed Action:	Update and/or enhance current agreement with Bell County as it pertains to the sheltering of our sister community, Brazoria County's, residents.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane / Tropical Storm, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$500
Potential Funding Sources:	Local General Funds
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 6 months of plan adoption
Incorporation into Existing Plans:	Evacuation Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #12	
Proposed Action:	Implement public education program regarding the dangers of lightning and its effects to homes and business locations. Educate residents on mitigation measures to reduce loss of life and safety tips to avoid injury or loss of life.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of hazards through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$500
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #13	
Proposed Action:	Implement a tree trimming program that routinely cleans tree limbs hanging in rights-of-way.
BACKGROUND INFORMATION	
Site and Location:	Throughout City proper
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado, Hurricane/ Tropical Storm, Lightning, Hail, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local General Fund
Lead Agency/Department Responsible:	Harker Heights Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

COMMENTS:
The creation of this program will assist in keeping tree limbs from being affected during severe weather events that cause limbs to fall onto power lines, rights-of-ways, create hazardous conditions and result in subsequent power outages.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #14	
Proposed Action:	Increase risk awareness of hail and tornado through education systems as NWS Skywarn through City Emergency Management webpage as well as during public relations events. Educate public on mitigation measures to reduce damages as well as health and safety tips to prevent injury.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of hazards through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$500
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #15	
Proposed Action:	Conduct a public education program on fire risks and wildfire mitigation with the assistance of the Texas A&M Forest Services.
BACKGROUND INFORMATION	
Site and Location:	Wildfire prone subdivisions within the city, specifically the Ridge and Comanche Hills Utility District.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfire through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Less than \$1,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Fire Department
Implementation Schedule:	Within 6 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #16	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate community members of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #17	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management, City Administration
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #18	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	County-wide critical facilities including all participating jurisdictions
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management, City Administration
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Harker Heights – Action #19		
	Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide critical facilities including all participating jurisdictions
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Harker Heights Emergency Management, City Administration
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

CITY OF HOLLAND

City of Holland – Action #1	
Proposed Action:	Conduct a hydrology study of the four main earthen drainage channels in the city to ensure or analyze the best way to allow adequate management of offsite and local stormwater flows.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #2	
Proposed Action:	Implement improvements to the drainage system based on the hydrology study the improvements may include, but are not limited to, cleaning and regrading the channel section, installing concrete or stone riprap to reduce erosion, and replacing culverts with adequate sizing to reduce debris blockage.
BACKGROUND INFORMATION	
Site and Location:	City-wide, and location of culverts under FM 2268 and on Travis St.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries; Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$780,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvements Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #3	
Proposed Action:	Adopt and implement a program for clearing debris and providing upgrades to bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	City-wide and specifically the culverts near the west and east of the Hackberry channel.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries; Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$470,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #4	
Proposed Action:	Join the Community Rating System program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood insurance premiums for residents; Reduce flood risk and build resiliency.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Floodplain Administrator
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #5	
Proposed Action:	Utilize media and social media on a regular schedule to educate residents with information about mitigation activities to reduce risk to property and life from all hazards that pose a risk to the city.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Holland Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #6	
Proposed Action:	Develop and implement a program to regularly clean and clear drainage ditches and culverts to maintain drainage capacity and reduce flooding.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flooding in high-risk areas by maintaining maximum drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Maintenance Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #7	
Proposed Action:	Acquire and install back-up generators with permanent quick connection wiring for critical facilities (including police, fire, water and sewer services).
BACKGROUND INFORMATION	
Site and Location:	City-wide Critical Facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages and injuries; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #8	
Proposed Action:	Upgrade / improve undersized drainage system to increase capacity and reduce flooding.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood damages and injuries through increased drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #9	
Proposed Action:	Implement tree trimming program around power lines.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #10	
Proposed Action:	Install drought tolerant landscaping at all public buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide public buildings
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce water usage at public facilities during periods of drought; Promote water conservation.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #11	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate community members of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #12	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Holland – Action #13	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Holland Public Works
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

CITY OF KILLEEN

City of Killeen – Action #1	
Proposed Action:	Remove downed trees and brush, decreasing fuels in remote and undeveloped parkland per fire department risk reduction recommendations.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfires and the spread of wildfire through targeted fuels reduction programs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Department Budget, Staff time, Volunteer and In-Kind Contribution, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Parks Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #2	
Proposed Action:	Develop, promote, and implement a new Firewise community program in neighborhoods located within the Wildland Urban Interface (WUI).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Fire Department
Implementation Schedule:	Within 24 – 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #3	
Proposed Action:	Install hail guards on critical facilities (fire stations, police station, etc.) to prevent hail damage, specifically to HVAC systems.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of critical services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	All Departments
Implementation Schedule:	Within 24 – 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Capital Improvement Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #4	
Proposed Action:	Enhance the mitigation and safety of critical facilities and city structures by recruiting two supplementary building inspectors.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve and enforce building codes and regulations; Reduce damages to infrastructure; Ensure continuity of critical services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$120,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Within 24 – 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #5	
Proposed Action:	Implement a syndromic surveillance and extreme heat mitigation program and use the data to drive heat mitigation recommendations and actions, including, but not limited to, opening cooling shelters and or providing fans to vulnerable populations.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Bell County Public Health District
Implementation Schedule:	Within 12 – 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #6	
Proposed Action:	Implement firebreaks into public wooded parkland areas at high risk of wildfire.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfire; Reduce risk of injury or damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 12 – 24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Parks Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #7	
Proposed Action:	Establish partnerships with local businesses, organizations, and volunteer groups to support fire fuel reduction projects. Leverage resources and expertise from these partnerships to implement larger-scale mitigation efforts.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfire; Reduce risk of injury or damages; Enhance coordination among stakeholder groups.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Fire Department
Implementation Schedule:	Within 12 - 24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Parks Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #8	
Proposed Action:	Develop a prescribed burn program to reduce accumulated fuels in designated areas. Conduct controlled burns during appropriate weather conditions to mimic natural fire cycles and prevent the buildup of hazardous fuels.
BACKGROUND INFORMATION	
Site and Location:	City-wide in Wildland Urban Interface (WUI)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfires and the spread of wildfire through targeted fuels reduction programs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Parks Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #9	
Proposed Action:	Develop and implement a hazard awareness and education program to promote the emergency alert system, provide community members with risk related information and procedures, and develop an online portal for vital information and records. This includes hiring staff to manage this program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen OHSEM
Implementation Schedule:	Within 12 – 24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Homeless Strategic Plan, Nolan Creek WPP, Lampasas River WPP, Fire Master Plan, Drainage Master Plan, Parks Master Plan
COMMENTS:	
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:	
Promotes public safety.	

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #10	
Proposed Action:	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane / Tropical Storm, Flood, Thunderstorm Wind, Hail, Lightning, Tornado, Winter Storm, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 24 – 36 months of plan adoption.
Incorporation into Existing Plans:	Comprehensive Plan, Nolan Creek WPP, Lampasas River WPP, Fire Master Plan, Drainage Master Plan, Parks Master Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members. Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #11	
Proposed Action:	Harden and upgrade the water line at the transfer station to mitigate wildfire impacts, including but not limited to, installing a fire suppression system.
BACKGROUND INFORMATION	
Site and Location:	12200 State Highway 195, Killeen, TX 76549
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$750,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Drainage Master Plan, Capital Improvement Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #12	
Proposed Action:	Design, develop, and install a water storage tank at the transfer station to aid in wildfire mitigation and prevent water shortages during drought and other natural hazard events.
BACKGROUND INFORMATION	
Site and Location:	12200 State Highway 195, Killeen, TX 76549
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Build resiliency within the community; Reduce impact on groundwater; Reduce damages at critical facilities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Capital Improvement Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #13	
Proposed Action:	Install hardening measures such as bollards, fencing, controlled access, and cameras at critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide (Lift Stations, Pump Station, Fire Stations, and EOC)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	All Departments
Implementation Schedule:	Within 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Capital Improvement Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #14	
Proposed Action:	Procure and implement SCADA backup and traffic system anti-intrusion protection.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Cyber Attack, Terrorism
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 36 - 48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Drainage Master Plan, Capital Improvement Plan, Water/Sewer Master Plan, Traffic Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #15	
Proposed Action:	Implement an inspection and maintenance program on the dams in the City of Killeen.
BACKGROUND INFORMATION	
Site and Location:	City-wide Dam Locations
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Nolan Creek WPP, Lampasas River WPP, Drainage Master Plan, Parks Master Plan, Dam EAPs

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #16	
Proposed Action:	Inspect storm drains to assess age and condition to determine maintenance requirements, and implement upgrades as determined by the assessment, including but not limited to, upgrading pipes, inlets, junction boxes and outfalls, and maintaining surrounding riparian areas.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Drainage Master Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #17	
Proposed Action:	Implement an inspection program to evaluate scour potential of bridges and culvert structures not inspected by TXDOT.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of erosion or scour due to flooding; Reduce damages to infrastructure including bridges and culverts; Reduce demands on emergency response during high water events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Nolan Creek WPP, Lampasas River WPP, Drainage Master Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #18	
Proposed Action:	Coordinate with the City Floodplain Administrator, NFIP, and FEMA representatives to update the City's FEMA floodplain maps.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness; Improve risk assessment.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Floodplain Administrator
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Flood Response Annex

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #19	
Proposed Action:	Develop a tool, similar to Austin’s Floodpro System, that allows the public to determine if their home or property is in the 100-year floodplain.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen IT Department
Implementation Schedule:	Within 24 – 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Flood Response Annex

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #20	
Proposed Action:	Implement a Data Loss Protection system to reduce the likelihood of data loss and ensure the continuity of critical public services.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and high costs to remediate data loss of PII.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Cyber Attack, Terrorism
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen IT Department
Implementation Schedule:	Within 36 – 48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Cybersecurity Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #21	
Proposed Action:	Move public facing and critical services to the cloud to allow for the continuity of services in the event of denial of services attack (DOS).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Ensure continuity of critical services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Cyber Attack, Terrorism
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen IT Department
Implementation Schedule:	Within 48 – 60 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Cybersecurity Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #22	
Proposed Action:	Implement a Security Information and Event Management (SIEM) System. Increase sharing of cyber threat intelligence and provide early identification of attacks on City technology infrastructure.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improves understanding of community risk.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Cyber Attack, Terrorism
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen IT Department
Implementation Schedule:	Within 36 – 48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Cybersecurity Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #23	
Proposed Action:	Survey and map historic resources and properties within flood prone areas. Provide an opportunity to ensure future growth and development minimizes risk of hazard related damage to historical property.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind, Tornado, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Withing 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #24	
Proposed Action:	Create a grant or rebate program to encourage energy retrofitting buildings that are designated as Historic. Mitigation efforts would include, but are not limited to, integrating fire protection systems with sprinklers, retrofitting windows for cold/heat resistant glass, and ensuring proper seals, attaching guards to AC units for hail and tornado impacts, replacing toilets with low-flow options to preserve water in drought conditions, and focusing on drainage-control strategies to remain within moisture content range of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damage to structures through improved construction techniques.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Withing 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #25	
Proposed Action:	Structurally retrofit existing City of Killeen facilities including, but not limited to, libraries and recreation facilities to serve as hardened shelters in the event of hazardous weather, extreme heat, or winter storms.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to community members by providing shelter in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind, Tornado, Wildfire, Hurricane / Tropical Storm, Winter Storm, Hail, Extreme Heat, Terrorism
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Community Development Department
Implementation Schedule:	Within 36 – 48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #26	
Proposed Action:	Update roadway development standards. Educate and train inspectors and contractors on new specifications and pavement design criteria to ensure proper construction of roadways.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Minimize damage to roadways and critical infrastructure.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Within 36 – 48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Transportation Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #27	
Proposed Action:	Utilization of goats and/or sheep to mitigate fire fuels in high-risk areas, such as detention ponds and right-of-way, where the use of mechanical equipment may result in unwanted environmental impacts. Establish contract services for prescribed grazing in wildfire risk areas.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfires and the spread of wildfire through targeted fuels reduction programs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural System Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 12 - 24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Drainage Master Plan, Parks Master Plan, Fire Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #28		
	Proposed Action:	Conduct public education to promote Xeriscaping of vegetation that requires little water for times of drought with resources are low and possibly offer a rebate program.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfire; Promote water conservation.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 24 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Parks Master Plan, Water/Wastewater Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #29	
Proposed Action:	Develop a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfires. Reduce risk of damages, and injuries.
Type of Action: (Safety/Security, Food, Water Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Fire Department
Implementation Schedule:	Within 36 – 48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Parks Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #30	
Proposed Action:	Assist vulnerable populations during extreme heat events by distributing fans and/or AC units.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen OHSEM
Implementation Schedule:	Within 12 - 24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, High Heat Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #31	
Proposed Action:	Acquire homes and businesses in flood-prone areas to reduce loss of property and life in the event of a flood.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Eliminate risk of flood damages to high-risk structures and prevent future losses in high-risk flood hazard areas; Reduce downstream impacts associated with development in the floodplain; Reduce risk of injuries to community members; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Within 0 - 12 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #32	
Proposed Action:	Implement a public safe room rebate program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to community members by providing in-home safe rooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Terrorism
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication, Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen OHSEM
Implementation Schedule:	Within 24 – 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Capital Improvement Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #33	
Proposed Action:	Purchase a sanding mechanism, sand, and de-icing mixture, to keep streets, especially main arterial streets, drivable during winter storm events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages and injuries on roadways and bridges during winter storm events; Reduce demand on emergency response during winter storms.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Transportation
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 12 - 36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Capital Improvement Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #34	
Proposed Action:	Ensure that Master Plans and Emergency plans are up to date. Include local plans such as the Comprehensive Plan, Traffic Master Plan, Emergency Operations Plan, Emergency Support Function Plans, Hazard Mitigation Plan, and Evacuation Plan.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Build resiliency within the community; Reduce risk of damages through improved planning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	All Departments
Implementation Schedule:	Within 12 - 48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Drainage Master Plan, Lampasas River WPP, Stormwater Management Plan, Nolan Creek WPP, Water/Wastewater Master Plan, Fire Master Plan, Parks Master Plan, Homeless Strategic Plan, Cybersecurity Plan, Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes Public Safety

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #35	
Proposed Action:	Acquire and distribute NOAA weather radios.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to community members through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen OHSEM
Implementation Schedule:	Within 12 - 24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, High Heat Plan, Flood Response Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #36	
Proposed Action:	Purchase and install automatic gate for bridge closures with reflective material and LED lighting for traffic management during inclement weather.
BACKGROUND INFORMATION	
Site and Location:	WS Young at Killeen Athletic Complex and other low water crossings
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury and fatalities to community members and first responders. Reduce risk of impacts with monitoring and notification system.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane / Tropical Storm, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Communication, Transportation
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Volunteer and In-Kind Contribution, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Capital Improvement Plan, Traffic Master Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #37	
Proposed Action:	Establish and update emergency evacuation routes and procedures for areas prone to flooding and extreme wildfire events. Study ingress / egress to and from neighborhoods to identify potential safety hubs for community members.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to community members through improved evacuation alternatives and awareness efforts.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen OHSEM
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Evacuation Annex, Traffic Master Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #38	
Proposed Action:	Develop new criteria for designing structures and slabs on expansive soils to minimize damage to structures from changing in moisture. Implement new criteria to ensure construction of longer lasting structures with less environmental damage, lower maintenance costs, and fewer repairs required.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to new structures and infrastructure through enhancing development and design protocol.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduces risk to new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #39	
Proposed Action:	Perform floodplain study updates to incorporate rainfall data and new construction development. Identify flood risks, inform the community, and provide modeling / mapping tools for use in evaluation and planning in flood reduction projects.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Reduce risk of damage or injuries through accurate flood risk identification to prioritize planning, and development. Reduce the risk of damage and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Communication
Effect on New/Existing Buildings:	Reduces risk to new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Within 24 -26 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Capital Improvement Plan, Traffic Master Plans, Flood Response Annex

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #40	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. to educate community members of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to community members and property through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen OHSEM
Implementation Schedule:	Within 6-12 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Homeless Strategic Plan, Nolan Creek WPP, Lampasas River WPP, Fire Master Plan, Drainage Master Plan

COMMENTS:
OHSEM started an AmeriCorps Disaster Education program in January 2023. As of 2020, the city uses social media and websites with more education on all hazards.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #41	
Proposed Action:	Implement a fuels reduction program within city right-of-way and other high-risk areas such as the Wildland Urban Interface (WUI).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfire and wildfire spread through fuels reduction program in high-risk areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing and new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Homeless Strategic Plan, Nolan Creek WPP, Lampasas River WPP, Fire Master Plan, Parks Master Plan, Local Ordinance

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #42	
Proposed Action:	Adopt and implement program for planting of native, drought-tolerant plants at city parks and public buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce water usage during periods of drought through drought tolerant landscaping.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Parks & Recreation Department
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Nolan Creek WPP, Lampasas River WPP, Fire Master Plan, Local Ordinance, Parks Master Plan

COMMENTS:
This action was incorporated into the 2023 Parks Master Plan for new build parks.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #43	
Proposed Action:	Upgrade undersized drainage system throughout the city to increase storm water capacity and reduce flooding.
BACKGROUND INFORMATION	
Site and Location:	City-wide (where needed)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flooding through increase/improved storm water capacity in high-risk areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000 - \$2,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Nolan Creek WPP, Lampasas River WPP, Drainage Master Plan, Stormwater Master Plan, Capital Improvement Plan, Local Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #44		
	Proposed Action:	Acquire and install an emergency back-up generator with permanent quick connections for city critical facilities to ensure continuity of emergency services.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide Critical Facilities
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Continue essential services in the event of a power outage.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduces risk to new and existing buildings
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000 per facility
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	All Departments
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Fire Master Plan, Capital Improvement Plan, Water/Sewer Master Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #45	
Proposed Action:	Install covered parking structures to protect emergency vehicles and equipment during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to emergency vehicles and equipment.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing emergency vehicles and equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Police Department & Fire Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Fire Master Plan, Capital Improvement Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #46	
Proposed Action:	Strengthen zoning ordinance to limit development in known high hazard areas.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to community members through improved construction practices.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Nolan Creek WPP, Lampasas River WPP, Local Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #47	
Proposed Action:	Purchase and install automated high-water warning signs at known flood areas. This includes vehicle and pedestrian crossings.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of loss of life to community members. City staff can be notified of the high-water and close the road early.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Homeless Strategic Plan, Nolan Creek WPP, Lampasas River WPP, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #48	
Proposed Action:	Purchase and install combined stream / rain gauges along South Nolan Creek and its tributaries.
BACKGROUND INFORMATION	
Site and Location:	City-wide (where needed)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood impacts with a stream monitoring and notification system.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Homeless Strategic Plan, Nolan Creek WPP, Drainage Master Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #49	
Proposed Action:	Develop and implement an ordinance requiring all new subdivisions to contribute to a fund to install outdoor warning sirens to cover newly developed areas including outdoor gathering areas.
BACKGROUND INFORMATION	
Site and Location:	City-wide – primarily the southern half which is heavy with new developments extending beyond the current siren system.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to community members with access to an Early Warning System (sirens).
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Lightning, Flood, Hurricane / Tropical Storm, Thunderstorm Wind, Tornado, Wildfire, Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Killeen Development Services Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Homeless Strategic Plan, Nolan Creek WPP, Lampasas River WPP, Fire Master Plan, Capital Improvement Plan, Parks Master Plan, Local Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #50	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	All Departments
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Killeen – Action #51	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	All Departments
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

CITY OF LITTLE RIVER ACADEMY

City of Little River Academy – Action #1	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, and culverts to improve storm drainage systems.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000 (annually)
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #2	
Proposed Action:	Acquire and install weather warning sirens.
BACKGROUND INFORMATION	
Site and Location:	509 E. Main St., Little River Academy 101 N. Haynes St., Little River Academy
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #3	
Proposed Action:	Acquire and install generators at community and emergency shelters.
BACKGROUND INFORMATION	
Site and Location:	509 E. Main St., Little River Academy – City Hall 109 S. Evans St., Little River Academy – Bliss Hall 711 Rio Poco St., Little River Academy – SPJST Hall
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #4	
Proposed Action:	Install hazard resistant streetlights throughout the city to improve visibility, ensuring that residents and first responders can navigate safely during extreme weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures through improved construction techniques; Reduce recovery efforts for the community after an event; Reduce burden on emergency response during hazardous events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #5	
Proposed Action:	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents. Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #6	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. to educate residents of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #7	
Proposed Action:	Implement a fuels reduction program within city right-of-way and other high-risk areas such as the Wildland Urban Interface (WUI).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfire and wildfire spread through fuels reduction program in high-risk areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #8	
Proposed Action:	Adopt and implement program for planting of native, drought-tolerant plants at city parks and public buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce water usage during periods of drought through drought tolerant landscaping.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #9	
Proposed Action:	Upgrade undersized drainage system throughout the city to increase storm water capacity and reduce flooding.
BACKGROUND INFORMATION	
Site and Location:	City-wide (where needed)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flooding through increased / improved storm water capacity in high-risk areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #10	
Proposed Action:	Acquire and install an emergency back-up generator and weather sirens with permanent quick connections for city critical facilities to ensure continuity of emergency services.
BACKGROUND INFORMATION	
Site and Location:	Community Critical Facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Continue essential services in the event of a power outage.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Flood, Hurricane / Tropical Storm, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to existing structure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #11	
Proposed Action:	Install covered parking structures to protect emergency vehicles and equipment during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to emergency vehicles and equipment.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing emergency vehicles and equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #12	
Proposed Action:	Strengthen zoning ordinance to limit development in known high hazard areas.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents through improved construction practices.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances and Regulations

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #13	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #14	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Administration
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

City of Little River Academy – Action #15	
Proposed Action:	Develop a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Participating jurisdictions that do not have an active CWPP: Bell County, Bartlett, Harker Heights, Killeen, Little River Academy, Nolanville, Rogers, Salado, Temple, Troy
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfires. Reduce risk of damages, and injuries.
Type of Action: (Safety/Security, Food, Water Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Little River Academy Fire Department
Implementation Schedule:	Within 12 - 36 months, pending plan adoption and available funding
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CITY OF MORGAN'S POINT RESORT

City of Morgan's Point Resort – Action #1		
	Proposed Action:	Implement a fuels reduction program and routinely clear extensive brush in overgrown areas within city limits and adjoining county areas.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfires and the spread of wildfire through targeted fuels reduction programs.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Fire Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	CWPP

COMMENTS:
Morgan's Point Resort continuously resides within the extreme high-risk area for wildfire. The difficult lakeside terrain combined with the thick undergrowth and numerous dead cedar trees make it extremely difficult for residents and city personnel to gain access to these areas and clear out the potential fire hazards. With a combined high probability of occurrence and the potential for catastrophic results, wildfire is of immediate concern.

SECTION 23: MITIGATION ACTIONS

City of Morgan's Point Resort – Action #2	
Proposed Action:	Build safe room shelters throughout the jurisdiction so that residents and public safety personnel can reach shelter during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries and fatalities by providing shelter in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
Currently there are no hardened shelters in the city. First responders on duty during severe weather outbreaks are forced to either seek shelter in an interior hallway or to relocate out of the city approximately 6 miles to the nearest hardened fire station in a neighboring municipality. Each facility should be able to safely accommodate 10-15 personnel at one time along with a small space for lifesaving gear and command and control equipment. The facility should also be equipped with a generator to operate as a temporary command center should the Public Safety Center sustain a direct strike.

SECTION 23: MITIGATION ACTIONS

City of Morgan's Point Resort – Action #3	
Proposed Action:	Install curbing, drains, or other flood mitigation structures along Morgan's Point Boulevard to manage stormwater and prevent flooding.
BACKGROUND INFORMATION	
Site and Location:	Morgan's Point Boulevard
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries; Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane / Tropical Storm, Thunderstorm Wind
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
Morgan's Point Boulevard is one of the main collector streets in the city that provides access to City Hall, the Utilities and Water Department and the MPR Community center. During periods of heavy rain, the runoff collects on Morgan's Point Boulevard and runs downhill to the lake. Residences and yards along the boulevard are frequently flooded during these events and the slope downhill provides causes rapidly flowing runoff.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Morgan's Point Resort – Action #4	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide (City Hall and Safety Center)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Morgan's Point Resort – Action #5	
Proposed Action:	Acquire specialized equipment designed for wildfire prevention and rapid response, including a quint fire apparatus.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfires and the spread of wildfire by increasing water access and firefighting capabilities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: TDA, TFS; Federal Grants: FEMA AFGP, DHS, EMPG, USFS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	CWPP, Capital Improvements Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Morgan's Point Resort – Action #6	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate community members of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Morgan's Point Resort – Action #7	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Morgan's Point Resort – Action #8		
	Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide critical facilities
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

CITY OF NOLANVILLE

City of Nolanville – Action #1	
Proposed Action:	Design and construct a pedestrian bridge over a creek in pecan village that is prone to flooding and incorporate native vegetation and landscaping to further reduce flood impacts.
BACKGROUND INFORMATION	
Site and Location:	East end of Pecan Village Mobile Home Park, south of Interstate-14.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Preserve/restore the natural function of the floodplain; Reduce flood damages and risk of injuries or fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$750,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
Incorporate landscaping elements to enhance the aesthetics of the bridge and its surroundings. Plant native vegetation and implement beautification measures to create an inviting space for pedestrians. Install appropriate safety features such as railings, lighting, and signage to enhance user safety, especially during low-light conditions.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #2	
Proposed Action:	Implement program to deploy utility vehicles (UTVS) for patrolling walking trails and city-sponsored events, as well as rescue for severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City walking trails, parks, downtown events, and city sponsored running events.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$18,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #3	
Proposed Action:	Acquire and install generators with hard wired quick connections at the Emergency Operations Center (EOC) at City Hall, Boys and Girls Club for Natural Disaster Support, and Fire Station.
BACKGROUND INFORMATION	
Site and Location:	Nolanville City Hall Nolanville Boy's and Girl's Club Nolanville Fire Station
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Manager
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #4	
Proposed Action:	Acquire a water tank for the Fire Department to address water deficiencies and ensure water is available during disaster events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide additional potential water sources for firefighting uses; Ensure continuity of emergency services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #5		
	Proposed Action:	Build safe room shelters for community use.
	BACKGROUND INFORMATION	
	Site and Location:	Mary Marie Multi-Use Center, 400 Gold Star Avenue (City Park) Nolanville, Texas 76559
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents by providing shelter in high-risk areas during extreme weather events.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane / Tropical Storm, Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	County and City Disaster Response plans

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #6	
Proposed Action:	Bury exposed utility and power lines.
BACKGROUND INFORMATION	
Site and Location:	City-wide (901 Old Nolanville Rd., Nolanville, TX 76559)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of critical services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Winter Storm, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #7	
Proposed Action:	Purchase and install early (weather) warning system to enhance city's ability to notify the public during extreme weather events.
BACKGROUND INFORMATION	
Site and Location:	At the EOC (100 N Main Street, Nolanville TX 76559) and specified locations throughout the city
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane / Tropical Storm, Flood, Tornado, Wildfire, Thunderstorm Wind
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$65,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #8	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. to educate residents of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #9	
Proposed Action:	Purchase and install emergency generators with permanent wired quick connections to critical facilities.
BACKGROUND INFORMATION	
Site and Location:	101 N Main Street (EOC), and 100 N Main Street (Fire Department)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury and fatality to residents; Ensure continuity of emergency services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$80,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville Emergency Management and City Manager
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #10	
Proposed Action:	Upgrade / replace bridges over main roadways including Levi Crossing, and Old Nolanville Road.
BACKGROUND INFORMATION	
Site and Location:	Levi Crossing and Old Nolanville Road
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Increase flow capacity at these critical roadways; Reduce damages at these sites due to inadequate or undersized bridges; Ensure emergency access to isolated parts of the city.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan; Land Use Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #11	
Proposed Action:	Purchase and install Automated High-Water Warning Signs at known flood areas.
BACKGROUND INFORMATION	
Site and Location:	Old Nolanville Road and Levi's Crossing
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk or loss of life to residents; Alerts emergency services that water is about to wash over roadway; Emergency services can close roads prior to loss of life.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #12	
Proposed Action:	Expand retention pond to increase the capacity to hold flood and stormwater.
BACKGROUND INFORMATION	
Site and Location:	10th Street inside the city limits
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flooding damages to city streets, structures, and infrastructure; Protect residents from injury or potential loss of life and property.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Received TCEQ grant and work will begin in October 2023.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #13	
Proposed Action:	Reroute, clean and clear existing drainage system to restore maximum flow capacity.
BACKGROUND INFORMATION	
Site and Location:	Numerous areas within the city and the surrounding area.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damage caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #14	
Proposed Action:	Purchase and install warning signs for high water, flood, and other caution signage.
BACKGROUND INFORMATION	
Site and Location:	Numerous areas within the city and the surrounding area
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$19,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #15	
Proposed Action:	Purchase and install a culvert in high-risk area.
BACKGROUND INFORMATION	
Site and Location:	FM 439 Spur
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve availability of emergency and public services due to non-evacuation requirements; Reduce loss of life and property due to inaccessibility; Reduce infrastructure damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$19,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville City Manager and Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #16	
Proposed Action:	Adopt ordinance to require drought tolerant landscaping at public buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide public buildings
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce water usage at public buildings through drought tolerant landscaping techniques; Promote water conservation.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Nolanville City Manager
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #17	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville City Manager
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Nolanville – Action #18	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Nolanville City Manager
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

CITY OF ROGERS

City of Rogers – Action #1		
	Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
	BACKGROUND INFORMATION	
	Site and Location:	City sewer plant, 3 lift stations, fire department, and police department
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,050,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #2	
Proposed Action:	Trim trees in alley ways to reduce falling limbs during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane / Tropical Storm, Flood, Thunderstorm Wind, Hail, Lightning, Tornado, Winter Storm, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents. Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #3	
Proposed Action:	Lagoon #1 Dredging Project: Based on geological testing in 2014, review, study, and implement the most effective and feasible mitigation techniques identified.
BACKGROUND INFORMATION	
Site and Location:	Lagoon #1
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk and build resiliency.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduces risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$750,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Engineering
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #4	
Proposed Action:	Facilitate assessment of Lagoon #2 to uncover source of leaking and implement mitigation techniques as identified in the assessment.
BACKGROUND INFORMATION	
Site and Location:	Lagoon #2
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; reduce risk of damages or injuries through improved building standards; reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduces risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Engineering
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #5	
Proposed Action:	Sewer System Repair and Upgrade: Conduct immediate repairs to the City's sewage system to prevent deterioration and collapse during a flood or other natural hazard event.
BACKGROUND INFORMATION	
Site and Location:	City-wide (Including but not limited to the system under Jolie Road)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood water contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #6	
Proposed Action:	Increase and improve drainage capacity through structural improvements and by implementing a regular program to clear debris from bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries; Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$7,500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #7	
Proposed Action:	Implement a city-wide Stormwater Master Plan.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Reduce risk of damages or injuries through drainage and stormwater improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #8	
Proposed Action:	Install water wells, ground water storage tanks, and pump stations as needed to prevent water shortages during drought and other natural hazard events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Build resiliency within the community; Reduce impact on groundwater; Reduce damages at critical facilities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #9	
Proposed Action:	Assess road conditions and implement retrofitting and repair measures, including erosion / sediment control, to improve the drainage and integrity of transportation infrastructure during flood events.
BACKGROUND INFORMATION	
Site and Location:	City-wide; Reeds Lake Road
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of erosion or scour due to flooding; Reduce damages to infrastructure including roadways, sidewalks, bridges, and culverts; Reduce demands on emergency response during high water events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
In May of 2024 the city experienced the complete washout of several roads, including Reeds Lake Road, due to flooding.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #10	
Proposed Action:	Update, expand and improve (current) drought management and water conservation plans. Adopt water restriction measure to implement during significant drought events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve water conservation during periods of drought.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Food, Water, Shelter
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #11	
Proposed Action:	Adopt and implement drainage ordinance to review and require permits for culverts and other drainage work.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve drainage capacity while protecting downstream development; Ensure adequate drainage improvement/capacity; Reduce flood damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #12	
Proposed Action:	Adopt and enforce 2' freeboard in existing Flood Damage Prevention Ordinance.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to life and property through improved floodplain management regulations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing and future structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #13	
Proposed Action:	Construct covered parking facilities or garage to house / protect public works and police vehicles and equipment.
BACKGROUND INFORMATION	
Site and Location:	City police and public works facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Extreme Heat, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Public Works and Police Department
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #14	
Proposed Action:	Clear debris from drainage systems and upgrade undersized culverts with new culverts and necessary repaving as a result of culvert work.
BACKGROUND INFORMATION	
Site and Location:	City-wide drainage system
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flooding to structures through improved drainage capacity; Protect lives and property.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #15	
Proposed Action:	Install surge protectors at local critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of critical services during and after event; Reduce damages associated with power outages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #16	
Proposed Action:	Update City Webpage on a regular schedule with education information about mitigation activities to reduce risk to property and life from all hazards that pose a risk to the City.
BACKGROUND INFORMATION	
Site and Location:	City-wide (city website)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #17	
Proposed Action:	Implement a hazardous fuels reduction program for schools and local critical facilities at risk for wildfire.
BACKGROUND INFORMATION	
Site and Location:	City-wide including schools and City critical facilities at risk for wildfire
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfires as well as the spread of wildfires through fuels reduction near critical facilities; Ensure continuity of services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Fire Department
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #18	
Proposed Action:	Construct / designate or retrofit community shelters for Winter Storm and Extreme Heat (cooling and heating centers), as well as other severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide, various locations as deemed appropriate / feasible
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents by providing shelter in new critical facilities during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #19	
Proposed Action:	Develop inter-local agreements between the City of Rogers and Bell County for repair and regular maintenance of water lines.
BACKGROUND INFORMATION	
Site and Location:	City of Rogers Extra-Territorial Areas
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood damages; Reduce risk of injuries to residents; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Preparedness/Recovery

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	County and City of Rogers Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #20	
Proposed Action:	Bury power lines.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Public Works
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #21	
Proposed Action:	Expand and improve wastewater retention pond.
BACKGROUND INFORMATION	
Site and Location:	Rogers wastewater treatment facility
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Current retention pond overflows into the nearby creek. Improvements will prevent environmental contamination of water during flood events.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #22	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate community members of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #23	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Rogers – Action #24	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Rogers Administration
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

VILLAGE OF SALADO

Village of Salado – Action #1		
	Proposed Action:	Implement mitigation measures to provide flood relief to high-risk communities, including but not limited to, establishing a “green infrastructure” program to manage or expand existing parks and greenways, limit the density of developments in the area, and/or implement the use of porous pavement.
	BACKGROUND INFORMATION	
	Site and Location:	Village-wide, Chisholm Trail and Stagecoach Circle Neighborhood
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impacts of flood through expanded greenspace; Reduce damages to infrastructure; Reduce risk of injuries or fatalities; Reduce damages by maintaining drainage capacity.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems, Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Village of Salado Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #2	
Proposed Action:	Upgrade and increase the capacity of the culverts along low-lying areas on Chisolm Trail.
BACKGROUND INFORMATION	
Site and Location:	Low water crossings on Chisholm Trail
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Enhance emergency access during times of flood to allow for the protection of life and property; Reduce damage to infrastructure; Increase flow capacity at crossings and reduce scour.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems, Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Village of Salado Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #3	
Proposed Action:	Adopt a landscape ordinance (selection and planting guidelines) that include drought tolerant landscaping to reduce the demand on groundwater supply.
BACKGROUND INFORMATION	
Site and Location:	Village-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce water usage and impacts to groundwater supply during an event through drought tolerant landscaping techniques.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Budget, Staff Time
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
Landscape ordinance is being developed. Expected to be adopted and implemented in calendar year 2024.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #4	
Proposed Action:	Adopt land use regulations including development restrictions in high-risk areas, as well as density controls throughout the city.
BACKGROUND INFORMATION	
Site and Location:	Village-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages in high-risk areas including floodplains and Wildland Urban Interface; Minimize risk of wildfire and imposition of water use restrictions in times of drought.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to future structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #5	
Proposed Action:	Identify and install stream and rain gauges at critical facility sites; Upgrade gauges at established sites where necessary; Coordinate installation requests.
BACKGROUND INFORMATION	
Site and Location:	Salado Creek Watershed
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide early warning to protect life and property from the impact of flooding; Improve vulnerability assessment.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #6	
Proposed Action:	Revise floodplain ordinance to incorporate freeboard requirements and cumulative substantial damage requirements.
BACKGROUND INFORMATION	
Site and Location:	Village-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood damages and risk of injuries or fatalities through comprehensive development standards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #7	
Proposed Action:	Elevate low lying bridges.
BACKGROUND INFORMATION	
Site and Location:	Low water crossings on Main Street and Old Mill Road
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure including bridges; Reduce demands on emergency response during high water events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #8	
Proposed Action:	Revise and update regulatory floodplain maps.
BACKGROUND INFORMATION	
Site and Location:	Village-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Minimize the risk of life and property loss from flooding; Enhance vulnerability assessment.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #9	
Proposed Action:	Revise building requirements to include measures such as structural bracing, shutters, laminated glass in windowpanes, and hail-resistant roof coverings or flashing in building design to minimize damage; Require manufactured housing be securely anchored to permanent foundations; Develop and implement a Wildland Urban Interface Code.
BACKGROUND INFORMATION	
Site and Location:	Village-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Building Codes; Subdivision Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #10	
Proposed Action:	Adopt and implement a tree trimming program along electrical power lines and rights-of-way.
BACKGROUND INFORMATION	
Site and Location:	Village-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Village of Salado
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #11	
Proposed Action:	Install lightning detection systems, lightning rods, and warning signage at local parks.
BACKGROUND INFORMATION	
Site and Location:	Pace Park and Sirena Park
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury or damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Department of Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #12	
Proposed Action:	Participate in the Firewise Program.
BACKGROUND INFORMATION	
Site and Location:	Village-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce the risk of property damage and loss of life from wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Revenue (staff time)
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #13	
Proposed Action:	Purchase and install emergency generators with permanent wired quick connections to critical facilities.
BACKGROUND INFORMATION	
Site and Location:	Village-wide Critical Facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury and fatality to residents; Ensure continuity of emergency and essential services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #14	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate community members of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City Wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect community members from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Village Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #15	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Emergency Manager
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #16	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	County-wide critical facilities including all participating jurisdictions
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration / Engineer
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

Village of Salado – Action #17	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	County-wide critical facilities including all participating jurisdictions
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration / Engineer
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

CITY OF TEMPLE

City of Temple – Action #1	
Proposed Action:	Implement a winterization and road maintenance program to identify priority roadways and bridges during winter weather events and extreme heat.
BACKGROUND INFORMATION	
Site and Location:	City-wide roadways and infrastructure
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages and injuries on roadways and bridges during winter storm events; Reduce demand on emergency response during winter storms. Reduces cost reparation.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Transportation, Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Temple Department of Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan, Emergency Evacuation Plan, Transportation Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #2	
Proposed Action:	Assess and implement additional culverts and road crossings as needed to properly manage stormwater runoff.
BACKGROUND INFORMATION	
Site and Location:	City-wide drainage system
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood damages through improved drainage capacity; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduces risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Temple Department of Public Works
Implementation Schedule:	Within 24 -48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan, Stormwater Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #3	
Proposed Action:	Completed a study / assessment and implemented recommended findings / measures to address vegetation and dead matter to reduce risk of wildfires and stormwater contamination.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; reduce risk of damages or injuries through improved maintenance.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Health/Medical
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Temple Fire Department
Implementation Schedule:	Within 24 -48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan, Stormwater Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #4	
Proposed Action:	Identify brine operations and develop a plan/procedure to enhance risk reduction for contamination.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment by reducing various contaminants that can be related to brine waste.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Water Systems
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Temple Department of Public Works
Implementation Schedule:	Within 24 -48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan, Stormwater Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #5	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, mail flyers, etc. to educate residents of hazards that can threaten the area, flood insurance availability, and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department / Emergency Management
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #6	
Proposed Action:	Increase / expand tree trimming program near public rights-of-way and utility lines to reduce falling limbs during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Winter Storm, Flood, Tornado, Hail, Hurricane / Tropical Storm, Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Utilities services operating procedures

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #7	
Proposed Action:	Upgrade drainage channels within the city to reduce flooding to residential and commercial structures.
BACKGROUND INFORMATION	
Site and Location:	City-wide drainage channels
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$25,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #8	
Proposed Action:	Upgrade and coordinate technology and communications equipment used by fire, police, EMS, and public works to be compatible and uniform; Install lightning devices to protect upgraded equipment.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning, Thunderstorm Wind, Winter Storm, Flood, Tornado, Hail, Hurricane / Tropical Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication, Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department and Information Technologies
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations / Response Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #9	
Proposed Action:	Develop and implement a Community Wildfire Protection Plan (CWPP) with local and state assistance; Implement fuels reduction program based on identified risk.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury and fatality to residents and first responders; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$400,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations; Response Plan; CWPP

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #10	
Proposed Action:	Acquire and install an emergency back-up generator with permanent quick connections for city critical lift stations to ensure continuity of operations and emergency services.
BACKGROUND INFORMATION	
Site and Location:	FM 2271, 100 KW, 480V, 3 phase power FM 2305, 60 KW, 480V, 3 phase power Lago Terra, 130KW, 230V, single phase power Northcliffe, 65KW, 480V, 3 phase power Oaks at Lakewood, 30KW, 230V, single phase power Synergy, 65KW, 480V, 3 phase power
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Ensure continuity of critical services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to existing emergency vehicles and equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #11	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #12	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Temple – Action #13	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

CITY OF TROY

City of Troy – Action #1		
	Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, etc. To educate residents of hazards that can threaten the areas and mitigation measures to reduce injuries, fatalities, and property damages.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property through improved education and awareness.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Troy City Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 23: MITIGATION ACTIONS

City of Troy – Action #2	
Proposed Action:	Implement a fuels reduction program within city right-of-way and other high-risk areas such as the Wildland Urban Interface (WUI).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfire and wildfire spread through fuels reduction program in high-risk areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Troy Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Troy – Action #3	
Proposed Action:	Adopt and implement program for planting of native, drought-tolerant plants at city parks and public buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce drought impacts; Reduce cost of damages associated with drought.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Troy – Action #4	
Proposed Action:	Upgrade undersized drainage system throughout the city to increase storm water capacity and reduce flooding.
BACKGROUND INFORMATION	
Site and Location:	City-wide (where needed)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flooding through increase/improved storm water capacity in high-risk flood areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

City of Troy – Action #5	
Proposed Action:	Acquire and install an emergency back-up generator with permanent quick connections for city critical facilities to ensure continuity of emergency services.
BACKGROUND INFORMATION	
Site and Location:	City-wide Critical Facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Ensure continuity of critical services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to existing emergency vehicles and equipment
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Troy – Action #6	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Troy Public Works
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 23: MITIGATION ACTIONS

City of Troy – Action #7	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration / Engineer
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 23: MITIGATION ACTIONS

City of Troy – Action #8	
Proposed Action:	Harden / retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration / Engineer
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of repairs, and prevents injury to community members.

SECTION 23: MITIGATION ACTIONS

City of Troy – Action #9	
Proposed Action:	Develop a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Participating jurisdictions that do not have an active CWPP: Bell County, Bartlett, Harker Heights, Killeen, Little River Academy, Nolanville, Rogers, Salado, Temple, Troy
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfires. Reduce risk of damages, and injuries.
Type of Action: (Safety/Security, Food, Water Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Troy Fire Department
Implementation Schedule:	Within 12 - 36 months, pending plan adoption and available funding
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CENTRAL TEXAS COUNCIL OF GOVERNMENTS (CTCOG)

CTCOG – Action #1	
Proposed Action:	Provide public education and risk disaster awareness and preparedness to the CTCOG seven county region; Educate employees and residents on mitigation measures to reduce property damages or potential injury or illness.
BACKGROUND INFORMATION	
Site and Location:	Central Texas Council of Governments: Bell County, Milam County, Coryell County, Lampasas County, Hamilton County, Mills County, San Saba County
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$30,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CTCOG – Action #2	
Proposed Action:	Implement a Home Shelter (Safe Room Rebate) program for the 7-county COG Region based on 50/50 match.
BACKGROUND INFORMATION	
Site and Location:	Central Texas Council of Governments
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries or fatalities of residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Hurricane / Tropical Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CTCOG – Action #3	
Proposed Action:	Improve wildfire fighting water delivery capabilities by the purchase of one large, mobile fifth-wheel water trailer to be strategically placed around the region.
BACKGROUND INFORMATION	
Site and Location:	Central Texas Council of Governments: Bell County, Milam County, Coryell County, Lampasas County, Hamilton County, Mills County, San Saba County
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries or fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Minimize fire damages to all structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000 - \$175,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	VFD and Regular Fire Departments within CTCOG region
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CTCOG – Action #4	
Proposed Action:	Assist communities in implementing development of a plan to relocate repetitive flood loss structures out of Special Flood Hazard Areas (SFHAs) to minimize flooding of structures and restore natural floodplain areas.
BACKGROUND INFORMATION	
Site and Location:	Central Texas Council of Governments: Bell County, Milam County, Coryell County, Lampasas County, Hamilton County, Mills County, San Saba County
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries or fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator and County EMCs
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CTCOG – Action #5	
Proposed Action:	Purchase a mobile recovery trailer for first responders to utilize during regional disasters. Trailer will disseminate first aid, water and other supplies.
BACKGROUND INFORMATION	
Site and Location:	Central Texas Council of Governments: Bell County, Milam County, Coryell County, Lampasas County, Hamilton County, Mills County, San Saba County
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries or fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Food, Water, Shelter
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$300,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CTCOG – Action #6	
Proposed Action:	Harden / retrofit CTCOG facility to protect against natural hazards; Acquire and install generator with permanent hard wired quick connections to facility.
BACKGROUND INFORMATION	
Site and Location:	CTCOG Facility
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to infrastructure; Reduce risk of injuries or fatalities to employees.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 23: MITIGATION ACTIONS

CTCOG – Action #7	
Proposed Action:	Plant drought tolerant landscaping around CTCOG facility; Plant additional trees near building, sidewalk and parking lot to reduce heat island effect on facility and provide shade for employees.
BACKGROUND INFORMATION	
Site and Location:	CTCOG Facility
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce water usage through drought tolerant landscaping; Reduce risk to employees by providing shaded areas; Reduce extreme heat impacts on building and infrastructure.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	CTCOG Homeland Security Coordinator
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:



SECTION 24 **PLAN MAINTENANCE**

SECTION 24: PLAN MAINTENANCE

Plan Maintenance Procedures	1
Incorporation	1
Process of Incorporation	1
Monitoring and Evaluation	5
Monitoring.....	6
Evaluation.....	6
Updating.....	7
Plan Revisions.....	7
Five (5) Year Review	7
Continued Public Involvement	8

PLAN MAINTENANCE PROCEDURES

The following is an explanation of how the participating jurisdictions within Bell County, and the general public will be involved in implementing, evaluating, and enhancing the Plan over time. When the plan is discussed in all maintenance procedures it includes mitigation actions and hazard assessments. The sustained hazard mitigation planning process consists of four main parts:

- Incorporation
- Monitoring and Evaluation
- Updating
- Continued Public Involvement

INCORPORATION

Participating jurisdictions within Bell County will be responsible for further development and implementation of mitigation actions. Each action has been assigned to a specific department within the participating jurisdictions. The following describes the process by which participating jurisdictions will incorporate elements of the mitigation plan into other planning mechanisms.

PROCESS OF INCORPORATION

Once the Plan Update is adopted, participating jurisdictions within Bell County will implement actions based on priority and the availability of funding. The planning area currently implements policies and programs to reduce loss to life and property from hazards. The mitigation actions developed for this Plan Update enhance this ongoing effort and will be implemented through other program mechanisms where possible.

The potential funding sources listed for each identified action may be used when the jurisdiction seeks funds to implement actions. An implementation time period or a specific implementation date has been assigned to each action as an incentive for completing each task and gauging whether actions are implemented in a timely manner.

Participating jurisdictions within Bell County will integrate implementation of their mitigation actions with other plans and policies such as construction standards and emergency management plans, and ensure that these actions, or proposed projects, are reflected in other planning efforts.

SECTION 24: PLAN MAINTENANCE

Coordinating and integrating components of other plans and policies into goals and objectives of the Plan Update will further maximize funding and provide possible cost-sharing of key projects, thereby reducing loss of lives and property and mitigating hazards affecting the area.

Upon formal adoption of the Plan Update, planning team members from each participating jurisdiction will work to integrate the hazard mitigation strategies into other plans and codes as they are developed. Participating team members will conduct periodic reviews of plans and policies, once per year at a minimum, and analyze the need for revisions in light of the approved Plan. The planning team will review all comprehensive land use plans (applicable jurisdictions only), capital improvement plans (applicable jurisdictions only), annual budget reviews, emergency operations or management plans (applicable jurisdictions only), and transportation plans (applicable jurisdictions only) to guide and control development. Participating jurisdictions will ensure that capital improvement planning (applicable jurisdictions only) in the future will also contribute to the goals of this hazard mitigation Plan Update to reduce the long-term risk to life and property from all hazards. Within one year of formal adoption of the hazard mitigation Plan Update, existing planning mechanisms will be reviewed by each jurisdiction.

The Central Texas Council of Governments (CTCOG) and Bell County are committed to supporting the participating jurisdictions as they implement their mitigation actions. Planning team members will review and revise, as necessary, the long-range goals and objectives in strategic plan and budgets to ensure that they are consistent with this mitigation action plan. Additionally, the planning area will work to advance the goals of this hazard mitigation plan through its routine, ongoing, long-range planning, budgeting, and work processes.

Table 24-1 identifies types of planning mechanisms and examples of methods for incorporating the Plan Update into other planning efforts. The team members, listed in Table 24-2 below, will be responsible for the review of these planning mechanisms and their incorporation of the plan, with the exception of the Floodplain Management Plans; the jurisdictions who have a Floodplain Administrator on staff will be responsible for incorporating the plan when floodplain management plans are updated or new plans are developed.

Table 24-1. Methods of Incorporation of the Plan

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Annual Budget Review	Bell County: EMC City of Barlett: City Manager City of Belton: EMC/Fire Chief City of Harker Heights: Planning & Development Director/City Engineer City of Holland: City Secretary City of Killeen: EMC City of Little River Academy: City Secretary City of Morgan's Point Resort: Councilman City of Nolanville: City Manager/Fire Chief City of Rogers: City Administrator	Various departments and key personnel that participated in the planning process for participating jurisdictions within Bell County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.

SECTION 24: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	City of Temple: Fire/Emergency Management Division Director City of Troy: City Administrator Village of Salado: Village Administrator CTCOG: Special Projects Coordinator	
Capital Improvement Plans	Bell County: EMC City of Bartlett: City Manager City of Belton: EMC/Fire Chief City of Harker Heights: Planning & Development Director/City Engineer City of Holland: City Secretary City of Killeen: EMC City of Morgan's Point Resort: Councilman City of Nolanville: City Manager/Fire Chief City of Rogers: City Administrator City of Temple: Fire/Emergency Management Division Director City of Troy: City Administrator Village of Salado: Village Administrator	Several participating jurisdictions within Bell County have a Capital Improvement Plan (CIP) in place or under development. Prior to any revisions to the CIP, county, city, or village departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Comprehensive Plans	City of Bartlett: City Manager City of Belton: EMC/Fire Chief City of Harker Heights: Planning & Development Director/City Engineer City of Holland: City Secretary City of Killeen: EMC City of Morgan's Point Resort: Councilman City of Nolanville: City Manager/Fire Chief City of Rogers: City Administrator City of Temple: Fire/Emergency Management Division Director City of Troy: City Administrator Village of Salado: Village Administrator	Several participating jurisdictions within Bell County have a Long-term Comprehensive Plan in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.

SECTION 24: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Floodplain Management Plans	Bell County: Floodplain Administrator City of Barlett: Floodplain Administrator City of Belton: Floodplain Administrator City of Harker Heights: Floodplain Administrator City of Holland: Floodplain Administrator City of Killeen: Floodplain Administrator City of Little River Academy: Floodplain Administrator City of Morgan's Point Resort: Floodplain Administrator City of Nolanville: Floodplain Administrator City of Rogers: Floodplain Administrator City of Temple: Floodplain Administrator City of Troy: Floodplain Administrator Village of Salado: Floodplain Administrator	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 10 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Bell County update their management plans or develops new plans.
Grant Applications	Bell County: EMC City of Barlett: City Manager City of Belton: EMC/Fire Chief City of Harker Heights: Planning & Development Director/City Engineer City of Holland: City Secretary City of Killeen: EMC City of Little River Academy: City Secretary City of Morgan's Point Resort: Councilman City of Nolanville: City Manager/Fire Chief City of Rogers: City Administrator City of Temple: Fire/Emergency Management Division Director City of Troy: City Administrator Village of Salado: Village Administrator	The Plan will be evaluated by participating jurisdictions within Bell County when grant funding is sought for mitigation projects. If a project is not in the Plan Update, a Plan Revision may be necessary to include the action in the Plan.

SECTION 24: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	CTCOG: Special Projects Coordinator	
Regulatory Plans	Bell County: EMC City of Bartlett: City Manager City of Belton: EMC/Fire Chief City of Harker Heights: Planning & Development Director/City Engineer City of Holland: City Secretary City of Killeen: EMC City of Morgan's Point Resort: Councilman City of Nolanville: City Manager/Fire Chief City of Rogers: City Administrator City of Temple: Fire/Emergency Management Division Director City of Troy: City Administrator Village of Salado: Village Administrator CTCOG: Special Projects Coordinator	Currently, several participating jurisdictions within Bell County have regulatory plans in place, such as Emergency Operations Plans, Continuity of Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when County, City, Village, or CTCOG departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.

MONITORING AND EVALUATION

Periodic revisions of the Plan are required to ensure that goals, objectives, and mitigation actions are kept current. When the plan is discussed in these sections it includes the risk assessment and mitigation actions as a part of the monitoring, evaluating, updating and review process. Revisions may be required to ensure the Plan is in compliance with federal and state statutes and regulations. This section outlines the procedures for completing Plan revisions, updates, and review. Table 24-2 indicates the department and title of the party responsible for Plan monitoring, evaluating, updating, and review of the Plan.

Table 24-2. Team Members Responsible for Plan Monitoring, Evaluating, Updating, and Review of the Plan

JURISDICTION	TITLE
Central Texas Council of Governments	Emergency Services Program Manager
Central Texas Council of Governments	Special Projects Coordinator
Bell County	Emergency Management Coordinator
City of Bartlett	City Manager

SECTION 24: PLAN MAINTENANCE

JURISDICTION	TITLE
City of Belton	Emergency Management Coordinator / Fire Chief
City of Harker Heights	Planning & Development Director/City Engineer
City of Killeen	Emergency Management Coordinator
City of Little River Academy	City Secretary
City of Morgan's Point Resort	Councilman
City of Nolanville	City Manager
City of Nolanville	Fire Chief
City of Holland	City Secretary
City of Rogers	City Administrator
Village of Salado	Village Administrator
City of Temple	Fire/Emergency Management Division Director
City of Troy	City Administrator

MONITORING

Designated Planning Team members are responsible for monitoring, evaluating, updating, and reviewing the Plan, as shown in Table 24-2. Individuals holding the title listed in Table 24-2 will be responsible for monitoring the Plan on an annual basis. Plan monitoring includes reviewing and incorporating into the Plan other existing planning mechanisms that relate or support goals and objectives of the Plan; monitoring the incorporation of the Plan into future updates of other existing planning mechanisms as appropriate; reviewing mitigation actions submitted and coordinating with various County, City, Village, and CTCOG departments to determine if mitigation actions need to be re-evaluated and updated; evaluating and updating the Plan as necessary; and monitoring plan maintenance to ensure that the process described is being followed, on an annual basis, throughout the planning process. The Planning Team will develop a brief report that identifies policies and actions in the plan that have been successfully implemented and any changes in the implementation process needed for continued success. A summary of meeting notes will report the particulars involved in developing an action into a project. In addition to the annual monitoring, the Plan will be similarly reviewed immediately after extreme weather events include but not limited to state and federally declared disasters.

EVALUATION

As part of the evaluation process, the Planning Team will assess changes in risk; determine whether the implementation of mitigation actions is on schedule; determine whether there are any implementation problems, such as technical, political, legal, or coordination issues; and identify changes in land development or programs that affect mitigation priorities for each respective department or organization.

SECTION 24: PLAN MAINTENANCE

The Planning Team will meet on an annual basis to evaluate the Plan and identify any needed changes and assess the effectiveness of the plan achieving its stated purpose and goals. The team will evaluate the number of mitigation actions implemented along with the loss-reduction associated with each action. Actions that have not been implemented will be evaluated to determine if any social, political, or financial barriers are impeding implementation and if any changes are necessary to improve the viability of an action. The team will evaluate changes in land development and/or programs that affect mitigation priorities in their respective jurisdictions. The annual evaluation process will help to determine if any changes are necessary. In addition, the Plan will be similarly evaluated immediately after extreme weather events including but not limited to state and federally declared disasters.

UPDATING

PLAN REVISIONS

At any time, minor technical changes may be made to update the Bell County Hazard Mitigation Action Plan Update 2025. Material changes to mitigation actions or major changes in the overall direction of the Plan or the policies contained within it, must be subject to formal adoption by the participating jurisdictions.

The CTCOG, along with the participating jurisdictions within Bell County, will review proposed revisions and vote to accept, reject, or amend the proposed change. Upon ratification, the Revision will be transmitted to TDEM.

In determining whether to recommend approval or denial of a Plan Revision request, participating jurisdictions will consider the following factors:

- Errors or omissions made in the identification of issues or needs during the preparation of the Plan Update;
- New issues or needs that were not adequately addressed in the Plan Update; and
- Changes in information, data, or assumptions from those on which the Plan Update was based.

FIVE (5) YEAR REVIEW

The Plan will be thoroughly reviewed by the Planning Team at the end of three years from the approval date, to determine whether there have been significant changes in the planning area that necessitate changes in the types of mitigation actions proposed. Factors that may affect the content of the Plan include new development in identified hazard areas, increased exposure to hazards, disaster declarations, increase or decrease in capability to address hazards, and changes to federal or state legislation.

The Plan review process provides the participating jurisdictions within Bell County an opportunity to evaluate mitigation actions that have been successful, identify losses avoided due to the implementation of specific mitigation measures, and address mitigation actions that may not have been successfully implemented as assigned.

It is recommended that the full Executive and Advisory Planning Team (Section 2, Tables 2-1 and 2-2) meet to review the Plan at the end of three years because grant funds may be necessary for the development of a five-year update. Reviewing planning grant options in advance of the five-

SECTION 24: PLAN MAINTENANCE

year Plan update deadline is recommended considering the timelines for grant and planning cycles can be in excess of a year.

Following the Plan review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and Plan Revision process outlined herein. Upon completion of the review, update, and revision process the revised Plan will be submitted to TDEM for final review and approval in coordination with FEMA.

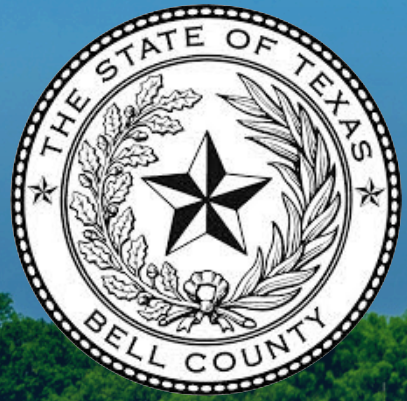
CONTINUED PUBLIC INVOLVEMENT

Public input was an integral part of the preparation of this Plan and will continue to be essential for Plan updates. The public will be directly involved in the annual evaluation, monitoring, reviews and cyclical updates. Changes or suggestions to improve or update the Plan will provide opportunities for additional public input.

The public can review the Plan on the CTCOG's or participating jurisdictions' websites, or at the CTCOG Office, where officials and the public are invited to provide ongoing feedback, via email.

The Planning Team may also designate voluntary citizens from the planning area or willing stakeholder members from the private sector businesses that were involved in the Plan's development to provide feedback on an annual basis. It is important that stakeholders and the immediate community maintain a vested interest in preserving the functionality of the planning area as it pertains to the overall goals of the mitigation plan. The Planning Team is responsible for notifying stakeholders and community members on an annual basis and maintaining the Plan.

Media, including local newspaper and radio stations, will be used to notify the public of any maintenance or periodic review activities during the implementation, monitoring, and evaluation phases. Additionally, local news media will be contacted to cover information regarding Plan updates, status of grant applications, and project implementation. Local and social media outlets, such as Facebook, Instagram, and X (formerly Twitter), will keep the public and stakeholders apprised of potential opportunities to fund and implement mitigation projects identified in the Plan.



APPENDIX A **PLANNING TEAM**

APPENDIX A: PLANNING TEAM

Planning Team Members	1
Stakeholders	6

PLANNING TEAM MEMBERS

The Bell County Hazard Mitigation Action Plan Update 2025 was organized using a direct representative model. An Executive Planning Team from the participating jurisdictions, shown in Table A-1, was formed to coordinate planning efforts and request input and participation in the planning process. Table A-2 reflects the Advisory Planning Team, consisting of area organizations and departments that participated throughout the planning process. Table A-3 is comprised of stakeholders who were invited to provide Plan input. Public outreach efforts and meeting documentation is provided in Appendix E.

Table A-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Central Texas Council of Governments	Emergency Services Program Manager
Central Texas Council of Governments	Special Projects Coordinator
Bell County	Emergency Management Coordinator
City of Bartlett	City Manager
City of Belton	Emergency Management Coordinator / Fire Chief
City of Harker Heights	Planning & Development Director/City Engineer
City of Holland	City Secretary
City of Killeen	Emergency Management Coordinator
City of Little River Academy	City Secretary
City of Morgan's Point Resort	Councilman
City of Nolanville	City Manager
City of Nolanville	Fire Chief
City of Rogers	City Administrator
Village of Salado	Village Administrator
City of Temple	Fire/Emergency Management Division Director
City of Troy	City Administrator

APPENDIX A: PLANNING TEAM

Table A-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Central Texas Council of Governments	Planning and Regional Service Director
Bell County	Administrative Assistant for Bell County Emergency Management
Bell County	Communications Director
Bell County	County Judge
Bell County	Facilities Department Director
Bell County	Indigent Health Department Director
Bell County	Precinct 1 Commissioner
Bell County	Precinct 2 Commissioner
Bell County	Precinct 3 Commissioner
Bell County	Precinct 4 Commissioner
Bell County	Road and Bridge Supervising Foreman
Bell County	Sherriff's Office – Administrative Lieutenant
Bell County	Sherriff's Office - Lieutenant
Bell County	Sherriff's Office - Support Services Bureau
City of Bartlett	City Councilman
City of Bartlett	Mayor
City of Bartlett	Mayor Pro-Tem
City of Belton	Assistant to the Chief of Police
City of Belton	Assistant to the City Manager
City of Belton	Assistant Director of Parks and Recreation
City of Belton	Assistant Fire Chief
City of Belton	Chief of Police
City of Belton	City Manager
City of Belton	Director of Planning
City of Belton	Director of Public Works
City of Belton	Mayor

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
City of Belton	Public Works Program Manager
City of Harker Heights	Assistant City Manager
City of Harker Heights	Chief of Police
City of Harker Heights	City Manager
City of Harker Heights	Code Enforcement Officer I
City of Harker Heights	Code Enforcement Officer II
City of Harker Heights	Deputy Fire Marshal / Chief
City of Harker Heights	Director of Parks and Recreation
City of Harker Heights	Director of Public Works
City of Harker Heights	Fire Chief
City of Harker Heights	Mayor
City of Harker Heights	Police Lieutenant
City of Holland	Chief of Police
City of Holland	Contracted Engineer for City
City of Holland	Mayor Pro-Tem
City of Killeen	Assistant Chief of Police
City of Killeen	Assistant City Attorney
City of Killeen	Assistant to the Director of Development
City of Killeen	Assistant Fire Chief
City of Killeen	Assistant Fire Marshal / Chief
City of Killeen	Assistant Director of I.T.
City of Killeen	Assistant Human Resources Director
City of Killeen	Chief of Police
City of Killeen	City Engineer
City of Killeen	City Manager
City of Killeen	Communications Coordinator
City of Killeen	Communications Officer

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
City of Killeen	Deputy Chief of EMS
City of Killeen	Deputy Chief of Training
City of Killeen	Director of Code Enforcement
City of Killeen	Director of Water & Sewer
City of Killeen	Drainage Manager
City of Killeen	Emergency Response Coordinator
City of Killeen	Executive Assistant
City of Killeen	Executive Director of Communications
City of Killeen	Executive Director of Development Services
City of Killeen	Executive Director of Public Works
City of Killeen	Deputy Chief of Fire Operations
City of Killeen	Finance Controller
City of Killeen	Finance Manager
City of Killeen	Financial Analyst
City of Killeen	Fire Chief
City of Killeen	Maintenance Supervisor
City of Killeen	Mayor
City of Killeen	Multi-Media Coordinator
City of Killeen	Office Administrator
City of Killeen	Senior Specialist – Planning
City of Killeen	Stormwater Project Manager
City of Killeen	Supervisor of Operations
City of Little River Academy	Chief of Police
City of Little River Academy	City Councilman
City of Little River Academy	Mayor
City of Morgan's Point Resort	City Manager (Interim)
City of Morgan's Point Resort	Chief of Police

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
City of Morgan's Point Resort	City Secretary
City of Morgan's Point Resort	Code Enforcement Officer
City of Morgan's Point Resort	Director of Finance
City of Morgan's Point Resort	Director of Utilities
City of Morgan's Point Resort	Fire Chief
City of Morgan's Point Resort	Maintenance Superintendent
City of Morgan's Point Resort	Marketing Communications Manager
City of Morgan's Point Resort	Mayor
City of Nolanville	Battalion Chief
City of Nolanville	Chief of Police
City of Nolanville	City Secretary
City of Nolanville	Community Outreach and Public Affairs Coordinator
City of Nolanville	Director of Economic Development
City of Nolanville	Director of Public Safety
City of Nolanville	Director of Public Works
City of Nolanville	Mayor
City of Nolanville	Public Works Operations Specialist
City of Rogers	Chief of Police
City of Rogers	Director of Public Works
City of Rogers	Fire Chief
City of Rogers	Mayor
Village of Salado	Assistant Village Administrator
Village of Salado	Chief of Police
Village of Salado	Fire Chief
Village of Salado	Mayor
Village of Salado	Village Secretary
City of Temple	Assistant Director of Public Works

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
City of Temple	Assistant Director of Public Works Operations
City of Temple	Assistant Director of Transform Temple
City of Temple	Chief Information Officer
City of Temple	Chief of Police
City of Temple	Chief Technology Officer
City of Temple	Deputy Chief of Police – Field Services Bureau
City of Temple	Deputy Chief of Police – Investigation Bureau
City of Temple	Director of Transform Temple
City of Temple	Director of Public Works
City of Temple	Executive Assistant
City of Temple	Executive Support Coordinator
City of Temple	Fire Chief
City of Temple	I.T. Infrastructure Manager
City of Temple	I.T. Security Administrator
City of Temple	Marketing Specialist
City of Temple	Mayor
City of Temple	Streets & Drainage Division Director
City of Temple	Transportation Director
City of Troy	Chief of Police
City of Troy	Fire Chief
City of Troy	Mayor
City of Troy	Special Projects

STAKEHOLDERS

The following groups listed in Table A-3 represent a list of organizations invited to stakeholder meetings, public meetings, and workshops throughout the planning process and include members of community groups, non-profit organizations, private businesses, utility providers, neighboring counties, school and universities, state and federal agencies, and legislators. The public were also invited to participate via e-mail throughout the planning process. Many of the invited

APPENDIX A: PLANNING TEAM

organizations and stakeholders participated and were integral to providing comments and data for the Plan. For a list of attendees at meetings, please see Appendix E¹.

Table A-3. Stakeholders

AGENCY	TITLE	STAKEHOLDER TYPE
Advent Health Central Texas	Bell County - Killeen	Health Care Facility
Advent Health Central Texas	Safety Officer	Health Care Facility
Amateru Radio Races	Radio Broadcaster	Community Organization
American Red Cross	Community Preparedness	Non-Profit / Community Organization
American Veterans Mission	General Representative	Community Organization
Area Agency on Aging of Central Texas	Supervisor	Community Organization
Bartlett ISD	Superintendent	Academia
Baylor, Scott & White Hospital	Regional Director of Emergency Management	Health Care Facility
Bell County Animal Shelter	General Representative	Community Organization
Bell County Public Health	Emergency Preparedness Representative	Community Organization
Bell County WCID #1	General Representative	Utility Provider
Bell County WCID #3	General Representative	Utility Provider
Bell County Storm Water Management	Engineering Tech	Utility Provider
Belton Economic Development	Executive Director	Community Organization
Belton Fire Corporation	Office Manager	Community Organization
Belton Fire Corporation	President	Community Organization
Belton ISD	Coordinator of Emergency Management	Academia
Bosque County	Emergency Management Coordinator	Neighboring Community
Bring Everyone in the Zone	Executive Director	Non-Profit / Community Organization
BSWH-Faith Community Health	Director	Health Care Facility

¹ Information contained in Appendix E is exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Burleson County	Emergency Management Coordinator	Neighboring Community
Burnet County	Emergency Management Coordinator	Neighboring Community
Carl R Darnall Army Medical Center	Bell County – Fort Cavazos	Health Care Facility
Central Texas 4C	Executive Director	Non-Profit / Community Organization
Central Texas College	Chancellor	Academia
Central Texas Food Bank	Communications Representative	Community Organization
Citizens for Progress	President	Community Organization
Clearwater Underground Water Conservation District	General Manager	Utility Provider
Comanche County	Emergency Management Coordinator	Neighboring Community
Communities in Schools – Greater Central Texas	CEO	Community Organizations
Department of Homeland Security	Media Representative	Federal Agency
Eagle Waste Disposal – Salado	General Representative	Utility Provider
Environmental Protection Agency	General Representative	Federal Agency
Erath County	Emergency Management Coordinator	Neighboring Community
Falls County	Emergency Management Coordinator	Neighboring Community
Food Care Center	General Representative	Non-Profit / Community Organization
Fort Cavazos	Director, Public Affairs	Army Base
Fort Cavazos	Chief Community Relations	Army Base
Fort Cavazos	Chief Media Relations	Army Base
Gause ISD	Superintendent	Academia
Grand Central Texas	Economic Development – Belton	Regional Agency
Grand Central Texas	Economic Development - Temple	Regional Agency
Goldthwaite Eagle	Reporter	Community Organization

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Goldthwaite Municipal Airport	General Representative	Community Organization
Hamilton County Hospital District	Director of EMS & Emergency Management	Health Care Facility
Hamilton Herald News	Editor	Community Organization
Hamilton ISD	Superintendent	Academia
Hispanic American Chamber of Commerce of Central Texas	General Representative	Community Organization
Holland ISD	Superintendent	Academia
HOME / Community Development	Director	Community Organization
HOP/Hill Country Transit District	Chief Safety and Security Officer	Community Organization
Innovation Black Chamber of Commerce	General Representative	Community Organization
Kempner Family Community Development	Director	Community Organization
Killeen-Fort Hood Regional Airport	General Representative	Community Organization
Killeen ISD	Superintendent	Academia
Killeen Water and Sewer	Director of Water and Sewer Facilities	Utility Provider
Lampasas County Chamber of Commerce	General Representative	Community Organization
Lampasas Dispatch Record	News Reporter	Community Organization
Lampasas ISD	Superintendent	Academia
Lee County	Emergency Management Coordinator	Neighboring Community
Lometa ISD	Superintendent	Academia
McLennan County	Emergency Management Coordinator	Neighboring Community
Mills County Ministerial Association	Representative	Community Organization
Milam County	Emergency Management Coordinator/Homeland Security	Neighboring Community
NOAA	General Representative	Federal Agency

APPENDIX A: PLANNING TEAM

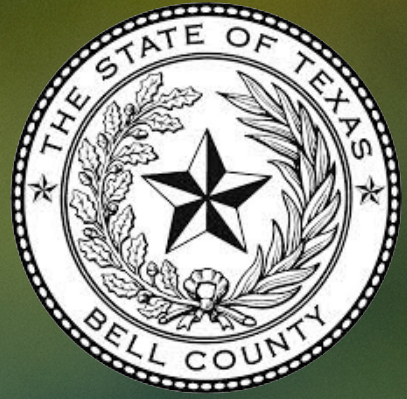
AGENCY	TITLE	STAKEHOLDER TYPE
Rehab Warriors	President of Business Development & Government Affairs	Community Organization
Robertson County	Emergency Management Coordinator	Neighboring Community
Rogers ISD	Superintendent	Academia
Office of Rural and Community Affairs	Executive Director	State Agency
Olin E. Teague Veteran's Medical Center	Office of Public Information	Health Care Facility
Salado ESD/VFD	Fire Chief	Community Organization
Salado ISD	Superintendent	Academia
Salado Water Supply Corporation	General Manager	Utility Provider
Salvation Army	Director of Social Services for Bell County	Non-Profit / Community Organization
Salvation Army	General Representative for Lampasas County	Non-Profit / Community Organization
San Saba County	Emergency Management Coordinator	Neighboring Community
Seton Medical Center	Vice President Operations	Health Care Facility
Somervell County	Emergency Management Coordinator/County Judge	Neighboring Community
Sutron Environmental & Hydrological	General Representative	Private Organization
SVFD	Communications Representative	Community Organization
Teex TAMU	Regional Training Manager	Community Organization
Temple College	Associate Vice President / Chief of Operations	Academia
Temple College	University Police Department	Academia
Temple ISD	Superintendent	Academia
Texas A&M AgriLife Extension	Bell County Representative	State Agency
Texas A&M AgriLife Extension	Hamilton County Representative	State Agency
Texas A&M AgriLife Extension	Lampasas County Representative	State Agency

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Texas A&M AgriLife Extension	Mills County Representative	State Agency
Texas A&M Central Texas	Safety & Risk Management Officer	Academia
Texas A&M Forest Service	City of Hamilton General Representative	State Agency
Texas A&M Forest Service	City of Temple General Representative	State Agency
Texas Department of Transportation	Safety Coordinator for Coryell, Bell and Milam	State Agency
Texas Division of Emergency Management	District Coordinator	State Agency
Texas Division of Emergency Management	Regional Representative for Mills and Hamilton County	State Agency
Texas State Legislature	Representative District 59	State Agency
Texas State Legislature	Representative District 54	State Agency
Texas State Legislature	Representative District 55	State Agency
Texas State Senate	Senator District 24	State Agency
Texas State Soil & Water	Field Representative	State Agency
Texas State Soil & Water	Field Representative for Hamilton-Coryell SWCID #506	State Agency
Texas State Soil & Water	Field Representative for Mills County SWCID #554	State Agency
Texas Water Development Board	Communications Representative	State Agency
Texas Windstorm Association	General Representative	State Agency
Troy ISD	Superintendent	Academia
University of Mary Hardin-Baylor	Senior Vice President of Administration & Chief Operating Officer	Academia
University of Mary Hardin-Baylor	University Police Department	Academia
University of Mary Hardin-Baylor	Vice President for Policy and Risk Management	Academia
U.S. Fish & Wildlife	Southwest Regional Representative	Federal Agency
U.S. Army Corps of Engineers	Southwest Regional Representative	Federal Agency

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Veteran Services	Director of Bell County	Community Organization
Veteran Services	Lampasas County VSO	Community Organization
Veteran Services	Mills County VSO	Community Organization
Williamson County	Emergency Management Coordinator	Neighboring Community
Workforce Solutions of Central Texas	Supervisor	Community Organization



APPENDIX B

PUBLIC SURVEY RESULTS

APPENDIX B: PUBLIC SURVEY RESULTS

Overview	1
Public Survey Results	2

OVERVIEW

Central Texas Council of Governments (CTCOG) prepared a public survey that requested public opinion on a wide range of questions relating to natural hazards. The survey was made available through the participating counties and jurisdictions' websites. This survey link was also distributed at public meetings and stakeholder events throughout the planning process.

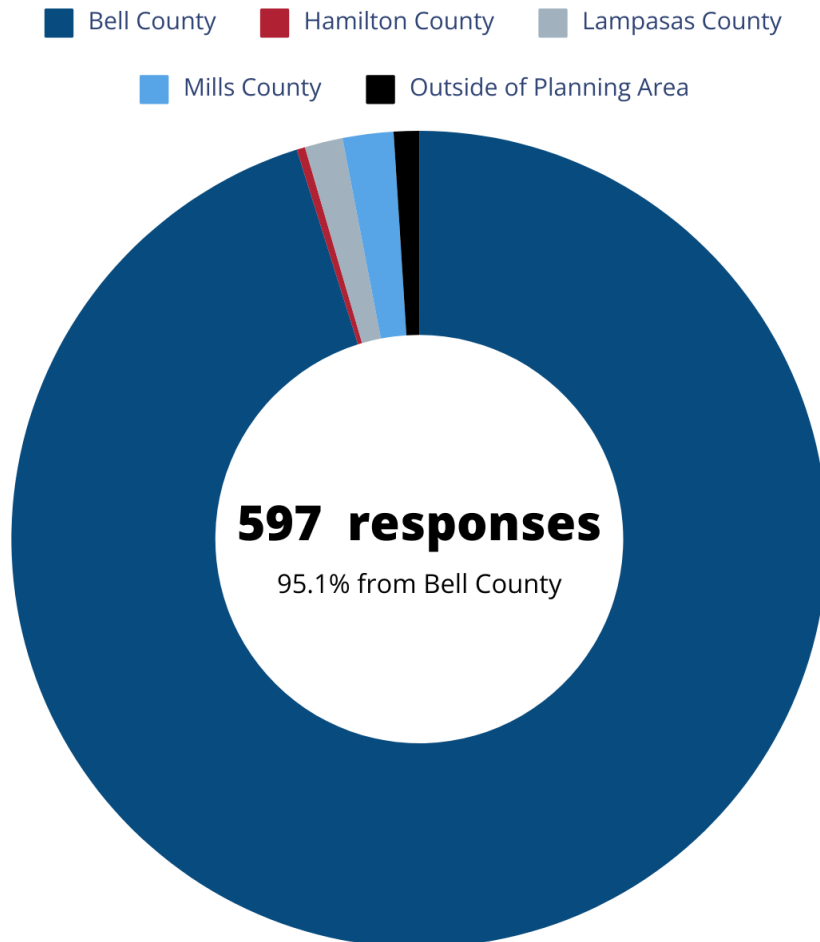
A total of 597 surveys were collected across the four participating counties, the results of which are analyzed in Appendix B. The purpose of the survey was twofold: 1) to solicit public input during the planning process, and 2) to help the jurisdictions identify any potential mitigation actions or problem areas.

All public survey results were discussed and shared with the Planning Team during the Mitigation Strategy Workshop. These results are also provided below. The survey results provide information regarding the public's experience with natural hazards, their perceived hazards of concern, recommended mitigation actions, and additional valuable insights. Overall, this survey enhances the mitigation planning process by ensuring the plan properly represents the community, is informed through local knowledge, and by promoting equity.

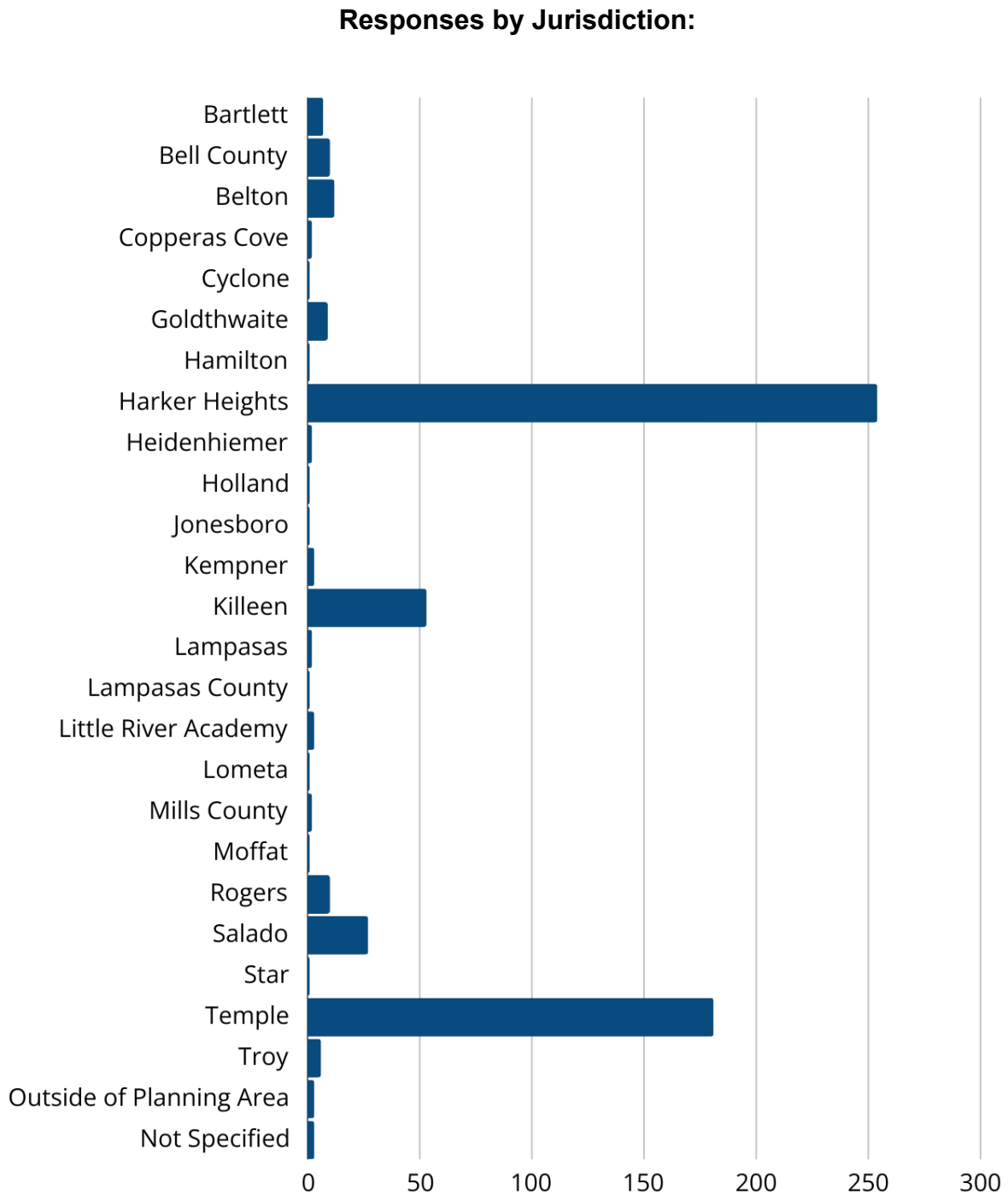
APPENDIX B: PUBLIC SURVEY RESULTS

PUBLIC SURVEY RESULTS

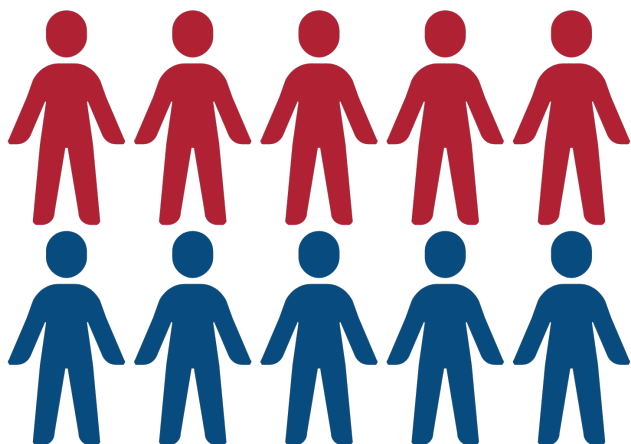
Responses by County:



APPENDIX B: PUBLIC SURVEY RESULTS



APPENDIX B: PUBLIC SURVEY RESULTS



48.24% of survey responders have been impacted by a disaster.

Personal experiences shared in survey responses included:

“2011 drought, 2021 winter storm / no electricity so froze our pipes which burst, causing about \$300,000.00 damage”

“We experienced a swimming pool business had a chemical explosion with chlorine fumes in the air in Temple, Belton and Nolanville. Tornadoes in Jarrell, Salado. There was a bridge on I35 in Salado. Shooting on Fort Hood.”

“No power for nearly a week after Winter Storm Uri (2021); air conditioning failure at both work and home during extreme heat (2023); drought effects on yard, trees, house, foundations, and community; severe weather - wind and hail (annually)”

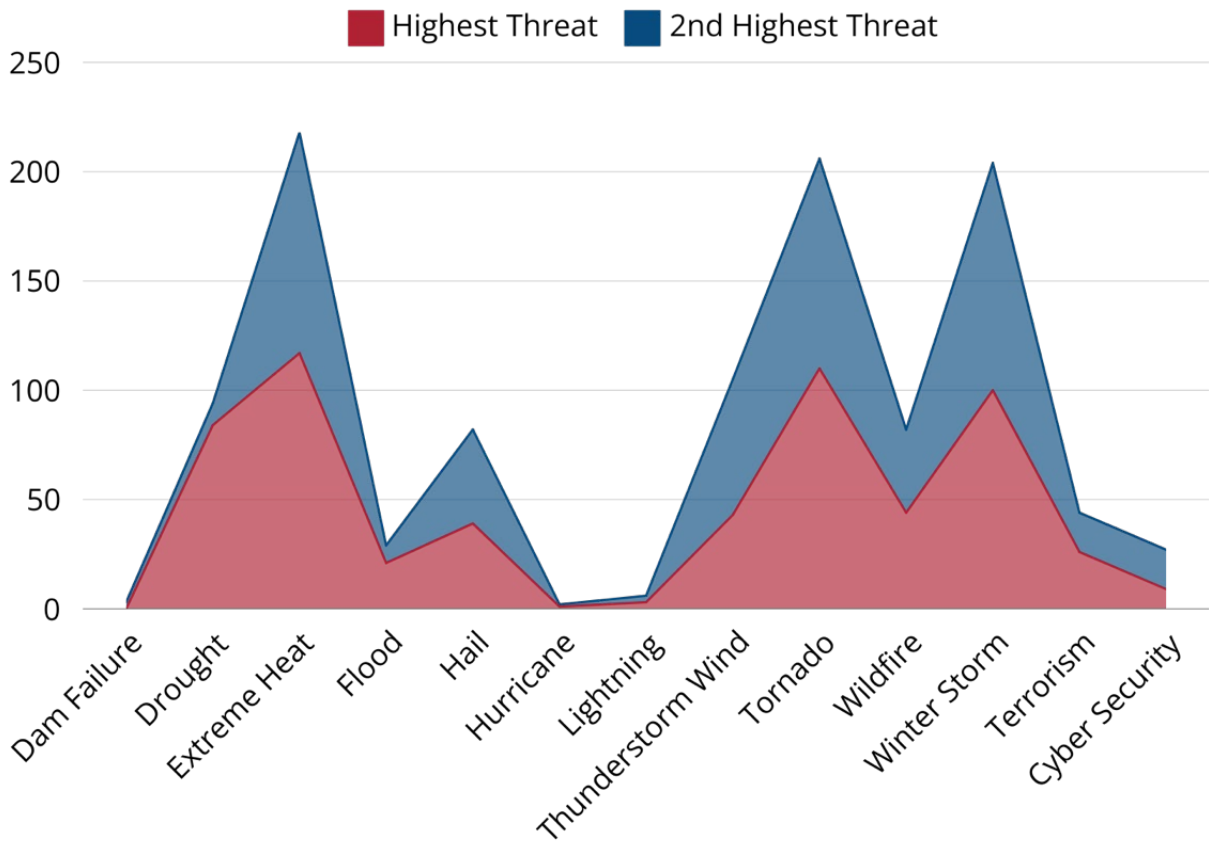
“I have experienced Tornadoes, drought, flooding, active shooters, and the COVID pandemic over the past 48 years of living in Bell County.”

48% of those who have been impacted by a disaster mentioned winter storms in their response.



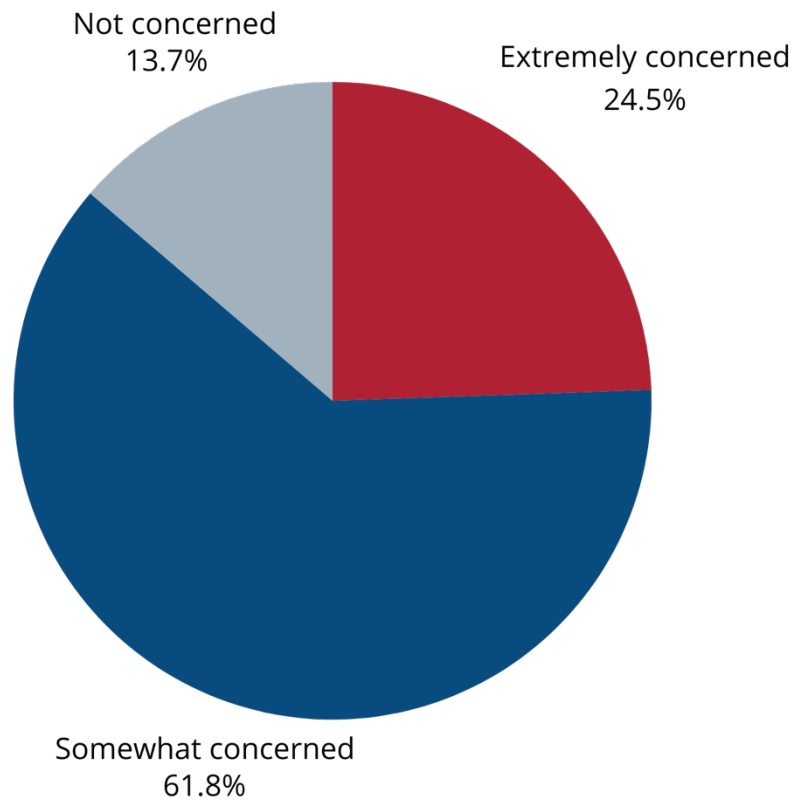
APPENDIX B: PUBLIC SURVEY RESULTS

Hazards that pose the highest perceived threat level:



APPENDIX B: PUBLIC SURVEY RESULTS

Concern level for potential hazard impacts:

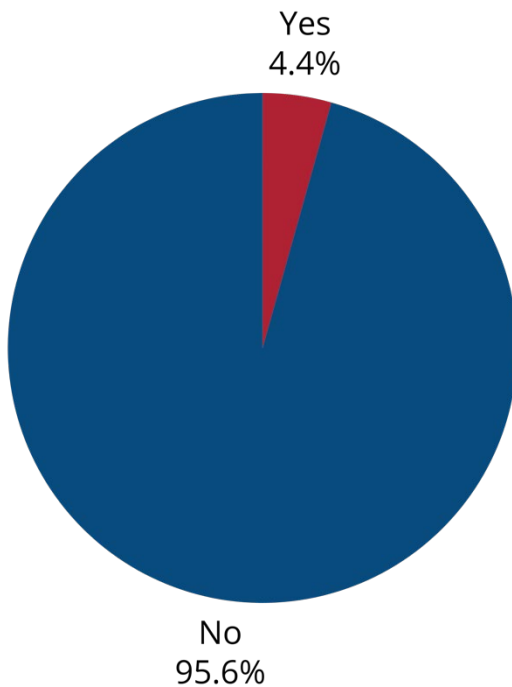


Hazards not profiled in the Hazard Mitigation Plan update that are of concern included:

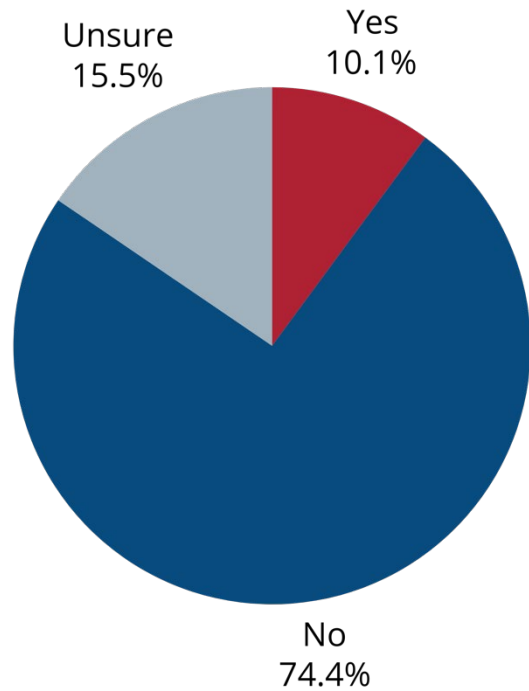
Terrorism
Water Supply Contamination
Hazardous Materials
Utility Failure

APPENDIX B: PUBLIC SURVEY RESULTS

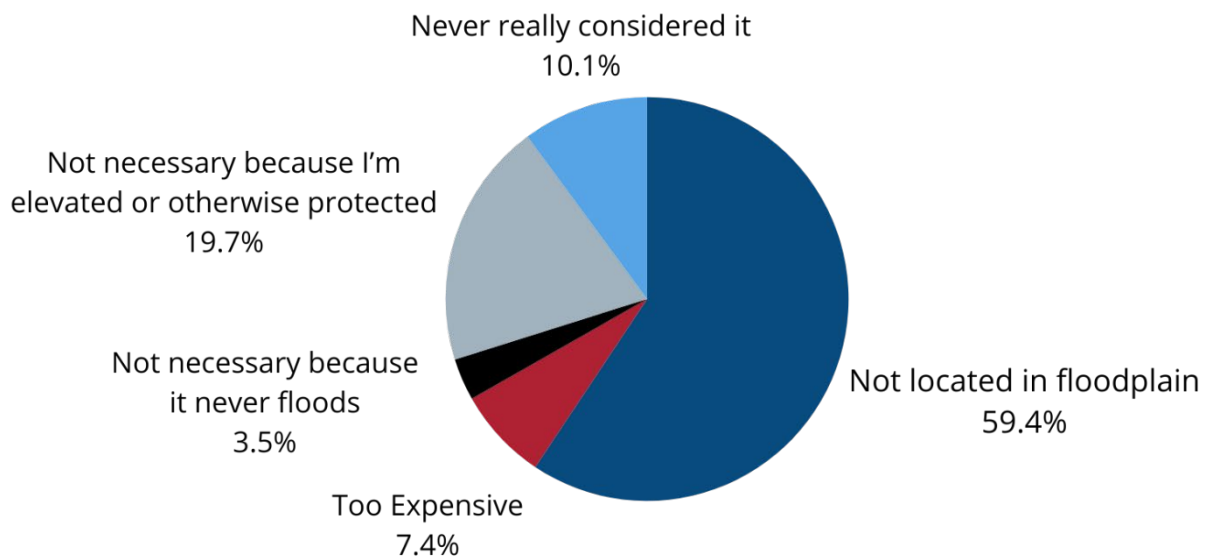
Home is in floodplain:



Has flood insurance:

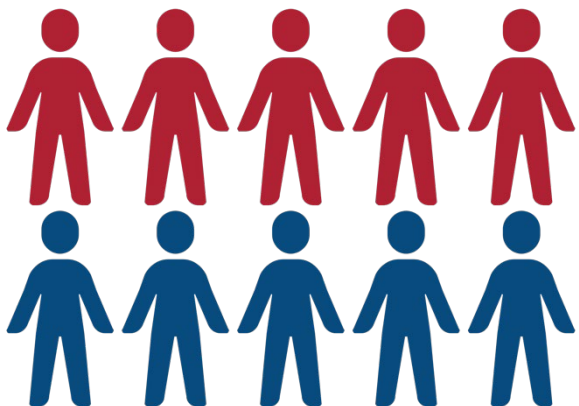


Reasoning for not having flood insurance:



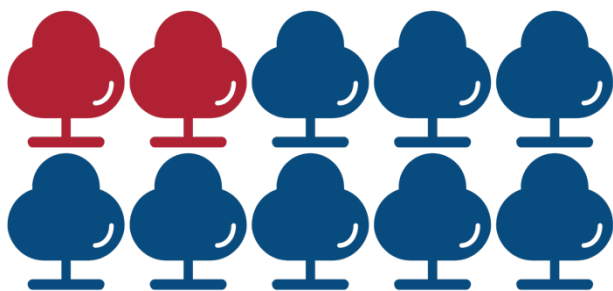
APPENDIX B: PUBLIC SURVEY RESULTS

Have you taken any actions to make your home or neighborhood more resistant to hazards?



83.42%
responded 'Yes'

**23% have taken action through
tree / debris management.**



**83.24% of all survey responders
are interested in making their
home more resistant to hazards.**



Actions taken included:

“Updated insulation in attic and added radiant barrier to save on energy and protect against extreme heat. Also updated old air conditioner condenser.”

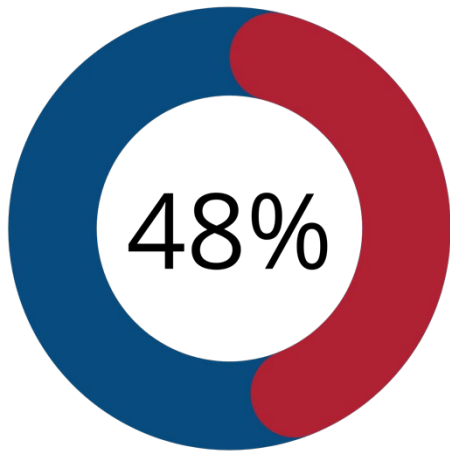
“Home improvement’s such as rain gutters, home insulation, upgraded home windows, front and rear patio covers, planted trees and scrubs.”

“Attempt to remove obstructions (plants, trees, debris, trash) to natural flow of storm water. Try to keep valuables on higher ground whenever possible.”

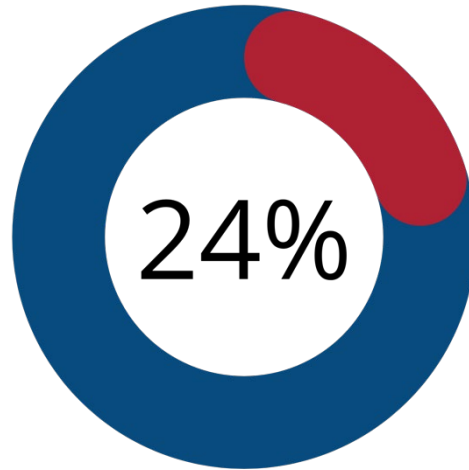
“Had trees trimmed near power lines to avoid power outage due to ice / snow storms.”

APPENDIX B: PUBLIC SURVEY RESULTS

Effectiveness of communication methods for receiving information about how to make your home and neighborhood more resistant to hazards.



Selected 'Internet'



Selected 'Mail'

Other responses: Public Workshops/Meetings 7.04%, Newspaper 6.37%, Television 5.19%, Radio 0.5%, School Meetings 0.34%.

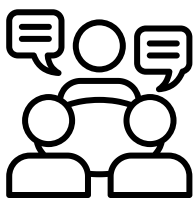
Additional communication methods suggested:



Email



Social Media



Neighborhood
Meetings



Alerts



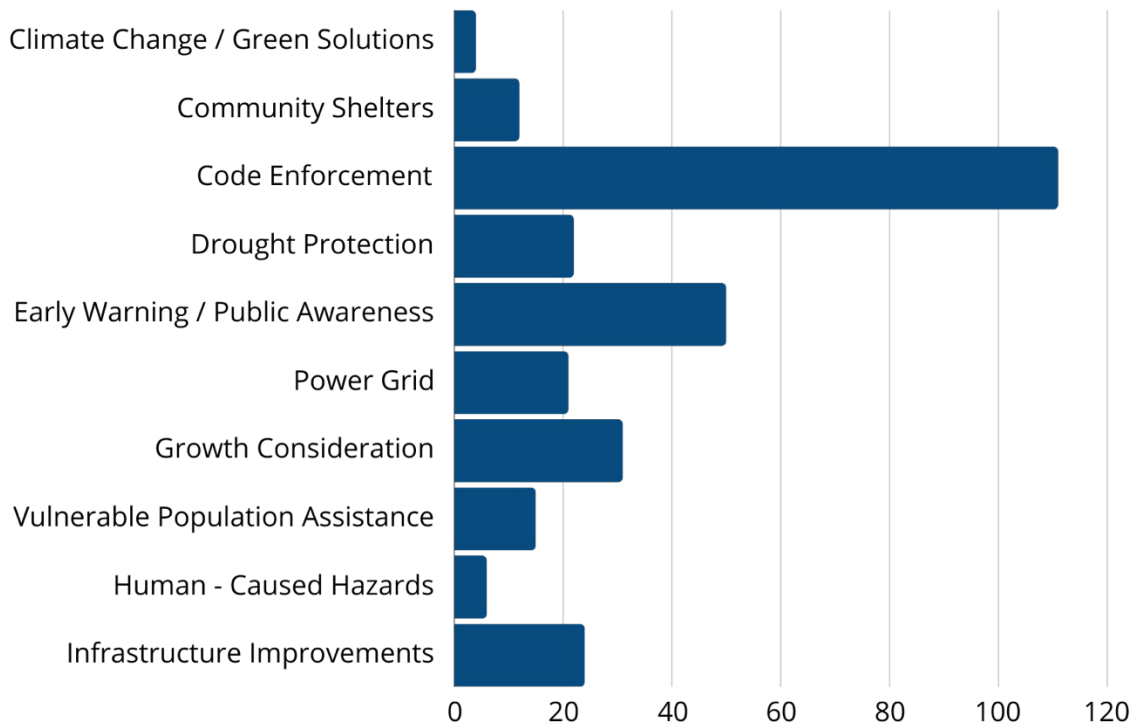
Texts

APPENDIX B: PUBLIC SURVEY RESULTS

Steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood:

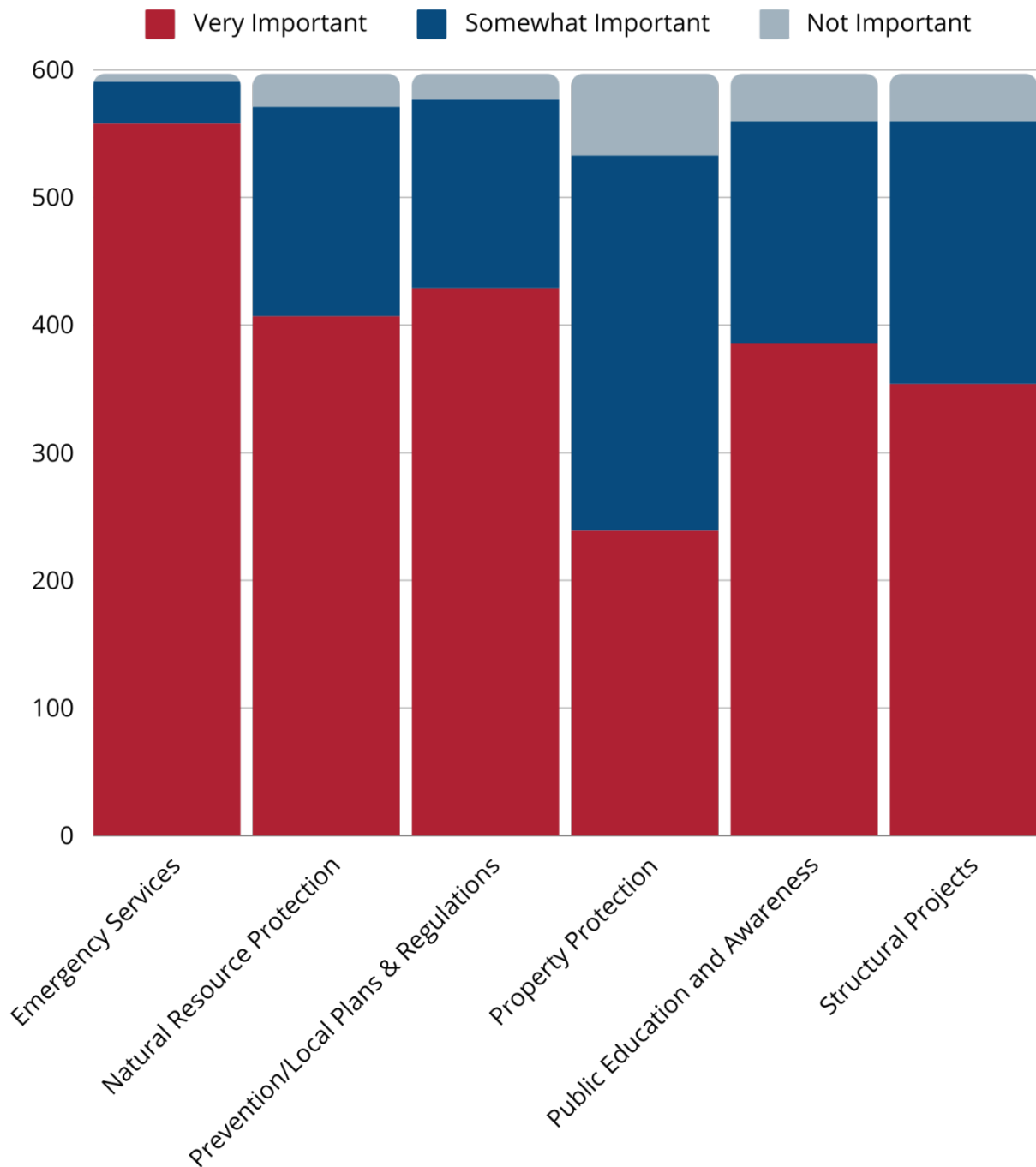


Are there any other issues regarding the reduction of risk and loss associated with hazards or disaster in the community that you think are important?



APPENDIX B: PUBLIC SURVEY RESULTS

A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.



APPENDIX B: PUBLIC SURVEY RESULTS

Emergency Services - Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical facilities or systems.

Natural Resource Protection - Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.

Prevention / Local Plans & Regulations - Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.

Property Protection - Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.

Public Education and Awareness - Actions to inform citizens about hazards and techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials, and demonstration events.

Structural Projects - Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, seawalls detention / retention basins, channel modification, retaining walls, and storm sewers.



APPENDIX C

CRITICAL FACILITIES

APPENDIX C: CRITICAL FACILITIES

Overview	1
Critical Facilities	1

OVERVIEW

Appendix C is **For Official Use Only (FOUO)** and may be exempt from public release under FOIA. Figures C-1 through C-14 locate all critical facilities that were included in the risk assessment. Mapped facilities were provided by Planning Team members. Tables C-1 through C-14 note the critical facilities by type.

CRITICAL FACILITIES

Figure C-1. Critical Facilities in Bell County

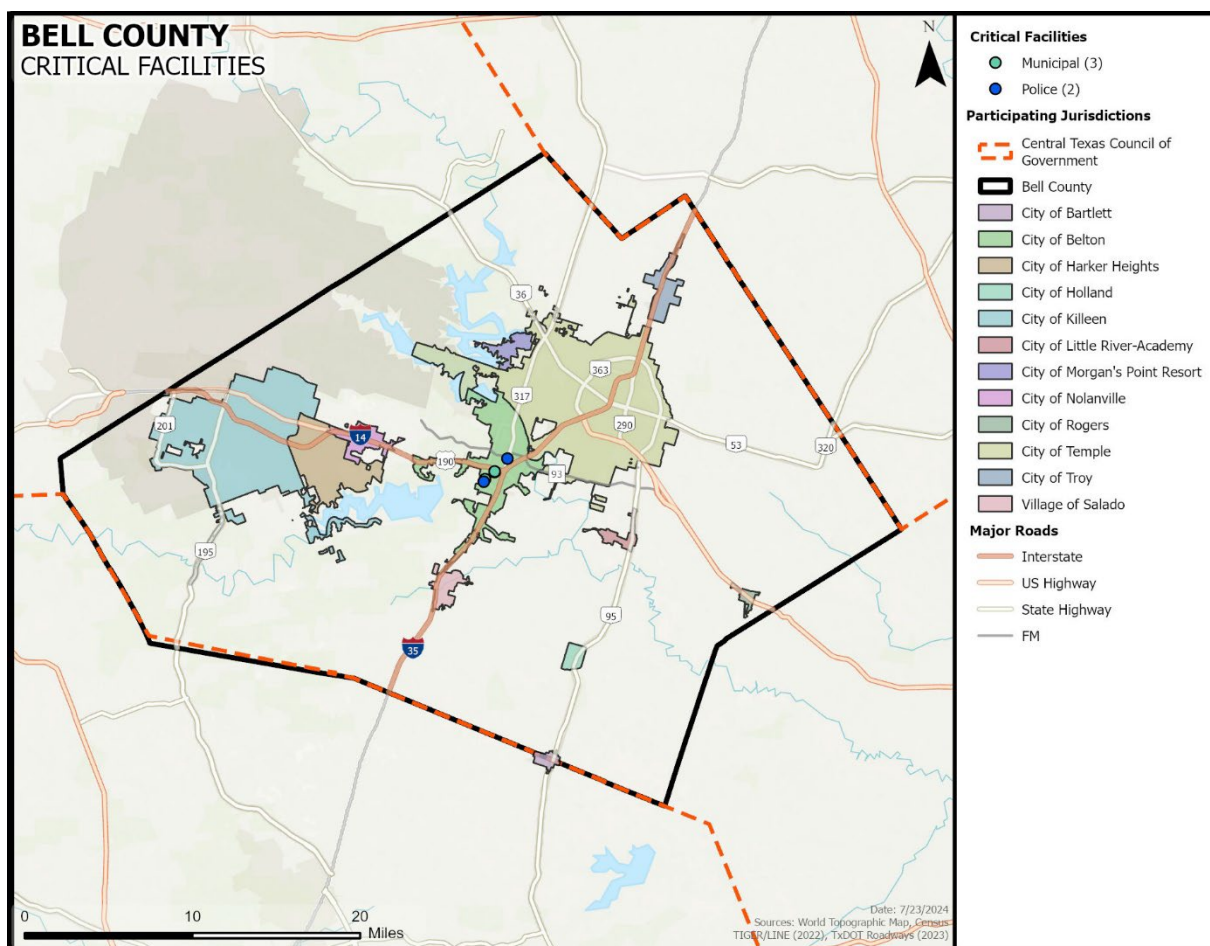


Table C-1. Critical Facilities by Type in Bell County

TYPE	NUMBER
Municipal	3
Police	2

APPENDIX C: CRITICAL FACILITIES

Figure C-2. Critical Facilities in the City of Bartlett

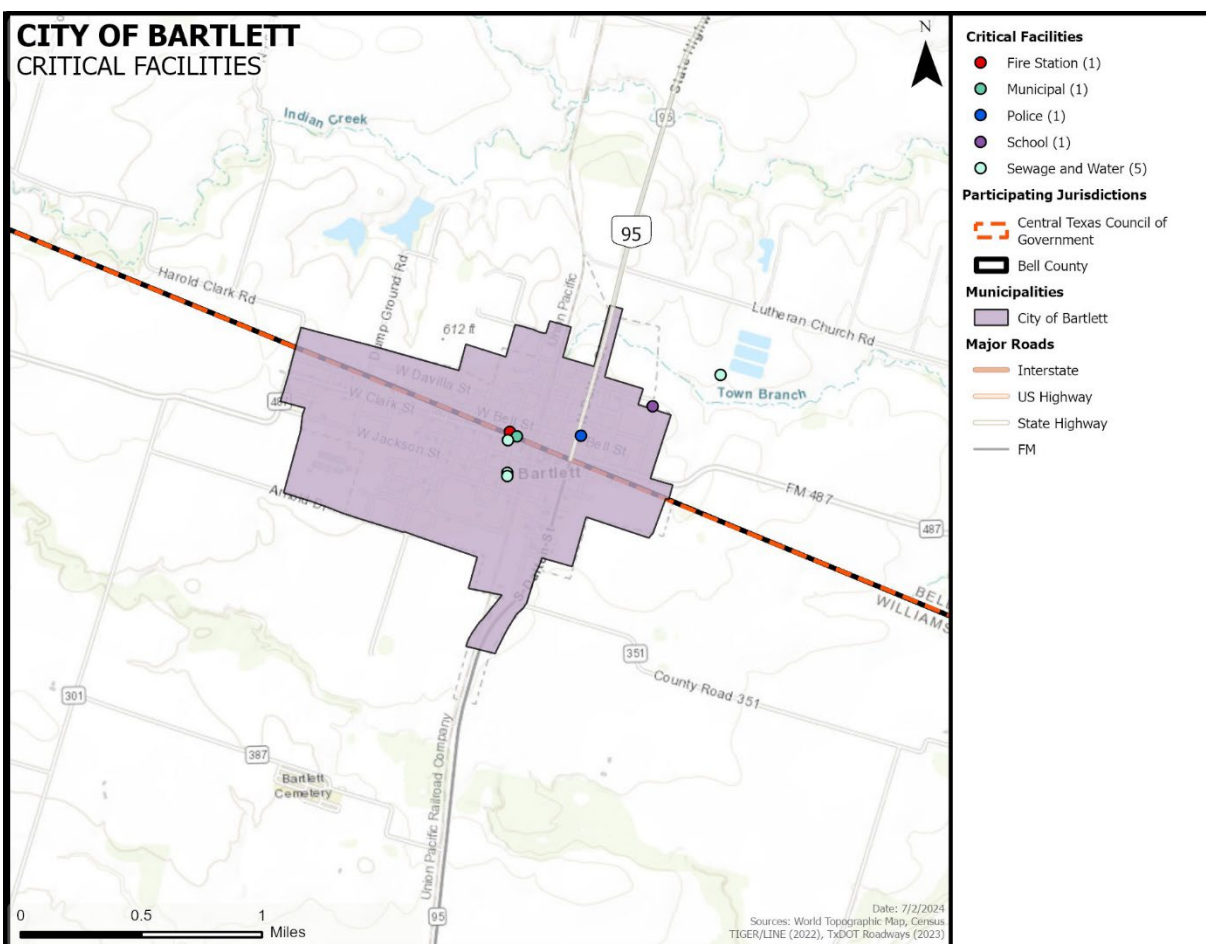


Table C-2. Critical Facilities by Type in the City of Bartlett

TYPE	NUMBER
Fire Station	1
Municipal	1
Police Station	1
School	1
Sewage and Water -Lift Station	2
Sewer and Water – Water Treatment Plant	1
Sewer and Water – Well	2

APPENDIX C: CRITICAL FACILITIES

Figure C-3. Critical Facilities in the City of Belton

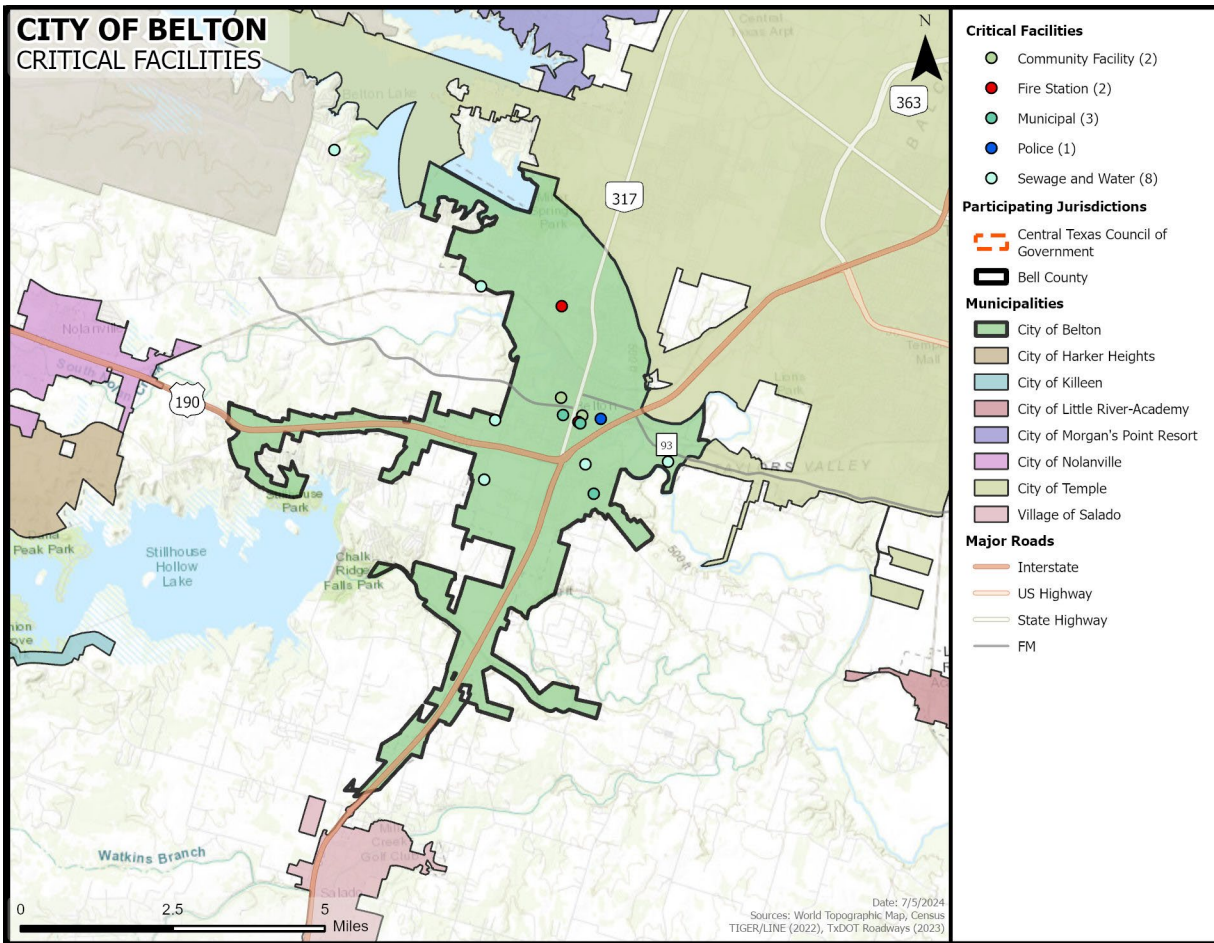


Table C-3. Critical Facilities by Type in the City of Belton

TYPE	NUMBER
Community Facility	2
Fire Station	2
Municipal	3
Police Station	1
Sewage and Water – Pump Station	2
Sewage and Water – Wastewater Treatment Plant	1
Sewage and Water – Water Tank/Tower	5

APPENDIX C: CRITICAL FACILITIES

Figure C-4. Critical Facilities in the City of Harker Heights

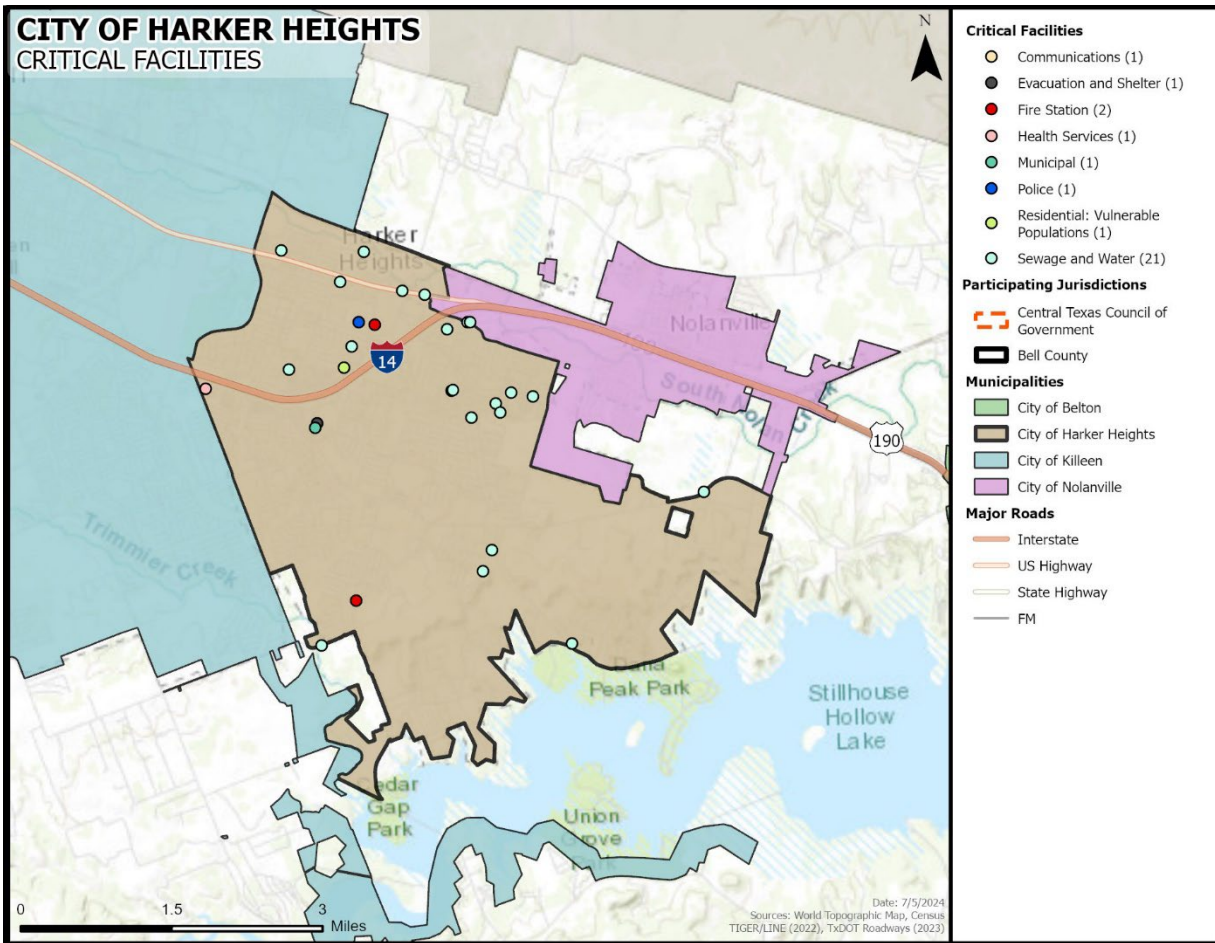


Table C-4. Critical Facilities by Type in the City of Harker Heights

TYPE	NUMBER
Communication	1
Evacuation and Shelter	1
Fire Station	2
Health Services	1
Municipal	1
Police Station	1
Residential: Vulnerable Populations	1
Sewer and Water – Lift Station	13
Sewer and Water – Pump Station	8

APPENDIX C: CRITICAL FACILITIES

Figure C-5. Critical Facilities in the City of Holland

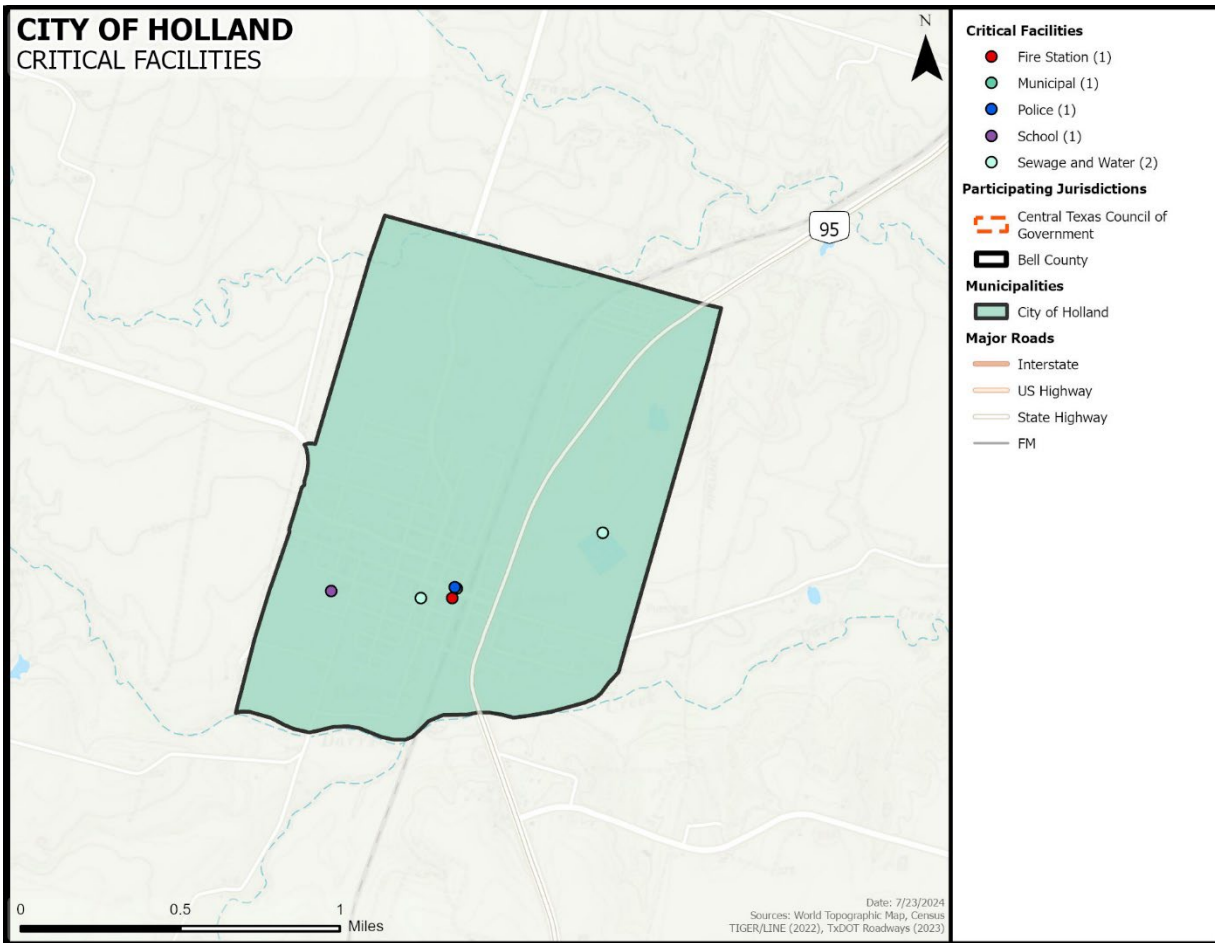


Table C-5. Critical Facilities by Type in the City of Holland

TYPE	NUMBER
Fire Station	1
Municipal	1
Police Station	1
School	1
Sewage and Water – Wastewater Treatment Plant	1
Sewage and Water – Water Treatment Plant	1

APPENDIX C: CRITICAL FACILITIES

Figure C-6. Critical Facilities in City of Killeen

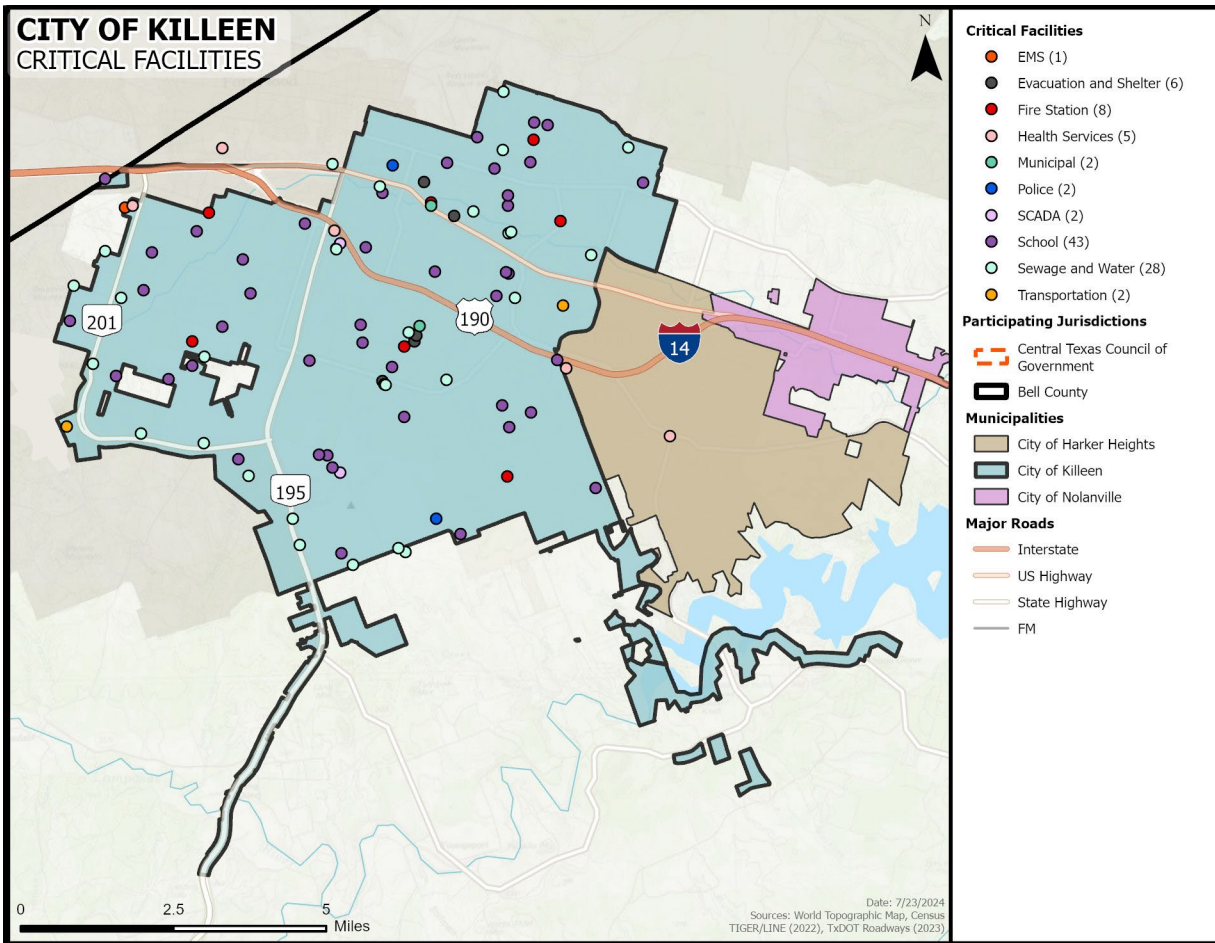


Table C-6. Critical Facilities by Type in City of Killeen

TYPE	NUMBER	TYPE	NUMBER
EMS	1	Supervisory Control and Data Acquisition Systems (SCADA) Control Room (SCADA)	2
Evacuation and Shelter	6	School	43
Fire Station	8	Sewer and Water – Lift Station	16
Health Services	5	Sewer and Water – Pump Station	6
Municipal	2	Sewer and Water – Water Tank/Tower	6
Police Station	2	Transportation - Air	2

APPENDIX C: CRITICAL FACILITIES

Figure C-7. Critical Facilities in the City of Little River Academy

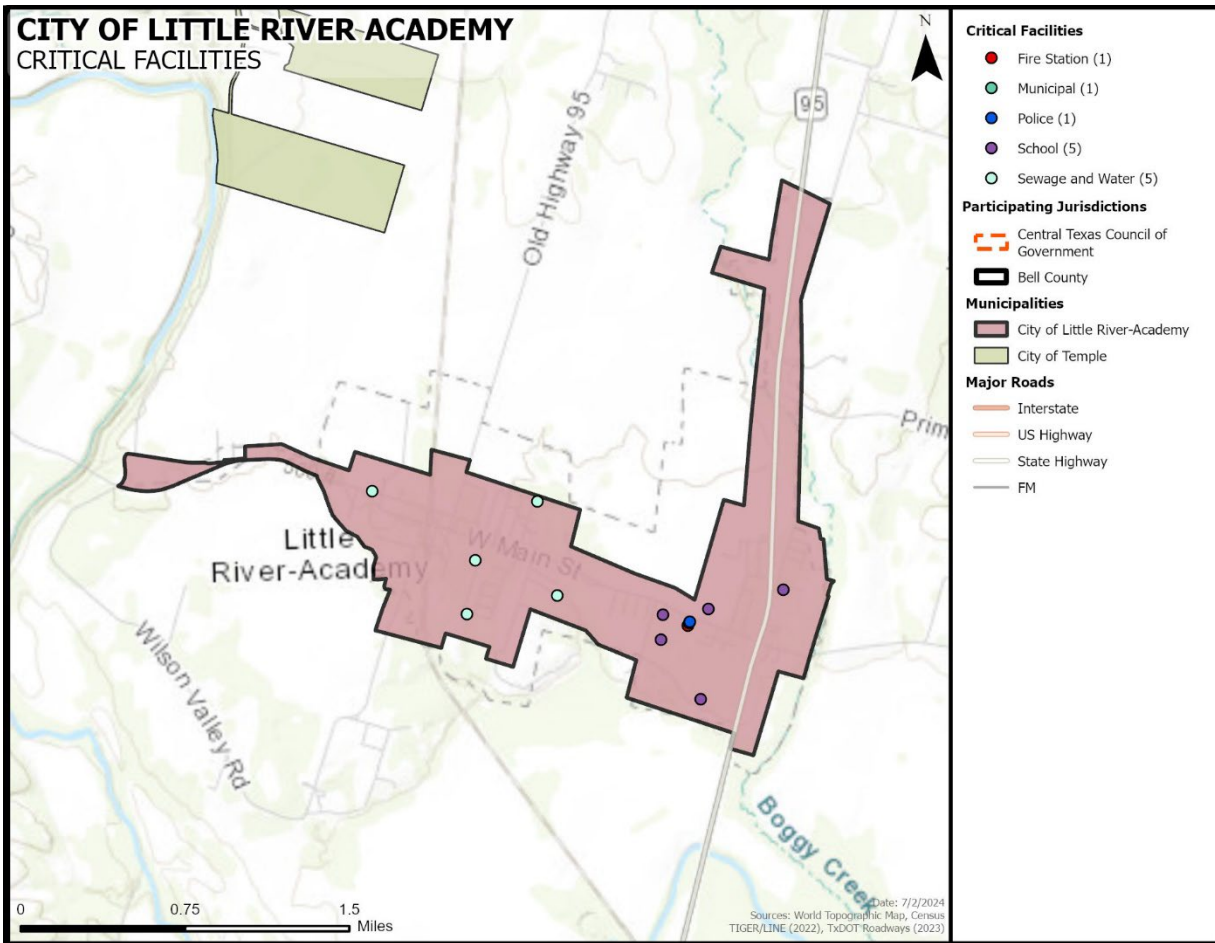


Table C-7. Critical Facilities by Type in the City of Little River Academy

TYPE	NUMBER
Fire Station	1
Municipal	1
Police Station	1
School	5
Sewer and Water – Administration/Department Building	1
Sewer and Water – Lift Station	4

APPENDIX C: CRITICAL FACILITIES

Figure C-8. Critical Facilities in the City of Morgan's Point Resort

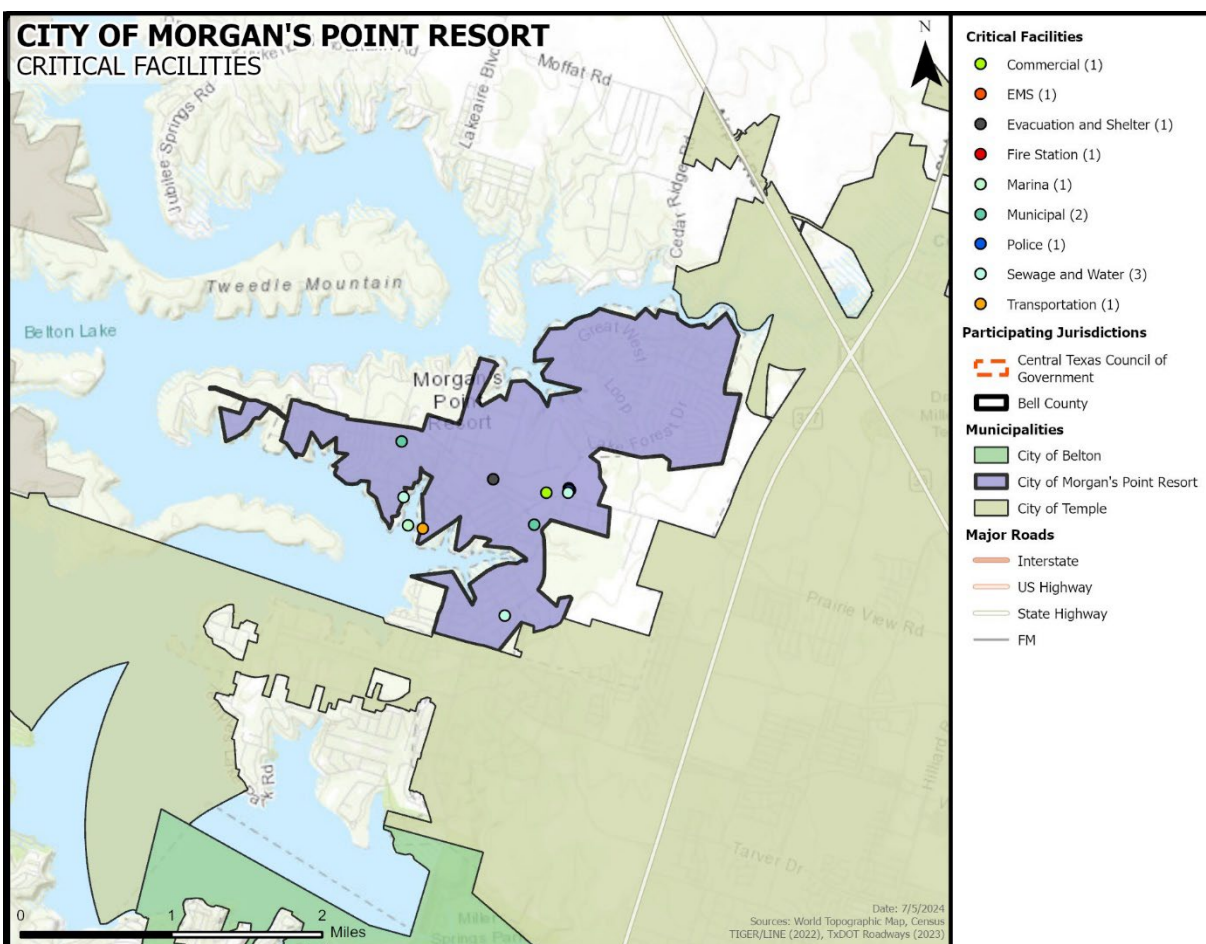


Table C-8. Critical Facilities by Type in the City of Morgan's Point Resort

TYPE	NUMBER	TYPE	NUMBER
Commercial	1	Municipal	2
EMS	1	Police	1
Evacuation and Shelter	1	Sewer and Water – Wastewater Treatment Plant	1
Fire Station	1	Sewage and Water – Water Tank/Tower	2
Marina	1	Transportation – Marina Fuel Station	1

APPENDIX C: CRITICAL FACILITIES

Figure C-9. Critical Facilities in the City of Nolanville

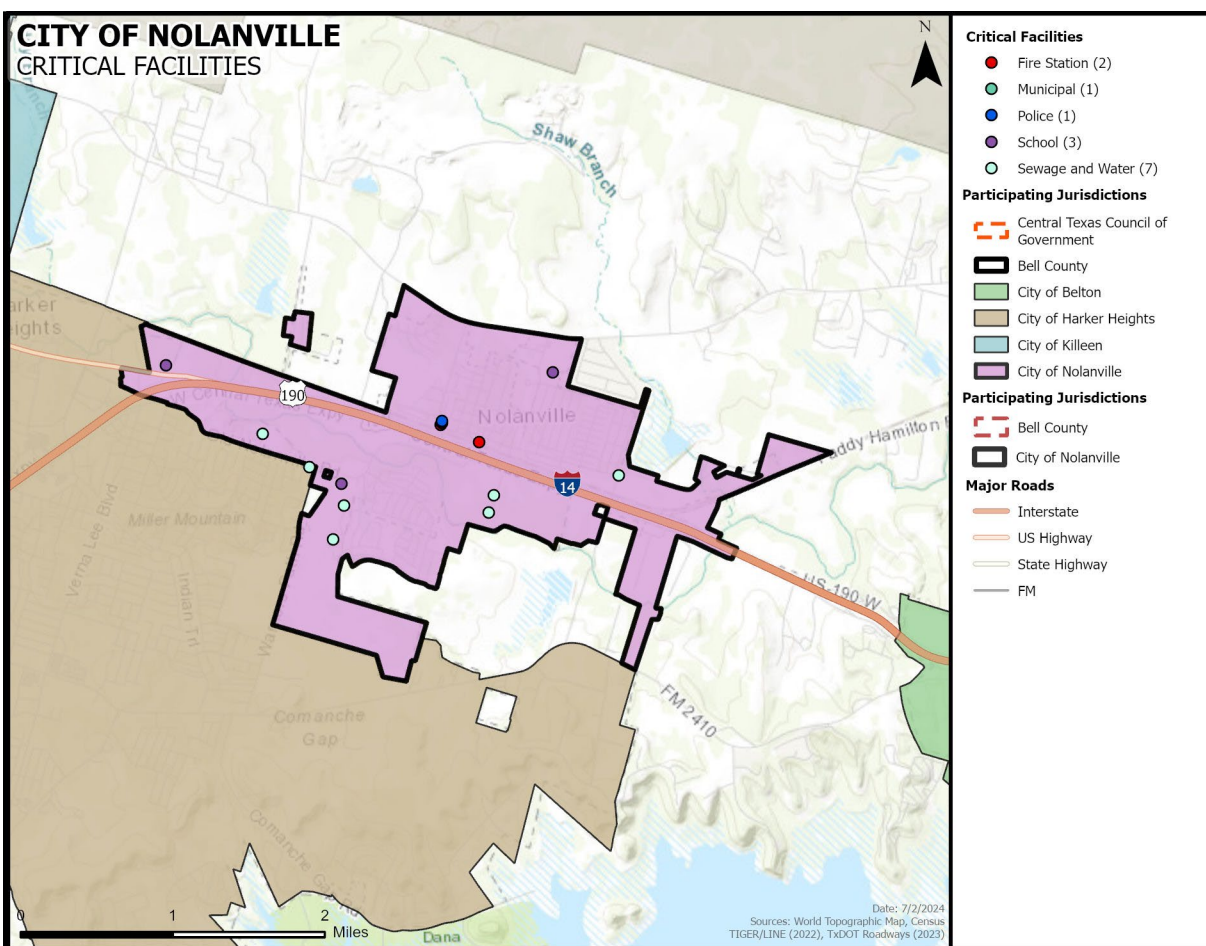


Table C-9. Critical Facilities by Type in the City of Nolanville

TYPE	NUMBER	TYPE	NUMBER
Fire Station	2	Sewage and Water - Lift Station	3
Municipal	1	Sewage and Water – Pump Station	2
Police Station	1	Sewage and Water – Wastewater Treatment Plant	1
School	3	Sewage and Water – Water Tank/Tower	1

APPENDIX C: CRITICAL FACILITIES

Figure C-10. Critical Facilities in the City of Rogers

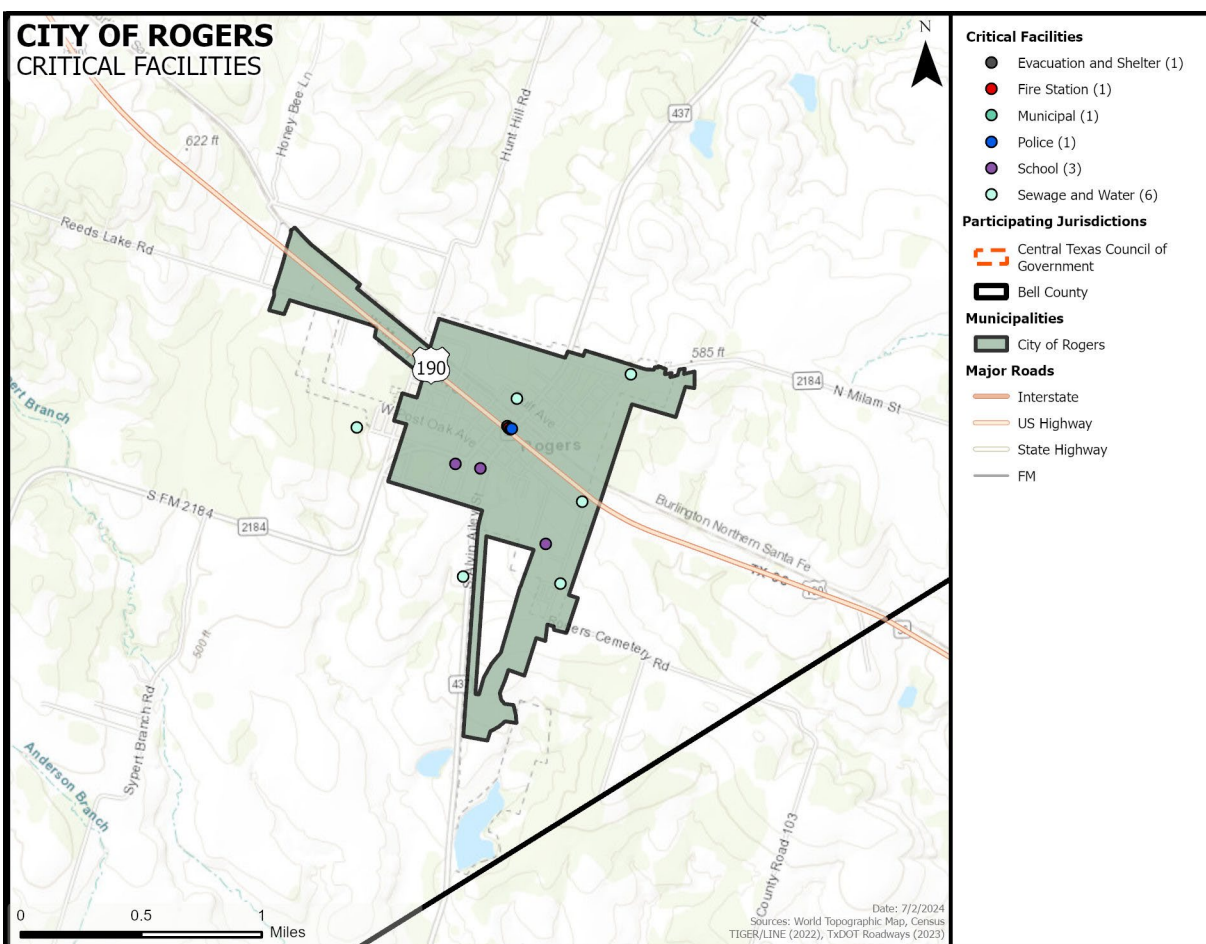


Table C-10. Critical Facilities by Type in the City of Rogers

TYPE	NUMBER
Evacuation and Shelter	1
Fire Station	1
Municipal	1
Police Station	1
School	3
Sewage and Water – Lift Station	3
Sewage and Water – Wastewater Treatment Plant	1
Sewage and Water – Water Tank/Tower	2

APPENDIX C: CRITICAL FACILITIES

Figure C-11. Critical Facilities in the Village of Salado

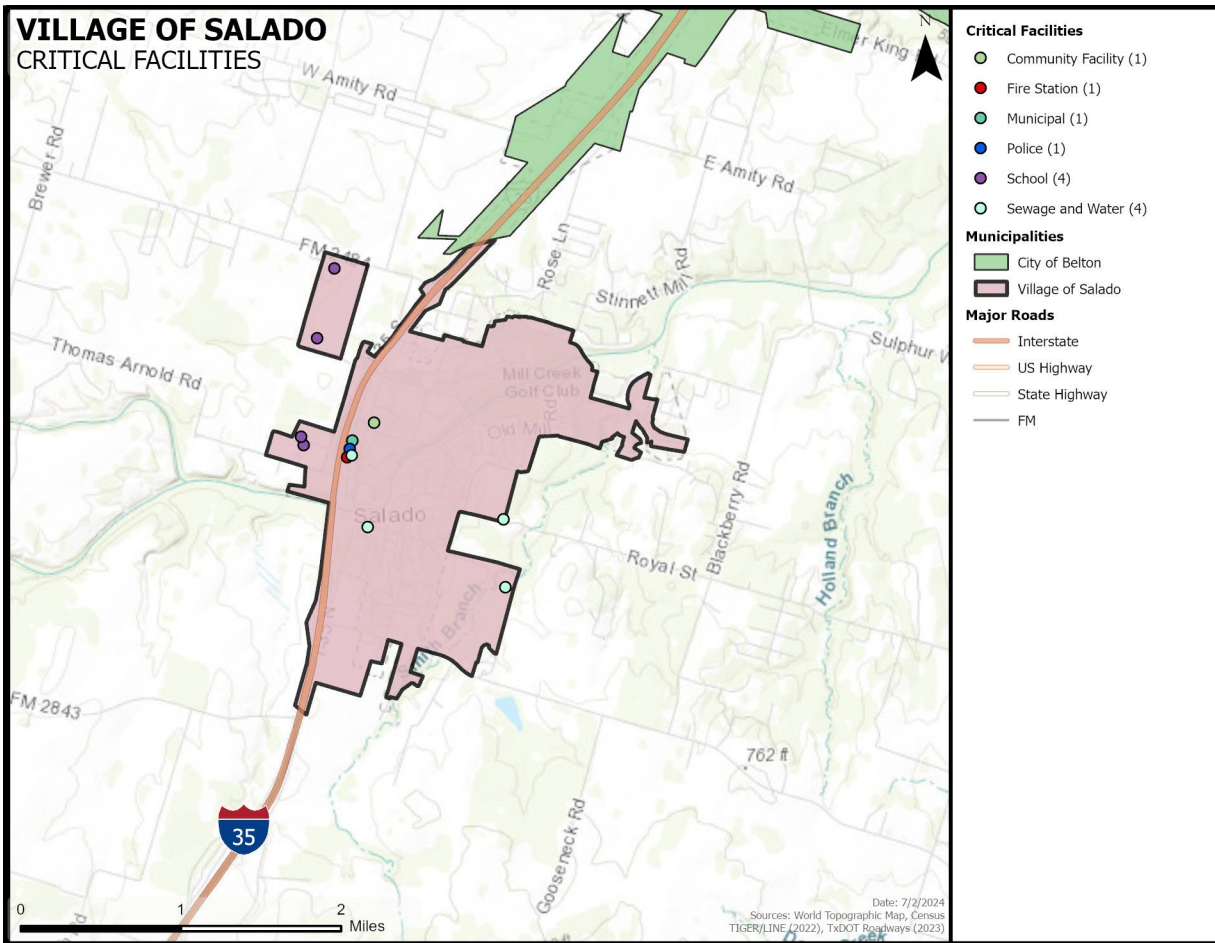


Table C-11. Critical Facilities by Type in the Village of Salado

TYPE	NUMBER
Community Facility	1
Fire Station	1
Municipal	1
Police Station	1
School	4
Sewage and Water – Lift Station	3
Sewage and Water – Wastewater Treatment Plant	1

APPENDIX C: CRITICAL FACILITIES

Figure C-12. Critical Facilities in the City of Temple

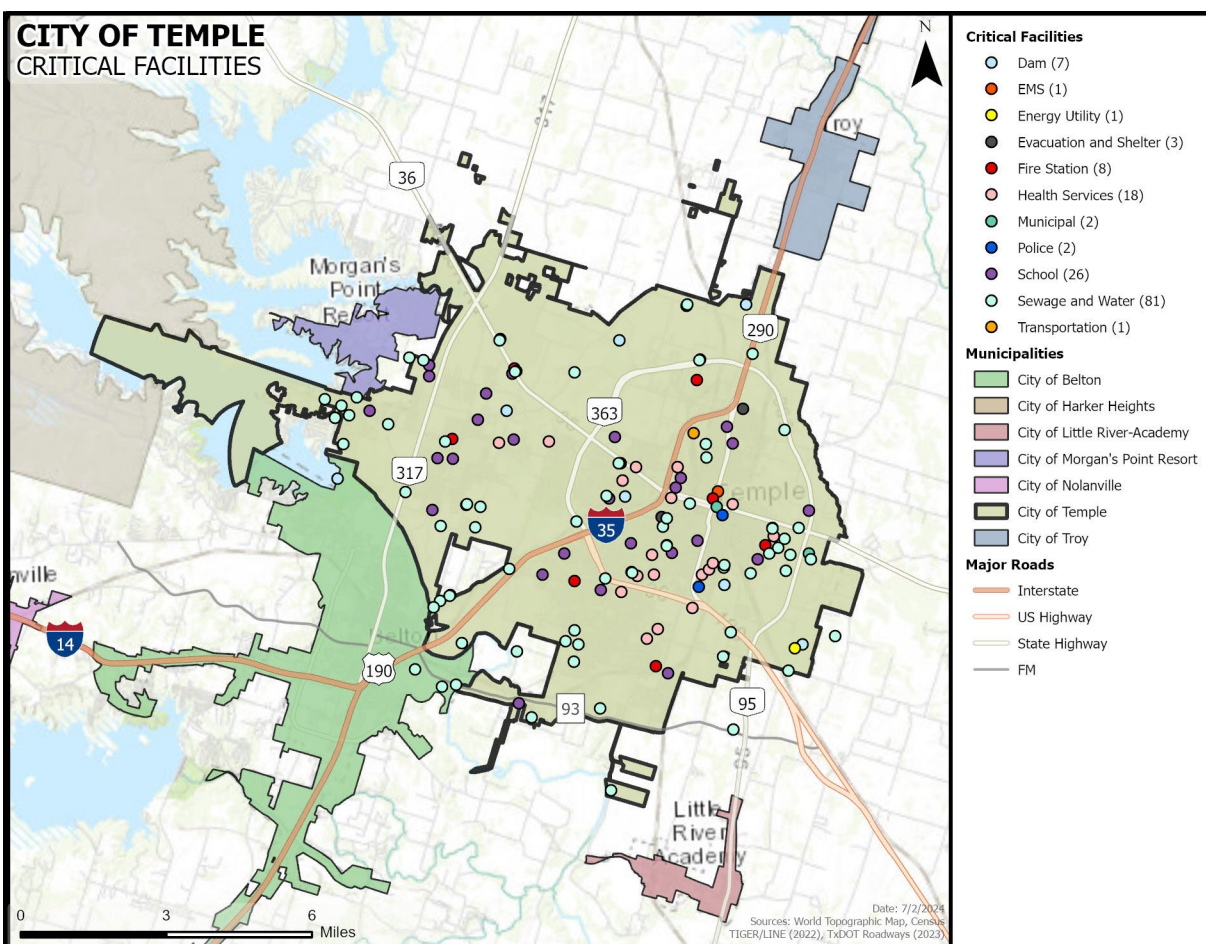


Table C-12. Critical Facilities by Type in the City of Temple

TYPE	NUMBER	TYPE	NUMBER
Dam	7	School	26
EMS	1	Sewage and Water – Lift Station	39
Energy Utility	1	Sewage and Water – Pump Station	25
Evacuation and Shelter	3	Sewage and Water - Wastewater Treatment Plant	2
Fire Station	8	Sewage and Water – Water Tank/Tower	13
Health Services	18	Sewage and Water - Water Treatment Plant	2
Municipal	2	Transportation - Train	1
Police Station	2		

APPENDIX C: CRITICAL FACILITIES

Figure C-13. Critical Facilities in the City of Troy

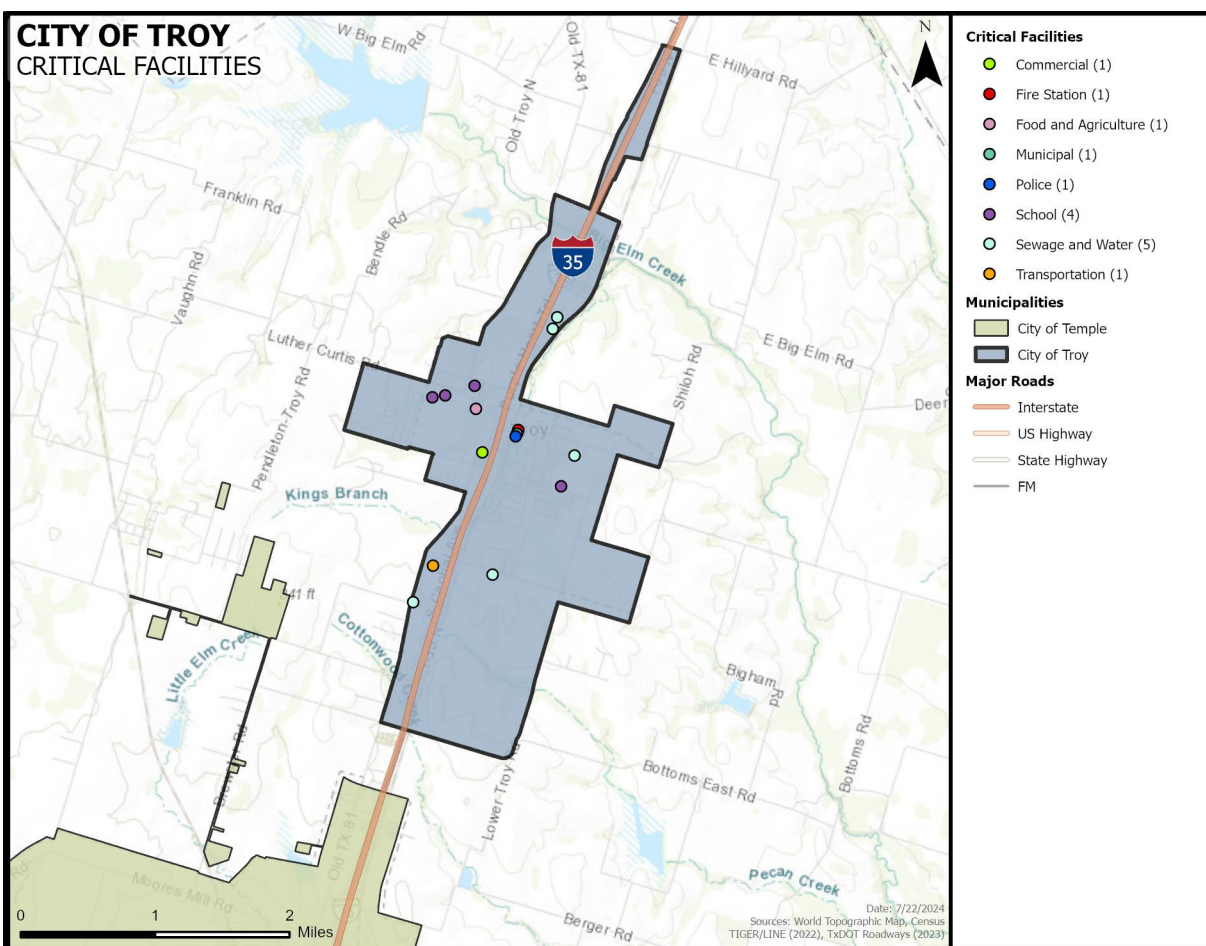


Table C-13. Critical Facilities by Type in the City of Troy

TYPE	NUMBER	TYPE	NUMBER
Commercial	1	School	4
Food and Agriculture	1	Sewage and Water - Wastewater Treatment Plant	1
Fire Station	1	Sewage and Water - Water Tank/Tower	2
Municipal	1	Sewage and Water - Well	2
Police	1	Transportation - Fuel Station	1

APPENDIX C: CRITICAL FACILITIES

APPENDIX C: CRITICAL FACILITIES

Figure C-14. Critical Facilities in Central Texas Council of Government (CTCOG)

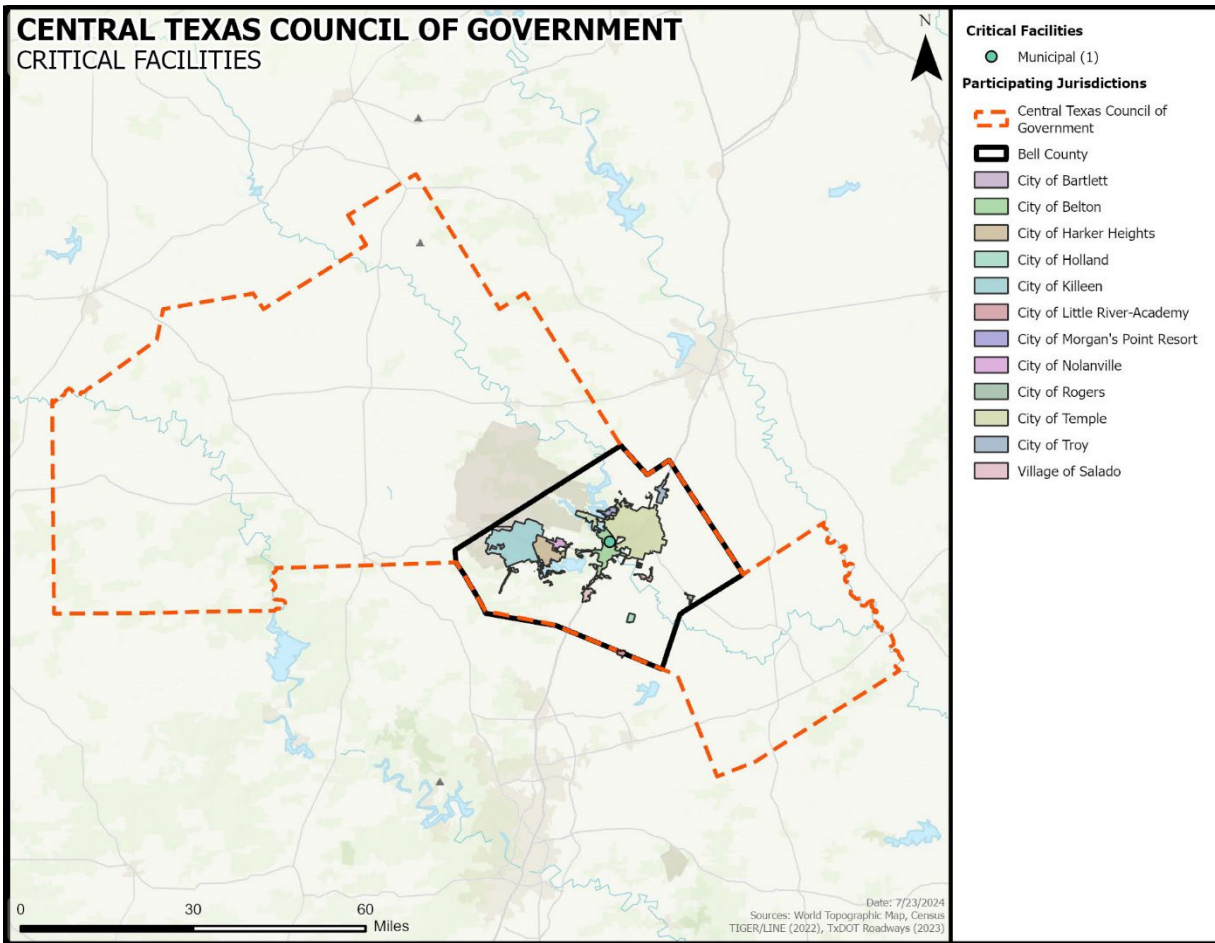


Table C-14. Critical Facilities by Type in Central Texas Council of Government (CTCOG)

TYPE	NUMBER
Regional / Municipal	1



APPENDIX D

DAM LOCATIONS

APPENDIX D: DAM LOCATIONS

Overview	1
Dam Locations	1

OVERVIEW

Appendix D is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

DAM LOCATIONS

Table D-1 below reflects all dams that are located in the participating jurisdictions within the Bell County Hazard Mitigation Action Plan Update 2025. This list includes High, Significant, and Low Hazard Dams. Section 5 of the Plan doesn't profile dams that were deemed to pose no past, current, or future risk to the planning area as no loss of life or impact to critical facilities or infrastructure is expected in the event of a breach. The asterisk denotes those that were profiled in the hazard assessment.

Table D-1. List of Dam Locations and Storage Capacities

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Bell County	31.0224	-97.531	200	1,013,800
Bell County*	31.0333	-97.533	200	1,013,800
Bell County	31.246	-97.534	31	211
Bell County*	31.2404	-97.312	74	18,300
Bell County*	30.9065	-97.232	22	216
Bell County	30.8373	-97.332	38	2,998
Bell County	30.8405	-97.319	39	3,009
Bell County	31.1634	-97.312	39	1,126.7
Bell County	31.2295	-97.303	49	716
Bell County	31.0715	-97.172	29	894
Bell County	31.0564	-97.165	34	841
Bell County	31.0318	-97.151	39	1,105
Bell County	30.994	-97.223	35	704
Bell County	31.1586	-97.284	35	1,813
Bell County	31.1724	-97.346	41	488
Bell County	31.0031	-97.765	25	61
Bell County	31.0507	-97.307	16	74.2

APPENDIX D: DAM LOCATIONS

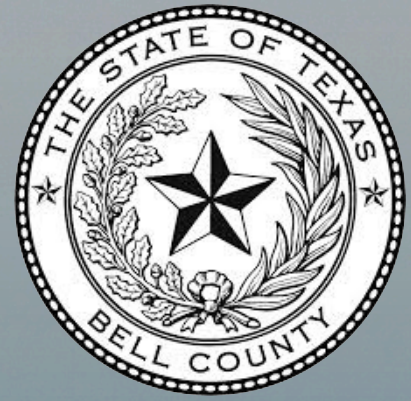
JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Bell County	30.9712	-97.245	28	1,832
Bell County	30.9504	-97.213	26	271
Bell County	30.9782	-97.211	28	312
Bell County	30.9267	-97.523	24	76
Bell County	30.81	-97.325	39	2,003
Bell County	30.8125	-97.303	36	981
Bell County	31.1394	-97.314	24	259
Bell County	31.025	-97.261	23	863
Bell County	31.0245	-97.247	28	796
Bell County	31.1286	-97.202	24	1,110
Bell County	31.1212	-97.193	21	220
Bell County	31.0918	-97.191	23	2,750
Bell County	31.0929	-97.173	23	350.5
Bell County	30.9976	-97.128	30	1,818.5
Bell County	30.9531	-97.206	25	183
Bell County	31.1745	-97.273	42	715
Bell County	30.9792	-97.269	18	83
Bell County	31.0539	-97.151	14	64
Bell County	30.7931	-97.372	31	20
Bell County	30.9608	-97.25	20	80
Bell County	30.9631	-97.245	18	187
Bell County	30.9703	-97.256	24	336
Bell County	31.1063	-97.6	16	53
Bell County	30.8905	-97.285	20	165
Bell County	31.0649	-97.442	11	480
Bell County	31.1963	-97.226	7	56
Bell County	30.9568	-97.185	17	91

APPENDIX D: DAM LOCATIONS

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Bell County	31.0985	-97.213	22	1,650
City of Belton*	31.1085	-97.473	192	1,876,700
City of Belton	31.0761	-97.582	44	1,421
City of Belton	31.0798	-97.563	31	1,229
City of Belton	31.0824	-97.554	45	721
City of Belton	31.0697	-97.54	29	485
City of Belton	31.0677	-97.506	50	879
City of Belton	31.0627	-97.595	40	1,543
City of Belton*	31.1576	-97.663	24	490
City of Belton	31.1582	-97.619	44	2,900
City of Belton*	31.1333	-97.61	30	236
City of Belton*	31.1299	-97.568	62	6,025
City of Belton	31.1483	-97.745	13	211
City of Belton	31.148	-97.738	9	24
City of Killeen*	31.1165	-97.769	49	4,758
City of Killeen	31.0855	-97.679	19	243
City of Killeen*	31.1431	-97.701	32	1,189
City of Killeen	31.0958	-97.824	21	135
City of Killeen	31.092	-97.826	21	106
City of Killeen	31.0841	-97.823	7	107.52
City of Nolanville	31.1078	-97.671	31	1,211
City of Nolanville	31.0973	-97.653	46	1,953
City of Nolanville	31.0899	-97.628	46	1,543
Village of Salado	30.9412	-97.547	31	383
City of Temple*	31.1012	-97.373	30	778.5
City of Temple	31.074	-97.34	20	160
City of Temple*	31.148	-97.374	25	255.9
City of Temple	31.1278	-97.414	19	353.7

APPENDIX D: DAM LOCATIONS

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
City of Temple	31.1577	-97.329	48	856
City of Temple	31.0528	-97.313	15	150.6
City of Temple	31.0548	-97.311	10	108.3
City of Temple	31.0556	-97.313	13	123.3



APPENDIX E **MEETING DOCUMENTATION**

APPENDIX E: MEETING DOCUMENTATION


Workshop Documentation.....	1
Public Meeting Documentation	9
Public Notices	12

WORKSHOP DOCUMENTATION


Appendix E is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

In coordination with the Central Texas Council of Governments, Bell County held a series of Planning Team workshops: a Kickoff Workshop on July 25, 2023, a Risk Assessment Workshop October 11, 2023, and a Mitigation Strategy Workshop on December 7, 2023. At each of these workshops members of the Planning Team were informed of the planning process, expressed opinions, and volunteered information. Bell County and the three other participating counties hosted public meetings throughout the area. The sign-in sheets for each workshop and public meeting are included below. For more details on the workshops and planning process, see Section 2. The City of Holland was unable to attend workshops throughout the planning process. The Consultant Team followed up with the City of Holland to review information discussed and gather documents that were collected during the workshops.

Figure E-1. Bell County Kickoff Workshop, July 25, 2023



BELL COUNTY HAZARD MITIGATION PLAN
Kick-Off Workshop
 Central Texas Council of Governments, Conference Room D-9
 2180 N. Main St., Belton TX 76513
 July 25th, 2023 @ 11 AM



Name	Jurisdiction	Title	Email	Phone
Robert Cunningham	Nolanville	Fire Chief	rcunningham@nolanvilletx.gov	254-698-6385
Amanda Valenz	Nolanville	Public Works	alexis7844@gmail.com	612-271-8000
Chris Atkinson	Nolanville	Public Works	c.atkinson@nolanvilletx.gov	254-258-0187
Shannon Stephens	Harker Heights	Fire Chief	sstephens@harkerheights.gov	469-450-1327
Amy Laws	Bell Co.	Emergency Services	Amy.Laws@bellcounty.texas.gov	254-933-6070
Jesse Measles	City of Morgan's Point Resort	Utility Director	jesse.measles@morgan.us	254-534-2405
Kristen Kranitz	COHH	Planning Director	kranitz@harkerheights.gov	254-953-9163
Gary Smith	City of Troy	City Administrator	gsmith@cityoftroy.us	254-938-2505
Dalton Rice	City of Morgan's Point Resort	City Manager	citymanager@morgan.us	254-346-4101
Jon Fortenot	City of Belton	Fire Chief	jfortenot@beltontexas.gov	254-317-1809

APPENDIX E: MEETING DOCUMENTATION



BELL COUNTY HAZARD MITIGATION PLAN
Kick-Off Workshop
Central Texas Council of Governments, Conference Room D-9
2180 N. Main St., Belton TX 76513
July 25th, 2023 @ 11 AM



Name	Jurisdiction	Title	Email	Phone
Dorise Adams	BCSD	CAPT	Dorise.Adams@bellcountytx.gov	254-271-6146
Bob Reinhardt	Bell County	EMC	bob.reinhardt@bellcountytx.gov	254-8641
Brian Fackler	City of Killeen	Sr. EM Specialist	BFackler@killeentexas.gov	254-200-7929
Edwin Revell	City of Killeen	ED Development Services	edwinrevell@killeentexas.gov	254-597-7655
Shawn Reynolds	City of Temple	Chief	sreynolds@templetx.gov	254-298-5552
David K. Leigh	City of Belton	Mayor	dkleigh@shirbranch.tx.gov	(254) 718-2081
Chris Mathis	Bell County	Fire Marshal	CHRIS.MATHIS@BELL-COUNTY.TX.GOV	254-933-5589
Jennifer Henager	City of Temple	Emergency Mgmt	jhenager@templetx.gov	254-654-4648



BELL COUNTY HAZARD MITIGATION PLAN
Kick-Off Workshop
Central Texas Council of Governments, Conference Room D-9
2180 N. Main St., Belton TX 76513
July 25th, 2023 @ 11 AM



Name	Jurisdiction	Title	Email	Phone
Russ Nelson	Little River Academy	Council Member	russ.nelson@lraacademy.us	254-534-1110
Rhonda Murphy	H2O Partners	Mitigation Planner	R.Murphy@H2OPartnersusa.com	512-571-2058
Will Parker	H2O Partners	Mitigation Specialist	wparker@H2OPartnersusa.com	817-470-1484
Pam Hawley	H2O	Dir. of Ops.	pam@H2OPartnersusa.com	512-750-6044

APPENDIX E: MEETING DOCUMENTATION



BELL COUNTY HAZARD MITIGATION PLAN
Kick-Off Workshop
Virtual Attendance
Zoom
July 25th, 2023 @ 11 AM



Name	Jurisdiction	Title	Email	Phone
Teresa Chandler	Nolanville	City Secretary	tchandler@nolanvillex.gov	254-698-6335
Andrew Zagars	Killeen	City Engineer	azagars@killeentexas.gov	254-616-3179
Rebecca Eaton	Bell County	OEM Admin. Asst	Rebecca.Eaton@bellcounty.texas.gov	254-933-5518
Alexander Tucker	Killeen	N/A	Atucker@killeentexas.gov	N/A
Anthony Marin	Killeen	N/A	amarin@killeentexas.gov	N/A
Anysia Jones	Little River Academy	City Secretary	citysecretary@littleriveracademy.us	254-982-4248
Betiale Hawkins II	Harker Heights	Chief of Police	bhawkins@harkerheights.gov	254-953-5400
Chad Parsons	Temple	N/A	cparsons@templetx.gov	N/A
Christopher Noll	Killeen	Manager of Mowing and Drainage	cnoll@killeentexas.gov	254-501-8895
Debbie Nash-King	Killeen	Mayor	mayor@killeentexas.gov	254-290-4510



BELL COUNTY HAZARD MITIGATION PLAN
Kick-Off Workshop
Virtual Attendance
Zoom
July 25th, 2023 @ 11 AM



Name	Jurisdiction	Title	Email	Phone
Don Ferguson	Salado	Village Administrator	dferguson@saladotx.gov	254-947-5060
Ebony Jackson	Bell County	Indigent Health Services Director	ebony.jackson@bellcounty.texas.gov	N/A
Emma Bouton	Killeen	Financial Analyst	ebouton@killeentexas.gov	254-501-7742
Jesse Hennage	CTCOG	Emergency Services Program Manager	jesse.hennage@ctcog.org	254-770-2365
Jim Franz	Salado	Fire Chief	saladofiredept@yahoo.com	254-947-8961
Joe Stuart	Killeen	Response Coordinator	jstuart@killeentexas.gov	254-501-6587
Kent Cagle	Killeen	City Manager	kcagle@killeentexas.gov	254-501-7700
Latashia Cherry	Killeen	Controller	lcherry@killeentexas.gov	254-501-7790
Marcie Seele	Belton	PW Program Manager	mseele@beltontexas.gov	
Matthew Schuetze	Morgan's Point Resort	Chief of Police	Matthew.Schuetze@mprtx.us	254-742-3255

APPENDIX E: MEETING DOCUMENTATION



BELL COUNTY HAZARD MITIGATION PLAN
Kick-Off Workshop
Virtual Attendance
Zoom
July 25th, 2023 @ 11 AM



Name	Jurisdiction	Title	Email	Phone
Mitch Randles	Temple	Fire Chief	mrandles@templetx.gov	254-298-5682
Peter Perez	Killeen	HSEM Director	pcperez@killeentexas.gov	254-200-7923
Philip Weaver	Bartlett	Acting Interim City Administrator / Mayor Pro-Tem	philip.weaver@bartlett-tx.us	254-527-3219
Tammy Cockrum	Rogers	City Administrator	cityadministrator@cityofrogerstx.gov	254-642-3312
Taran Vaszocz	Morgan's Point Resort	Fire Chief	taran.williams@mprtx.us	254-721-3975
Stevie-Ann O'Donnell	H2O Partners Inc.	Mitigation Outreach Specialist	shodgson@h2opartnersusa.com	631-921-2460

Figure E-2. Bell County Risk Assessment Workshop, October 11, 2023



BELL COUNTY HAZARD MITIGATION PLAN
Risk Assessment Workshop
Conference Room D-8
2180 N. Main St., Belton TX 76513
October 11th, 2023 @ 1 PM

Name	Jurisdiction	Title	Email
Jennifer Krager	City of Temple	EMC	jkrager@templetx.gov
Peter Perez	City of Killeen	Director	pcperez@killeentexas.gov
Robert Cunningham	Nolanville	Fire Chief	rcunningham@nolanvilletx.gov
Bob Reinhard	Bell Co.	EMC	bob.reinhard@bellcounty-texas.gov
Jesse Measles	Morgan's Point Resort	Utility Director	jesse.measles@mprtx.us
Kristina Kramer	City of Harker Heights	Planning Analyst	krainer@harkerheights.gov
Russ Nelson	City of Little River Academy	Councilman Mayor Pro Tem	russ.nelson@littleriveracademy.com
Jon Fontenot	Belton	Fire Chief	jfontenot@beltontx.gov
Chad Parsons	Temple	Assistant Director	cparsons@templetx.gov

APPENDIX E: MEETING DOCUMENTATION



BELL COUNTY HAZARD MITIGATION PLAN
Risk Assessment Workshop
Conference Room D-8
2180 N. Main St., Belton TX 76513
October 11th, 2023 @ 1 PM

Name	Jurisdiction	Title	Email
Rhonda Murphy	H2O Partners	Mitigation Planner	Rmurphy@H2Opartners.com
Will Parker	H2O Partners	Mitigation Specialist	wparker@H2Opartners.com



BELL COUNTY HAZARD MITIGATION PLAN
Risk Assessment Workshop
Virtual Attendance
Zoom
October 11th, 2023 @ 1:00 PM



Name	Jurisdiction	Title	Email	Phone
Don Bond	Temple	Director of Public Works	dbond@templetx.gov	n/a
Kevin Watkins	Killeen	Director of Code Enforcement	KWatkins@KilleenTexas.Gov	254-501-7611
Steven Kana	Killeen	Director of Water and Sewer	skana@killeentexas.gov	n/a
Brian O'Connor	Nolanville	Director of Economic Development	boconnor@nolanvilletx.gov	254-968-6335
Mitch Randles	Temple	Fire Chief	mrandles@templetx.gov	254-298-5682
Buford Craig	Temple	Director of Transform Temple	Bcraig@templetx.gov	254-298-5995
Jon Fontenot	Belton	Fire Chief/EMC	jfontenot@beltontexas.gov	254-933-5882
Kenton Moffett	Temple	Assistant Public Works Director	kmoffett@templetx.gov	n/a
Andrew Zagara	Killeen	City Engineer	azagara@killeentexas.gov	254-616-3179
Shawn Reynolds	Temple	Chief of Police	sreynolds@templetx.gov	254-298-5552

APPENDIX E: MEETING DOCUMENTATION



BELL COUNTY HAZARD MITIGATION PLAN
Risk Assessment Workshop
Virtual Attendance
Zoom
October 11th, 2023 @ 1:00 PM



Name	Jurisdiction	Title	Email	Phone
Bobby Whitson	Bell County	Commissioner, Pct.2	Bobby.whitson@bellcounty.texas.gov	254-933-5102
Kent Cagle	Killeen	City Manager	kcagle@killeentexas.gov	254-501-7700
Alex Gearhart	Killeen	Asst. Chief of Police	agearthart@killeentexas.gov	254-200-7989
Brian Fackler	Killeen	Senior Emergency Management Specialist	bfackler@killeentexas.gov	254-200-7924
Don Ferguson	Salado	Village Administrator	dferguson@saladotx.gov	254-534-9010
Edwin Revell	Killeen	Executive Director of Development Services	erevell@killeentexas.gov	254-501-7648
James Kubinski	Killeen	Fire Chief	jkubinski@killeentexas.gov	254-501-7671
Jeffery Reynolds	Killeen	Director of Public Works	jreynolds@killeentexas.gov	254-616-3180
Kara Escajeda	Nolanville	City Manager	kescajeda@nolanvilletx.gov	254-698-6335




BELL COUNTY HAZARD MITIGATION PLAN
Risk Assessment Workshop
Virtual Attendance
Zoom
October 11th, 2023 @ 1:00 PM




Name	Jurisdiction	Title	Email	Phone
Matthew Schuetze	Morgan's Point Resort	Chief of Police	Matthew.Schuetze@mprtx.us	254-742-3255
Mayra Cantu	Bartlett	City Administrator	Mayra.cantu@bartlett-tx.us	254-527-3219
Rebecca Eaton	Bell County	OEM Admin Asst	Rebecca.eaton@bellcounty.texas.gov	254-933-5518
Tammy Cockrum	Rogers	City Administrator	cityadministrator@cityofrogerstx.gov	254-642-3312
Taran Vaszocz	Morgan's Point Resort	Fire Chief	taran.williams@mprtx.us	254-780-1334
Joe Stuart	Killeen	Response Coordinator	jstuart@killeentexas.gov	254-501-6587
Stevie-Ann O'Donnell	H2O Partners	Mitigation Outreach Specialist	shodgson@h2opartnersusa.com	631-921-2460

APPENDIX E: MEETING DOCUMENTATION


Figure E-3. Bell County Mitigation Strategy Workshop, December 7, 2023




BELL COUNTY HAZARD MITIGATION PLAN
Mitigation Strategy Workshop
7268 Airport Road, Temple TX (Temple's Training Center)
Thursday, December 7th, 2023 @ 10 AM



Name	Jurisdiction	Title	Email	Phone
Rhonda Murphy	H2O Partners	Mitigation Planner	RMurphy@H2OPartnersusa.com	512-571-2020
Kristian Murman	H2O Partners	Mit. Specialist	kmurman@h2opartnersusa.com	254-422-1683
Jennifer Henner	City of Temple	EMC	jhenner@templetx.gov	254-654-4164
Jeff Clark	Temple PD	Deputy Chief	jclark@templetx.gov	254-278-5861
Jesse Hannon	CTCOG	Public Safety	jesse.hannon@ctcog.org	254-770-2365
Josua Menix	Nolanville	Patrol Chief	jmenix@nolanvilletx.gov	254-541-6899
Joel Seemst	Killeen PD	Deputy Chief	jseemst@killeentexas.gov	254-501-7679
Bob Reinhard	Bell Co. OEM	EMC	bob.reinhard@bellcountytx.gov	254-334-3343
Kristina Kramarz	City of Hobbs Heights	Planning	Kramarz@hobbsheights.org	254-453-5667
Sam Lute	City of Belton	City Mgr	slute@beltontx.gov	254-721-5522



BELL COUNTY HAZARD MITIGATION PLAN
Mitigation Strategy Workshop
7268 Airport Road, Temple TX (Temple's Training Center)
Thursday, December 7th, 2023 @ 10 AM



Name	Jurisdiction	Title	Email	Phone
Chad Parsons	TEMPLE	Assistant Director	Cparsons@templetx.gov	254-493-3298
Ralph Martinez	Temple	AD - Public Works	rafael.m@templetx.gov	254-278-5027
Peter Perez	Killeen	OHSEM Director	p.perez@killeentexas.gov	254-501-7706

APPENDIX E: MEETING DOCUMENTATION



BELL COUNTY HAZARD MITIGATION PLAN
Mitigation Strategy Workshop
Zoom Virtual Attendance
Thursday, December 7th, 2023 @ 10 AM



Name	Jurisdiction	Title	Email	Phone
Andrew Zagars	Killeen	City Engineer	azagars@killeentexas.gov	254-616-3179
Anysia Jones	Little River Academy	City Secretary	citysecretary@littleriveracademy.us	254-982-4248
Kenton Moffett	Temple	Assistant Director of Utilities- Water Distribution / Sewer Collection	kmoffett@templetx.gov	n/a
Rebecca Eaton	Bell County	EM Specialist	Rebecca.eaton@bellcounty.texas.gov	254-933-5518
Bobby Whitson	Bell County	Bell Co. CommissionerPct. 2	Bobby.whitson@bellcounty.texas.gov	254-383-1320
Buford Craig	Temple	Director of Transform Temple	bcraig@templetx.gov	254-298-5995
Chris Bailey	Killeen	Assistant Director of IT	cbailey@killeentexas.gov	254-501-7894
Jeff Achee	Harker Heights	Director of Parks and Rec	jachee@harkerheights.gov	254-953-5657
Joe Stuart	Killeen	Emergency Response Coordinator	jstuart@killeentexas.gov	254-501-6587



BELL COUNTY HAZARD MITIGATION PLAN
Mitigation Strategy Workshop
Zoom Virtual Attendance
Thursday, December 7th, 2023 @ 10 AM



Name	Jurisdiction	Title	Email	Phone
Jon Fontenot	Belton	Fire Chief/EMC	jfontenot@beltontexas.gov	254-933-5882
Kenny Henderson	Temple	Assistant Director of Transportation - Drainage/Streets/Traffic Control	khenderson@templetx.gov	n/a
Kent Cagle	Killeen	City Manager	kcagle@killeentexas.gov	254-501-7700
Steven Kana	Killeen	Director of Water & Sewer	skana@killeentexas.gov	n/a
Tammy Cockrum	Rogers	City Administrator	cityadministrator@cityofrogerstx.gov	254-642-3312
Stevie-Ann O'Donnell	H2O Partners Inc	Mitigation Outreach Specialist	shodgson@h2opartnersusa.com	631-921-2460

APPENDIX E: MEETING DOCUMENTATION

PUBLIC MEETING DOCUMENTATION

As discussed in Section 2, public meetings were held within each of the four counties participating in the CTCOG Regional Hazard Mitigation Action Plan Updates. Documentation in the form of sign-in sheets for each of the meetings follows.

Figure E-4. Public Meeting, Lampasas County, September 27, 2023




LAMPASAS COUNTY HAZARD MITIGATION PLAN
Public Meeting
409 S. Pecan St., Lampasas, TX 76550
September 27th, 2023 @ 5:00 PM



Name	Jurisdiction	Title	Email	Phone
Will Parker	H2O Partners	Mitigation Specialist	wparker@H2Opartnersusa.com	817-470-1479
Rhonda Murphy	H2O Partners	Investigation Planner	Rmurphy@H2Opartnersusa.com	512-571-2088
STEVE ASH	TEEX	Regional Training MGR	STEVE.ASH@TEEX.TAMU.EDU	979-321-2392
Joseph Adams	City of Lampasas	Deputy Chief	fireadmin@cityoflampasas.com	512 754 3324
Erick Mitchell	LDR	News Editor	news@Lampasas.com	210-378-2728
Angela Ramirez	Lampasas Co.	Emergency Mgmt	eme@co.lampasas.tx.us	512-556-4177

APPENDIX E: MEETING DOCUMENTATION


Figure E-5. Public Meeting, Bell County, October 11, 2023




BELL COUNTY HAZARD MITIGATION PLAN
Public Meeting
 Conference Room D-8
 2180 N. Main St., Belton TX 76513
 October 11th, 2023 @ 5:30 PM

Name	Jurisdiction	Title	Email
Will Parker	H2O Partners	Mitigation Specialist	wparker@h2opartnersusa.com
KEN CATES	CITIZEN & RENTAS WARRIORS	PRESIDENT OF BUS DEV & GOV. AFFAIRS	Ken@RentasWarriors.com
Rhonda Murphy	H2O Partners	Mitigation Planner	Rmurphy@H2OPartnersUSA.com

Figure E-6. Public Meeting, Hamilton County, December 6, 2023




HAMILTON COUNTY HAZARD MITIGATION PLAN
Hamilton County Public Meeting
 Hamilton County Annex (2nd floor conference room)
 101 E. Henry St. Hamilton TX 76531
 December 6th, 2023 @ 5:00 PM




Name	Jurisdiction	Title	Email	Phone
MARIA WEAVER	HAMILTON HERALD-NEWS	EDITOR	Maria@hnpaper.com	254-386-3145
Rhonda Murphy	H2O Partners	Mitigation Planner	Rmurphy@H2OPartnersUSA.com	512-571-2088
Kristian Murray	H2O Partners	Mit. Specialist	Kmurray@h2opartnersusa.com	254-422-1682
Melissa Hussel	Amateur Radio RACES	Hamilton - CLO RACES	KMSRC.outlook.com	417-253-1888

APPENDIX E: MEETING DOCUMENTATION


Figure E-7. Public Meeting, Mills County, December 7, 2023




MILLS COUNTY HAZARD MITIGATION PLAN
Public Meeting
LEC (conference room)
2111 Priddy Rd., Goldthwaite TX 76844
December 7th, 2023 @ 5:00 PM



Name	Jurisdiction	Title	Email	Phone
Dexter Morris	Mullin	City Mgr Mullin	dexter.morris.tx@gmail	737 215 2715
Sam Morris	Mullin			512 818 4542
Roger Ruff	Mullin	city council		325-490-3445
Ronnie Wilson	Mullin			512-785-1699
Rex Williams	Mullin	city council		325-451-7026
Ray Koen	GOLDTHWAITE	RESIDENT	rayjnc@center.net	281.687.1603
Kevin Newell	Goldthwaite	Goldthwaite VFD		(325) 938-6479
Duane H. Hansen	Goldthwaite		Base1@center.net	325-451-7619
Brenda Brooks	"	Citizen		325-938-7404
Orlando Wadley	"	"	leincw@jgail.com	512-484-9361
Dee Quen Star	VFD		LPB0@center.net	325-948-3251



MILLS COUNTY HAZARD MITIGATION PLAN
Public Meeting
LEC (conference room)
2111 Priddy Rd., Goldthwaite TX 76844
December 7th, 2023 @ 5:00 PM



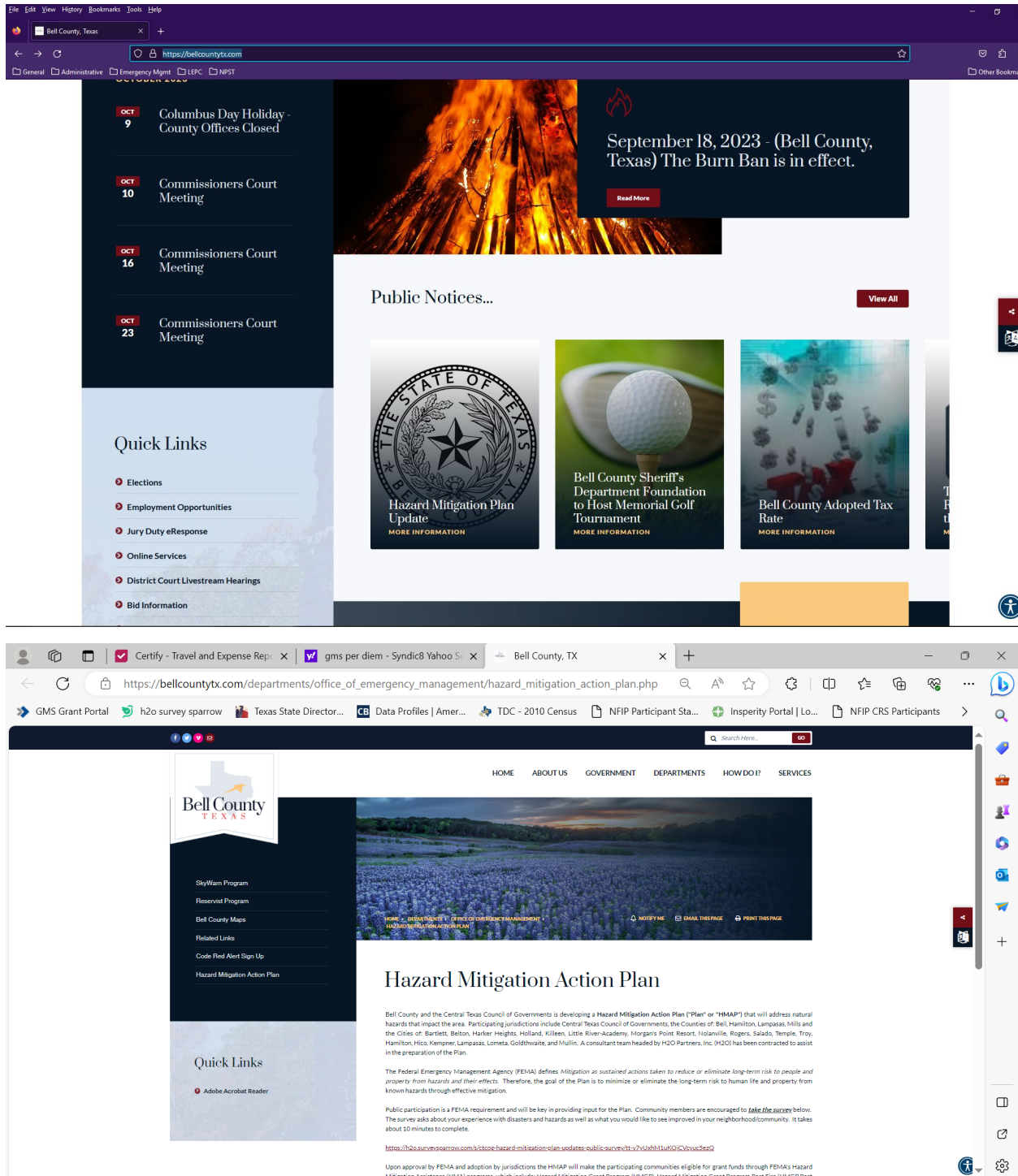
Name	Jurisdiction	Title	Email	Phone
Benny Owens	SXFD	COMMS	KSKVMS@GMAIL.COM	325-718-3226
Kristian Murray	H2O Partners	Mit. Specialist	kmurray@h2opartnersusa.com	254-482-1483
Ronda Murphree	H2O Partners	Mit. Planner	rmurphree@h2opartnersusa.com	512-571-7010
Beverly Sullivan			Sullivan@center.net	325-642-0403
Craig Sullivan			"	325-642-6004

APPENDIX E: MEETING DOCUMENTATION

PUBLIC NOTICES

Public notices to announce Bell County's participation in the Plan Update development process were posted on their website, on social media sources include Facebook, Instagram and X (formerly known as Twitter), through the local media, and/or posting the information on bulletin board in public facilities.

Figure E-8. Bell County Public Notice, County Website



APPENDIX E: MEETING DOCUMENTATION

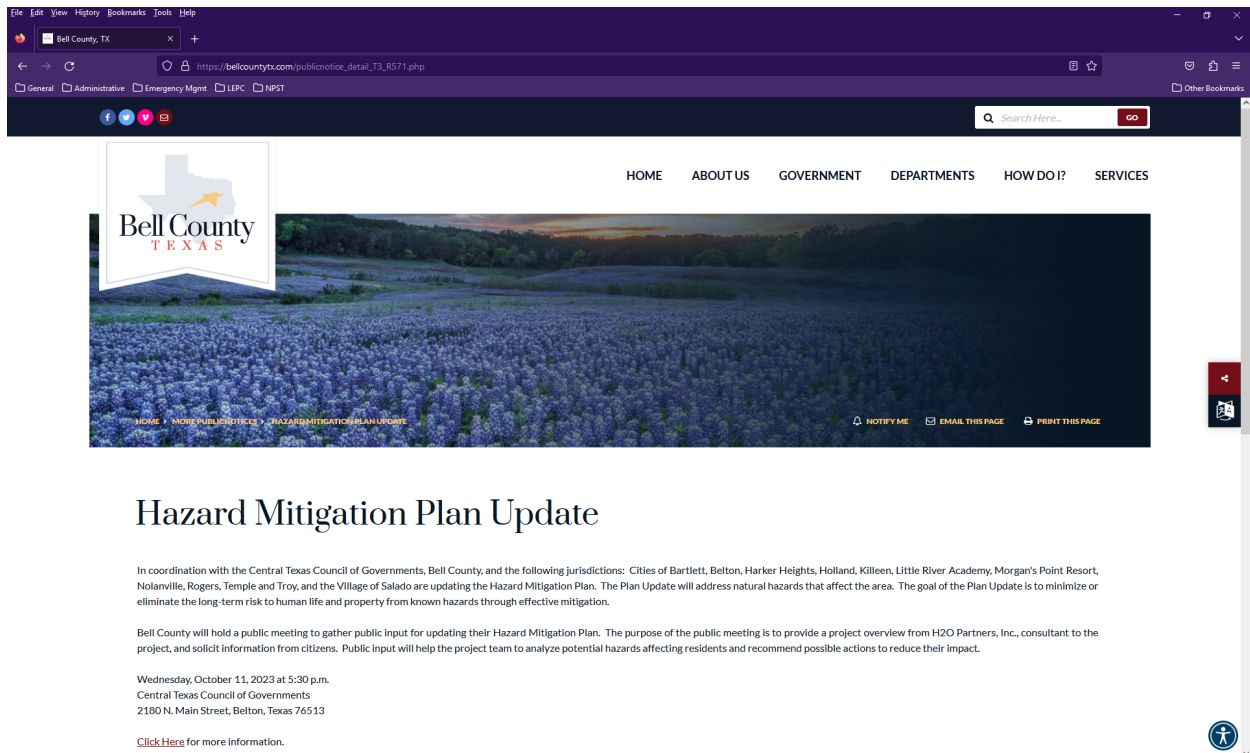
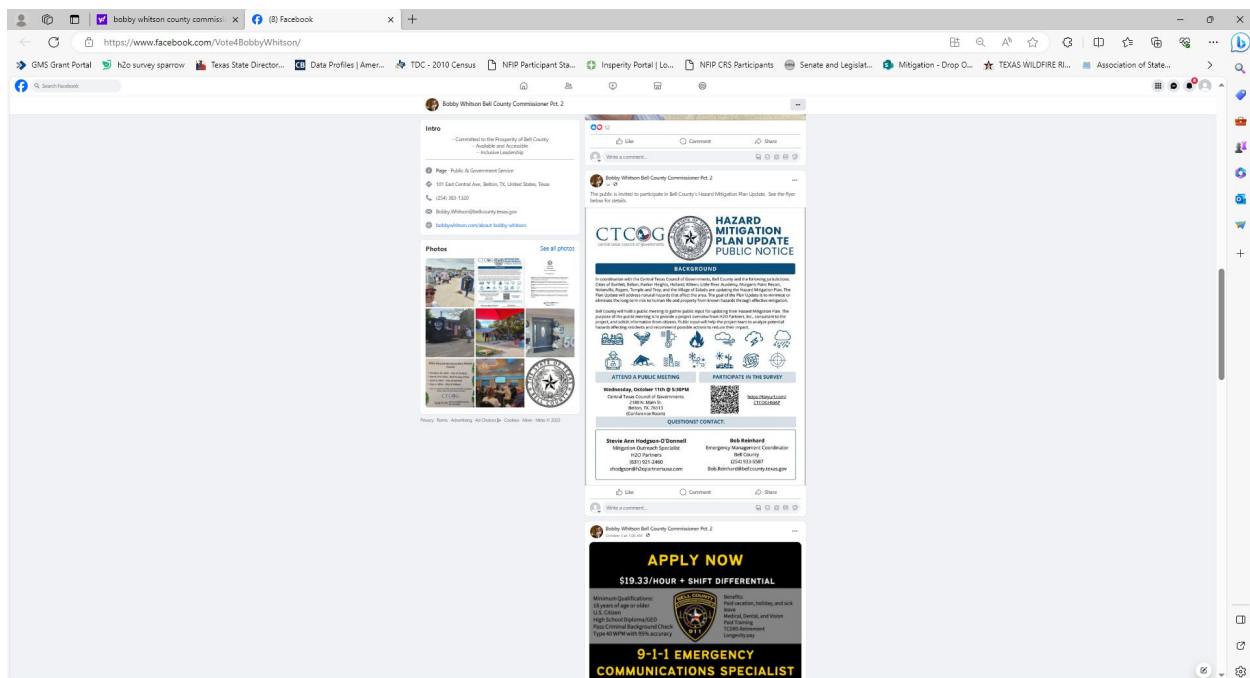


Figure E-9. Bell County Public Notice, Precinct 2 Commissioner's Facebook



APPENDIX E: MEETING DOCUMENTATION

Figure E-10. Bell County Public Notice, Precinct 2 Neighborhood Pages

(Facebook – restricted access to pull image)

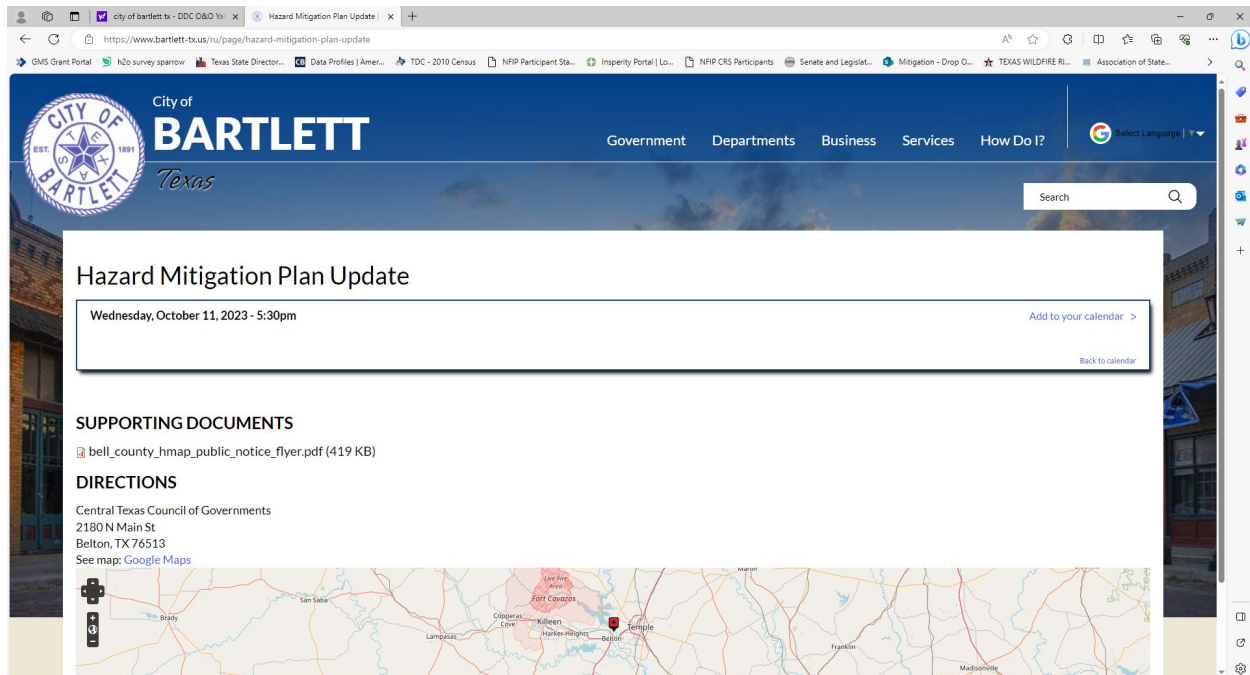
From: [Robert D. Whitson](#)
To: [Stevie-Ann Hodgson](#)
Subject: Public Flyer
Date: Saturday, October 7, 2023 9:28:48 AM

Stevie Ann,

I posted the flyer on my Bobby Whitson County Commissioner Facebook Page and Shared it to Salado People, Killeen and Heights Community, and Skipchaw Neighborhood pages as well.

Sent from my T-Mobile 5G Device
Get [Outlook for Android](#)

Figure E-11. City of Bartlett Public Notice, City Website



APPENDIX E: MEETING DOCUMENTATION

Figure E-12. City of Harker Heights Public Notice, City Website

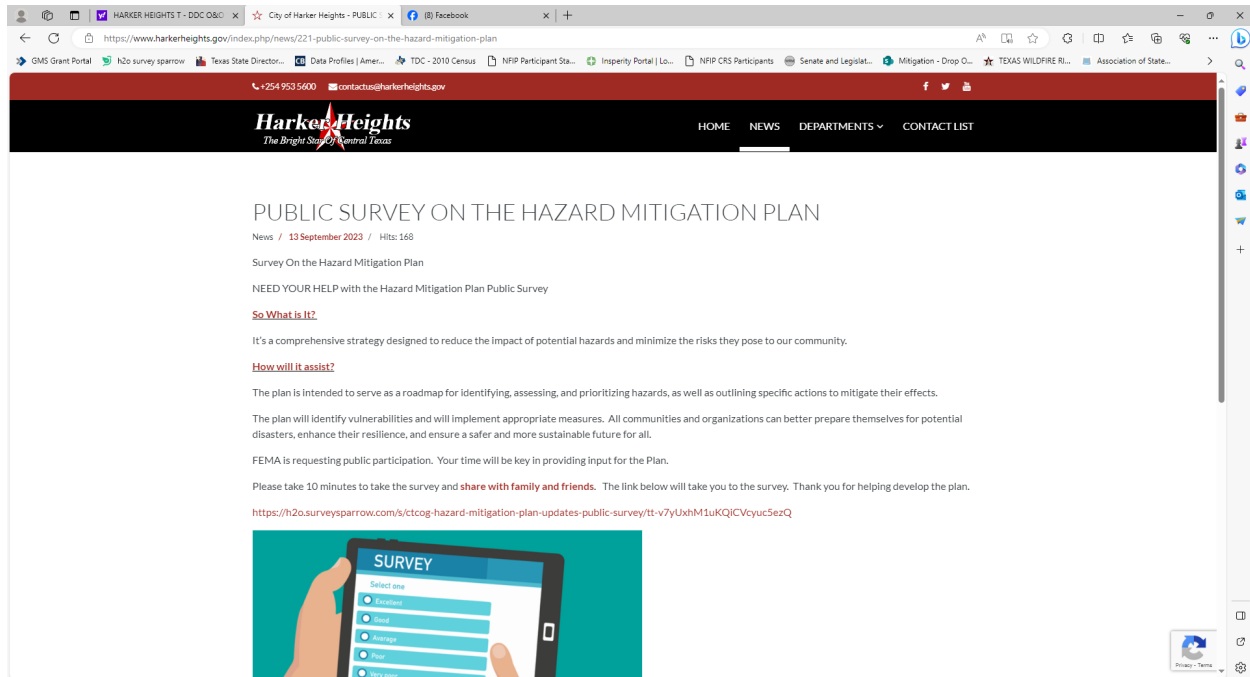
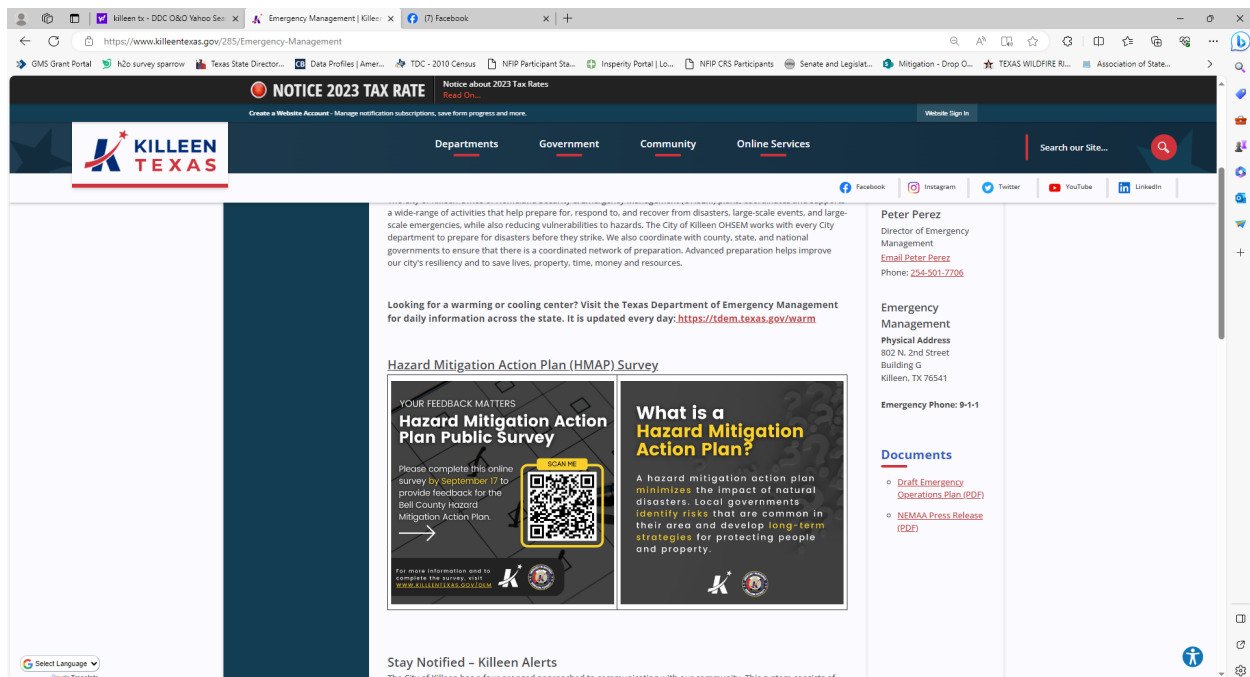


Figure E-13. City of Killeen Public Notice, City Website



APPENDIX E: MEETING DOCUMENTATION

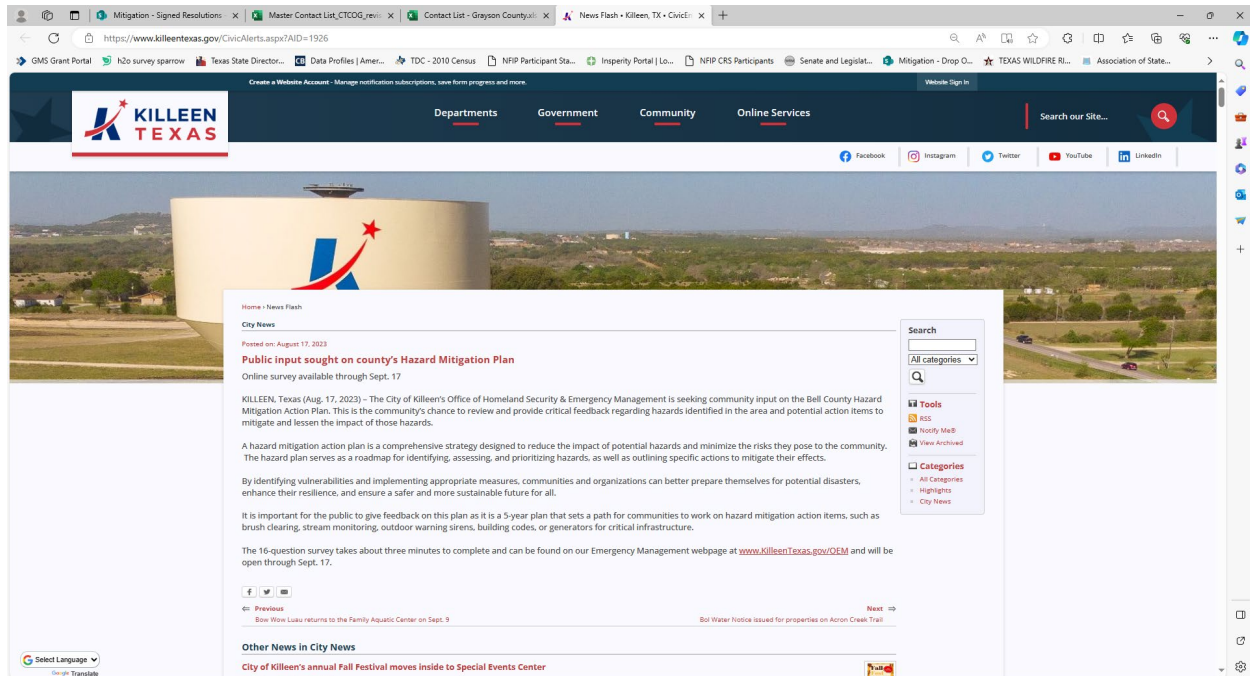
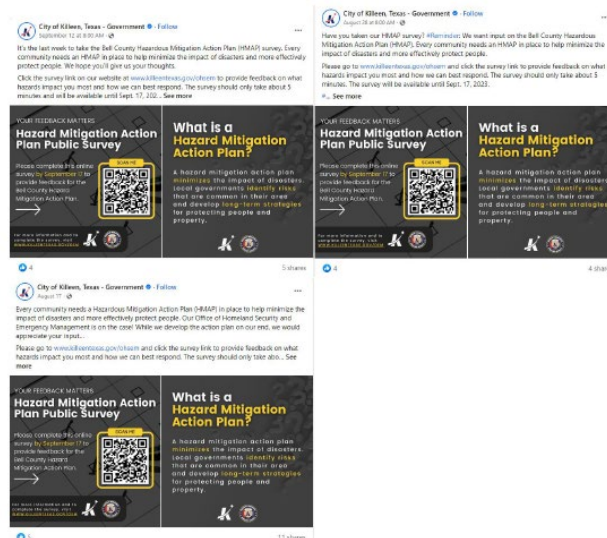


Figure E-14. City of Killeen Public Notice, Facebook

City Killeen put three (3) posts on Facebook about the survey

7.7K total reach on Facebook
26 total clicks on survey link on Facebook



APPENDIX E: MEETING DOCUMENTATION

Figure E-15. City of Killeen Public Notice, Instagram

City Killeen put three (3) posts on Instagram about the survey
14 total likes on Instagram

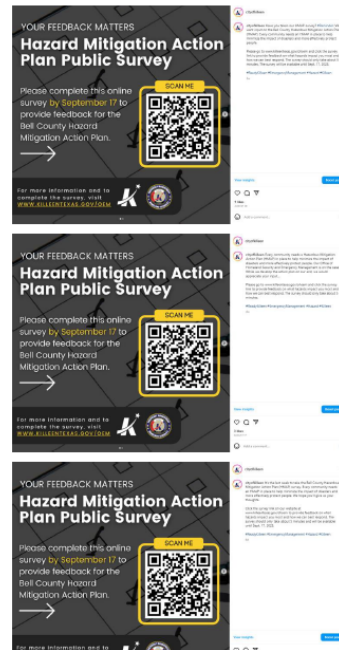
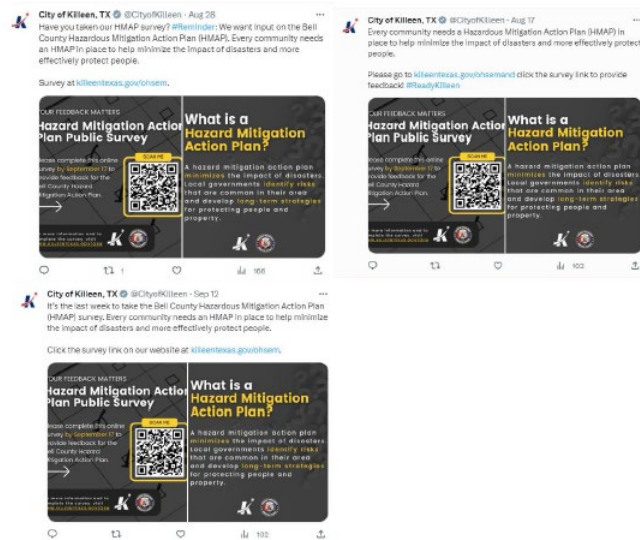


Figure E-16. City of Killeen Public Notice, Twitter

City Killeen put three (3) posts on X about the survey

Sept 12: 103 views, 2 link clicks
Aug. 28 167 view, 0 clicks
Aug 17 103 views, 1 click



APPENDIX E: MEETING DOCUMENTATION

Figure E-17. City of Nolanville Public Notice, Facebook

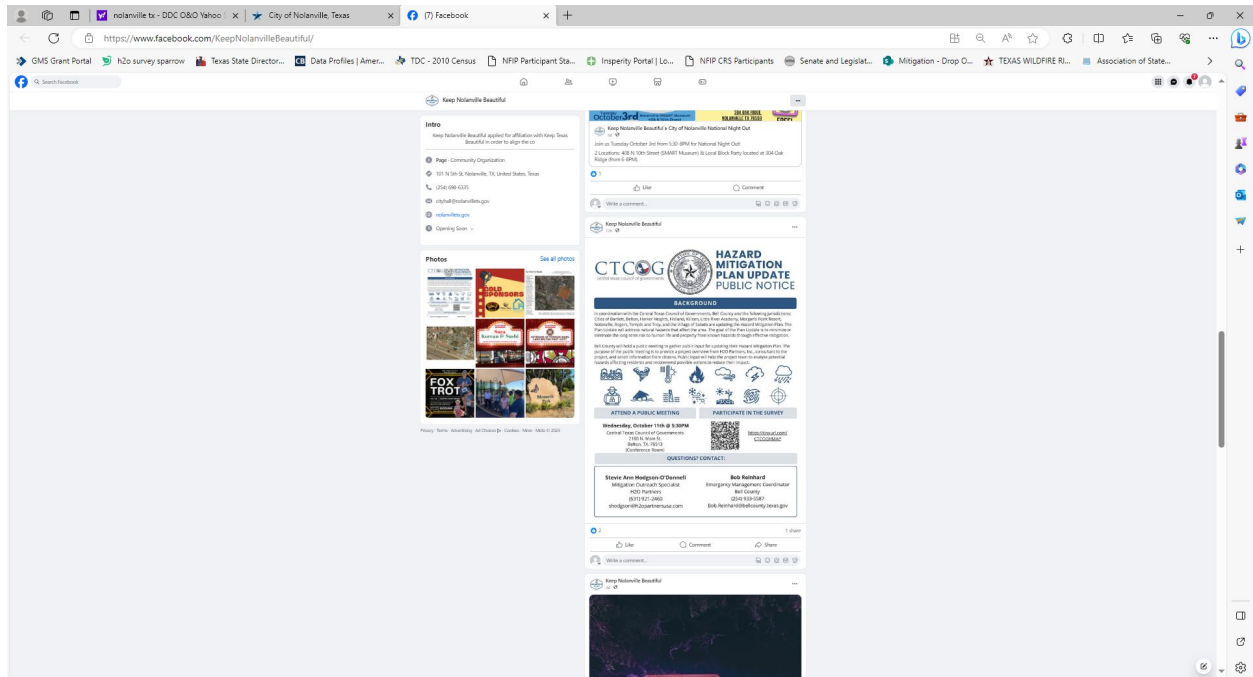
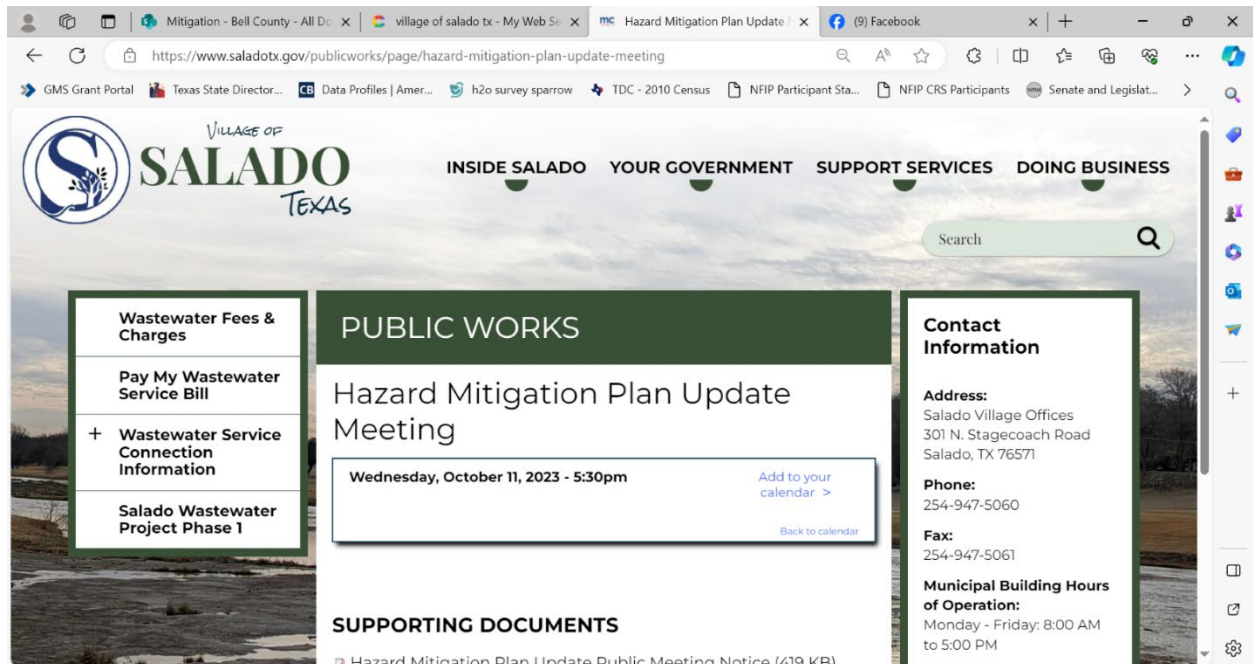


Figure E-18. Village of Salado Public Notice, Village Website



APPENDIX E: MEETING DOCUMENTATION

Figure E-19. Village of Salado Public Notice, Facebook

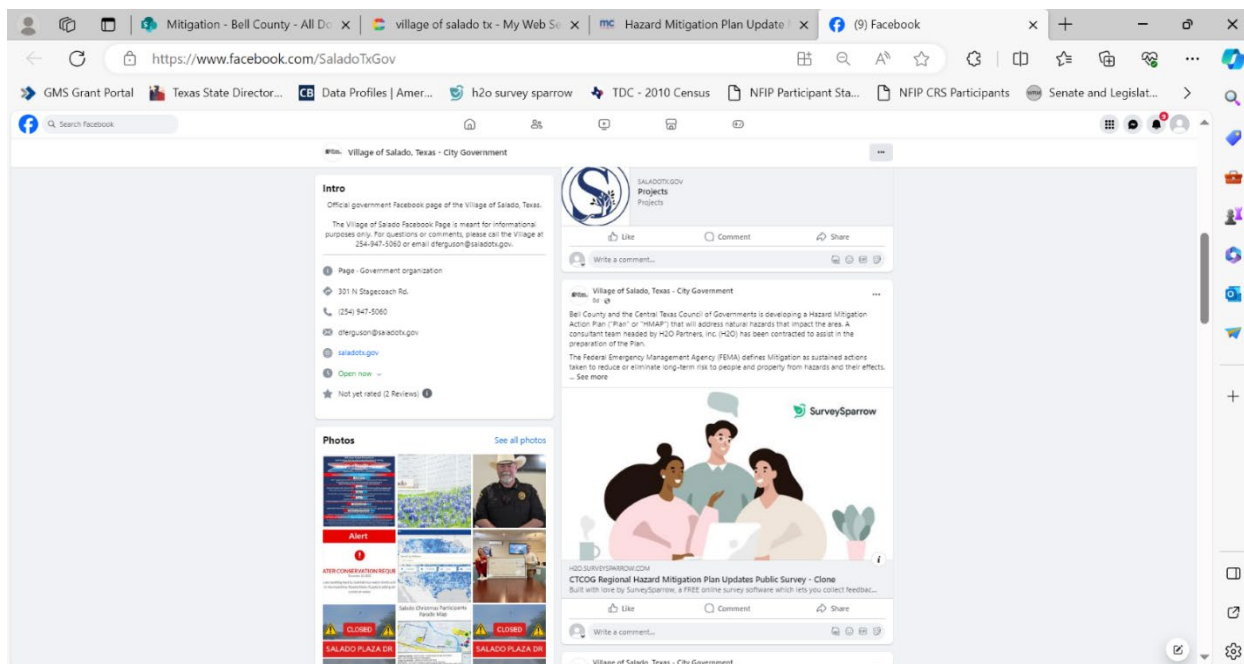
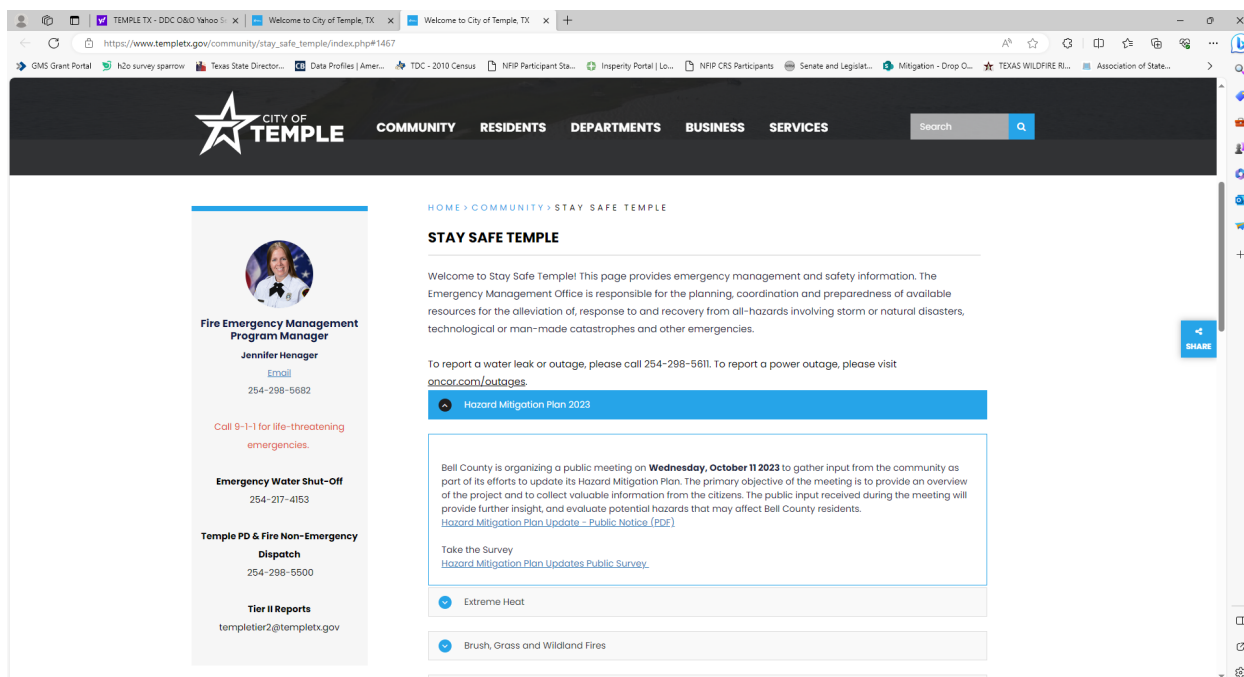


Figure E-20. City of Temple Public Notice, City Website



APPENDIX E: MEETING DOCUMENTATION

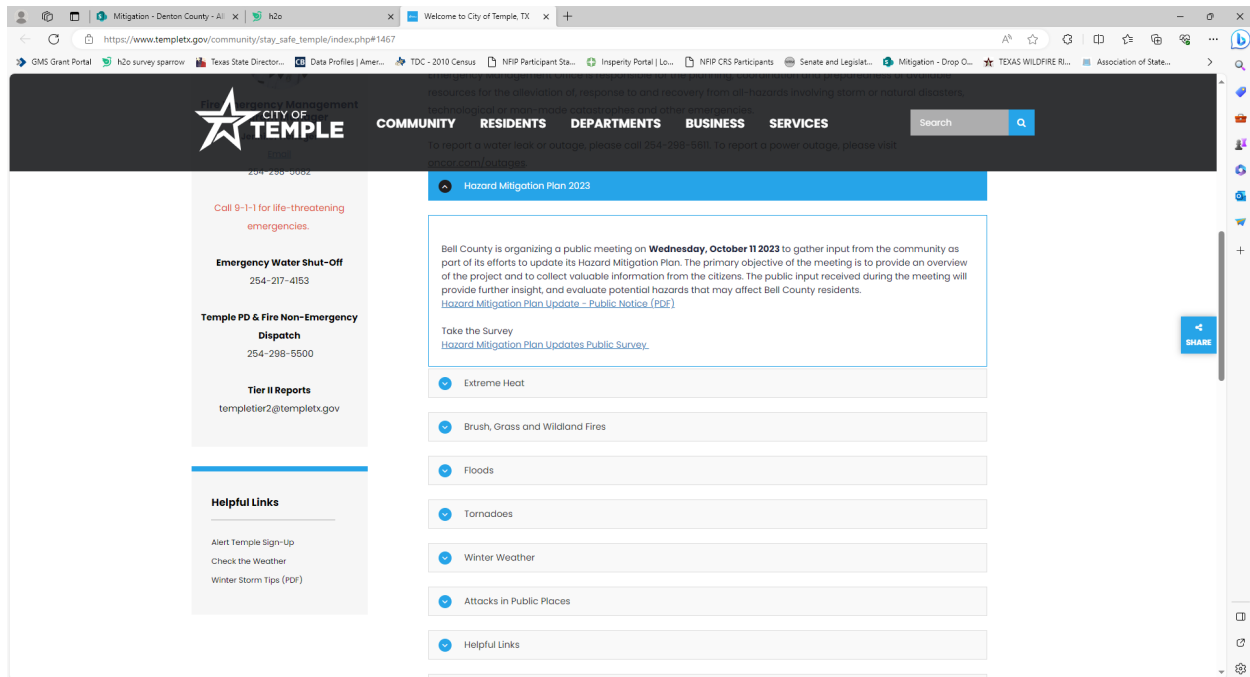
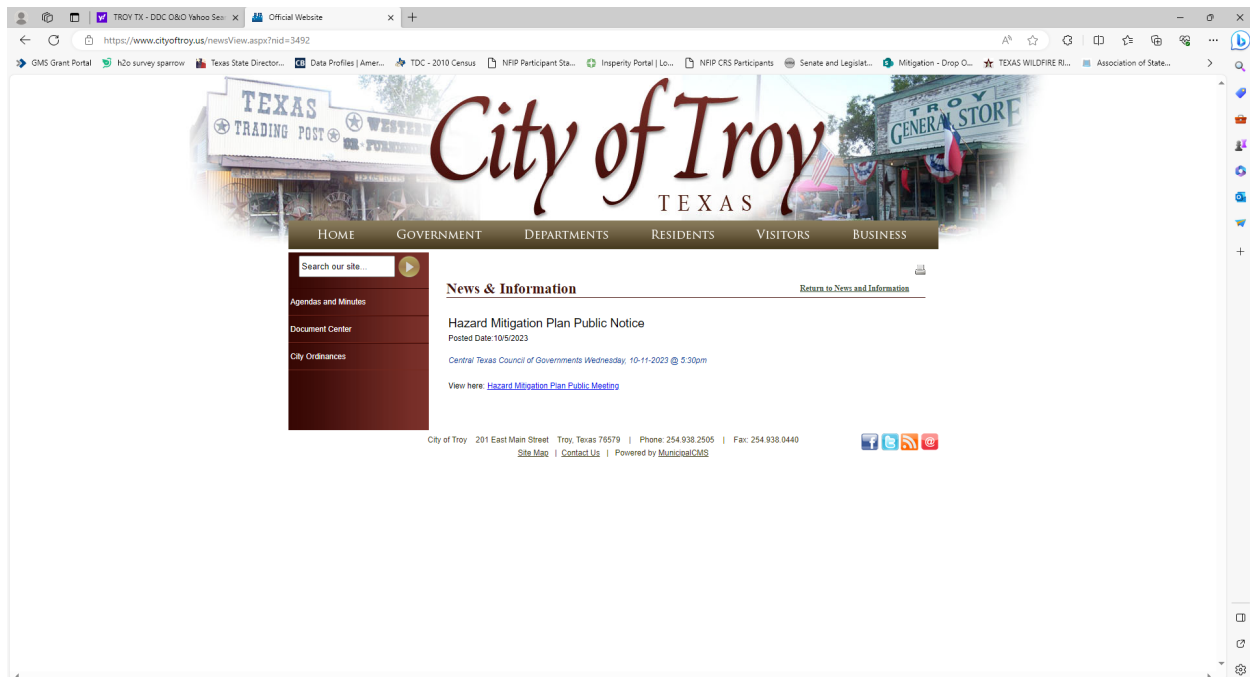


Figure E-21. City of Troy Public Notice, City Website





APPENDIX F **CAPABILITY ASSESSMENT**

APPENDIX F: CAPABILITY ASSESSMENT

Overview	1
Community Capability Assessments.....	2

OVERVIEW

A Community Capability Assessment is an integral component of the Hazard Mitigation Planning Process. It is an invaluable tool in assessing a community’s existing planning and regulatory capabilities to support implementation of mitigation strategy objectives.

Beginning on Page 2, a completed Capability Assessment Checklist provides information on existing policies, plans, and regulations in place for Planning Team members at the local level or that may be provided by the County on an as-needed basis. ***Participation is denoted with an “x” on the Checklist.***

APPENDIX F: CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY ASSESSMENTS

COMMUNITY CAPABILITY CHECKLIST	<i>Bell County</i>	<i>City of Bartlett</i>	<i>City of Belton</i>	<i>City of Harker Heights</i>	<i>City of Holland</i>	<i>City of Killeen</i>	<i>City of Little River Academy</i>
Plans							
Capital Improvements Plan	X	X	X	X	X	X	
Community Wildfire Protection Plan	X		X	X	X	X	
Comprehensive / Master Plan / Land Use Plan		X	X	X	X	X	
Continuity of Operations				X			
Drought Contingency Plan	X		X	X		X	
Emergency Operations Plan	X		X	X	X	X	
Extreme Heat Protocol						X	
Evacuation Plan				X	X	X	
Hazard Mitigation Plan	X	X	X	X	X	X	X
Stormwater Management Plan	X		X	X	X	X	
Policies / Ordinances							
Building Codes		X	X	X	X	X	X
Fire Code		X		X	X	X	X
Floodplain Ordinance	X	X	X	X	X	X	X
Stormwater Ordinance		X	X	X		X	
Subdivision Regulations	X	X	X	X	X	X	X
Wildfire Ordinance			X	X		X	
Zoning Ordinance/Land Use Restrictions		X	X	X	X	X	X
Programs							
Floodplain Maps/Flood Insurance Studies	X	X	X	X	X	X	X

APPENDIX F: CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST	<i>Bell County</i>	<i>City of Bartlett</i>	<i>City of Belton</i>	<i>City of Harker Heights</i>	<i>City of Holland</i>	<i>City of Killeen</i>	<i>City of Little River Academy</i>
Hydrologic/Hydraulic Studies			X	X	X	X	
Mutual Aid Agreement	X		X			X	
National Flood Insurance Program Participant	X	X	X	X	X	X	X
NFIP Community Rating System Participant							
Property Acquisition Program						X	
Public Education/Awareness Programs		X	X	X		X	
Storm Drainage Systems Maintenance Program			X	X		X	
Stream Maintenance Program			X	X	X	X	
Warning Systems/Services (reverse 911, outdoor warning sirens)	X	X	X			X	X
Staff / Departments							
Building Code Official		X	X	X	X	X	X
Emergency Manager	X	X	X	X		X	
Engineers	X	X	X	X	X	X	X
Environmental Conservation Specialist							
Floodplain Administrator	X	X	X	X	X	X	X
Geographic Information System (GIS) Coordinator	X	X	X	X	X	X	X
Personnel with Hazard Knowledge			X	X		X	X
Planners			X	X		X	
Public Information Official	X		X	X		X	X
Resource Development/Grant Writer		X	X		X		X

APPENDIX F: CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST	City of Morgan's Point Resort	City of Nolanville	City of Rogers	Village of Salado	City of Temple ¹	City of Troy	CTCOG
Plans							
Capital Improvements Plan	X	X	X	X	X	X	
Community Wildfire Protection Plan	X	X		X	X	X	
Comprehensive / Master Plan / Land Use Plan	X	X	X	X	X	X	
Continuity of Operations	X	X		X	X	X	X
Drought Contingency Plan	X	X				X	
Emergency Operations Plan	X	X	X	X	X	X	
Evacuation Plan	X			X	X	X	
Extreme Heat Protocol	X	X				X	
Hazard Mitigation Plan	X	X	X	X	X	X	X
Stormwater Management Plan	X	X	X	X	X	X	
Policies / Ordinances							
Building Codes	X	X	X	X	X	X	
Fire Code	X	X	X		X	X	
Floodplain Ordinance	X	X	X	X	X	X	
Stormwater Ordinance	X	X		X	X	X	
Subdivision Regulations	X	X	X	X	X	X	
Wildfire Ordinance	X	X			X	X	
Zoning Ordinance/Land Use Restrictions	X	X	X	X	X	X	X

¹ The City of Temple identified additional Plans in place which include the following: Economic Development Plan, Emergency Action Plan, Historic Preservation Plan, Land Use Plan, Open Space Plan, Redevelopment Plan, Transportation Plan, Utility Plan, and lastly Watershed Protection Plan.

APPENDIX F: CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST	City of Morgan's Point Resort	City of Nolanville	City of Rogers	Village of Salado	City of Temple ¹	City of Troy	CTCOG
Programs							
Floodplain Maps/Flood Insurance Studies	X	X	X	X	X	X	
Hydrologic/Hydraulic Studies		X			X	X	
Mutual Aid Agreement	X	X	X		X		X
National Flood Insurance Program Participant	X	X	X	X	X	X	
NFIP Community Rating System Participant							
Property Acquisition Program					X	X	
Public Education/Awareness Programs	X	X			X	X	X
Storm Drainage Systems Maintenance Program		X			X	X	
Stream Maintenance Program		X				X	
Warning Systems/Services (reverse 911, outdoor warning sirens)		X	X			X	X
Staff / Departments							
Building Code Official	X	X	X		X	X	
Emergency Manager	X	X	X	X	X	X	
Engineers	X	X	X	X	X	X	
Environmental Conservation Specialist		X					
Floodplain Administrator	X	X	X	X	X	X	
Geographic Information System (GIS) Coordinator	X			X	X	X	X
Personnel with Hazard Knowledge	X	X	X		X	X	
Planners		X		X	X	X	X
Public Information Official	X	X	X		X	X	
Resource Development/Grant Writer	X	X	X		X	X	X



APPENDIX G STATE AND FEDERAL FUNDING OPPORTUNITIES

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

Overview	1
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OVERVIEW

Texas utilizes state funds to improve statewide hazard mitigation capabilities and advance their hazard mitigation goals to help identify, understand, and manage various risks associated with natural hazards. State funds also provide funding for state facility and infrastructure upgrades, hazard mapping, mitigation planning, and other mitigation programmatic activities. Table G-1 describes a variety of loan and grant programs offered by state agencies for which mitigation activities may be eligible.

Table G-1. Summary of State Funded Mitigation Programs

AGENCY	FUNDING PROGRAM
Texas A&M Forest Service (TAMFS)	<ul style="list-style-type: none">• Community Fire Protection Program• Community Wildfire Defense Grant• Fire-Adapted Communities Program (FAC)• Firewise USA Program• Mitigation Project Support Fund• Forest Land Enhancement Program• Forest Legacy Program• Prescribed Fire Grants• Resilient Landscapes Program• Rural Fire Assistance Grant• State Fire Assistance for Mitigation (SFAM) - Mechanical Fuels Grants• SFAM Vegetative Fuel Break Grant• Texas Longleaf Conservation Assistance Program• Urban Tree Canopy Project (UTC)
Texas Commission on Environmental Quality (TCEQ)	<ul style="list-style-type: none">• Clean Water Act Section 319 Grants• Nonpoint Source Grant Program• High Hazard Potential Dam Program (HHPD)• U.S.-Mexico Border Water Infrastructure Program
Texas Department of Agriculture (TDA)	<ul style="list-style-type: none">• Agricultural Management Assistance (AMA)• Agricultural Water Enhancement Program (AWEP)• Community Development Block Grant• Community Development Block Grant for Rural Texas• Conservation Innovation Grants (CIG)• Environmental Quality Incentives Program (EQUIP)
Texas Department of Housing and Community Affairs (TDHCA)	<ul style="list-style-type: none">• Texas HOME Disaster Relief
Texas Department of State Health Services (TXDSHS)	<ul style="list-style-type: none">• Hospital Preparedness Program (HPP) Cooperative Agreement• Public Health Emergency Preparedness (PHEP) Cooperative Agreement

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

AGENCY	FUNDING PROGRAM
Texas Department of Transportation (TXDOT)	<ul style="list-style-type: none"> • Bridge Preventative Maintenance Program • Emergency Relief (ER) Program • Highway Bridge Replacement and Rehabilitation Program • Safe Rest Stops Program • Transportation Enhancement Program
Texas Division of Emergency Management (TDEM)	<ul style="list-style-type: none"> • Building Resilient Infrastructure & Communities (BRIC) • Emergency Management Performance Grant (EMPG) • Fire Management Assistance Grants (FMAG) • Hazard Mitigation Planning Grants Program (HMGP) • Homeland Security Grant Program (HSGP) • Individual Assistance (IA) • National Earthquake Hazard Reduction Program (NEHRP) • Public Assistance (PA) Section 406 Funds
Texas Economic Development & Tourism (EDT)	<ul style="list-style-type: none"> • Economic Development Administration Grants and Investments
Texas General Land Office (TXGLO)	<ul style="list-style-type: none"> • Beach Grants • Beach Maintenance Reimbursement Fund • Coastal Erosion Planning and Response Act (CEPRA) • Coastal and Estuarine Land Conservation Program (CELCP) • Coastal Management Program (CMP) • Community Development Block Grant – Disaster Recovery (CDBG-DR) • Community Development Block Grant – Mitigation (CDBG-MIT) • Gulf of Mexico Energy Security Act (GOMESA) • Hazard Mitigation Grant Program Supplemental -LHMPP
Texas Parks and Wildlife Department (TPWD)	<ul style="list-style-type: none"> • Nation Resources Damage Assessment (NRDA) • National Wildlife Wetland Refuge System • North American Wetland Conservation Fund • Partners for Fish and Wildlife • Texas Farm and Ranch Lands Conservation Program (TFRLCP) • Wildlife Habitat Incentive Program (WHIP)
Texas State Soil and Water Conservation Board (TSSWCB)	<ul style="list-style-type: none"> • Clean Water Act Section 319 Grants • Nonpoint Source Grant Program
Texas Water Development Board (TWDB)	<ul style="list-style-type: none"> • Agricultural Water Conservation Grants • Agricultural Water Conservation Loans • Clean Water State Revolving Fund (SWSRF) • Community Assistance Program (CAP) • Drinking Water State Revolving Fund (DWSRF) • Economically Distressed Areas Program • Emergency Community Water Assistance Grants

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

AGENCY	FUNDING PROGRAM
Texas Water Development Board (TWDB) (continued)	<ul style="list-style-type: none"> • Flood Infrastructure Fund (FIF) • Flood Mitigation Assistance (FMA) Program • Flood Protection Planning Program • Groundwater Conservation District Loan Program • Planning Assistance to States • Regional Facility Planning Grant Program • Regional Water Planning Group Grants • Research and Planning Fund and Fund Development Program • Risk MAP Program • Rural Development Grants • Rural Water Assistance Fund • Silver Jackets • Small Flood Control Projects (USACE Section 205) • State Participation Program – Regional Water and Wastewater Facilities • State Water Implementation Fund for Texas (SWIFT) • State Water Resources Research Act Program • Texas Infrastructure Resiliency Fund (TIRF) • Texas Water Development Fund (DFund) • Water Research Grant Program • Water SMART - Drought Response Program

In addition to State funded programs, many local jurisdictions benefit from federal mitigation funding opportunities. FEMA'S Hazard Mitigation Assistance is a primary source for the implementation of mitigation projects throughout the Nation. Table G-2 described additional Federal, State, Local, and Non-Profit mitigation funding sources specifically within the State of Texas.

Table G-2. Federal, State, Local and Non-Profit Mitigation Funding Sources in Texas

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Agricultural Management Assistance (AMA)	Federal	USDA, NRCS	TDA	Provides financial and technical assistance to agricultural producers to voluntarily address issues such as water management, water quality, and erosion control by incorporating conservation methods into their farming operations.
Agricultural Water Enhancement Program (AWEP)	Federal	USDA, NRCS	TDA	Voluntary conservation initiative that provides financial and technical assistance to agricultural producers to implement water enhancement activities on agricultural land to conserve surface and ground water and improve water quality.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Agricultural Water Conservation Grants	State	TWDB	TWDB	Provided to state agencies and political subdivisions for projects that support the implementation of conservation of water management strategies identified in state and regional water plans. Yearly applications. Up to \$1.2 million available annually. Grant categories vary from year to year.
Agricultural Water Conservation Loans	State	TWDB	TWDB	Agricultural water conservation loans to use either for improvements on facilities or as loan to individuals. Low-interest, fixed rates. Up to 10-year repayment terms. U.S. Iron and Steel requirements apply to certain projects. Eligible Loan applicants include political subdivisions.
AmeriCorps - Corporation for National & Community Service (CNCS)	Federal	AmeriCorps	N/A	Provides funding for volunteers to serve communities, including disaster prevention. AmeriCorps/Vista has assisted local communities with wildfire mitigation projects.
American Recovery and Reinvestment Act (ARRA)	Federal	DOT Federal Transit Administration	TDA	Nicknamed the Recovery Act was a stimulus package enacted by the 111th U.S. Congress and signed into law by President Barack Obama in February 2009. Developed in response to the Great Recession, the primary objective of this federal statute was to save existing jobs and create new ones as soon as possible. Other objectives were to provide temporary relief programs for those most affected by the recession and invest in infrastructure, education, health, and renewable energy.
Assistance to Firefighters program - Fire Prevention & Safety (FP&S) Grants	Federal	FEMA, AFG		Fire Prevention & Safety (FP&S) Grants support projects that enhance the safety of the public and firefighters from fire and related hazards.
Beach Grants	Federal	EPA	TXGLO	EPA awards grants under authority of the BEACH Act to eligible states, territories, and tribes with beaches on ocean and Great Lakes coasts to develop and implement programs to monitor their beaches and notify the public when it is not safe to swim.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Beach Maintenance Reimbursement Fund	State	GLO	TXGLO	Allocates approximately \$750,000 per year to help communities keep their beaches maintained. Applications are distributed to eligible participants in early fall and are due within a specified amount of time, no less than 30 days. Contracts are renewable annually.
Bridge Preventative Maintenance Program	State	TXDOT	TXDOT	A planned, cost-effective treatment that preserves, improves, or delays future deterioration of the condition of a bridge. To be eligible for the BMIP a bridge must have a condition rating of 5 or 6 for at least one of the following: deck, superstructure, substructure, culvert, or channel. Safety and improvement to the physical conditions of the State's on-system bridges are TxDOT's main goals in the prioritization of the bridges using BMIP funds. The Bridge Division develops an initial list each FY of eligible bridges in each district and distribute to the districts for the annual program call.
Building Resilient Infrastructure & Communities (BRIC)	Federal	FEMA	TDEM	Pre-disaster/annual cycle addressing all natural hazards, emphasis on infrastructure & lifelines.
Clean Water Act Section 319 Grants	Federal	EPA	TCEQ and TSSWCB	Provides grants for a wide variety of activities related to non-point source pollution runoff mitigation.
Clean Water State Revolving Fund (CWSRF)	Federal	EPA	TWDB	Providing low-cost financing for a wide range of wastewater, stormwater, reuse, and other pollution control projects.
Coastal Erosion Planning and Response Act (CEPRA)	State	GLO	TXGLO	Since 2000, the Texas General Land Office's Coastal Erosion Planning and Response Program has received more than \$62 million in state funding and more than \$62 million in matching funds, completing more than 200 coastal erosion projects and studies. The application process for non-emergency project funding requests opens every even year in February and closes in early June of that same year.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Coastal and Estuarine Land Conservation Program (CELCP)	Federal	NOAA	TXGLO	When NOAA provides funding for CELCP, the GLO provides coastal communities an opportunity to apply for up to three projects per year, with federal grants for any single project not to exceed \$3 million.
Coastal Management Program (CMP)	Federal	NOAA	TXGLO	Texas receives approximately \$2 million annually in grants from National Oceanic and Atmospheric Administration (NOAA) and 90% of the funds are passed through to local governments and entities to address environmental needs and promote sustainable economic development along the coast. Projects must improve the management of the state's coastal resources and ensure long-term ecological and economic productivity. Section 306 administrative funds can be used for non- construction, coastal planning and education, and research. Section 306A improvement funds can be utilized for construction and land acquisition projects and preservation and restoration. CMP funding categories include Coastal Natural Hazards Response, Critical Areas Enhancement, Public Access, Water/Sediment Quantity and Quality Improvements, Waterfront Revitalization and Ecotourism Development, Permit Streamlining/ Assistance, Governmental Coordination and Local Government Planning Assistance.
Community Assistance Program (CAP)	Federal	FEMA, NFIP	TWDB	Product-oriented financial assistance program directly related to the flood loss reduction objectives of the NFIP.
Community Development Block Grant	Federal	HUD	TDA	The primary objective is to develop viable communities by providing decent housing and suitable living environments and expanding economic opportunities principally for persons of low- to moderate- income. Eligible applicants are non-entitlement cities under 50,000 in population and non-entitlement counties that have a non-metropolitan population under 200,000 and are not eligible for direct CDBG funding from HUD may apply for funding through any of the Texas CDBG programs.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Community Development Block Grant for Rural Texas	State	TDA	TDA	TDA administers the Community Development Block Grant for Rural Texas. The primary objective of the CDBG is to develop viable communities by providing decent housing and suitable living environments and expanding economic opportunities principally for persons of low- to moderate-income. Eligible applicants are non-entitlement cities under 50,000 in population and non-entitlement counties that have a non-metropolitan population under 200,000 and are not eligible for direct CDBG funding from HUD may apply for funding through any of the Texas CDBG programs.
Community Development Block Grant – Disaster Recovery (CDBG-DR)	Federal	HUD	TXGLO	Often following a disaster, the state may receive a CDBG-DR Supplement intended for mitigation and disaster recovery projects in the affected areas. Funding can be used to acquire properties in hazard prone areas. Since CDBG funds lose their federal identify they can also be used to supplement state or local match requirements on other funds such as FEMA HMA grants. Funding also supports public facilities including water and wastewater.
Community Development Block Grant – Mitigation (CDBG-MIT)	Federal	HUD	TXGLO	Eligible grantees to use this assistance in areas impacted by recent disasters to carry out strategic and high-impact activities to mitigate disaster risks and reduce future losses. In February of 2018, Congress appropriated \$12 billion dollars in Community Development Block Grant (CDBG) funds specifically for mitigation activities for qualifying disasters in 2015, 2016, and 2017. HUD was able to allocate an additional \$3.9 billion, bringing the amount available for mitigation to nearly \$16 billion.
Community Fire Protection Program	Federal	USDA	TAMFS	Mitigation delivered via USDA Forest Service and Private Forestry Coop Fire Program.
Community Wildfire Defense Grant	Federal	USFS	TAMFS	Offers financial assistance to at-risk local communities with planning for and mitigating against the risk of catastrophic wildfire. This program is authorized in Public Law 117-58, the Infrastructure Investment and Jobs Act.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Community Wildfire Defense Grant (continued)				Two primary objectives: The development and revision of Community Wildfire Protection Plans (CWPP), and the implementation of projects described in a CWPP that is less than ten years old. Prioritizes at-risk communities that are in an area identified as having high or very high wildfire hazard potential, are low-income, and/or have been impacted by a severe disaster. No minimum federal funding limit for projects.
Conservation Innovation Grants (CIG)	Federal	USDA, NRCS	TDA	Voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production.
Drinking Water State Revolving Fund (DWSRF)	Federal	EPA	TWDB	Makes funds available to drinking water systems to finance infrastructure improvements. The program also emphasizes providing funds to small and disadvantaged communities and to programs that encourage pollution prevention as a tool for ensuring safe drinking water.
Economic Development Administration Grants and Investments	Federal	U.S. DOC, EDA	EDT	Invests and provides grants for community construction projects, including mitigation activities.
Economically Distressed Areas Program	State	TWDB	TWDB	Provides financial assistance for projects serving economically distressed areas where water or sewer services do not exist, or systems do not meet minimum state standards. Eligible EDAP applicants include cities, counties, water districts, nonprofit water supply corporations, and all other political subdivisions. The city or county where the project is located must adopt and enforce Model Subdivision Rules for the regulation of subdivisions prior to application for financial assistance. Projects must also be in an economically distressed area where the median household income is not greater than 75 percent of the median state household income.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Emergency Community Water Assistance Grants	Federal	USDA	TWDB	\$150,000 to \$500,000 available to rural communities with populations over 10,000 people with a median household income less than \$65,900. Aids communities who have experienced a decline in quantity or quality of drinking water as a result of an emergency including drought.
Emergency Management Performance Grant (EMPG)	Federal	FEMA	TDEM	The EMPG program provides a yearly allocation of funding to support state and local emergency management programs. This has included providing some funding for local mitigation plans, mitigation-oriented studies, and related activities.
Emergency Relief (ER) Program	Federal	US DOT - FHWA	TXDOT	Provides funds for roads and bridges on Federal-aid highways that are damaged as a direct result of a natural disaster or catastrophic failure from an external cause.
Emergency Watershed Protection (EWP)	Federal	USDA, NRCS	TWDB	Provides funding and technical assistance for emergency measures such as floodplain easements in impaired watersheds. Funding available through the Simplified Acquisition Procedures (SAP) ranges from \$25K to \$100K. Funded through contracts between project sponsors and the NRCS. There are no grants. The NRCS pays 75% of the costs.
Environmental Quality Incentives Program (EQUIP)	Federal	USDA, NRCS	TDA	Provides funding and technical assistance to farmers and ranchers to promote agricultural production and environmental quality as compatible goals.
Fire-Adapted Communities Program (FAC)	Federal	FEMA, USFA	TAMFS	Collaborates to identify its wildfire risk and works collectively on actionable steps to reduce its risk of loss. This work protects property and increases the safety of firefighters and residents.
Fire Management Assistance Grants (FMAG)	Federal	FEMA	TDEM	Provides fire suppression support to states when loss of life and property are imminent. Wildfire mitigation is also eligible under emergency protection if life is in imminent danger.
Firewise USA Program	Federal	USDA, DOI, NASFF, NFPA	TAMFS	The national Firewise USA® recognition program provides a collaborative framework to help neighbors in a geographic area get organized, find direction, and take action to increase the ignition resistance of their homes and community and to reduce wildfire risks at the local level.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Flood Infrastructure Fund (FIF)	State	TWDB	TWDB	Enacted through Senate Bill 7 to address needs identified following the flood disasters of 2015, 2016, and 2017. Senate Bill 500 appropriated \$793 million. The purpose is to provide loans and grants for flood activities and projects. Once the State Flood Plan is adopted, the account may only be used for projects included in the plan. The SWIFT Advisory Committee is the oversight entity.
Flood Mitigation Assistance Program (FMA)	Federal	FEMA	TWDB	Repetitive flood loss property reduction and projects that mitigate losses to NFIP insured properties.
Flood Protection Planning Program	State	TWDB	TWDB	Developed to evaluate solutions to flooding problems in the state of Texas. Planning activities eligible for this program may include:
Forest Land Enhancement Program	Federal	USDA, NRCS	TAMFS	Provides educational, technical, and financial assistance to help landowners implement sustainable forestry management objectives.
Forest Legacy Program	Federal	USFS	TAMFS	Program providing funding to protect private forest lands that are environmentally, economically, and socially critical. This program reduces development in the wildland-urban interface.
Hazard Mitigation Grant Program (HMGP)	Federal	FEMA	TDEM	Post-disaster multi-hazard mitigation funding for federally declared disasters. HMGP Post Fire funds are available for FMAG declarations.
Hazard Mitigation Grant Program Supplemental – Local Hazard Mitigation Plan Program (LHMPP)	Federal	FEMA	TXGLO	Local Hazard Mitigation Plan Program (LHMPP) assists eligible entities by providing grants to develop or update local hazard mitigation plans, or to provide cost share for hazard mitigation planning activities funded through other federal sources. Community Development Block Grant Mitigation (CDBG-MIT) funds allocated by the United States Department of Housing and Urban Development (HUD) and administered by the Texas General Land Office (GLO) fund these planning activities, and the Hazard Mitigation Plan development and approval oversight is administered by the Federal Emergency Management Agency (FEMA) and administered

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
LHMPP (continued)				by the Texas Division of Emergency Management (TDEM Grant awards will range from \$20,000 – \$100,000.
High Hazard Potential Dam Program (HHPD)	Federal	FEMA	TCEQ	Pre-disaster/annual cycle, for non-federal high hazard dams rated Unsatisfactory. Local match is 35% for each of the four grant periods.
Highway Bridge Replacement and Rehabilitation Program	Federal	FHWA	TXDOT	Provides funding to enable states to improve the condition of highway bridges through replacement, rehabilitation, and systematic preventive maintenance. Also includes the National Historic Covered Bridge Preservation Program.
Homeland Security Grant Program (HSGP)	Federal	DHS	TDEM	Homeland security activities identified in the state and local strategic plans. Funding supports threat & hazard and risk identification for natural, technological, and human-caused hazards. Some prevention activities may be considered mitigation.
Hospital Preparedness Program (HPP) Cooperative Agreement	Federal	HHS	TXDSHS	HPP is the primary source of federal funding for health care system preparedness and response and, in collaboration with public health, prepares health care delivery systems to save lives through the development of health care coalitions (HCCs). Under the direction of the HPP providers, the HCCs develop plans and provide training, and coordinate regional exercises.
Hydrologic Research Grants	Federal	NOAA		Up to \$125,000 to conduct joint research and development on pressing surface water hydrology issues common to national, regional, local operational offices. Eligible applicants are federally recognized agencies of state or local governments, quasi-public institutions such as water supply or power companies, hydrologic consultants and companies involved in using and developing hydrologic forecasts.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Groundwater Conservation District Loan Program	State	TWDB	TWDB	Provides short-term loans to finance the start-up costs of Groundwater Conservation Districts. Funding is available for any Groundwater District or Authority with the authority to regulate the spacing of water wells, the production from water wells, or both. The program is authorized under Texas Water Code Chap. 36, Subchapter. L, and governed by TWDB rules in 31 Tex. Admin. Code Chap. 363, Subchapter. H.
Gulf of Mexico Energy Security Act (GOMESA)	Federal	DOI	TXGLO	GOMESA significantly enhances oil and gas leasing activities and creates revenue sharing provisions for the oil- and gas-producing states of Alabama, Louisiana, Mississippi, and Texas, and their coastal political subdivisions (CPSs). GOMESA funds are used for coastal conservation, restoration, and hurricane protection. The second phase of GOMESA revenue sharing began in Fiscal Year 2017 and expands the definition of qualified Outer Continental Shelf revenues to include receipts from Gulf of Mexico leases subject to withdrawal or moratoria restrictions. A revenue-sharing cap of \$500 million per year for the four Gulf producing states, their CPSs and the Land and Water Conservation Fund applies from fiscal years 2016 through 2055.
Individual Assistance (IA)	Federal	FEMA	TDEM	Following a disaster, funds can be used to mitigate hazards when repairing individual and family homes.
In-Lieu Fee Program Mitigation Projects	Federal	USACE	Community Applicants	Restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements for Department of the Army permits.
Mitigation Banks	Federal	USACE	Community Applicants	Mitigation Banks are sites approved by the Corps to sell compensatory mitigation credits for projects resulting in unavoidable impacts to waters of the U.S. When a permit is issued that requires compensatory mitigation, the permit will specify how many credits are required to be purchased at an approved mitigation bank.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
National Earthquake Hazards Reduction Program (NEHRP)	Federal	FEMA	TDEM	Provides money to support enhanced earthquake risk assessments in local hazard mitigation plans and other earthquake hazard mitigation and preparedness activities.
Natural Resources Damage Assessment (NRDA)	Federal	EPA	TPWD	ERAs evaluate the likelihood that adverse ecological effects are occurring or may occur as a result of exposure to physical stressors (e.g., cleanup activities) or chemical stressors (e.g., release of hazardous substances) at a site.
National Weather Service (NWS)	Federal	NOAA - NWS		NWS offers storm spotter training, along with weather and flooding safety guides. They can also sometimes provide funding to support severe weather signage in parks or other public places.
National Wildlife Wetland Refuge System	Federal	USFWS	TPWD	Provides funding for the acquisition of lands into the federal wildlife refuge system.
Nonpoint Source Grant Program	Federal	EPA	TCEQ, TSSWCB	The federal Clean Water Act (CWA) requires States to develop a program to protect the quality of water resources from the adverse effects of nonpoint source (NPS) water pollution. TCEQ and TSSWCB administer federal grants for activities that prevent or reduce nonpoint source pollution (NPS).
North American Wetland Conservation Fund	Federal	USFWS	TPWD	Provides funding for wetland conservation projects.
NRCS Conservation Programs	Federal	USDA, NRCS	Community Applicants	Provides funding through several programs for the conservation of natural resources.
Partners for Fish and Wildlife	Federal	USFWS	TPWD	Provides financial and technical assistance to landowners for wetland restoration projects in “Focus Areas” of the state.
Planning Assistance to States	Federal	USACE	TWDB	Aids states in planning for the development, utilization, and conservation of water and related land resources.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Pre-Disaster Mitigation Loan Program	Federal	SBA		Provides low-interest loans to small businesses for mitigation projects.
Prescribed Fire Grants	State	TAMFS	TAMFS	<p>TAMFS's Mitigation & Prevention Department annually implements four prescribed fire grants intended to protect local communities and restore ecosystems.</p> <p>(1) SFAM Plains Prescribed Fire Grant – aids communities that have been or may be threatened by wildland fire by funding prescribed burning to reduce hazardous fuels in or around communities. Treatment areas will be located adjacent to priority communities in Texas that are at the highest risk for loss during a Southern Plains Wildfire Outbreak event.</p> <p>(2) The Community Protection Program Grant aids reducing the hazard of high-risk fuels on private lands through the use of prescribed burning. The treatment area will be within 10 miles of a National Forest boundary. The grant's goal is to protect high-risk communities and associated forest resources by reducing the risk of catastrophic wildfire on private and public lands.</p> <p>(3) The State Fire Assistance for Mitigation Central & East Texas Grant provides assistance to communities that have been or may be threatened by wildfire by funding prescribed burning to reduce hazardous fuels in and around communities. Treatment areas will be private property in the 43 Counties in Central and East Texas that have a Community Wildfire Protection Plan within the county. The goal is to protect high-risk communities and aid in ecosystem restoration by utilizing prescribed fire to consume excess vegetation before it contributes to catastrophic wildfire. Priority will be given to treatments sites that are within a CWPP, located near a Firewise community, located near homes based on Texas Wildfire Risk Assessment Portal and contain ecosystems that will benefit from prescribed fire.</p>

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Prescribed Fire Grants (continued)				(4) Neches River and Cypress Basin Watershed Restoration Program - Prescribed Fire Grant provides assistance to landowners in utilizing prescribed fire for ecological improvement to the Neches River and Cypress Basin watersheds. This program will benefit the public and natural resources through improvement of water quality and quantity, control of invasive species and enhancement of wildlife habitat. Treatment areas will be private property in the Neches River and Cypress Basin Watersheds. Priority will be given to prescribed burn treatments that promote native ecosystem restoration, are in priority watershed protection zones and near public land.
Public Assistance (PA) Section 406 Funds	Federal	FEMA	TDEM	Following a disaster, funds can be used to mitigate hazards when repairing damages to a public structure or infrastructure. Wildfire mitigation is also eligible under emergency protection if life is in imminent danger.
Public Health Emergency Preparedness (PHEP) Cooperative Agreement	Federal	CDC	TXDSHS	Helps health departments build and strengthen their abilities to effectively respond to a range of public health threats, including infectious diseases, natural disasters, and biological, chemical, nuclear, and radiological events. Preparedness activities funded by the PHEP cooperative agreement specifically target the development of emergency-ready public health departments that are flexible and adaptable.
Regional Facility Planning Grant Program	State	TWDB	TWDB	TWDB grants to political subdivisions of the State of Texas for studies and analyses to evaluate and determine the most feasible alternatives to meet regional water supply and wastewater facility needs, estimate the costs associated with implementing feasible regional water supply and wastewater facility alternatives, and identify institutional arrangements to provide regional water supply and wastewater services for areas in Texas.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Regional Water Planning Group Grants	State	TWDB	TWDB	Developed to guide and support planning of the state's water resources by administering and assisting in the development of the regional and state water plans. The department strives to improve the planning process each cycle by developing clear guidance for the program's stakeholders and utilizing best-available data, methodologies, and technical innovations.
Research and Planning Fund and Fund Development Program	State	TWDB	TWDB	Offers grants to eligible applicants for the development or revision of regional water plans. The proposed planning must be a plan, an amendment to an approved regional water plan developed by the regional water planning group for a regional water planning area pursuant to the Texas Water Code, §16.053 and Chapter 357, or other special studies approved by the TWDB which will enhance water planning efforts in the region. Activities eligible for funding are those related to the development, revision, or improvement of regional water plans including public meetings, hearings, and special studies.
Resilient Landscapes Program	Federal	USDA, USFS	TAMFS	The USFS is working with partners to restore healthy, resilient, fire-adapted ecosystems. Restoring ecosystems includes thinning crowded forests and using prescribed fire on two to three million acres each year, which can help prevent the buildup of flammable vegetation that feeds extreme wildfires.
Risk MAP Program	Federal	FEMA, NFIP	TWDB	Establishes or updates floodplain mapping and multi-hazard risk products.
Rural Development Grants	Federal	USDA-Rural Development	TWDB	Provides grants and loans for infrastructure and public safety development and enhancement in rural areas. Provides \$100,000 or 75% of the total project, whichever is less.
Rural Fire Assistance Grant	Federal	NIFC	TAMFS	Funds fire mitigation activities in rural communities.
Rural Utilities Service (RUS)	Federal	USDA-Rural Development		RUS administers programs that provide much-needed infrastructure or infrastructure improvements to rural communities. These include water and waste treatment, electric power, and telecommunications services.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Rural Water Assistance Fund	State	TWDB	TWDB	Designed to assist small rural utilities to obtain low-cost financing for water and wastewater projects. The RWAF offers tax-exempt equivalent interest rate loans with long-term finance options.
Safe Rest Stops Program	State	TXDOT	TXDOT	Texas has 21 major highways that serve as long distance travel corridors. Along each of these roadways, rest areas are an essential safety feature to reduce accidents caused by driver fatigue. These facilities give travelers a break from driving, and then return them to the road rested, refreshed and alert.
State Fire Assistance for Mitigation (SFAM) - Mechanical Fuels Grants	State	TAMFS	TAMFS	Provides financial assistance to reduce the hazard of high-risk fuels on private lands using hazardous fuel reduction. The grant's goal is protected high risk communities within the 32 high risk counties in Central Texas identified by Texas A&M Forest Service Mitigation and Prevention Department. Priority will be given to landowners that live with in the 32 high risk counties, are in a county or city that has an active Community Wildfire Protection plan or live with in a Firewise USA Site.
SFAM Vegetative Fuel Break Grant	State	TAMFS	TAMFS	Provides financial assistance for the creation of vegetative fuel breaks on private lands in Texas. Vegetative fuel breaks are trees and shrubs systematically planted adjacent to fields, homesteads, or feedlots to reduce or redirect the wind. Projects will be in the Texas High Plains. The goal of the grant is to protect high-risk communities by reducing the risk of catastrophic wildfire on private and public lands. Grant recipients will be reimbursed up to \$2,500 for actual costs associated with creating a green, vegetative fuel break, consisting of a minimum of 3 rows of trees and 400 feet in length.
Silver Jackets	Federal	USACE	TWDB	Can provide funding for flood related studies, public awareness, risk analysis, and flood response plans. Construction of small flood control projects.
Small Flood Control Projects (USACE Section 205)	Federal	USACE	TWDB	Authorizes use of USACE to do feasibility and construction of small flood control projects.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
State Participation Program – Regional Water and Wastewater Facilities	State	TWDB	TWDB	The State Participation Program enables the TWDB to provide funding and assume a temporary ownership interest in a regional water, wastewater, or flood control project when the local sponsors are unable to assume debt for an optimally sized facility. The program is intended to encourage the optimum regional development of projects by funding excess capacity for future use where the benefits can be documented, and where such development is unaffordable without state participation. The goal is to allow for the "right sizing" of projects in consideration of future needs.
State Water Implementation Fund for Texas (SWIFT)	State	TWDB	TWDB	Passed by the Legislature and approved by Texas voters through a constitutional amendment, the SWIFT program helps communities develop and optimize water supplies at cost-effective rates. The program provides low-interest loans, extended repayment terms, deferral of loan repayments, and incremental repurchase terms for projects with state ownership aspects.
State Water Resources Research Act Program	Federal	USGS	TWDB	USGS in cooperation with the National Institutes for Water Resources supports an annual call for proposals to focus on water problems and issues that are of a regional or interstate nature or relate to a specific program priority identified by the Secretary of the Interior and the Institutes.
Texas Farm and Ranch Lands Conservation Program (TFRLCP)	State	TPWD	TPWD	Maintains and enhances the ecological and agricultural productivity of these lands through Agricultural Conservation Easements. The TFRLCP supports responsible stewardship and conservation of working lands, water, fish and wildlife, and agricultural production through: <ul style="list-style-type: none"> • Generating interest and awareness in easement programs and other options for conserving working lands. • Leveraging available monies to fund as many high-quality projects as possible. Highlighting the ecological and economic value of working lands and the opportunities to conserve working lands for the future.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Texas HOME Disaster Relief	Federal	TDHCA	TDHCA	The Texas HOME Disaster Relief Program is a long-term housing program designed to help eligible organizations serve income eligible households impacted by disasters. Funds are available to assist with federal or state declared disasters, or other natural or man-made disasters that may occur. The Department's practice is to maintain a HOME Disaster Relief Fund balance of \$1 million whenever possible. These funds can be accessed to support impacted households not located in communities that receive HOME funds directly from the U.S. Department of Housing and Urban Development (HUD).
Texas Longleaf Conservation Assistance Program	Federal	National Fish and Wildlife Foundation (NFWF)	TAMFS	Provides eligible landowners with financial and technical assistance for establishing, enhancing, and managing longleaf pine. Landowners with property within ten East Texas counties which include Angelina, Hardin, Jasper, Nacogdoches, Newton, Polk, San Augustine, Sabine, San Jacinto, Trinity, and Tyler are eligible to apply. Approved participants may receive up to 50% payment not to exceed a standard cap rate for implementing approved conservation practices. Approved conservation practices include prescribed burning, reforestation, site preparation, and forest stand improvement.
Texas Infrastructure Resiliency Fund (TIRF)	State	TWDB	TWDB	Enacted through Senate Bill 7 to address needs identified following the flood disasters of 2015, 2016, and 2017. Senate Bill 500 appropriated \$685 million. Purpose is to provide loans, grants, and matching funds for flood projects through four separate accounts. Each account has different purposes. The oversight entity is the TIRF Advisory Board (SWIFT Advisory Committee and TDEM Director as non-voting member).
Texas Water Development Fund (DFund)	State	TWDB	TWDB	State funded loan program The DFund enables the Board to fund multiple eligible components in one loan to our borrowers, e.g., an application for funding of water and wastewater components can be processed in a single loan. Provide financial assistance for water supply projects, wastewater projects, and flood control projects (including structural and nonstructural flood protection improvements).

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Transportation Enhancement Program	Federal	FHWA	TXDOT	Provides opportunities for non-traditional transportation related activities. Projects should go above and beyond standard transportation activities and be integrated into the surrounding environment in a sensitive and creative manner that contributes to the livelihood of the communities, promotes the quality of our environment, and enhances the aesthetics of our roadways. Projects undertaken with enhancement funds are eligible for reimbursement of up to 80 percent of allowable costs.
United States Geological Survey (USGS)	Federal	USGS		USGS issues competitive grants and cooperative agreements to support research in earthquake hazards, the physics of earthquakes, earthquake occurrence, and earthquake safety policy.
Urban Tree Canopy Project (UTC)	Federal	USDA, USFS	TAMFS	Urban tree canopy (UTC) is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above. In urban areas, the UTC provides an important stormwater management function by intercepting rainfall that would otherwise run off of paved surfaces and be transported into local waters through the storm drainage system, picking up various pollutants along the way. UTC also reduces the urban heat island effect, reduces heating/cooling costs, lowers air temperatures, reduces air pollution, increases property values, provides wildlife habitat, and provides aesthetic and community benefits such as improved quality of life.
U.S.-Mexico Border Water Infrastructure Program	Federal	EPA	TCEQ	Provides grant assistance to U.S. and Mexican communities located within 60 miles of the border for the development and construction of high-priority drinking water and wastewater facilities. The program furthers EPA's mission of protecting human health and the environment by providing critical resources for what is often an area's first drinking water and basic sanitation services.
Water Research Grant Program	State	TWDB	TWDB	TWDB funds a variety of water planning and water research studies and projects intended to assist and support regional water planning efforts or to answer regional water planning questions.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Water Conservation Field Services Program	Federal	HUD	Texas A&M AgriLife	Provides several grants related to safe housing initiatives.
Water2025 Challenge Grant Program for Western States	Federal	Bureau of Reclamation	TWDB	Up to \$25,000 for projects that improve water use efficiency and improve water management practices.
Watershed Processes and Water Resources	Federal	Bureau of Reclamation	TWDB	Up to \$250,000 for projects that can be completed within 24 months and that reduce conflicts through water conservation, efficiency, and markets.
Watershed Processes and Water Resources – National Research Initiative Standard Research (Part T)	Federal	USDA	TWDB	\$100,000 available. Sponsors research that addresses two areas: (1) understanding fundamental watershed processes; and (2) developing appropriate technology and management practices for improving the effective use of water (consumptive and non-consumptive) and protecting or improving water quality for agriculture and forestry production.
WaterSMART – Drought Response Program	Federal	USDA	TWDB	\$500,000 available. Innovative research in understanding fundamental processes that affect the quality and quantity of water resources at diverse spatial and temporal scales, ways on improving water resource management in agriculture, forested, and rangeland watersheds, and developing appropriate technology to reach those goals.
Wildlife Habitat Incentive Program (WHIP)	Federal	USDA, NRCS	TPWD	Voluntary program for conservation-minded landowners who want to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and tribal land.



ADOPTION RESOLUTIONS