



Grand Prairie
TEXAS
EMERGENCY MANAGEMENT



2023

City of Grand Prairie

Hazard Mitigation Plan

This work was sponsored by the City of Grand Prairie.

The research was conducted by IEM, incorporating data provided by the City of Grand Prairie.

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Executive Summary

The strength and occurrence of hazards cannot be prevented, but we can save lives and reduce property damage by understanding the risks and taking action to address those risks. In the process, we can increase resilience in our community, environment, and economy. The City of Grand Prairie is dedicated to the protection of residents, their property, and to the improvement of the quality of life for all.

Mitigation has been defined as any “sustained action to reduce or eliminate long-term risk to human life and property from natural, human-caused, and technological hazards.”¹ It is fundamentally a loss-prevention function characterized by planned, long-term alteration of the built environment to ensure resilience against natural and human-caused hazards.

The benefits of mitigation planning go beyond reducing hazard vulnerability. Measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, maintaining environmental health, and enhancing recreational opportunities.

Success in a 21st-century economy requires serious, sustained leadership on infrastructure and asset investment at all levels of government. Delaying these investments only escalates the cost and risks of an aging infrastructure system, an option that the City can no longer afford.

Mitigation planning offers many benefits, including the following:

- Saving lives and property
- Saving money
- Reducing future damages from hazards
- Expediting recovery following disasters
- Reducing future vulnerability through wise development and post-disaster recovery and reconstruction
- Expediting the receipt of pre-disaster and post-disaster grant funding
- Demonstrating a firm commitment to improving community health and safety

With development support from IEM, the City of Grand Prairie Hazard Mitigation Plan (HMP) identifies potential hazards, vulnerabilities to these hazards, and mitigation strategies to reduce future damages. The plan fulfills the requirements of the Federal Disaster Mitigation Act as administered by the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA).

Emphasis has been placed on the identification and prioritization of possible mitigation actions that will assist Grand Prairie in becoming less vulnerable to the damaging forces of natural and non-natural hazards while improving the economic, social, and environmental health of the City.

This plan is not legally binding but is a tool for the City to use to become more resilient to hazards. Mitigation actions will be implemented as capabilities and funding allow.

¹ [Glossary \(fema.gov\)](https://www.fema.gov/glossary)

Abbreviations and Acronyms

ADU	Accessory Dwelling Unit
ATSDR	Agency for Toxic Substances and Disease Registry
AWC	Available Water Content
BFE	Base Flood Elevation
BMP	Best Management Practice
BRIC	Building Resilient Infrastructure and Communities
CAC	Community Assistance Contact
CAGR	Compound Annual Growth Rate
CASA	Collaborative Adaptive Sensing of the Atmosphere
CAV	Community Assistance Visit
CDBG	Community Development Block Grant
CDC	Centers for Disease Control and Prevention
CEDS	Comprehensive Economic Development Strategy
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CISA	Cybersecurity and Infrastructure Security Agency
CRS	Community Rating System
DART	Dallas Area Rapid Transit
DFIRM	Digital Flood Insurance Rate Map
DFW	Dallas–Fort Worth
DI	Damage Indicator
DIR	Texas Department of Information Resources
DMA 2000	Disaster Mitigation Act of 2000
DOD	Degrees of Damage
DoS	Denial of Service
DR	Disaster Recovery
DRRA	Disaster Recovery Reform Act
EF	Enhanced Fujita
EI	Expansion Index
EPA	Environmental Protection Agency
ERCOT	Electric Reliability Council of Texas
ETJ	Extra Territorial Jurisdiction

FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FMAG	Fire Management Assistance Grant Program
GIS	Geographic Information Systems
GPISD	Grand Prairie Independent School District
HMA	Hazard Mitigation Assistance
HMAP	Hazard Mitigation Action Plan
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HUD	U.S. Department of Housing and Urban Development
IH	Interstate Highway
ISD	Independent School District
ISO	International Organization for Standardization
LEP	Limited English Proficiency
NCEI	National Centers for Environmental Information
NCISS	National Cyber Incident Scoring System
NCTCOG	North Central Texas Council of Governments
NFIP	National Flood Insurance Program
NIBS	National Institute of Building Science
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NWS	National Weather Service
PA	Public Assistance Grant Program
PDM	Pre-Disaster Mitigation Grant Program
PDSI	Palmer Drought Severity Index
PTSD	Post Traumatic Stress Disorder
Risk MAP	Risk Mapping, Assessment, and Planning
RL	Repetitive Loss
SFHA	Special Flood Hazard Area
SGCN	Species of Greatest Conservation Need
SH	State Highway
SHPO	State Historic Preservation Offices
SRL	Severe Repetitive Loss
STEM	Science, Technology, Engineering, Math

SVI	Social Vulnerability Index
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TCAP	Texas Conservation Action Plan
TDEM	Texas Division of Emergency Management
TFS	Texas A&M Forest Service
TPWD	Texas Parks and Wildlife Department
TWRA	Texas Wildfire Risk Assessment
TxWRAP	Texas Wildfire Summary Risk Assessment Portal
USDM	U.S. Drought Monitor
USGS	U.S. Geological Survey
WFSI	Wildland Fire Susceptibility Index
WSSI	Winter Storm Severity Index
WUI	Wildland Urban Interface

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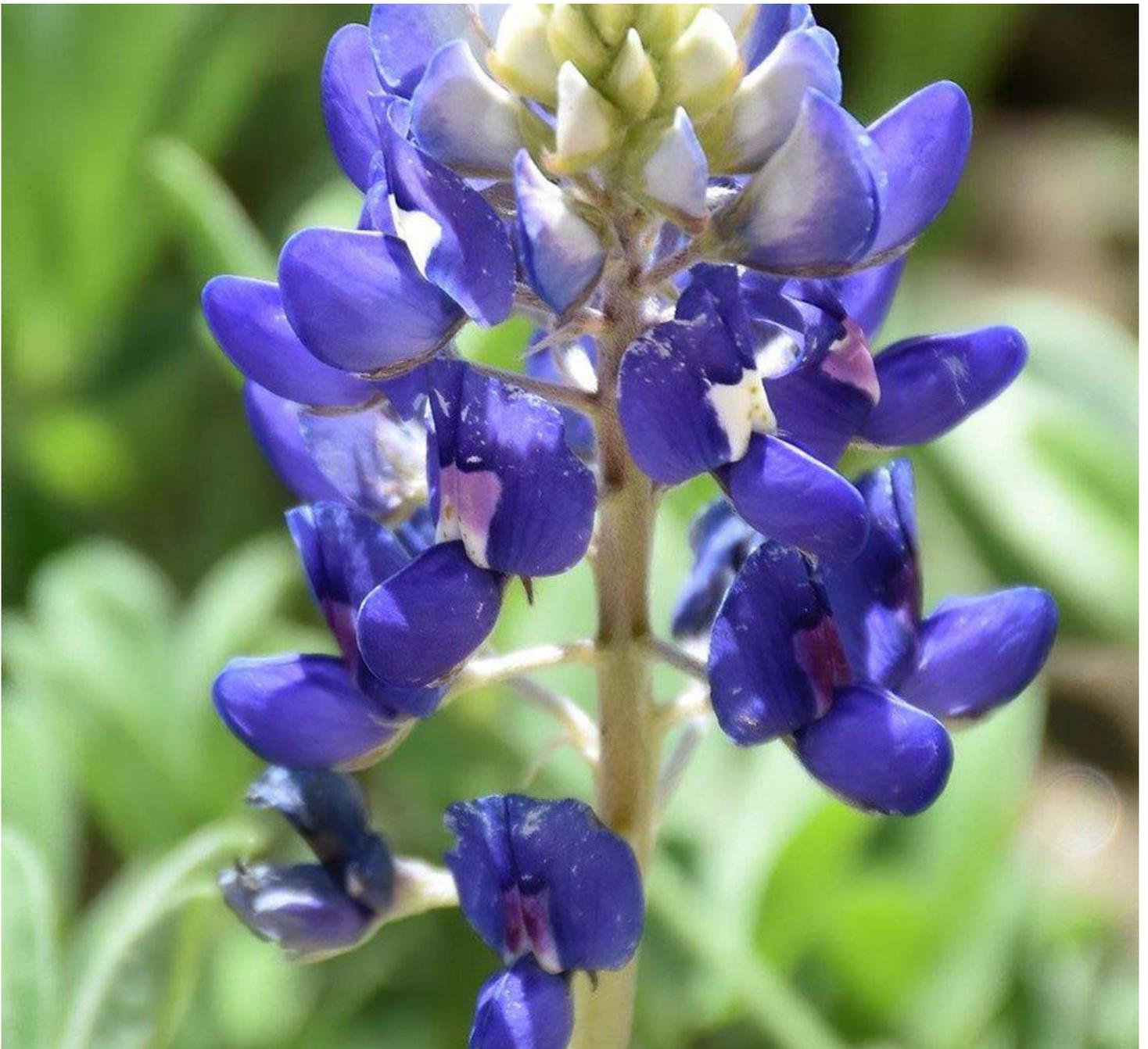
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Section 1: Introduction

1. Introduction

1.1. Plan Overview

The City of Grand Prairie Hazard Mitigation Plan (HMP) fulfills the requirements of the Disaster Mitigation Act of 2000 (DMA 2000), which is administered by the Federal Emergency Management Agency (FEMA). The Disaster Mitigation Act provides federal assistance to City and local emergency management entities to mitigate the effects of disasters. The HMP also encourages cooperation among various organizations across political subdivisions.

This HMP is an update of the 2016 FEMA-approved HMP. With each update, new challenges are identified, new strategies are proposed, and when incorporated, the updated plan grows in complexity, but not necessarily in utility.

All participants involved in this planning process understand the benefits of developing and implementing mitigation plans and strategies. Elected officials, public safety organizations, planners, and many others have worked together to develop and implement this HMP, displaying that they have the vision to implement mitigation practices and therefore reduce the loss of life and property in their communities. There is also understanding that the City is not liable for completing the actions identified but will strive to implement the actions as funding, staffing, and time allow.

1.2. Purpose

This HMP is intended to enhance and complement federal and state recommendations for the mitigation of hazards in the following ways:

- Protect life, safety, and property by reducing the potential for future damages and economic losses that result from natural and man-caused hazards;
- Meet the requirements of the Disaster Mitigation Act of 2000 and therefore qualify for additional grant funding in both the pre-disaster and post-disaster environment;
- Speed up recovery and redevelopment following future disaster events;
- Demonstrate a firm local commitment to hazard mitigation principles; and
- Comply with both state and federal legislative requirements for local hazard mitigation plans.

The City is susceptible to a number of different hazards that have potential to cause property loss, loss of life, economic hardship, and threats to community lifelines and public health and safety. Occurrence of natural disasters cannot be prevented; however, their impact on people and property can be lessened through hazard mitigation measures.

Mitigation planning is imperative to lessen the impact of disasters in the City. This plan is an excellent method by which to organize the City's mitigation strategies. The implementation of the plan and its components is vital to preparing a community that is resilient to the effects of a disaster. The implementation of this HMP can reduce loss of life and property and allow the City to operate with minimal disruption of vital services to residents. This HMP provides a risk assessment of the hazards the City is exposed to and puts forth a mitigation strategy based on that risk assessment.

1.3. Authority

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended by the Disaster Mitigation Act of 2000, provides the legal basis for City, tribal, and local governments to undertake risk-based approaches to reducing natural hazard risks through mitigation planning. Specifically, the Stafford Act requires state, tribal, and local governments to develop and adopt FEMA-approved hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance. The Stafford Act authorizes the following grant programs:

- Hazard Mitigation Grant Program (HMGP), which helps communities implement hazard mitigation measures following a Presidential major disaster declaration. This program also funds development and update of hazard mitigation plans.
- Building Resilient Infrastructure and Communities (BRIC) grant program, which gives states, local communities, tribes, and territories funding to address future risks to natural disasters, including ones involving wildfires, drought, hurricanes, earthquakes, extreme heat, and flooding.
- Pre-Disaster Mitigation Grant Program (PDM), which awards planning and project grants to assist states, territories, federally recognized tribes, and local communities in implementing sustained pre-disaster natural hazard mitigation programs. Such efforts may include development or update of hazard mitigation plans.
- Public Assistance Grant Program (PA), which provides assistance to state, tribal, and local governments and certain types of private nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President.
- Fire Management Assistance Grant Program (FMAG), which provides assistance to state, tribal, and local governments for the mitigation, management, and control of fires on publicly or privately owned forests or grasslands that threaten such destruction as would constitute a major disaster.

Title 44, Chapter 1, Part 201 (44 CFR Part 201) of the Code of Federal Regulations (CFR) contains requirements and procedures to implement the hazard mitigation planning provisions of the Stafford Act. The purpose of the Stafford Act, as amended by the Disaster Mitigation Act of 2000, is “to reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters.” Chapter 322 of the act specifically addresses mitigation planning and requires City and local governments to prepare multi-hazard mitigation plans as a precondition for receiving FEMA mitigation grants.

This plan, updating the plan, and timely future updates of this plan will allow the City to comply with the Disaster Mitigation Act of 2000 and its implementation regulations, 44 CFR Part 201.4, thus resulting in eligibility to apply for federal aid for technical assistance and post-disaster hazard mitigation project funding. The update will also prioritize potential risks and vulnerabilities in an effort to minimize the effects of disasters across the City of Grand Prairie.

1.4. Planning Area

The planning area includes the City of Grand Prairie, Grand Prairie Independent School District (GPISD), and Grand Prairie Extra Territorial Jurisdiction (ETJ). Areas of the City are located in Dallas County, Tarrant County, and Ellis County. Centrally located in the Dallas–Fort Worth (DFW) Metropolitan Area, the City is about 26 miles long and about 8 miles at its widest point. The City covers approximately 81 square miles and is home to over 200,000 residents, making it the 16th largest city in Texas.²

² [About Grand Prairie, Texas City of Grand Prairie \(gptx.org\)](https://www.gptx.org/about-grand-prairie)

The City is situated in a highly frequented area. The northern part of the City is adjacent to the Dallas–Fort Worth International Airport, which is the world’s second busiest commercial airport.³ Other large transportation infrastructure is prominent in the City, such as Interstate 30. This makes Grand Prairie one of the most ideal and largest distribution centers. The Great Southwest Industrial District consists of 5,500 acres in Grand Prairie alone. The City’s prime location and access to transportation networks contributes to its economic, commercial, and industrial growth. The area is also experiencing prominent residential growth, especially in the southern part of Grand Prairie, which is attracting high-end residential housing. In 2022, there were 322 new Single-Family Building Permits issued in the City.⁴ This rapid growth environment is relevant to mitigation planning because in an expanding environment, the need for communication, accurate information, and a clear understanding of the risks affecting the area and roles and responsibilities is heightened.

The Grand Prairie Independent School District is one of the largest employers in Grand Prairie with approximately 3,972 employees. GPISD is a 58-square mile district serving approximately 28,230 students within the Dallas County portion of Grand Prairie.

Figure 1 is from the City’s Interactive Map, the area outlined in orange represents the City of Grand Prairie and its ETJ zones.

³ [DFW Once Again Celebrates Status as World’s Second-Busiest Airport \(dfwairport.com\)](https://www.dfwairport.com)

⁴ [About Grand Prairie, Texas City of Grand Prairie \(gptx.org\)](https://www.gptx.org)

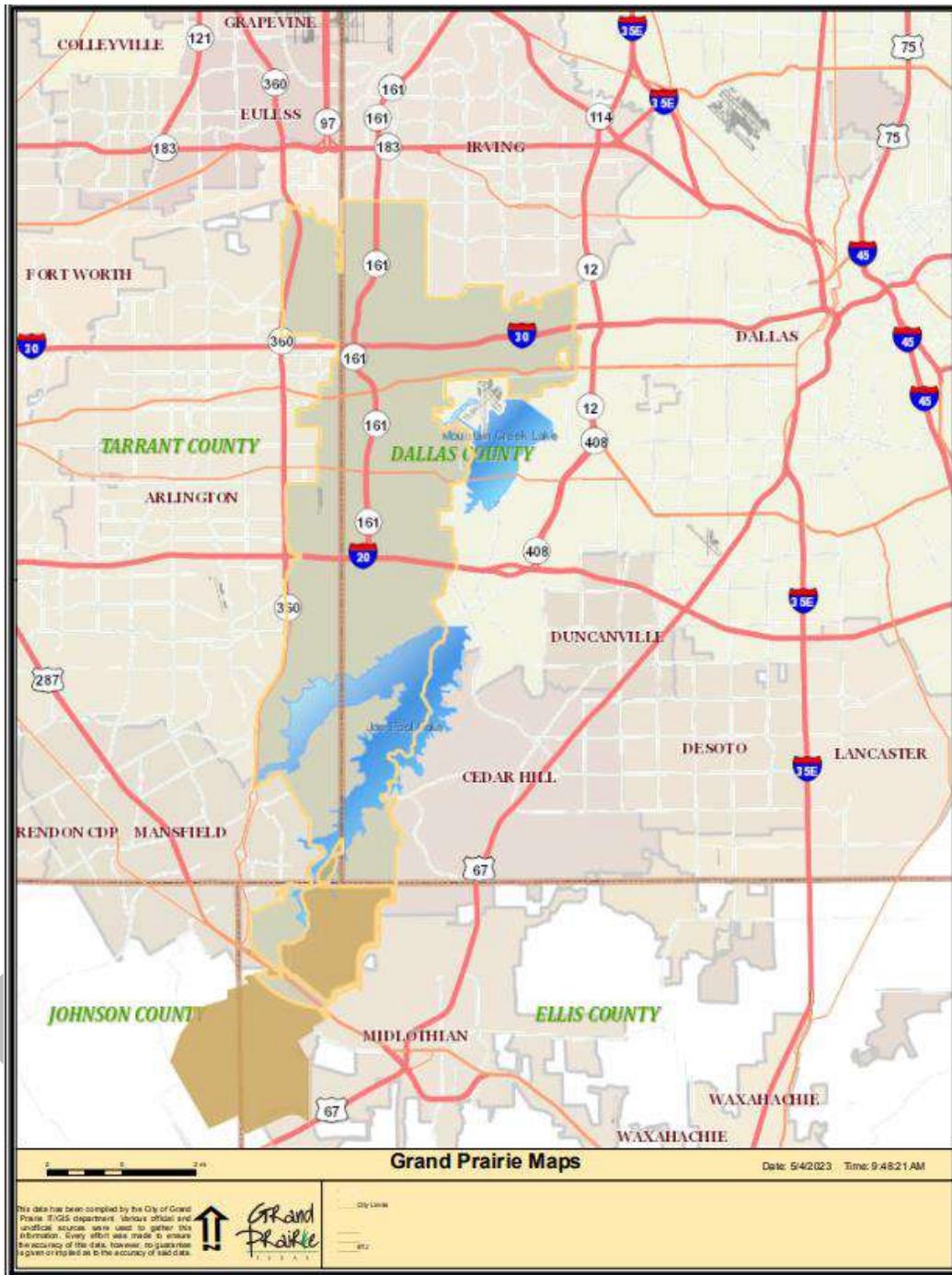
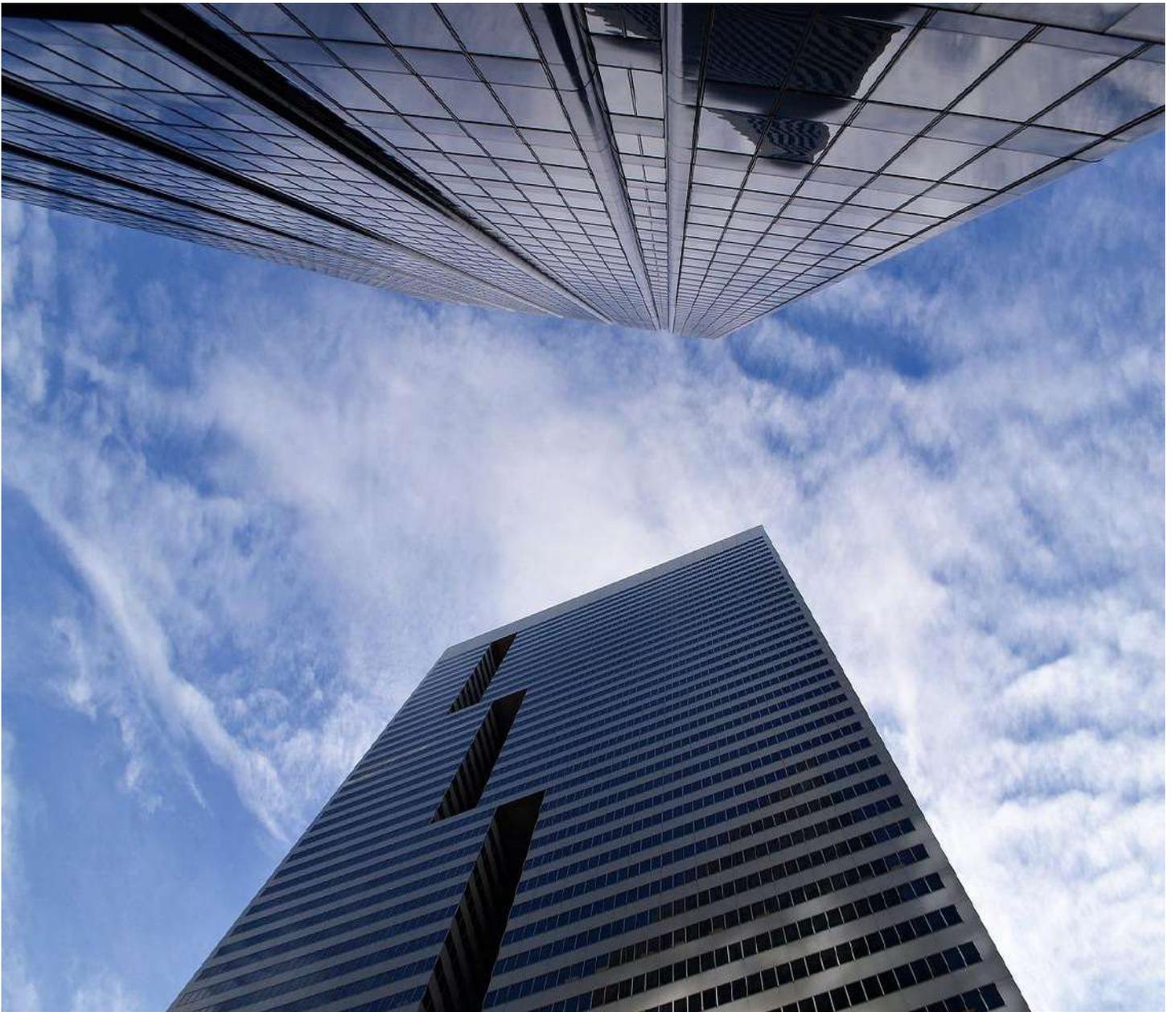


Figure 1: Planning Area⁵

⁵ [Interactive Maps \(gptx.org\)](https://www.gptx.org)



Section 2:

Planning Process

2. Planning Process

2.1. Collaborative Process

The Planning Team utilized the planning process guidance provided by IEM to revise the current Hazard Mitigation Plan. An open public involvement process was established to provide opportunities for the whole community to be involved in the planning process.

2.1.1. Planning Team

Efforts to involve mitigation partners included inviting participants to attend meetings and serve on the Planning Team, coordinating with functional experts, obtaining progress or summary reports, conducting strategy meetings, and providing opportunities for input and comment on all draft deliverables.

The Planning Team for this update consisted of the following staff members in the City of Grand Prairie and Grand Prairie ISD. If a member leaves prior to the completion of this plan or before the next update, their replacement in their position will be requested to sit on the Planning Team.

Table 1: Planning Team Members

Department	Name	Position
City of Grand Prairie Building Inspector	Dennis Morrison	Chief Plans Examiner
City of Grand Prairie City Secretary Office	Gloria Colvin	Deputy City Secretary
City of Grand Prairie Water/Wastewater	Addicus Hughes	Construction Inspector – Water Utilities
City of Grand Prairie Water/Wastewater	Mickey Tucker	Operations Supervisor – Water Production
City of Grand Prairie Engineering Services	Barry Fulfer	Public Works Contingency / CRS Coordinator
City of Grand Prairie Engineering Services	Noreen Houseright	Engineering Services Director
City of Grand Prairie Finance	Jesus Flores	Senior Accountant
City of Grand Prairie Finance	Luis Barrera	Controller
City of Grand Prairie Fire Department	Jeremy Ashcraft	Battalion Chief
City of Grand Prairie Fire Department	Adan Elizarraras	Captain

Department	Name	Position
City of Grand Prairie General Services	Jayson Ramirez	General Services Director
City of Grand Prairie Human Resources	Lisa Norris	HR Director
City of Grand Prairie Human Resources	Michon Wynn	HR Manager
City of Grand Prairie GIS	Scott Webber	Manager
City of Grand Prairie GIS	Hatim Mahdi	Senior GIS Analyst
City of Grand Prairie City Attorney's Office	Chuong Phung	Assistant City Attorney
City of Grand Prairie Communications & Marketing	Ana Enriquez	Communications Supervisor
City of Grand Prairie Office of Emergency Management	Chase Wheeler	Assistant Director
City of Grand Prairie Office of Emergency Management	Madison Sims	Emergency Management Specialist
City of Grand Prairie Planning and Development	Rashad Jackson	Director
City of Grand Prairie Police Department	Matthew Dick	Sergeant
City of Grand Prairie Public Health and Environmental Quality	Jody Cason	Environmental Quality Manager
City of Grand Prairie Solid Waste and Recycling	Patricia Redfearn	Director
City of Grand Prairie Transportation / Mobility Services	Leland Miller	Street Services Manager
City of Grand Prairie Transportation/Mobility Services	Clark Davis	Assistant Director
		-Repeat Input
City of Grand Prairie Water/Wastewater	Rene Luna	Water Operations - Superintendent
City of Irving Office of Emergency Management	Jason Carriere	Emergency Management Coordinator
City of Irving Office of Emergency Management	Jordan Serrano	Assistant Emergency Management Coordinator
Grand Prairie ISD	Neal Sandlin	Emergency Management Director

The members' role during this planning process was to:

- Discuss the hazards, risks, vulnerabilities, capabilities, and possible mitigation actions that would be incorporated into this Hazard Mitigation Plan update;
- Contribute expertise, data, studies, information, etc. related to hazards;

- Provide a status report of previous action items; and
- Provide general information requested by IEM.

2.1.2. Stakeholders

Stakeholders were invited via email to participate in the planning process. Stakeholders include agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, and neighboring communities. Each stakeholder provided insight on community capabilities, risks, vulnerabilities, and assisted in developing mitigation actions that would be incorporated into this Hazard Mitigation Plan update. These representatives are presented in Table 2.

Other stakeholders that were given the opportunity to participate include the following:

- City of Arlington
- City of Duncanville
- City of Fort Worth
- City of Mansfield
- Dallas Fort Worth International Airport
- Johnson County
- Texas Division of Emergency Management

Table 2: Stakeholders

Organization	Name	Position
City of Irving Office of Emergency Management	Jason Carriere	Emergency Management Coordinator
Dallas County Homeland Security and Emergency Management	Denise Martinez	Hazardous Material and Technology Manager
Dallas County Homeland Security and Emergency Management	Richard Faulkner	Office Clerk II
Tarrant County Office of Emergency Management	David McCurdy	Emergency Management Coordinator

2.1.3. Public Involvement

Public involvement is an opportunity to educate the public about the hazards and risks in the community, the types of activities to mitigate those risks, and how these activities impact them.

A public survey was posted to the City of Grand Prairie’s website to garner public input on existing hazards, capabilities, and mitigation strategy from residents and Grand Prairie ISD parents. The responses from the public survey were used by the Planning Team to influence decision in this plan’s development. Survey participation and details are included in Appendix A.

Public participation will remain an active component of this plan, even after adoption, to ensure citizens understand what the community is doing on their behalf and to provide a chance for input on community vulnerabilities and mitigation activities that will inform the plan’s content.

2.2. Existing Data and Plans

Existing hazard mitigation information and other relevant hazard mitigation plans were reviewed during the development of this plan. Data was gathered through numerous sources, including Geographic Information Systems (GIS). The intent of reviewing existing material was to identify existing data and information, shared objectives, and past and ongoing activities that can help inform the mitigation plan. It also helps identify the existing capabilities and planning mechanisms to implement the mitigation strategy. Table 3 outlines some of the sources used to collect data for the plan.

Table 3: Data Sources

Data Source	Data Incorporation	Purpose
Appraisal data, census data, land use data	Population and demographics	Risk assessment
National Centers for Environmental Information (NCEI)	Hazard occurrences	Risk assessment
Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Map (DFIRM) Flood Zones, National Flood Insurance Program (NFIP) studies	Flood zone maps and NFIP information	GIS mapping of flood zones and NFIP data.
Texas 2018 Hazard Mitigation Plan	All sections	Alignment with the state mitigation strategy.
2016 City of Grand Prairie Hazard Mitigation Plan	All sections	This HMP is an update of the 2016 plan.
City of Grand Prairie 2021-2026 Floodplain Management Plan	Hazard data and vulnerable locations	Identifying and addressing flood risk
North Central Texas Council of Governments (NCTCOG) Comprehensive Economic Development Strategy	Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis	Vulnerability Assessment
Texas A&M Forest Service (TFS) Texas Wildfire Risk Assessment Summary Report	Wildfire threat and urban interface	Mapping and wildfire vulnerability
Department resources and plans	Hazard and asset data	Risk and capability assessments
National Inventory of Dams	Hazard data	Risk Assessment
U.S. Geological Survey (USGS) Earthquake Catalog	Hazard data	Risk Assessment

2.3. Timeframe and Planning Meetings

Table 4 shows the approximate six-month timeframe for the planning process. During the planning process, the team met to discuss relevant information and to review objectives and progress of the plan.

The goals of these meetings were to gather information and to provide guidance for the jurisdictions throughout the planning stages.

Table 4: Planning Timeframe

Activity	Time Period
Kickoff Meeting	May 1, 2023
Confirmed members of the team	May 1, 2023
Capability assessment	May–June 2023
Hazard identification and risk assessment	May–June 2023
Mitigation Strategy Workshop (Goals and Actions)	July 21, 2023
Review HMP draft	August 2023
Update plan as needed	September 2023
Send to TDEM and FEMA; make revisions as needed	To be determined
Adoption and signatures	Once “Approvable Pending Adoption” letter received

Figure 2 and Figure 3 capture some of these meetings.

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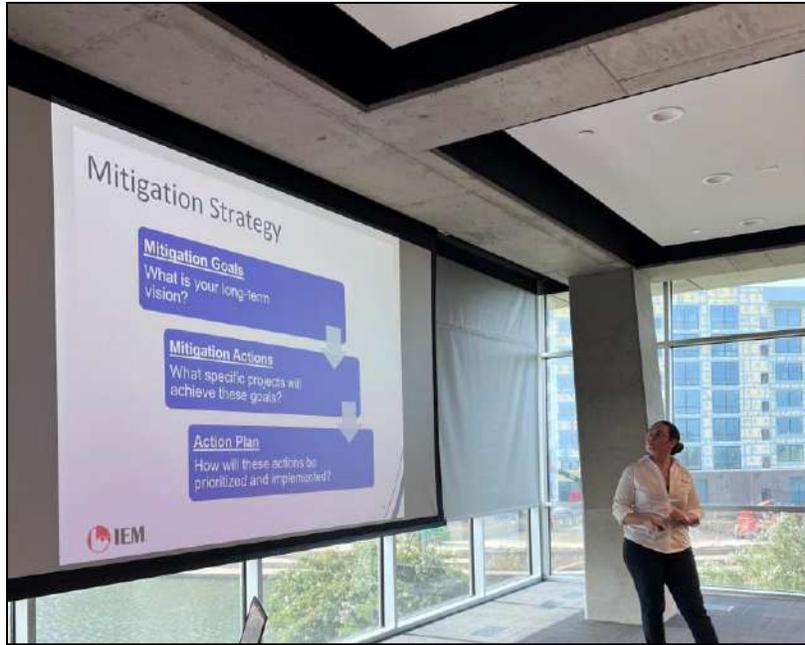


Figure 2: City of Grand Prairie Mitigation Strategy Workshop



Figure 3: Mitigation Strategy Workshop Planning Team and Stakeholders



Section 3:

Risk and Vulnerability Assessment

3. Risk and Vulnerability Assessment

Risk, for the purpose of hazard mitigation planning, is the potential for damage, loss, or other potential impacts created by the interaction of hazards with community assets. The exposure of people, property, and other community assets to hazards can result in disasters, depending on the impacts.



Figure 4: Risk Assessment Steps

Figure 4 shows the four steps followed for this plan's risk assessment. The desired outcomes of these steps are 1) an evaluation of each hazard's potential impacts on the people, economy, and built and natural environments in the planning area, and 2) an understanding of each community's overall vulnerability and most significant risks. These potential impacts and the overall vulnerability can be used to create problem statements and identify mitigation actions to reduce risk.

3.1. Natural Hazard Profiles

Through a review of the 2016 HMP, an assessment of previous federally declared disasters, historical events captured by National Centers for Environmental Information (NCEI) and U.S. Geological Survey (USGS), and a review of available local mitigation plans, the planning team identified nine natural hazards that could potentially impact the City within the next 5 years. In alphabetical order, the natural hazards are as follows:

- Drought
- Earthquakes
- Expansive/Corrosive Soils
- Extreme Heat
- Flooding
- Severe Thunderstorms
- Severe Winter Weather
- Tornadoes
- Wildfires

Dam Failure is also a hazard of concern for the participants over the next 5 years and is profiled in the following Non-Natural Hazards Section, as dams themselves are manmade.

3.1.1. Historical Overview

The NCEI receives storm data from the National Weather Service (NWS) that is then compiled into a Storm Events Database. NWS receives their information from a variety of sources, which include but are not limited to, county, City, and federal emergency management officials; local law enforcement officials; SkyWarn spotters; NWS damage surveys; newspaper clipping services; the insurance industry; and the general public, among others. Please note that the NWS does not guarantee the accuracy, validity, or completeness of the event data in the Storm Events Database. The data collected by NCEI is reflected in Table 5.

Table 5: 2016–2022 Historical Weather Overview

Hazard	Days	Impact			
		Property Damage	Crop Damage	Deaths	Injuries
Extreme Heat	28	100.00K	0.00K	3	8
Flooding	1	0.00K	0.00K	0	0
Severe Thunderstorms	9	100.00K	0.00K	0	0
Severe Winter Weather	14	6.430M	0.00K	12	2
Tornadoes	1	120.00K	0.00K	0	0

Since 2017, Texas has experienced nine major disaster declarations. Of these, Dallas, Tarrant, and/or Ellis County have been a Designated Area for the three disasters in Table 6. More details on these disasters can be found on FEMA’s Disaster Declaration website, <https://www.fema.gov/disaster/declarations>.

Table 6: Major Disaster Declarations 2017–2022

Event	Declaration Date	Type of Assistance	Declaration Number
Texas Severe Winter Storms	February 19, 2021	Individual and Public	DR-4586
Texas COVID-19 Pandemic	March 25, 2020	Individual and Public	DR-4485
Texas Hurricane Harvey	August 25, 2017	Public	DR-4332

3.1.2. Probability of Future Events and Impacts

Past occurrences are important to review to establish a factual basis of hazard risk. However, the challenges posed by climate change, such as more intense storms, frequent heavy precipitation, heat waves, drought, extreme flooding, and higher sea levels, could significantly alter the types and magnitudes of hazards affecting communities in the future. Because predicting future hazard events is inherently uncertain, current and relevant data were used to select the most appropriate methodologies to assess risks and vulnerability.

Climate change, including changes in temperature, intensity, hazard distribution, or frequency of weather events, may increase vulnerability to these hazards in the future. Based on historical knowledge and current conditions, it can be expected that all hazards will see a rise in scope, scale, and frequency of events on a yearly basis.

Disaster costs are predicted to increase on a yearly basis as well. These costs include physical damage to residential, commercial, and municipal buildings; material assets (content) within buildings; time element losses such as business interruption or loss of living quarters; damage to vehicles and boats; public assets, including roads, bridges, and levees; electrical infrastructure and offshore energy platforms; agricultural assets, including crops, livestock, and commercial timber; and wildfire suppression costs, among others. However, these disaster costs do not consider losses to natural capital or environmental degradation, mental or physical healthcare-related costs, the value of a statistical life, or supply chain contingent business interruption costs. Therefore, our estimates should be considered conservative with respect to what is truly lost but cannot be completely measured due to a lack of consistently available data.

The increase in population and material wealth over the last several decades is an important cause for the rising costs. These trends are further complicated by the fact that much of the growth has taken place in vulnerable areas like coasts, the wildland–urban interface (WUI), or river floodplains. Vulnerability is especially high where building codes are insufficient for reducing damage from extreme events.

To further profile the details regarding each natural hazard, hazard summaries were developed and are presented below in alphabetical order.

3.1.3. Drought

According to the National Oceanic and Atmospheric Administration (NOAA), **drought** is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area. Conceptually, drought is a protracted period of deficient precipitation resulting in extensive damage to crops and loss of yield.

3.1.3.1. Location

Due to the nature of drought, it is not confined to geographical barriers. Therefore, the entire planning area is vulnerable to the hazard. Figure 5 reflects the 2011 drought event; Dallas County is outlined on the map.

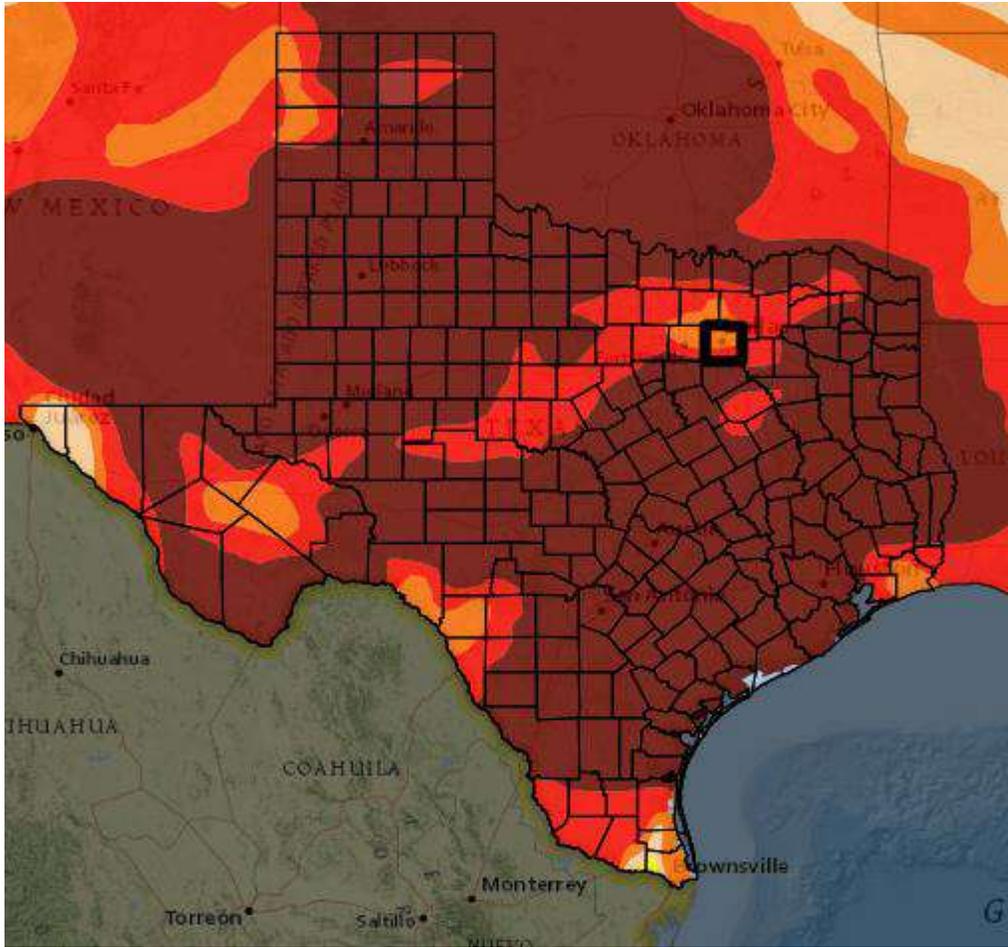


Figure 5: 2011 Drought Map⁶

3.1.3.2. Previous Occurrences

The Planning Team referred to the U.S. Drought Monitor (USDM) for historical occurrences within the planning area. Based on Figure 6, the planning area experienced all levels of drought extent (D0–D4) between 2000 and 2023.

⁶ [Historical Data and Conditions | Drought.gov](https://drought.gov)

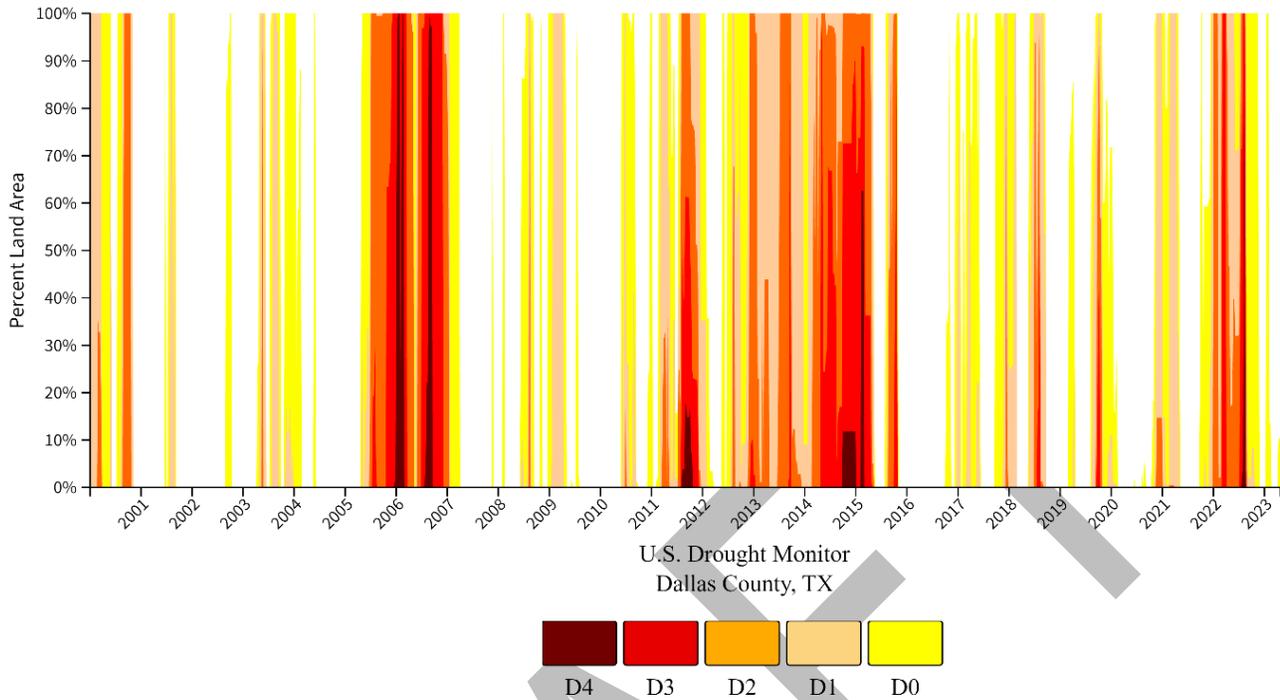


Figure 6: 2000–2023 Historic Drought Conditions in Dallas County, Texas⁷

3.1.3.3. Extent/Intensity

The Palmer Drought Severity Index (PDSI) has been used the longest for monitoring drought. The PDSI is a standardized measure, ranging from about -10 (dry) to +10 (wet) with values below -3 representing severe to extreme drought. The PDSI is calculated based on precipitation and temperature data, as well as the local Available Water Content (AWC) of the soil.

In conjunction with the PDSI, the U.S. Drought Monitor uses a five-category system, labeled Abnormally Dry or D0, (a precursor to drought, not actually drought) and Moderate (D1), Severe (D2), Extreme (D3), and Exceptional (D4) Drought. Drought categories show experts’ assessments of conditions related to dryness and drought, including observations of how much water is available in streams, lakes, and soils compared to usual for the same time of year.

Figure 7 reflects the drought severity scale.

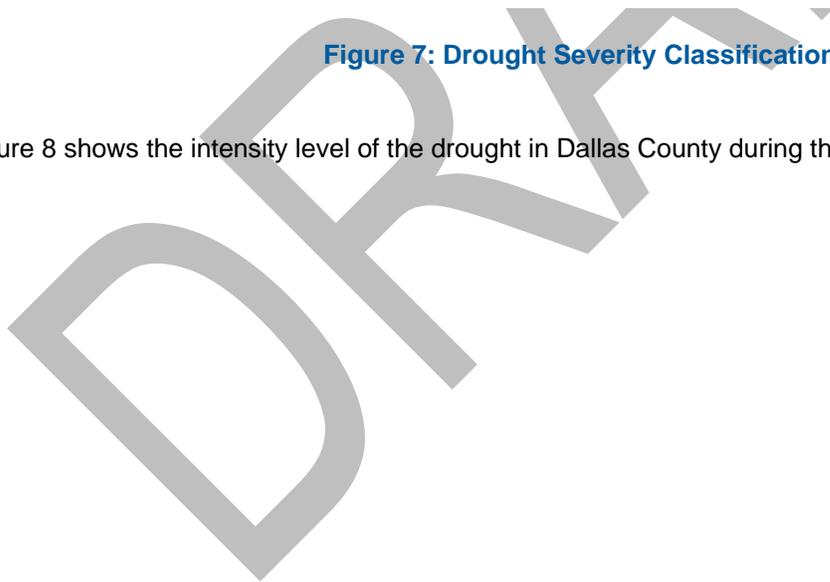
⁷ <https://www.drought.gov/states/Texas/county/Dallas>.

Drought Severity Classification

Category	Description	Possible Impacts	Ranges				
			Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Short and Long-term Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	21-30
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	11-20
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9	6-10	6-10	-1.3 to -1.5	6-10
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9	3-5	3-5	-1.6 to -1.9	3-5
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0-2	0-2	-2.0 or less	0-2

Figure 7: Drought Severity Classification

Figure 8 shows the intensity level of the drought in Dallas County during the 2011 drought.



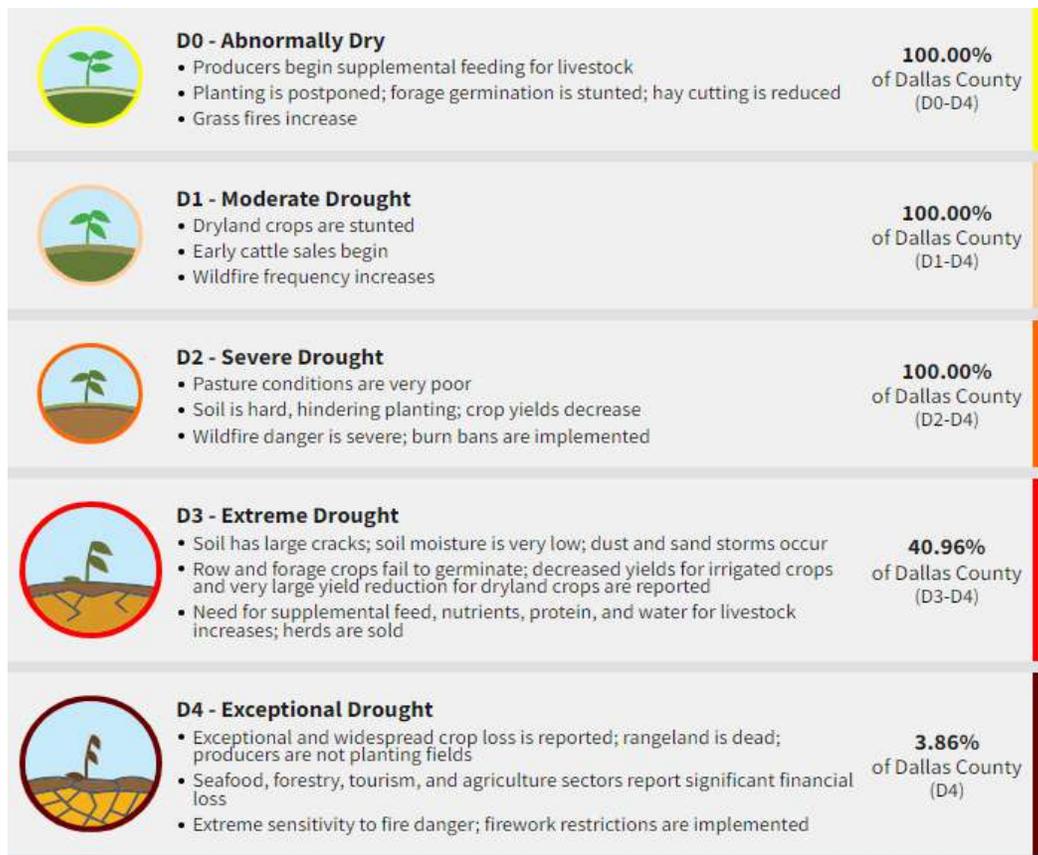


Figure 8: 2011 Drought Intensity Scale of Dallas County

3.1.3.4. Impact and Vulnerability

Immediate drought impacts can include visibly dry vegetation and lower water levels in lakes and reservoirs. Longer-term impacts, such as land subsidence and damage to ecosystems, can be harder to see and more costly to manage in the future.

Drought primarily impacts life and property in the form of water supply. Drought conditions can greatly impact the City’s water availability and water quality. The City of Grand Prairie has a Drought Contingency and Emergency Water Use Plan, which can be found online at <https://www.gptx.org/water-service/documents/drought-contingency-plan.pdf>.

Impacts can be widespread, and all people and environments are vulnerable to the effects of drought. To minimize these impacts, the City places water restrictions when needed to conserve the local water supply. Water restrictions are categorized as Stage 1 and Stage 2 and are established by the Grand Prairie Water Conservation Ordinance. Restrictions are usually set until drought conditions improve and the city water supply has recovered to normal operation levels.⁸

Figure 9 further describes the impact of a possible drought event based on the D0–D4 drought intensity categories. Based on the 2011 drought event, we know that Grand Prairie can experience the D4 level and its full range of impacts.

⁸ [Current Water Restrictions City of Grand Prairie \(gptx.org\)](https://www.gptx.org/water-service/documents/drought-contingency-plan.pdf)

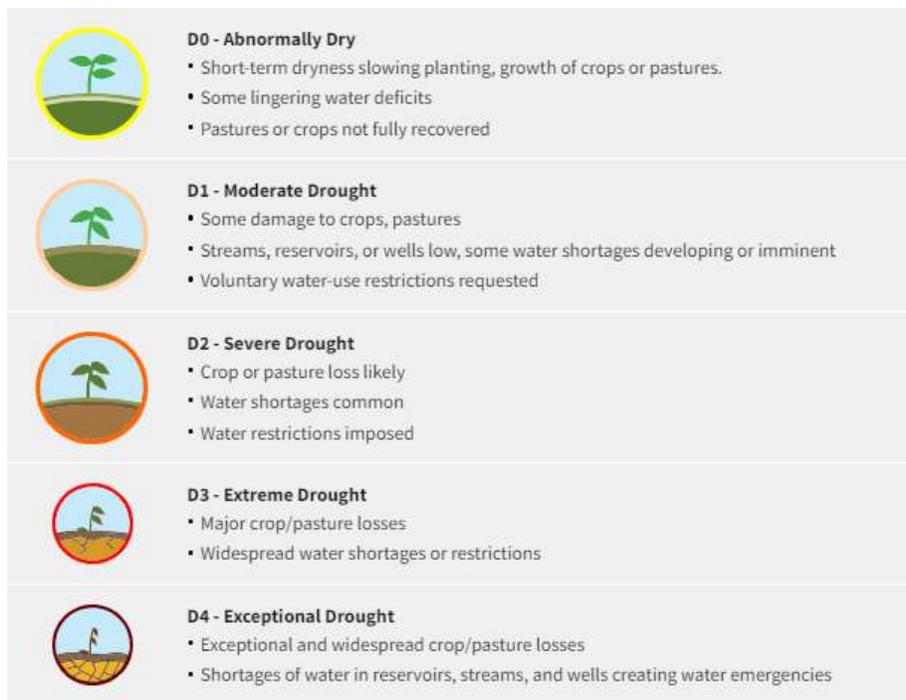


Figure 9: Drought Impact by Category

3.1.4. Earthquakes

An **earthquake** occurs when the earth’s tectonic plates move or shift. This causes the ground to shake, which can sometimes be very intense and cause significant damage to the area. The largest main earthquake is called the mainshock. An aftershock always occurs after a mainshock. An aftershock is a smaller earthquake that occurs in the same place as the mainshock. Aftershocks can continue for weeks, months, or even years after the mainshock occurs.⁹

3.1.4.1. Location

Earthquakes can occur at any place or any time. However, a majority of earthquakes occur along fault lines or at the boundaries between the earth’s tectonic plates. The planning area is located within the Fort Worth Basin. According to the Bureau of Economic Geology, from 2006 to 2018 there have been 125 earthquakes with a magnitude of 2.5 or greater recorded within the Fort Worth Basin and the Dallas–Fort Worth metropolitan area. Research suggests an increase of seismic activity in and around the planning area is due to wastewater injection, which is common in areas of oil and gas production.¹⁰ It is possible that the planning area may experience an increased level of seismic activity based on the location and its developments.

⁹ [The Science of Earthquakes | U.S. Geological Survey \(usgs.gov\)](https://www.usgs.gov)

¹⁰ [Fort Worth Basin | Bureau of Economic Geology \(utexas.edu\)](https://www.utexas.edu)

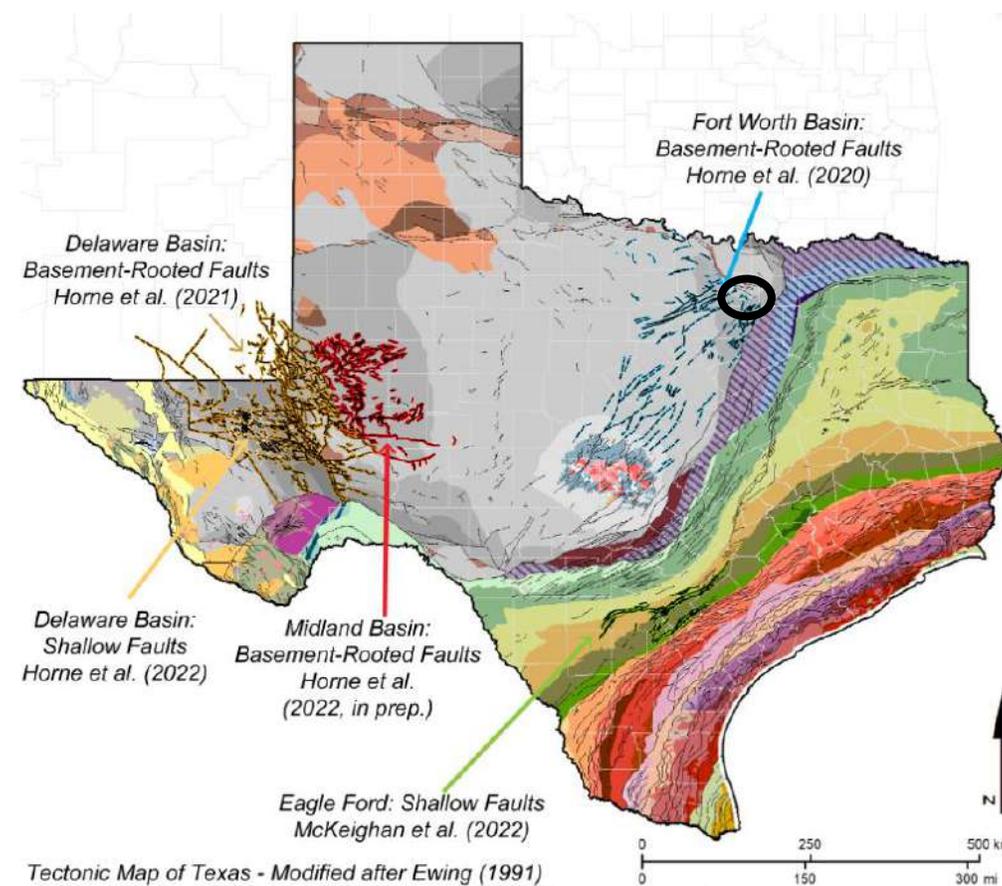


Figure 10: Texas Fault Map¹¹

3.1.4.2. Previous Occurrences

According to the USGS Earthquake Catalog, there are 5 reported events with a magnitude of 2.5 or greater between January 1, 2000, and January 1, 2023.

Table 7: Previous Occurrences of Earthquakes

Date	Magnitude	Location
5/16/2009	2.6	5 km NNW of Grand Prairie, Texas
5/16/2009	3.3	5 km NNW of Grand Prairie, Texas
11/1/2008	2.5	4 km WNW of Grand Prairie, Texas
10/31/2008	2.9	5 km NNW of Grand Prairie, Texas
10/31/2008	2.5	2 km WNW of Grand Prairie, Texas

¹¹ [Fault Maps | Bureau of Economic Geology \(utexas.edu\)](https://www.utexas.edu/bureau-of-economic-geology/fault-maps)

3.1.4.3. Extent/Intensity

The Modified Mercalli Intensity Scale measures the intensity of earthquakes and is based on observable earthquake damage. Levels on this scale are represented by roman numerals and range from weak to extreme. Figure 11 presents each level of intensity and the possible corresponding impacts.

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Figure 11: The Modified Mercalli Scale¹²

3.1.4.4. Impact and Vulnerabilities

The planning area may experience some of the common impacts associated with earthquakes. This includes significant structural damage to buildings, critical facilities, roads, bridges, and other infrastructure. Fires are common after earthquakes because electrical lines and pipelines become damaged. The damages can cause loss of life, property, and money.

While it is impossible to know when or where an earthquake will occur, it is crucial to acknowledge that all critical facilities, individuals, and the natural environment within the planning area are vulnerable to the effects of an earthquake. This includes all critical buildings, hospitals, schools, transportation systems, and utility infrastructure. Any buildings that are outdated or do not meet current building standards may be especially susceptible to damage. People may be harmed or injured during an earthquake and the environment may be affected by liquidation or other geological disturbances.

3.1.5. Expansive and Corrosive Soils

Soils that experience a change in volume due to a change in moisture content are known as **expansive soils**. These soils may shrink or swell, and the hazard is exacerbated by long periods of drought followed by heavy rain or precipitation events.¹³ Due to chemical reactions that may occur in the soil, the soil may become corrosive. **Corrosive soils** are a geologic hazard that affect buried metals and concrete in direct

¹² [Modified Mercalli Intensity Scale | U.S. Geological Survey \(usgs.gov\)](https://www.usgs.gov/learn/modified-mercalli-intensity-scale)

¹³ [Virginia Energy - Geology and Mineral Resources - Expansive Soils](https://www.virginiaenergy.com/geology-and-mineral-resources/expansive-soils)

contact with soil or bedrock.¹⁴ Both expansive and corrosive soils can lead to erosion and infrastructure damage.

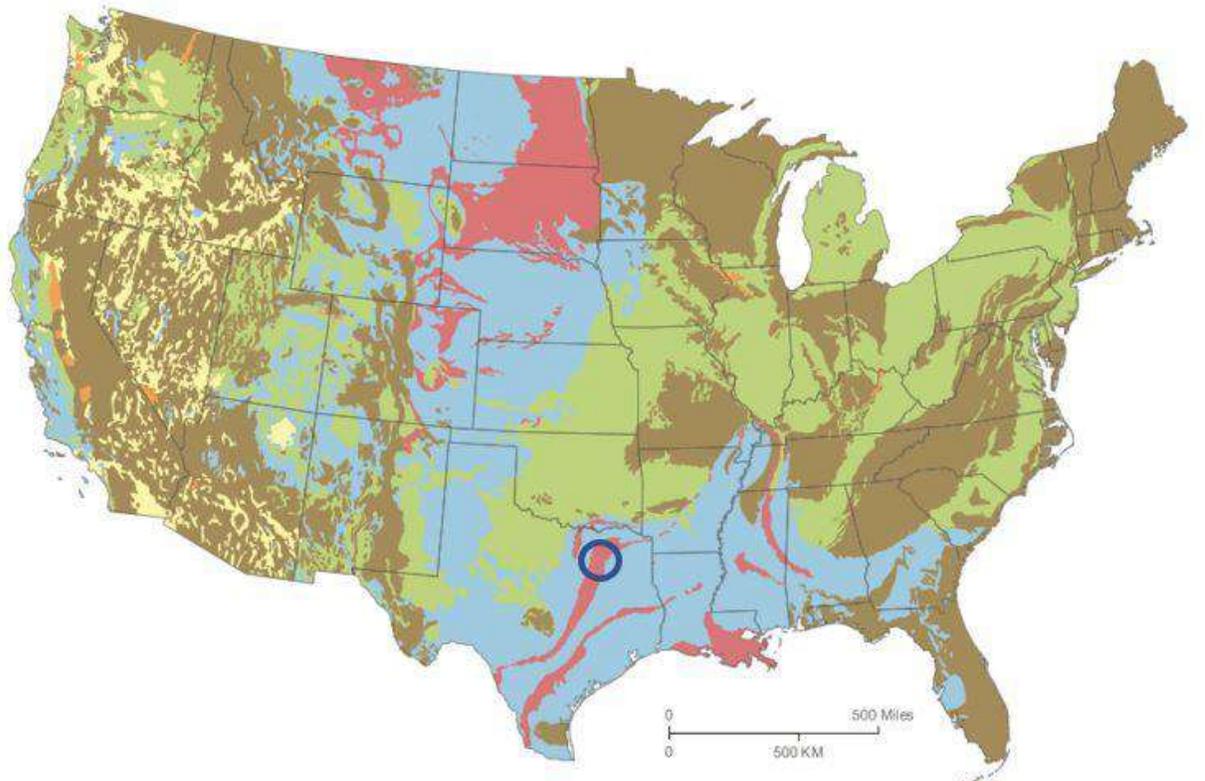


Figure 12: Expansive Soils

3.1.5.1. Location

Expansive soils are not confined to geographical barriers, but they are dependent on the material of the soil and levels of moisture. The American Society of Civil Engineers estimates that half of all homes in the United States are built on expansive soils. According to the soil map in Figure 13, over 50 percent of areas in the red are underlain by soils with abundant clays of high swelling potential. Dallas County and the planning area are in the general area of the circle on the map. Both expansive and corrosive soils are present throughout the world and are known in every state.

¹⁴ [Corrosive Soils - Colorado Geological Survey](#)



- Over 50 percent of these areas are underlain by soils with abundant clays of high swelling potential.
- Less than 50 percent of these areas are underlain by soils with clays of high swelling potential.
- Over 50 percent of these areas are underlain by soils with abundant clays of slight to moderate swelling potential.
- Less than 50 percent of these areas are underlain by soils with abundant clays of slight to moderate swelling potential.
- These areas are underlain by soils with little to no clays with swelling potential.
- Data insufficient to indicate the clay content or the swelling potential of soils.



Figure 13: Expansive Soils Map¹⁵

According to the U.S. Department of Agriculture (USDA) General Soil Map (see Figure 14), Dallas County and the planning area has Texas Blackland Prairie soil in which the shale parent materials have produced a significant extent of clayey soils having high shrink–swell properties, including Houston Black, Heiden, Frelsburg, Bleiblerville, and Latium soils. Loamy soils on similar landscape positions, which formed in interbedded sandstone and shale, include Hallettsville, Crockett, Wilson, and Carbengle.

¹⁵ <https://geology.com/articles/soil/>.

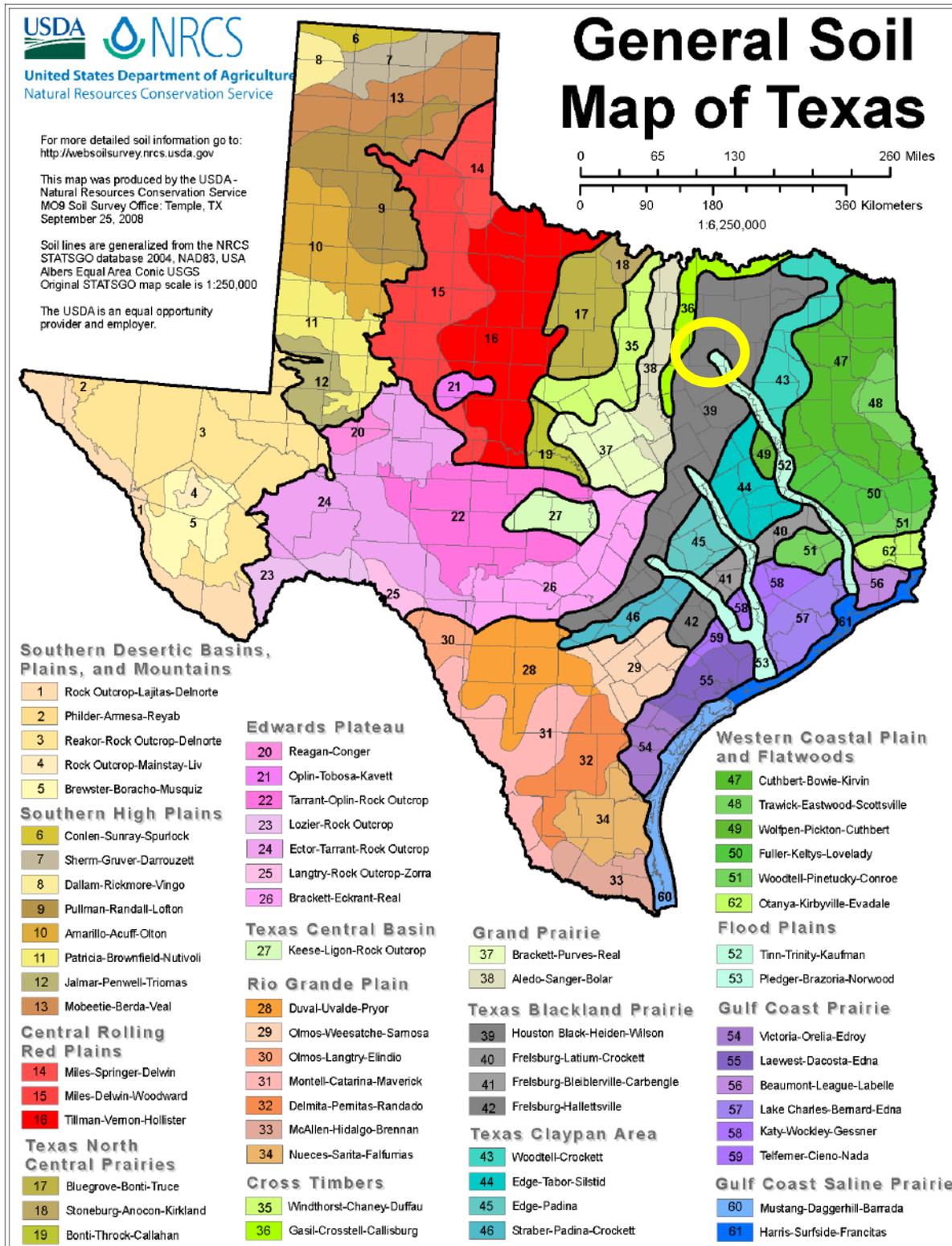


Figure 14: USDA 2008 General Soil Map of Texas

3.1.5.2. Previous Occurrences

The City of Grand Prairie has responded to numerous erosions concerns due to hazards such as expansive and corrosive soils. To address these issues, the City has implemented several erosion control resolutions and requirements within the planning area. This includes the requirement for all new developments to provide erosion control plans in compliance with city codes.

3.1.5.3. Extent/Intensity

The Expansion Index (EI) value (Table 8) of soil is used by engineers and other professionals as an indicator of the soil's swelling potential.

Table 8: Soil Expansion Index

EI	Expansion Potential
0 to 20	Very Low
21 to 50	Low
51 to 90	Medium
91 to 130	High
>130	Very High

3.1.5.4. Impact and Vulnerabilities

Areas that are prone to drought and flooding, such as the City of Grand Prairie, are especially vulnerable to the impacts of expansive soils. Expansive and corrosive soils can cause extensive damage to existing and new infrastructure. Problems associated with this hazard type include the following:¹⁶

- Foundation cracks
- Heaving and cracking of floor slabs and walls
- Jammed doors and windows
- Ruptured pipelines
- Heaving and cracking of sidewalks and roads

Infrastructure damage may occur to critical facilities, utilities, and transportation networks, creating a direct concern for public safety. All of impacts lead to significant economic damage.

3.1.6. Extreme Heat

Extreme heat refers to temperatures that are significantly higher than what is normal for a particular region or season.

¹⁶ [Problem Soils | AZGS \(arizona.edu\)](https://www.arizona.edu/azgs/problem-soils)

3.1.6.1. Location

Extreme heat is not confined to geographical boundaries and could occur within the entire planning area.

3.1.6.2. Previous Occurrences

Between 2016 and 2022, extreme heat events in Dallas County reported by the NCEI Storm Events Database resulted in 3 deaths and 8 injuries, but no property damage. These deaths and injuries all occurred in 2016, between the months of June and July. Many of these deaths and injuries occurred at an outdoor Trump rally.

Table 9: Previous Occurrences of Extreme Heat

Location	Date	Hazard Type	Direct Deaths	Direct Injuries	Property Damage Estimate	Crop Damage Estimate
DALLAS (ZONE)	6/15/2016	Heat	0	1	0.00K	0.00K
DALLAS (ZONE)	6/16/2016	Heat	1	0	0.00K	0.00K
DALLAS (ZONE)	6/16/2016	Heat	0	7	0.00K	0.00K
DALLAS (ZONE)	7/18/2016	Heat	1	0	0.00K	0.00K
DALLAS (ZONE)	7/24/2016	Heat	1	0	0.00K	0.00K
DALLAS (ZONE)	6/20/2019	Excessive Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	7/8/2019	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	7/16/2019	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/7/2019	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/17/2019	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/26/2019	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	7/9/2020	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/12/2020	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/13/2020	Excessive Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/28/2020	Excessive Heat	0	0	0.00K	0.00K

Location	Date	Hazard Type	Direct Deaths	Direct Injuries	Property Damage Estimate	Crop Damage Estimate
DALLAS (ZONE)	8/30/2020	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	9/1/2020	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	7/25/2021	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	7/29/2021	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/1/2021	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/9/2021	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	9/1/2021	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	6/11/2022	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	6/23/2022	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	7/6/2022	Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	7/7/2022	Excessive Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	7/17/2022	Excessive Heat	0	0	0.00K	0.00K
DALLAS (ZONE)	8/3/2022	Heat	0	0	0.00K	0.00K

3.1.6.3. Extent/Intensity

NWS created the Heat Index Scale (see Figure 15), which measures how hot it feels when humidity is factored in with the actual air temperature, with temperature warnings ranging from “caution” to “extreme danger.”

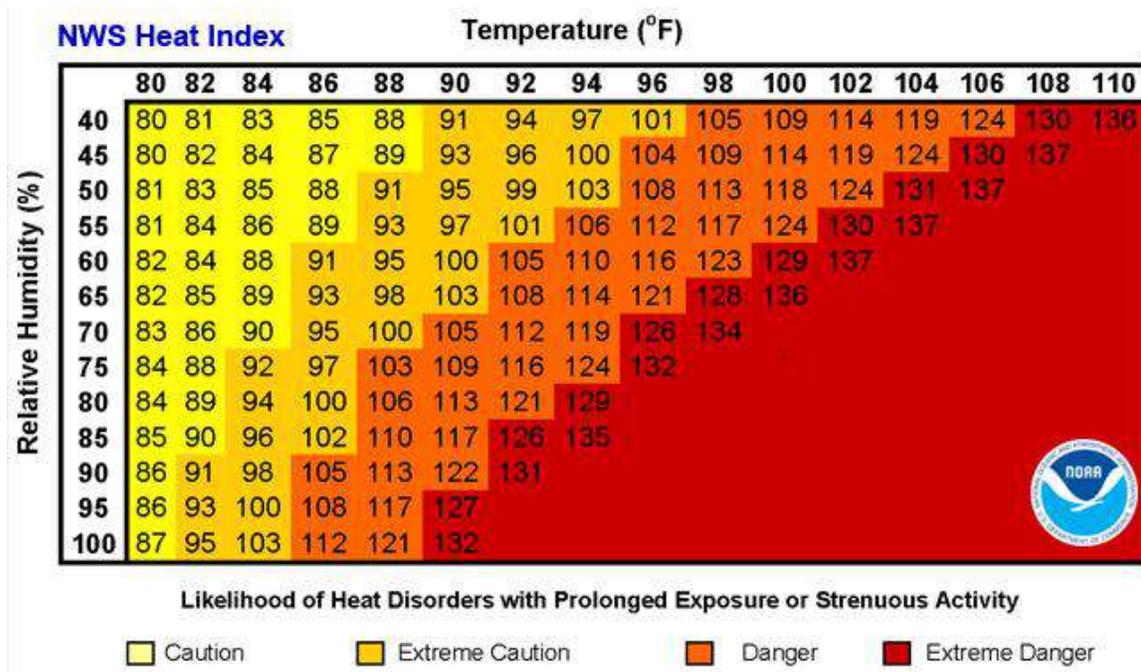


Figure 15: National Weather Service Heat Index Scale¹⁷

3.1.6.4. Impact and Vulnerabilities

Outdoor activities can be impacted by extreme heat. Grand Prairie ISD hosts many outdoor sporting events throughout the year, and the City regularly hosts a farmer’s market and many other holiday celebrations and community events during the summer.

Extreme heat can lead to heat-related illness and greatly affect vulnerable populations like the elderly, children, pregnant women, and those with pre-existing medical conditions.¹⁸ As mentioned above, extreme heat events caused three deaths and several injuries between 2016 and 2022. Similar impacts may be expected in the future.

To help protect vulnerable populations during the summer, the City encourages residents to use any three of the Grand Prairie Libraries to stay cool. Additionally, residents have access to public pools and recreation centers.

Utilities and infrastructure can also be damaged by extreme heat. Similarly, extreme heat 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.

3.1.7. Flood

According to NOAA, a **flood** is any high flow, overflow, or inundation by water that causes damage. In general, this would mean the inundation of a normally dry area caused by an increased water level in an established watercourse, or ponding of water, that poses a threat to life or property. **Urban and small stream flooding** commonly occurs in poorly drained or low-lying areas. **Flash floods** are described as a life-threatening, rapid rise of water into a normally dry area beginning within minutes to multiple hours of the causative event (e.g., intense rainfall, dam failure, ice jam). Ongoing flooding can intensify to the

¹⁷ [Heat Forecast Tools \(weather.gov\)](https://www.weather.gov/heat-forecast-tools)

¹⁸ [About Extreme Heat | Natural Disasters and Severe Weather | CDC](https://www.cdc.gov/ncez/diseases/disasters/severe-weather/about-extreme-heat)

shorter-term flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters. Flash flooding, such as dangerous small stream or urban flooding and dam or levee failures, requires immediate action to protect life and property. Conversely, flash flooding can transition into flooding as rapidly rising waters abate.

3.1.7.1. Location

Floods occur naturally and can happen almost anywhere within the planning area. Heavy rains, poor drainage, and even nearby construction projects can put people at risk for flood damage, though floodplains are the most common site of flooding. A floodplain is a geographic area subject to flooding and/or land adjacent to a waterway necessary to contain a flood.

Floodplains can be associated with rivers, lakes, streams, channels, or even small creeks that are normally dry most of the year. The two types of floodplains commonly dealt with are the following:

- **100-year (100-YR) floodplain:** An area subject to flooding as a result of the occurrence of a 100-year storm event—a storm that has a 1 percent chance of occurring in any given year. The 100-year floodplain, also called the 1 percent annual chance floodplain, is regulated by FEMA and Williamson County. This floodplain is also called Zone A or Zone AE.
- **500-year (500-YR) floodplain:** An area subject to flooding as a result of the occurrence of a 500-year storm event—a storm that has a 0.2 percent chance of occurring in any given year. The 500-year floodplain, also called the 0.2 percent annual chance floodplain, is currently not regulated by FEMA or Williamson County. This floodplain is also called Zone X shaded.¹⁹

There are over 19,000 acres of floodplain in the City of Grand Prairie. This accounts for 36.7 percent of the total City area, more than any other City in the region. Large floodplain areas include Joe Pool Lake, Mountain Creek, and the West Fork Trinity River floodplain. Other major watersheds include Cottonwood Creek, Fish Creek, and Johnson Creek.

Flood maps are one tool that communities use to know which areas have the highest risk of flooding. The City's floodplains are represented in Figure 16.

¹⁹ <https://www.wilco.org/Departments/Infrastructure/County-Engineer-Road-and-Bridge/Floodplain-Management> .

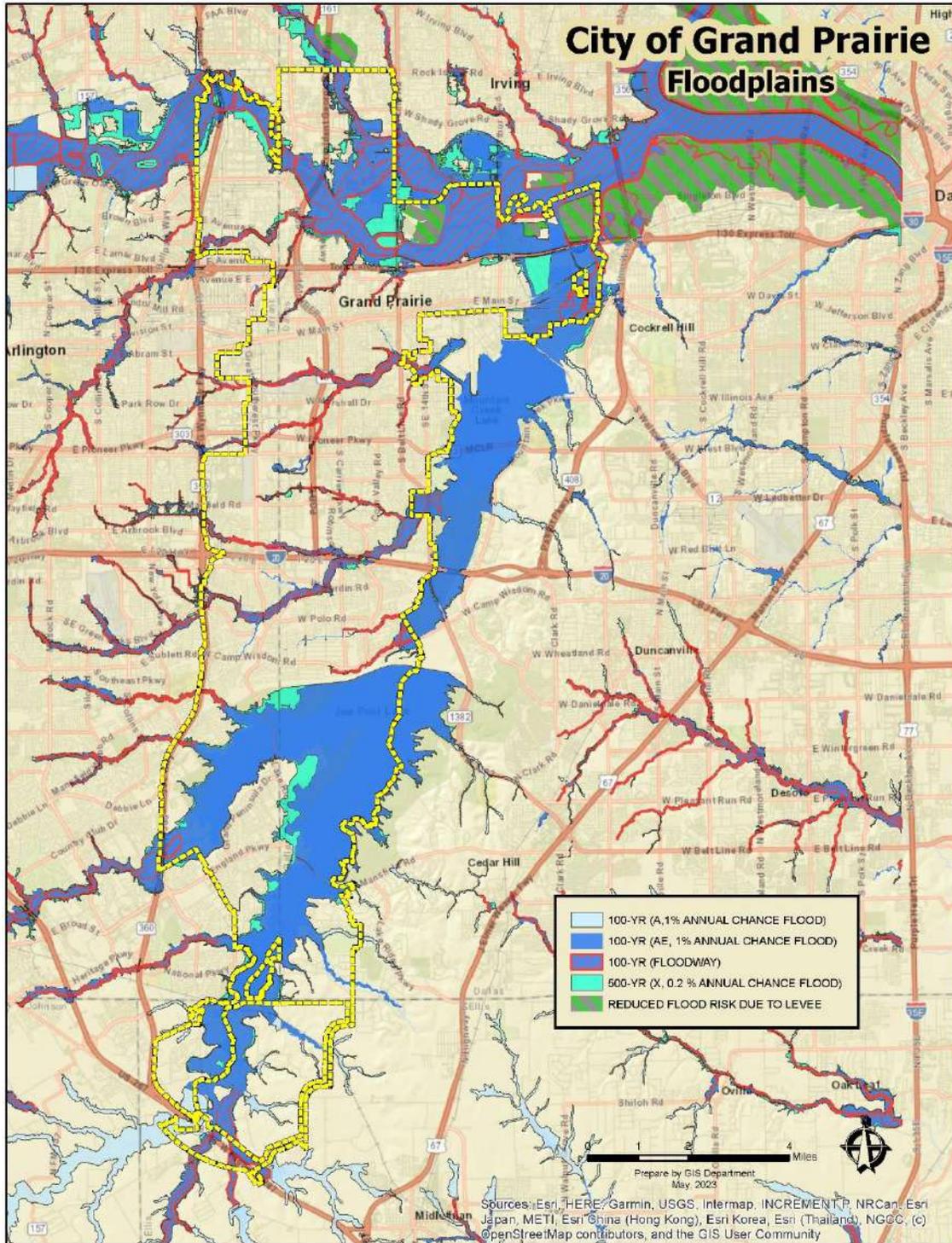


Figure 16: City of Grand Prairie Floodplains

3.1.7.2. Previous Occurrences

The NOAA NCEI database reported one case of flash flooding in the City of Grand Prairie between 2016 and 2022. This event occurred on August 22, 2022, with no impact to life or property.

3.1.7.3. Extent/Intensity

Flooding can vary in extent and intensity based on the type of flooding and the topography of an area. Flash floods generally cause greater loss of life while river type floods generally cause greater loss of property.²⁰ Flash flooding, riverine flooding, and urban flooding can all contribute to infrastructure loss, economic loss, and environmental damage.

While flood extent is often described using the 100-YR and 500-YR floodplains described above, the University of Colorado Boulder DFO Flood Observatory created the following Flood Magnitude Scale to describe flood intensity:

- The Flood Magnitude value is a measure of how severe a flood is, as a strictly hydrological occurrence (no assessment of damage is implied). The smallest reported value (discharge is below the 1.5 year recurrence interval discharge; no flooding) is “0.” The largest is “10”; this is the flood of record (1998–present). A value of 8 indicates that the flood runoff volume is 0.8 that of the flood of record (the measured current flooding/flood of record), a ratio that is multiplied by 10.
- To calculate the flood magnitude, total runoff volumes are measured for the flood hydrograph above the bankfull discharge, using this as a threshold discharge the 1.5 year recurrence interval flow. The reported current magnitude value is the runoff volume accumulated so far, compared to the flood volume of record, times 10.
- In the algorithm used to automatically calculate the flood magnitude from the River Watch discharge information, a 30-day window is used for such accumulation to span the duration of most floods and avoid incorporating runoff volumes from earlier floods.
- To obtain total runoff volume, daily runoff values are summed once discharge exceeds this threshold, and the sum is multiplied by contributing watershed area to measure total flood runoff volume (cubic meters). The volume increases each day until discharge recedes below the threshold.
- A longer duration flood exhibits a higher flood magnitude. Also, floods reaching higher peak discharges will exhibit higher magnitudes. Flood volumes will be larger from larger watersheds (other factors being equal), but the magnitude value compares flood volume to the flood of record: watershed and river size do not affect the magnitude number.

3.1.7.4. Impact and Vulnerabilities

As mentioned, flooding has the potential to cause severe damage. Homes, businesses, and other structures, which are costly to repair, can flood. Economic impacts are greater in agricultural areas, where crops are easily damaged by flood waters. Critical infrastructure may be impaired, and power outages and incidents of contaminated water are common. Transportation systems are also impacted. Roads and bridges can become damaged, making it difficult for people to reach medical and emergency services.

As identified in the City’s Floodplain Management Plan, historical flooding incidents in the City of Grand Prairie have occurred in the northwest quadrant of the City between the Trinity River and Johnson Creek. Several flooding events have also occurred along Cottonwood Creek, Dry Branch, Bear Creek, Mountain Creek, South Fork of Cottonwood Creek, North Fork of Fish Creek, Kirby Creek, and Lakeview Branch.

²⁰ [What are the two types of floods? | U.S. Geological Survey \(usgs.gov\)](https://www.usgs.gov/what-are-the-two-types-of-floods/)

Nearly 36 percent of the City is in a floodplain area, which is more than any other City in the region.²¹ Any infrastructure, people, or environment located within the floodplain may be especially vulnerable to flood damage.

As of 2009, over 2,300 drainage complaints have been filed to City staff. Land development in Grand Prairie continues to increase, which could result in the potential for faster and greater flooding chances at many locations across the City. According to the NOAA, densely populated areas are at a higher risk of flash floods, especially where storm drains are placed. They may become overwhelmed or plugged by debris during a high precipitation event.²² A map of the storm drainage system in the City is provided in Figure 17.

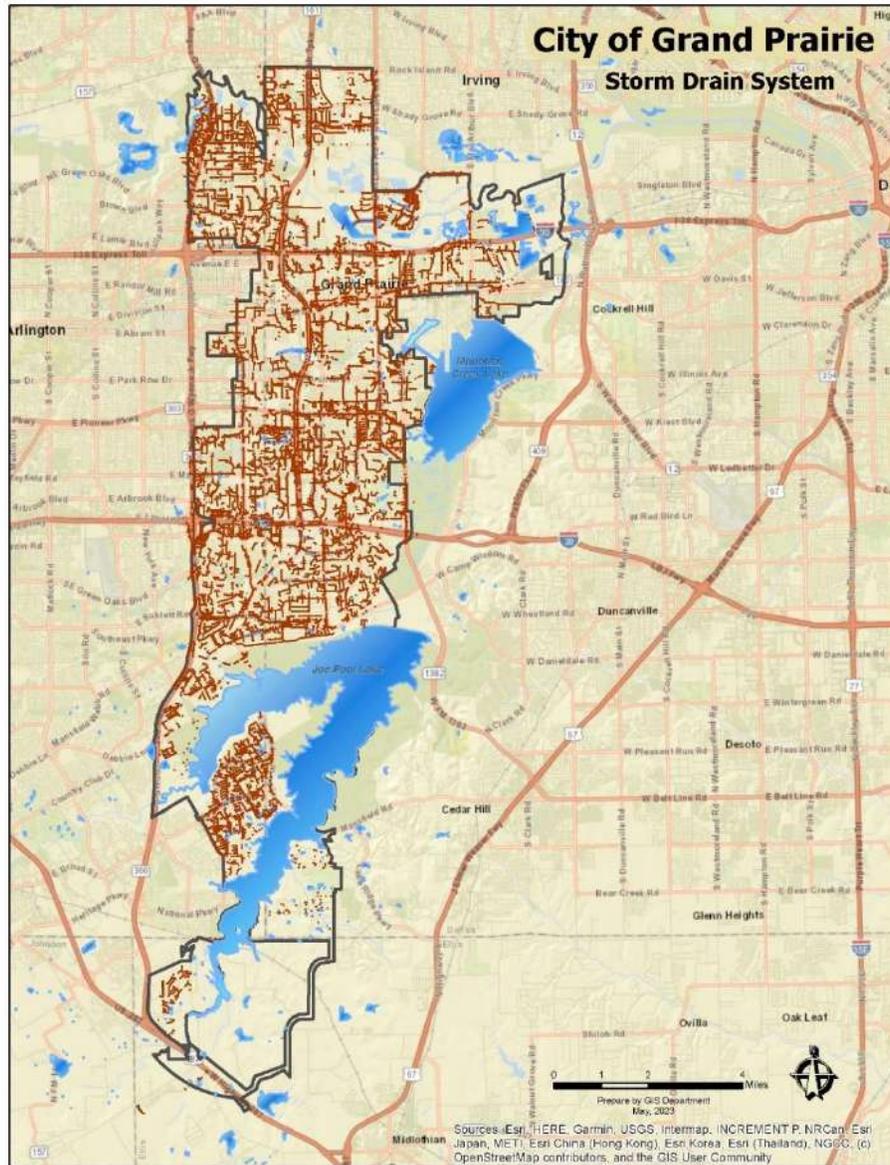


Figure 17: City of Grand Prairie Storm Drain System

²¹ [Floodplain Management Plan 2021-2026 \(gptx.org\)](https://www.gptx.org/floodplain-management-plan-2021-2026)

²² [Severe Weather 101: Flood Basics \(noaa.gov\)](https://www.noaa.gov/severe-weather-101/flood-basics)

Many successful projects have been built in the City to provide flood control, including channels, culverts, bridges, detentions, and lakes. However, many areas are still in need of additional flood control measures or repairs and improvements to existing flood control structures. The City-Wide Drainage Master Plan Road Map establishes the processes for future flood control planning in the City of Grand Prairie.

3.1.8. Severe Thunderstorm

NOAA describes the below elements within a thunderstorm in terms of its characteristics and how NOAA presents Storm Data for reported events.

- **Hail:** Frozen precipitation in the form of balls or irregular lumps of ice.
- **Heavy Rain:** Unusually large amount of rain that does not cause a Flash Flood or Flood event, but causes damage (e.g., roof collapse or other human/economic impact).
- **High Wind:** Sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer, or gusts of 50 knots (58 mph) or greater for any duration (or otherwise locally/regionally defined).
- **Lightning:** A giant spark of electricity in the atmosphere or between the atmosphere and the ground.
- **Strong Wind:** Non-convective winds gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph), resulting in a fatality, injury, or damage.
- **Thunderstorm Wind:** Winds, arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 50 knots (58 mph), or winds of any speed (non-severe thunderstorm winds below 50 knots) producing a fatality, injury, or damage.

Note: “Extreme” damage, produced by thunderstorm winds greater than 64 knots (74 mph), is equivalent to estimated winds in the EF0 category of the Enhanced Fujita damage scale. Therefore, partial roofs removed, windows broken, light trailer homes pushed over/overturnd, and automobiles pushed off the road would be considered extreme wind damage.

3.1.8.1. Location

Due to the nature of thunderstorms, this hazard is not confined to geographical barriers. Therefore, the entire planning area is vulnerable to the hazard.

3.1.8.2. Previous Occurrences

Between 2016 and 2022, severe thunderstorm events reported by the NCEI Storm Events Database resulted in \$100K in property damage, but no injuries or death.

Table 10: Previous Occurrences of Severe Thunderstorms

Location	Date	Hazard Type	Magnitude	Direct Deaths	Direct Injuries	Property Damage Estimate	Crop Damage Estimate
GRAND PRAIRIE ARPT	4/2/2017	Lightning	-	0	0	50.00K	0.00K

Location	Date	Hazard Type	Magnitude	Direct Deaths	Direct Injuries	Property Damage Estimate	Crop Damage Estimate
GRAND PRAIRIE	3/13/2019	Thunderstorm Wind	70 kts. MG	0	0	0.00K	0.00K
GRAND PRAIRIE	10/10/2019	Hail	1.00 in.	0	0	0.00K	0.00K
GRAND PRAIRIE	10/21/2019	Thunderstorm Wind	56 kts. MG	0	0	0.00K	0.00K
GRAND PRAIRIE	4/23/2021	Hail	1.00 in.	0	0	0.00K	0.00K
DALLAS (ZONE)	10/28/2021	High Wind	50 kts. MG	0	0	0.00K	0.00K
GRAND PRAIRIE	11/10/2021	Hail	1.25 in.	0	0	0.00K	0.00K
DALLAS (ZONE)	1/15/2022	High Wind	50 kts. MG	0	0	0.00K	0.00K
DALLAS (ZONE)	3/29/2022	Strong Wind	39 kts. EG	0	0	50.00K	0.00K

3.1.8.3. Extent/Intensity

The extent and intensity of a severe thunderstorm are subject to variation, which depends on atmospheric conditions, location, and duration. A severe storm can range from a small, localized storm that only affects a few square miles, to widespread storms that cover hundreds of square miles. NOAA's Storm Prediction Center defines a severe thunderstorm as any storm that produces one or more of the following:²³

- A tornado
- Damaging winds with a speed of 58 mph (50 knots) or greater
- Hail 1 inch or greater in diameter

The Storm Prediction Center also uses the Severe Thunderstorm Risk Categories to explain the levels of storm intensity. The scale ranges from "marginal" to "high."

²³ [SPC Products \(noaa.gov\)](https://www.noaa.gov/products)

Understanding Severe Thunderstorm Risk Categories					
THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe storms expected
Lightning/flooding threats exist with all thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense
					
<small>* NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph, and/or hail to at least one inch in diameter, and/or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.</small>					
		<p align="center">National Weather Service www.spc.noaa.gov</p>			

Figure 18: National Weather Service Severe Thunderstorm Risk Categories²⁴

Based on historical analysis, it is expected that the planning area could experience the maximum extent of thunderstorms.

3.1.8.4. Impact and Vulnerabilities

Severe thunderstorms can have far-reaching impacts. Strong winds, hail, heavy rain, and lightning have the ability to damage buildings, destroy crops, and disrupt powerlines. Additionally, since 2017, there has been significant damage due to lightning, causing at least \$50,000 in property damage. Similar impacts can be expected in the future.

Certain populations, such as people experiencing homelessness, the elderly, and people with disabilities, may be more vulnerable to the effects of severe thunderstorms. Especially if they are unable to evacuate or seek shelter.

3.1.9. Severe Winter Weather

Severe winter weather includes snow, sleet, freezing rain, extreme cold, or a mix of these wintry forms of precipitation.

The track of a system often determines the type of precipitation that falls in a particular location. The rain/snow line, for example, can be tricky to forecast and its location can change during the event. Sometimes snow, sleet, or ice can fall sooner than anticipated if the system moves faster than forecast or if the atmosphere is colder than originally expected. Low-pressure systems can track quickly across the United States in the winter, bringing rapid changes in conditions over a short period of time and distance.

²⁴ [SPC Products \(noaa.gov\)](http://www.spc.noaa.gov)

In short-term forecasts, heavy bursts of snow or snow squalls can develop. The location of these squalls is difficult to determine ahead of time. Snow squalls have historically been a contributor to major highway pileups due to their brief but intense snowfall rates that drop visibility suddenly.

3.1.9.1. Location

Due to the nature of winter weather, it is not confined to geographical barriers. Therefore, the entire planning area is vulnerable to the hazard.

3.1.9.2. Previous Occurrences

Between 2016 and 2022, severe winter weather events reported by the NCEI Storm Events Database resulted in 12 death, 2 injuries, and \$6.430M in property damage.

Table 11: Previous Occurrences of Severe Winter Weather

Location	Date	Hazard Type	Magnitude	Direct Deaths	Direct Injuries	Property Damage Estimate
DALLAS (ZONE)	12/19/2016	Cold/Wind Chill	1	0	0.00K	0.00K
DALLAS (ZONE)	12/7/2017	Winter Weather	0	0	0.00K	0.00K
DALLAS (ZONE)	12/31/2017	Winter Weather	0	0	10.00K	0.00K
DALLAS (ZONE)	1/16/2018	Extreme Cold/Wind Chill	2	0	0.00K	0.00K
DALLAS (ZONE)	1/16/2018	Winter Weather	0	0	0.00K	0.00K
DALLAS (ZONE)	2/11/2018	Winter Weather	0	0	0.00K	0.00K
DALLAS (ZONE)	2/28/2019	Winter Weather	0	0	10.00K	0.00K
DALLAS (ZONE)	2/28/2019	Winter Weather	0	0	0.00K	0.00K
DALLAS (ZONE)	10/31/2019	Cold/Wind Chill	0	0	0.00K	0.00K
DALLAS (ZONE)	2/10/2021	Winter Weather	0	1	100.00K	0.00K
DALLAS (ZONE)	2/11/2021	Winter Weather	0	1	10.00K	0.00K
DALLAS (ZONE)	2/13/2021	Winter Storm	1	0	0.00K	0.00K

Location	Date	Hazard Type	Magnitude	Direct Deaths	Direct Injuries	Property Damage Estimate
DALLAS (ZONE)	2/14/2021	Extreme Cold/Wind Chill	8	0	6.300M	0.00K
DALLAS (ZONE)	2/2/2022	Winter Storm	0	0	0.00K	0.00K
DALLAS (ZONE)	2/23/2022	Winter Storm	0	0	0.00K	0.00K

Most recently, one of the worst winter storms in the DFW metroplex occurred in February 2021, negatively impacting the planning area and the surrounding communities. The president issued a major disaster declaration on February 19, 2021. The figure below, provided by the National Weather Service (NWS), shows the record-breaking snowfall and temperature amounts. Ice, snow, and extreme cold temperatures caused prolonged power outages and shut down critical infrastructure in the City.

Date	Max / Min Temps	Records Broken
Feb 14, 2021	22 / 9	Record Low Temp of 9 degrees (Previous: 15 in 1936 and 1909) Record Snowfall of 4" (Previous: 3.0" in 1935) Record Low Max/High Temp of 22 degrees (Previous: 27 in 1951)
Feb 15, 2021	14 / 4	Record Low Temp of 4 degrees (Previous: 15 in 1909) Record Low Max/High Temp of 14 degrees (Previous: 31 in 1909)
Feb 16, 2021	18 / -2	Record Low Temp of -2 degrees (Previous: 12 in 1903) Record Low Max/High Temp of 18 degrees (Previous: 21 in 1903)
Feb 17, 2021	27 / 18	Tied Record Low Max/High Temp of 27 degrees (Previous 1936 and 1910)

Climate Stats and New Records for Dallas/Fort Worth

Figure 19: NWS Climate Stats Recorded at DFW Airport²⁵

3.1.9.3. Maximum Extent/Intensity

The maximum extent of severe winter weather can affect several states or an entire region at one time. The intensity of severe winter weather can be measured by the strength of winds, amount of snow or ice accumulation, and temperature drops. A severe storm can bring down power lines, damage or freeze pipes, impact roads and travel systems, and cause frostbite or hypothermia. The maximum extent and intensity of severe winter weather can have significant impacts on communities and individuals.

The NWS provides a Wind Chill Chart to calculate the dangers from winter winds and freezing temperatures. Wind chill is represented by the actual air temperature factored in by wind speed. Figure 20 displays the extent and intensity by the time it takes to develop frostbite.

²⁵ [February 2021: Historic Winter Storm and Arctic Outbreak \(weather.gov\)](#)

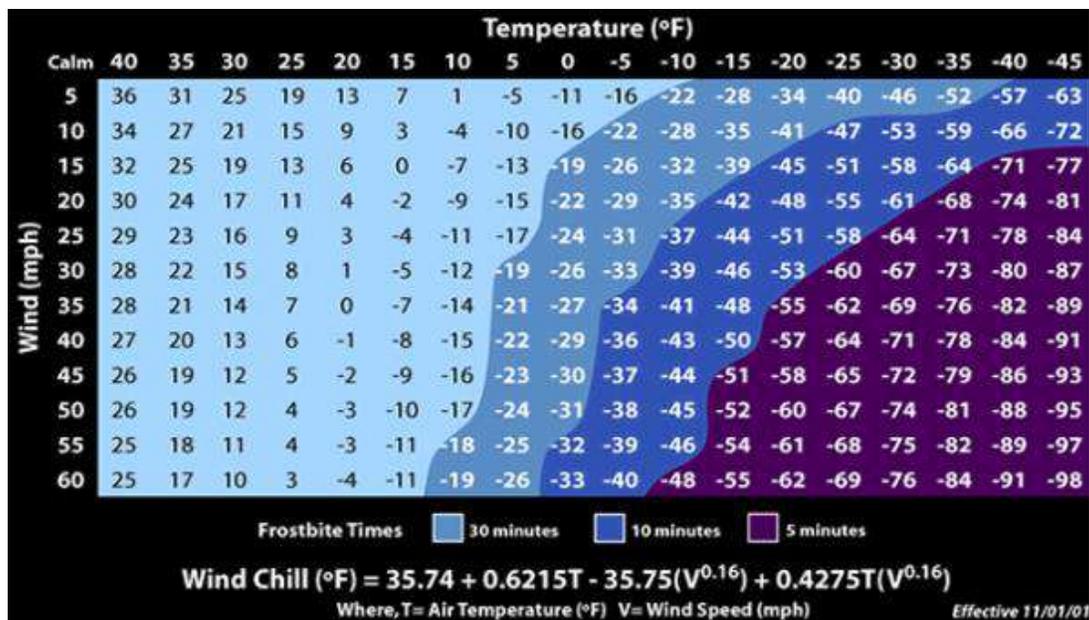


Figure 20: National Weather Service Wind Chill Chart²⁶

The NOAA Weather Prediction Center has a Winter Storm Severity Index (WSSI) tool. This tool communicates the general level of severe winter weather and can be viewed in Figure 21. The levels range from “minor” to “extreme.”

Potential Winter Storm Impacts	
	<p>Winter Weather Area Expect Winter Weather. • Winter driving conditions. Drive carefully.</p>
	<p>Minor Impacts Expect a few inconveniences to daily life. • Winter driving conditions. Use caution while driving.</p>
	<p>Moderate Impacts Expect disruptions to daily life. • Hazardous driving conditions. Use extra caution while driving. • Closures and disruptions to infrastructure may occur.</p>
	<p>Major Impacts Expect considerable disruptions to daily life. • Dangerous or impossible driving conditions. • Avoid travel if possible. • Widespread closures and disruptions to infrastructure may occur.</p>
	<p>Extreme Impacts Expect substantial disruptions to daily life. • Extremely dangerous or impossible driving conditions. Travel is not advised. • Extensive and widespread closures and disruptions to infrastructure may occur. • Life-saving actions may be needed.</p>

Figure 21: Winter Storm Severity Index (WSSI)²⁷

²⁶ [Wind Chill Chart \(weather.gov\)](https://www.weather.gov)

²⁷ [Winter Storm Severity Index Web Display \(noaa.gov\)](https://www.noaa.gov)

Based on historical analysis, the planning area is expected to experience the maximum extent of winter weather.

3.1.9.4. Impact and Vulnerabilities

Severe winter weather has a wide range of impacts and varies based on the level of severity. Winter weather can down trees, cause widespread power outages, damage property, and affect human health, potentially leading to injuries and fatalities. Most commonly, winter weather will impact transportation systems and the ability to travel safely, as detailed in the WSSI tool above.

Ice-covered roads lead to major injuries and accidents. Winter weather can also greatly impair the mobility of the City's regional and local transportation networks. This affects emergency and first response abilities. Major roads and highways that could be impacted by winter weather conditions in the City include the following:

- Carrier Parkway
- FM 1382
- Great Southwest Parkway
- Interstate 20
- Interstate 30
- Lake Ridge Parkway
- Loop 12
- State Highway 161
- State Highway 183
- State Highway 360
- U.S. Route 287
- U.S. Route 80

Utilities are highly susceptible to winter weather. In 2021, Electric Reliability Council of Texas (ERCOT) mandated power outages contributed to widespread power loss, and all City facilities were shutdown.

3.1.10. Tornado

A **tornado** is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Tornadoes frequently accompany thunderstorms, so their locations and spatial extents tend to overlap. Typically, tornadoes cause the greatest damage to structures of light construction, including residential dwellings and particularly manufactured homes. Tornadoes are much more likely to occur during March through June and tend to form in the late afternoon and early evening.



Figure 22: Tornado Image

3.1.10.1. Location

Tornadoes can happen at any time or place when conditions are right. They occur in every part of the United States but are most likely to form in the southern plains during the severe weather season.

3.1.10.2. Previous Occurrences

Between 2017 and 2022, there was only one tornadic event, according to the NOAA NCEI database. A magnitude EF-0 tornado touched down in the City of Grand Prairie on January 15, 2017, causing \$120,000 in property damage. No crop damage, deaths, or injuries were reported.

3.1.10.3. Maximum Extent/Intensity

The extent and intensity of a tornado is determined by its size, strength, and duration. The most destructive tornadoes can be several miles wide, with a path that can stretch for dozens of miles. However, many tornadoes are much smaller, with paths that may only be a few hundred yards wide and a mile or less in length.

The Enhanced Fujita Scale, or EF Scale, which became operational on February 1, 2007, is used to assign a tornado a rating based on estimated wind speeds and related damage. When tornado-related

damage is surveyed, it is compared to a list of Damage Indicators (DIs) and Degrees of Damage (DOD), which help estimate better the range of wind speeds the tornado likely produced. From that, a rating (from EF-0 to EF-5) is assigned.

The EF Scale was revised from the original Fujita Scale to reflect better examinations of tornado damage surveys so as to align wind speeds more closely with associated storm damage. The new scale has to do with how most structures are designed.

Fujita Scale		Enhanced Fujita Scale* <small>* In use since 2007</small>	
F-0	40–72 mph winds	EF-0	65–85 mph winds
F-1	73–112 mph	EF-1	86–110 mph
F-2	113–157 mph	EF-2	111–135 mph
F-3	158–206 mph	EF-3	136–165 mph
F-4	207–260 mph	EF-4	166–200 mph
F-5	261–318 mph	EF-5	>200 mph

Figure 23: Enhanced Fujita Scale of Tornado Intensity

The EF scale still is a set of wind estimates (not measurements) based on damage. Its uses 3-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed in Figure 24. These estimates vary with height and exposure. Important: The 3-second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured "one-minute-mile" speed.

NWS is the only federal agency with authority to provide official tornado EF Scale ratings. The goal is to assign an EF Scale category based on the highest wind speed that occurred within the damage path. First, trained NWS personnel identify the appropriate damage indicator (DI) from more than one of the 28 used in rating the damage. The construction or description of a building should match the DI being considered, and the observed damage should match one of the 8 degrees of damage (DOD) used by the scale. The tornado evaluator would then make a judgment within the range of upper and lower bound wind speeds, as to whether the wind speed to cause the damage is higher or lower than the expected value for the particular DOD. This is done for several structures, not just one, before a final EF rating is determined.

NUMBER (Details Linked)	DAMAGE INDICATOR	ABBREVIATION
1	Small barns, farm outbuildings	SBO
2	One- or two-family residences	FR12
3	Single-wide mobile home (MHSW)	MHSW
4	Double-wide mobile home	MHDW
5	Apt, condo, townhouse (3 stories or less)	ACT
6	Motel	M
7	Masonry apt. or motel	MAM
8	Small retail bldg. (fast food)	SRB
9	Small professional (doctor office, branch bank)	SPB
10	Strip mall	SM
11	Large shopping mall	LSM
12	Large, isolated ("big box") retail bldg.	LIRB
13	Automobile showroom	ASR
14	Automotive service building	ASB
15	School - 1-story elementary (interior or exterior halls)	ES
16	School - jr. or sr. high school	JHSH
17	Low-rise (1-4 story) bldg.	LRB
18	Mid-rise (5-20 story) bldg.	MRB
19	High-rise (over 20 stories)	HRB
20	Institutional bldg. (hospital, govt. or university)	IB
21	Metal building system	MBS
22	Service station canopy	SSC
23	Warehouse (tilt-up walls or heavy timber)	WHB
24	Transmission line tower	TLT
25	Free-standing tower	FST
26	Free standing pole (light, flag, luminary)	FSP
27	Tree - hardwood	TH
28	Tree - softwood	TS

Figure 24: EF Scale Damage Indicators

Based on historical analysis, the planning area is expected to experience EF-0 to EF-3 tornadoes over the next 5 years.

3.1.10.4. Impact and Vulnerabilities

The impact of a tornado can result in loss of life and injury, as well as significant property damage. Homes and businesses can be destroyed, leaving individuals and families without shelter or means of income. Infrastructure such as power lines, water supply, and transportation can also be affected, resulting in prolonged disruptions to daily life.

Tornado events in the City of Grand Prairie have caused at least \$120,000 in property damage during the last 5 years. There are reports of damage to homes, fences, and trees. Similar impacts are expected in the future.

3.1.11. Wildfire

There are two primary fire types – surface fire and canopy fire. Canopy fire can be further subdivided into passive canopy fire and active canopy fire. A short description of each of these is provided below by the Texas A&M Forest Service.

Surface Fire

A fire that spreads through surface fuel without consuming any overlying canopy fuel. Surface fuels include grass, timber litter, shrub/brush, slash, and other dead or live vegetation within about 6 feet of the ground.



Passive Canopy Fire

A type of crown fire in which the crowns of individual trees or small groups of trees burn, but solid flaming in the canopy cannot be maintained except for short periods.²⁸



Active Canopy Fire

A crown fire in which the entire fuel complex (canopy) is involved in flame, but the crowning phase remains dependent on heat released from surface fuel for continued spread.²⁹



[Texas A&M Forest Service](#) serves as the lead agency for the state when it comes to fighting wildfires and is nationally renowned for work in incident management. Their programs improve local capabilities and help residents protect themselves from wildfires. A majority of the data in this wildfire section was derived by their Texas Wildfire Summary Report through the Texas Wildfire Risk Assessment Portal (TxWRAP).

3.1.11.1. Location

Figure 25 shows that the threat of wildfires within the City ranges from low to high. The southern section of the city faces the highest level of threat, with areas identified with moderate to high risk. Wildfire threat is the likelihood of a wildfire occurring or burning into an area. Threat is derived by combining a number of landscape characteristics, including surface fuels and canopy fuels, resultant fire behavior, historical fire occurrence, percentile weather derived from historical weather observations, and terrain conditions. These inputs are combined using analysis techniques based on established fire science.

²⁸ Scott, J. H., & Reinhardt, E. D. (2001). Assessing the Crown Fire Potential by Linking Models of Surface and Crown Fire Behavior. USDA Forest Service, Rocky Mountain Research Station. Research Paper RMRS-RP-29. Ft. Collins, CO.

²⁹ Scott, J. H., & Reinhardt, E. D. (2001). Assessing the Crown Fire Potential by Linking Models of Surface and Crown Fire Behavior. USDA Forest Service, Rocky Mountain Research Station. Research Paper RMRS-RP-29. Ft. Collins, CO.

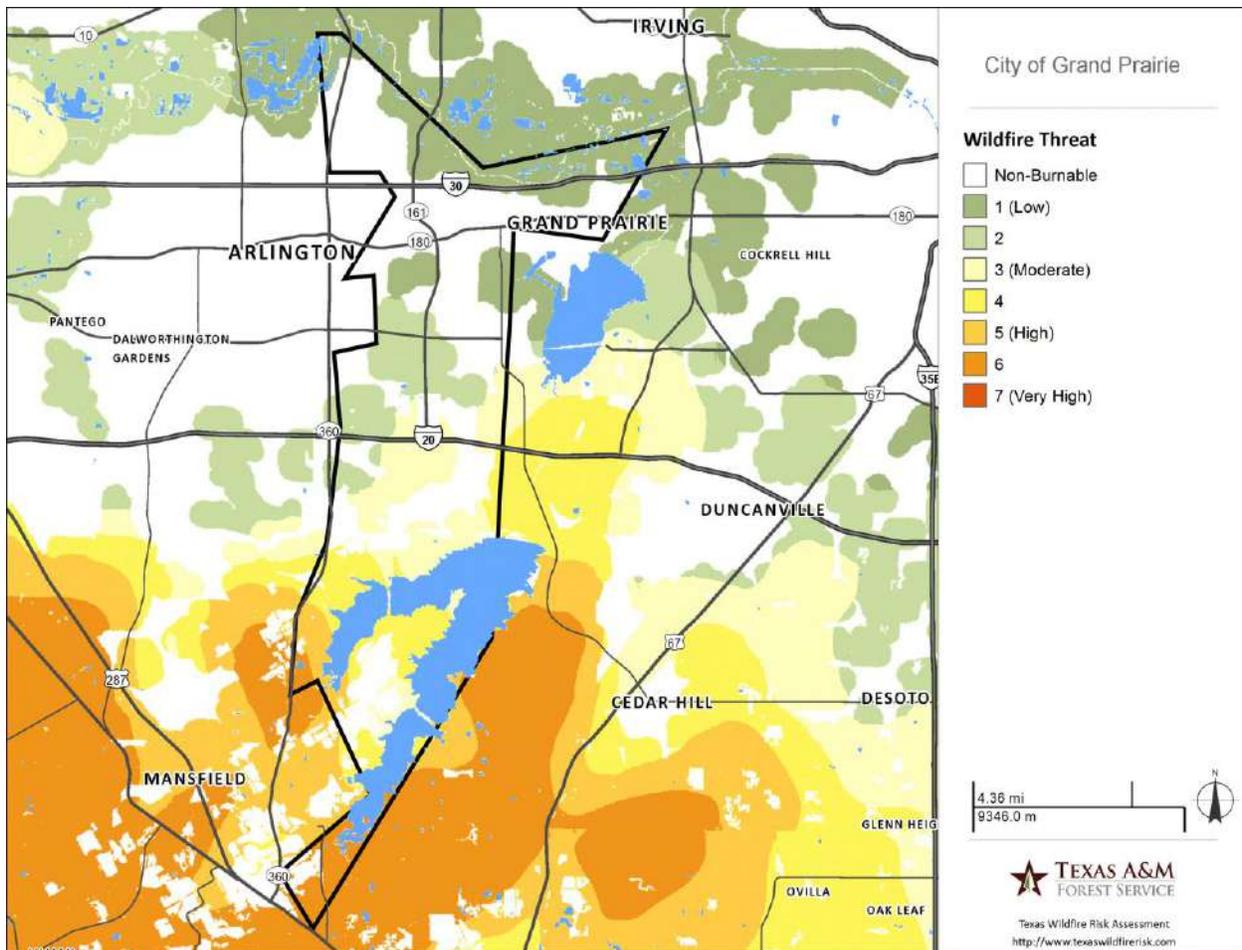


Figure 25: Wildfire Threat

3.1.11.2. Previous Occurrences

Data was obtained from state and local fire department report data sources for the years 2005 to 2021. The compiled fire occurrence database was cleaned to remove duplicate records and to correct inaccurate locations. According to Figure 26, 11 fires were reported, with approximately 90 acres burned.

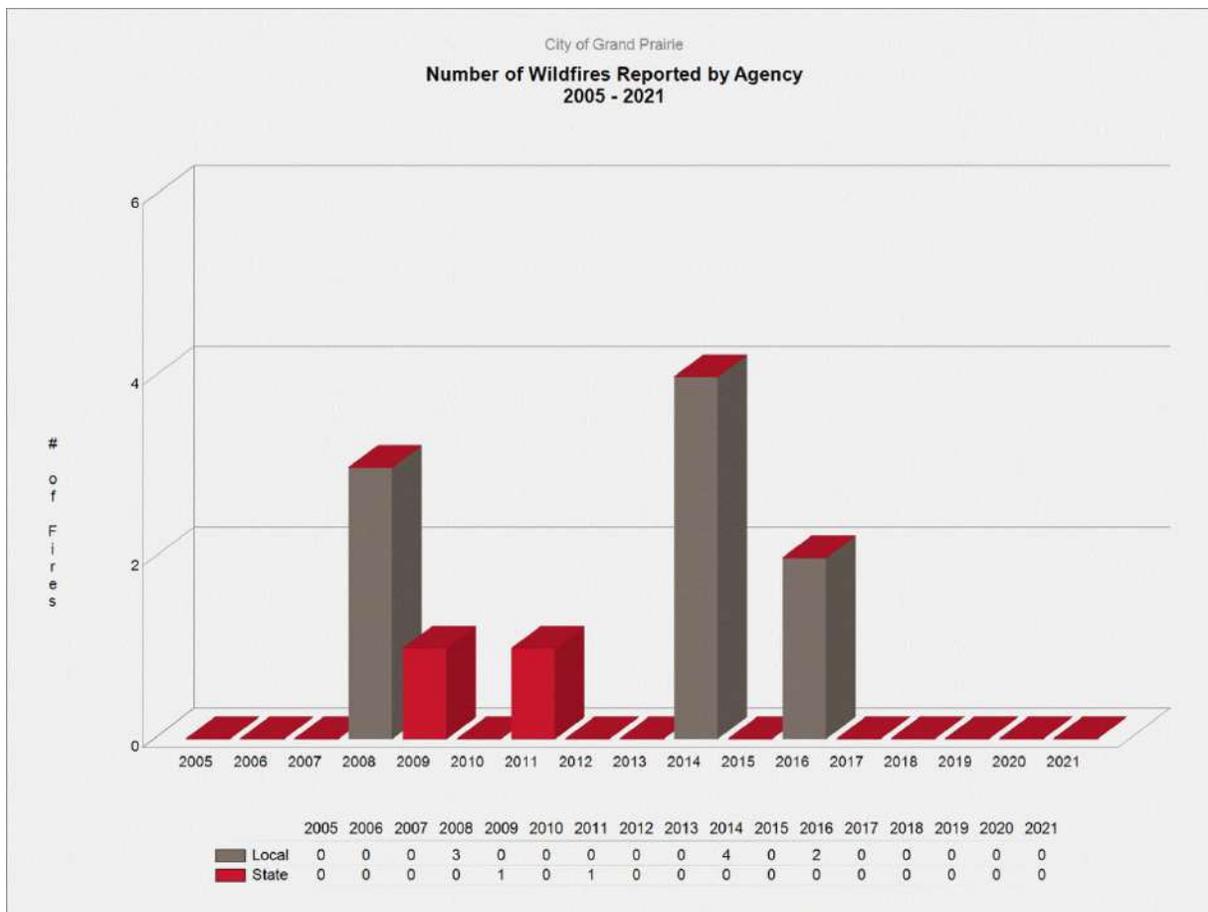


Figure 26: Number of Wildfires Reported by Agency, 2005–2021

3.1.11.3. Maximum Extent/Intensity

The peak fire seasons in the Grand Prairie area are from June through September during the late dry summer months and January through March following cyclical growth and frost events. This normal sequence of fire seasons has been impacted over the past few years with the continuing area-wide drought and unusual weather patterns.

The measure of wildfire threat used in the Texas Wildfire Risk Assessment (TWRA) is called Wildland Fire Susceptibility Index, or WFSI, which is defined as the likelihood of an acre burning. WFSI combines the probability of an acre igniting (Wildfire Ignition Density) and the expected final fire size based on rate of spread in four weather percentile categories.

To aid in the use of wildfire threat for planning activities, the output values are categorized into seven classes, which are given general descriptions from “Low” to “Very High” threat.

With a low to moderately high ignition density, rapid population growth and new development into WUI areas, and an increasing frequency of elevated fire weather conditions, there are concerns moving forward. Based on exposure analysis, the planning area may experience the maximum extent of wildfires.

Table 12 and Figure 27 show the different classes of ignition density throughout the City and its surrounding communities.

Table 12: Wildland Fire Susceptibility Index by Acres in Grand Prairie

Class	Acres	Percent
Non-Burnable	29,915	73.5 %
1 (Very Low)	791	1.9 %
1.5	2,142	5.3 %
2 (Low)	1,904	4.7 %
2.5	622	1.5 %
3 (Moderate)	3,518	8.6 %
3.5	1,768	4.3 %
4 (High)	9	0.0 %
4.5	50	0.1 %
5 (Very High)	0	0.0 %
Total	40,719	100.0 %

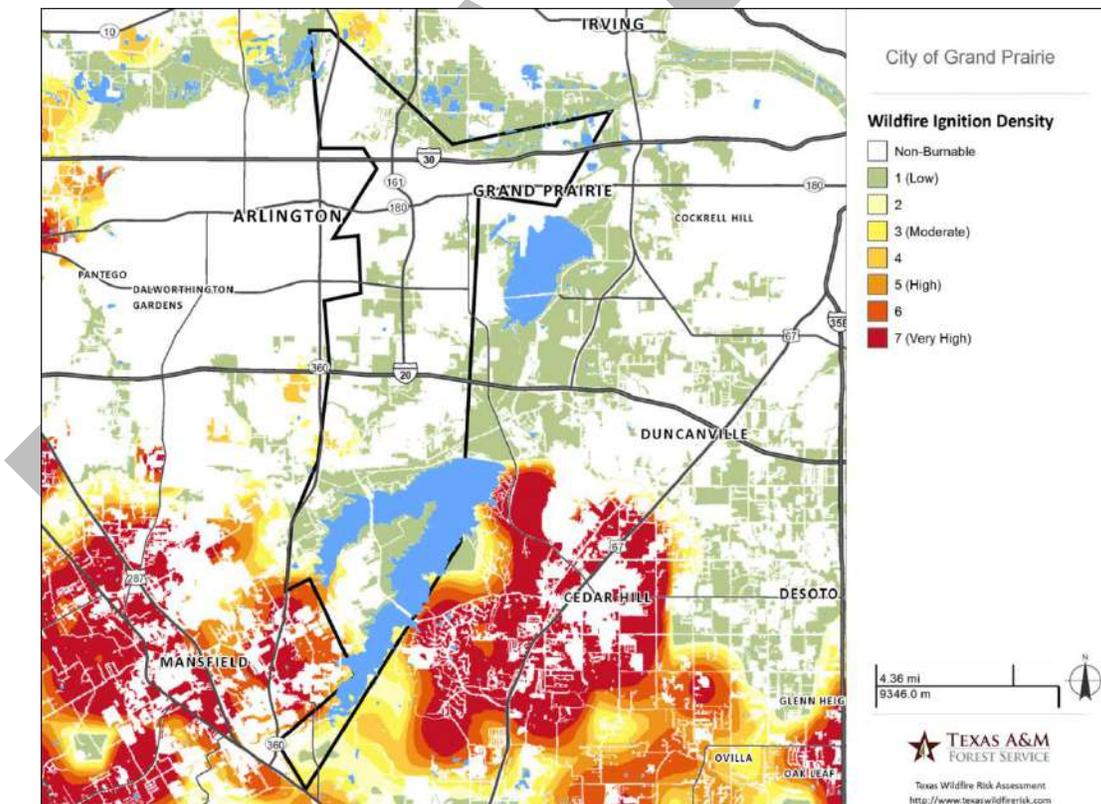


Figure 27: Wildfire Ignition Density

3.1.11.4. Impact and Vulnerabilities

Wildfires impact both people and property in various ways. The Environmental Protection Agency (EPA) explained that the effects of smoke from wildfires can range from eye and respiratory tract irritation to more serious disorders, including reduced lung function, bronchitis, exacerbation of asthma and heart failure, and premature death.

Children, pregnant women, and the elderly are especially vulnerable to smoke exposure. Emissions from wildfires are known to cause increased visits to hospitals and clinics by those exposed to smoke. A more detailed outlook of wildfire impacts comes from WorldAtlas.com, in their article, *What Are the Effects of Wildfire?* The impacts are described below:³⁰

- A heavy loss to the economy is incurred.
- Local heritage could be lost.
- Carbon sequestration and storage is affected.
- Biodiversity is lost.
- High levels of soil erosion occur.
- High levels of air and water pollution occur.
- Wildfires can lead to the extinction of a species.
- Vulnerability to other natural disasters increase.

It is expected that the City will face similar impacts during a wildfire event. Vulnerable populations as well as critical infrastructure located within the wildfire threat areas are more susceptible to loss and damage.

3.2. Non-Natural Hazards

The non-natural hazards that could impact the planning area include, in alphabetical order, the following:

- Active Shooter Event
- Aircraft Accident
- Civil Disturbance
- Cyber Threats
- Dam and Levee Failure
- Energy/Fuel Shortage
- Gas Wells
- Hazardous Materials Spill
- Infectious Disease
- Terrorism

3.2.1. Active Shooter Event

An **active shooter event** occurs when one or more persons use a firearm to attack or cause injury. This can happen in public spaces such as a school, workplace, or community gathering. There is no pattern or method to these types of events. They are often unpredictable and evolve quickly.³¹

³⁰ <https://www.worldatlas.com/articles/what-are-the-effects-of-a-wildfire.html>.

³¹ [Active Shooter Preparedness | Cybersecurity and Infrastructure Security Agency CISA](#)

3.2.1.1. Location

An active shooter event can happen anywhere and is not confined to a specific area. However, events are most likely to occur in public spaces.

3.2.1.2. Previous Occurrences

While there are no direct reports of active shooter events in the planning area, the Federal Bureau of Investigation (FBI) released a report detailing active shooter incidents that occurred in the United States during 2021. There were 61 active shooter events across the United States, and 5 events in Texas for the year alone.³² Texas holds second highest number of active shooter events for 2021.

The report also shows that between 2017 and 2021, occurrences of active shooter events increased by 96.8 percent. Between 2020 and 2021, the number of events increased by 52.5 percent. Though there have been no reports of a shooter within the planning area, we understand that Texas has a history of active shooter events and that occurrences are likely to increase in the future.

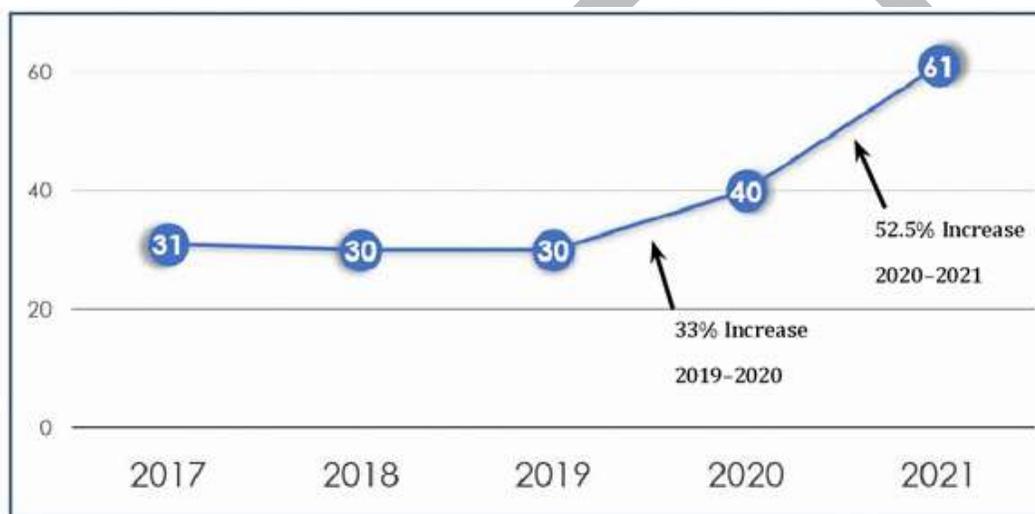


Figure 28: Active Shooter Trend in the United States

3.2.1.3. Maximum Extent/Intensity

The extent and intensity of an active shooter event can vary. In general, these events have the potential to cause significant harm and destruction. The planning area could experience the full extent of an active shooter event.

3.2.1.4. Impact and Vulnerabilities

The impacts of an active shooter event can be severe and affect the whole community. The immediate impact of this event type in the planning area would include the loss of life and injuries to those present. Active shooter events can stress first responder and medical resources. Communities and individuals may develop post-traumatic stress disorder (PTSD) after the event. Public spaces such as schools or workspaces can be a potential target for active shooter attacks and are especially vulnerable.

The City of Grand Prairie regularly hosts many public events, and other vulnerable areas may include Grand Prairie ISD school buildings, day care centers, shopping centers such as the Grand Prairie

³² [Active Shooter Incidents in the United States in 2021 — FBI](#)

Premium Outlets, one of the many recreational entertainment centers, and any other highly concentrated public area.

3.2.2. Aircraft Accident

An aviation or **aircraft accident** is an incident that happens in which any person suffers death or serious injury, or in which the aircraft receives significant damage. This type of transportation accident is less common than among other modes of transportation, but it can have devastating impacts.

3.2.2.1. Location

An aircraft accident can happen anywhere and is not confined to a specific area. However, the City of Grand Prairie is centrally located in the DFW metropolitan area. There are two major airports in the DFW area: the Dallas Fort Worth (DFW) International Airport, which is the second busiest commercial airport in the world, and Dallas Love Field Airport. The City of Grand Prairie also has a general aviation airport and Grand Prairie Municipal Airport. Based on location, the planning area is vulnerable to the effects on aircraft accidents.

The figure below shows the planning area's proximity to the DFW International Airport.

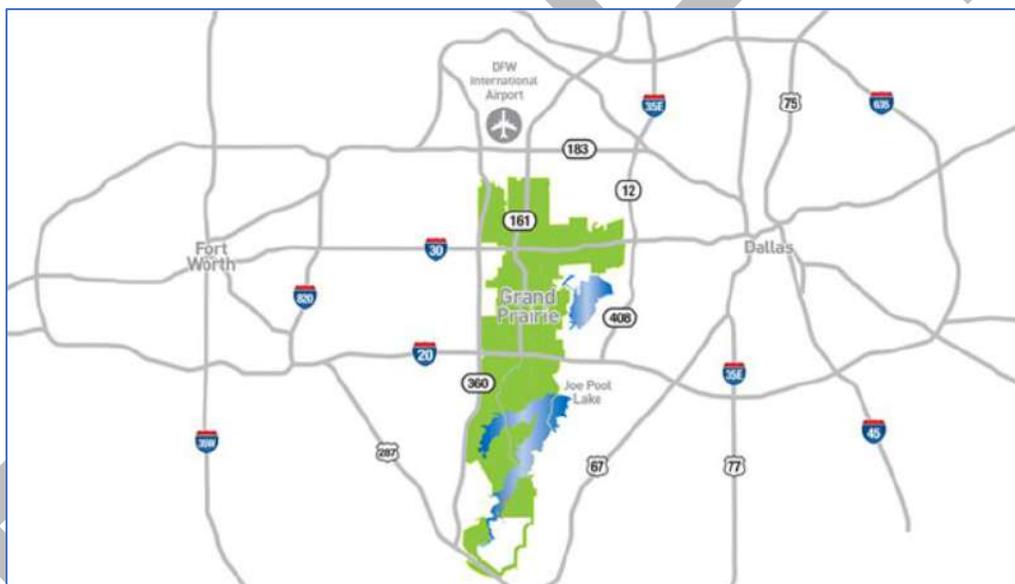


Figure 29: Planning Area Map

3.2.2.2. Previous Occurrences

In December of 2020, an aircraft accident occurred in the planning area. According to local news sources, the plane was attempting to land in Grand Prairie along a service road when it crashed. This was a fatal accident and there were two reported deaths. There was infrastructure damage at the crash site, and at least one bystander was injured.

3.2.2.3. Maximum Extent/Intensity

An aircraft accident in the City would have a detrimental effect. The magnitude and intensity of an accident varies depending on the size of the plane, and where it may land. In the case where a large

commercial airplane crash lands into a highly populated area, it would lead to significant loss of life, property, and money.

3.2.2.4. Impact and Vulnerabilities

The direct impacts of an aircraft accident include the loss of life and severe injuries of the individuals on board, or around the crash site. Other impacts include infrastructure damage at the crash site, risk of fire from the aircraft fuel, and falling debris from the aircraft. An aircraft accident poses a threat to all people on board and those in the area surrounding the crash site.

Since there is no way to determine or predict when or where an accident will occur, the entire planning area is vulnerable to the impacts of an aircraft accident.

3.2.3. Civil Disturbance

Civil disturbance includes any civil unrest activity such as a demonstration, riot, or strike that disrupts a community and requires intervention to maintain public safety.³³

3.2.3.1. Location

Civil disturbance events can happen anywhere and are not confined to a specific area. However, these events tend to occur in areas with a concentrated population. This includes areas such as college campuses, government buildings, as well as cultural, religious, sporting, and other similar events.

3.2.3.2. Previous Occurrences

While there are no direct reports of civil disturbances in the City of Grand Prairie, there have been numerous reports of similar events in neighboring areas and within the county. As identified in the last plan update, five Dallas Police Officers were shot while working to monitor a protest in the city in 2016. On June 1, 2020, the Dallas County Judge issued a local disaster declaration partially due to the imminent threat of civil unrest, and a nighttime curfew was set for all areas owned or leased by Dallas County.³⁴

3.2.3.3. Maximum Extent/Intensity

Civil disturbance events have the potential to become very violent. Protests may escalate into riots, which pose a direct threat to public safety. The intensity of an event depends on many factors, including the cause of the disturbance, participation level of the public, and law enforcement response. It is possible that the planning area may experience the maximum extent of civil disturbances.

3.2.3.4. Impact and Vulnerabilities

Some direct impacts of civil disturbance events include possibly injury or death of those present, damage to surrounding infrastructure, transportation interruption, urban fire, and even looting. Any high population area or government building may be especially vulnerable to the occurrence of civil disturbance, as well as the individuals who live or work there.

³³ [Glossary \(fema.gov\)](https://www.fema.gov/glossary)

³⁴ [060120-OrderofCountyJudgeClayJenkins-SettingCurfewPursuanttoDeclarationofLocalDisaster.pdf \(dallascounty.org\)](https://www.dallascounty.org/060120-OrderofCountyJudgeClayJenkins-SettingCurfewPursuanttoDeclarationofLocalDisaster.pdf)

3.2.4. Cyber Threat

A **cyber or cybersecurity threat** is a malicious act that seeks to damage data, steal data, or disrupt digital life in general. Cyber threats include computer viruses, data breaches, [Denial of Service](#) (DoS) attacks, and other attack vectors.

Cyber threats also refer to the possibility of a successful cyber attack that aims to gain unauthorized access, damage, disrupt, or steal an information technology asset, computer network, intellectual property, or any other form of sensitive data. Cyber threats can come from within an organization by trusted users or from remote locations by unknown parties.

3.2.4.1. Location

Cyber threats are not limited by geographic boundaries and could occur anywhere within the planning area and beyond.

3.2.4.2. Previous Occurrences

There are no reports of cyber threats within the planning area. However, the 2022 Cybersecurity Report by the Texas Department of Information Resources (DIR) stated that Texas faced cyber challenges affecting both the public and private sector, such as ransomware attacks and nation state cyber threats, over the last two years. The report also states that cybersecurity incidents are happening more frequently across the United States. According to the 2022 Verizon Data Breach Investigation Report, ransomware remains the prominent threat to systems and data, with a 13 percent increase in attacks since 2021.³⁵

One notable event occurred in Texas on August 16, 2019. The Texas DIR reports that more than 20 entities in Texas experienced a ransomware attack. The majority of the targeted entities were smaller local governments, similar to the planning area.³⁶

3.2.4.3. Maximum Extent/Intensity

The magnitude and severity of a cyber threat varies greatly and depends on the type and nature of attack. Cybersecurity is a complex global concern and, based on the history of cyberattacks nationwide and statewide, the planning area could experience the full extent of a cyber threat.

The Cybersecurity and Infrastructure Security Agency (CISA) has a National Cyber Incident Scoring System (NCISS) that assigns cyber incident priority levels. Each priority level represents a different level of extent and intensity. They are described as follows:

- **Emergency (Black):** An Emergency priority incident poses an imminent threat to the provision of wide-scale critical infrastructure services, national government stability, or the lives of U.S. persons.
- **Severe (Red):** A Severe priority incident is likely to result in a significant impact to public health or safety, national security, economic security, foreign relations, or civil liberties.
- **High (Orange):** A High priority incident is likely to result in a demonstrable impact to public health or safety, national security, economic security, foreign relations, civil liberties, or public confidence.
- **Medium (Yellow):** A Medium priority incident may affect public health or safety, national security, economic security, foreign relations, civil liberties, or public confidence.

³⁵ [DIR Cybersecurity Report 2022 | Texas Department of Information Resources](#)

³⁶ [Update on Texas Local Government Ransomware Attack | Texas Department of Information Resources](#)

- Low (Green): A Low priority incident is unlikely to affect public health or safety, national security, economic security, foreign relations, civil liberties, or public confidence.
- Baseline (Blue & White): A baseline priority incident is highly unlikely to affect public health or safety, national security, economic security, foreign relations, civil liberties, or public confidence.

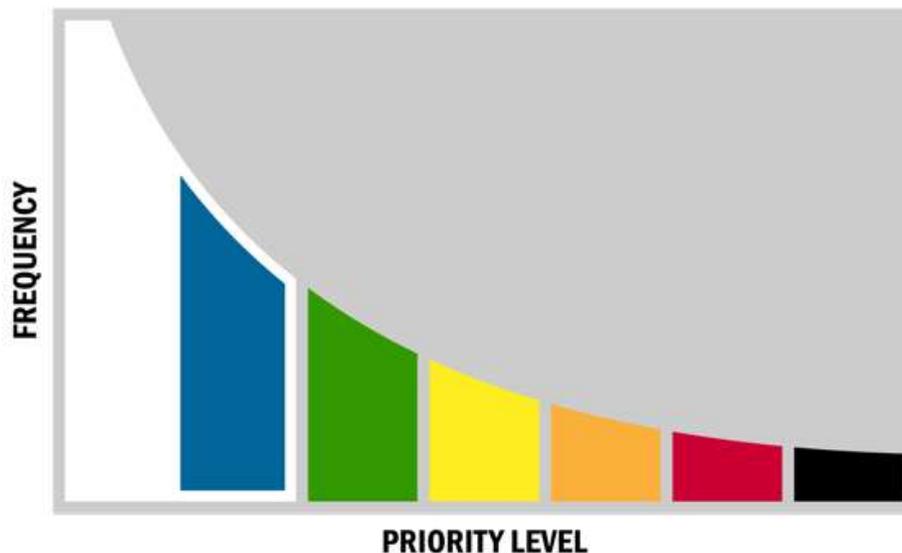


Figure 30: Cybersecurity & Infrastructure Security Agency National Incident Scoring System³⁷

3.2.4.4. Impact and Vulnerabilities

Cyberattacks pose a direct threat to critical infrastructure. It is possible for attackers to target power grids, transportation systems, and other utilities. This can lead to power and internet outages, disrupted communication services, and even contaminated water supplies. These attacks can be less severe and may be aimed at gathering data or sensitive information from businesses or individuals. All cyberattacks have cascading impacts and can be costly to both the public and private sector. The increased dependence on technology and Internet systems directly increases vulnerability to cyber threats.

The ransomware attack that impacted local Texas municipalities in 2019 caused disruptions to governmental functions. During the cyberattack, computer systems froze, preventing government officials and residents from accessing certain services. These services included utility payments, payroll processing, and record access. As a result, many people were left without essential services. In the event of a cyber threat, the planning area could experience similar impacts.

3.2.5. Dam and Levee Failure

Dams and levees are designed to mitigate flood events, but sometimes floods larger than the estimated risk occur, which can cause a partial or total failure. A **dam failure** occurs when the barrier constructed does not obstruct or restrain water as designed, which can rapidly result in a large area of completely inundated land. Levees, though similar, are embankments built to prevent the overflow of a river or stream.

³⁷ [CISA National Cyber Incident Scoring System \(NCISS\) | CISA](#)

The U.S. Army identified other causes of dam failure as the following:

- Landslide
- Earthquake
- Foundation failure
- Equipment failure/malfunction (gates, etc.)
- Structural failure
- Upstream dam failure
- Rapid drawdown of pool
- Sabotage
- Planned removal

3.2.5.1. Location

The information in the table below is from the City of Grand Prairie 2021–2026 Floodplain Management Plan. The table includes an inventory of levees and dams that would affect the planning area if a failure were to occur.

Table 13: Dams/Levees and Affected Properties

Dams		
Name	Inundation Depth (ft)	Affected Properties
Joe Pool Lake Dam	6	Commercial properties in western part of City
Mountain Creek Lake Dam	2	Commercial properties in eastern part of City, mobile homes, industrial buildings, some residential neighborhoods
Padera Lake Dam	10	Residential properties downstream of lake
Levees		
Name	Inundation Depth (ft)	Affected Properties
Dorchester	3	Nottingham Neighborhood, Dwight D. Eisenhower Elementary School
Landfill	2	Grand Prairie City Landfill
GPMURD	1	Lonestar Park, Grand Prairie Cricket Stadium, Texas Trust Credit Theater of Grand Prairie

3.2.5.2. Previous Occurrences

There are no reports of dam or levee failure in the planning area.

3.2.5.3. Maximum Extent/Intensity

Dams are given a hazard potential classification according to the potential impact of a dam failure. They are usually classified as the following:³⁸

Table 14: Dam Hazard Potential Classification

Class	Description
High Hazard	Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.
Significant Hazard	Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.
Low Hazard	Dams assigned the low hazard potential classification are those where failure results in no probable loss of human life and low economic and/or environmental losses.

Joe Pool Lake Dam is classified as a high hazard dam, but with no history of failure and regular maintenance, a major failure is not expected.

3.2.5.4. Impact and Vulnerabilities

Structures located around the dam are most vulnerable if a dam failure were to occur. The most concerning impacts of a dam breach include severe flooding, potential loss of life, infrastructure damage, and economic loss. Potential impacts to the surrounding areas are detailed below.

A breach at the Joe Poole Lake would result in 6 feet of water flowing into local businesses in the western portion of the planning area. A breach at Mountain Creek Dam would result in approximately 700 acres covered in 2 feet of water. A breach at Padera Lake Dam could result in 20 feet of water to flow across U.S. Highway 287. There are many homes downstream of Padera Lake Dam and waters from Padera Lake would flow into Joe Pool Lake.

3.2.6. Energy and Fuel Shortages

Energy and fuel shortages may occur when supply exceeds demand. Disruptions and shortages in energy and fuel can be attributed to factors such as growing populations, higher rates of consumption, outdated infrastructure, natural disasters, and current economic and socio-political conditions.

3.2.6.1. Location

Energy or fuel shortages are not limited by geographic boundaries and could occur anywhere within the planning area and beyond.

3.2.6.2. Previous Occurrences

Most recently, in February of 2021, a winter weather system with extremely cold temperatures spread across the United States. This system interrupted energy systems in Texas as the cold weather increased

³⁸ [Frequently Asked Questions | Association of State Dam Safety](#)

the demand for energy supply, leading to widespread blackouts. At this time, electricity deliveries were disrupted in the parts of Texas served by the Electric Reliability Council of Texas (ERCOT) due to its limited connections with the nation's interconnected grid system. Freezing temperatures also stalled natural gas production, leading to a disruption in the fuel supply.³⁹

The state's electricity demand also has a history of peaking during extreme heat events and hot summer months with the increased use of electricity for air conditioning.

3.2.6.3. Maximum Extent/Intensity

It is possible that the planning area could experience the maximum extent of energy or fuel shortages. Because of the increased frequency of natural disasters and extreme temperature events, along with the other contributing factors already mentioned, there is cause for concern moving forward.

3.2.6.4. Impact and Vulnerabilities

Most infrastructure systems, government systems, and businesses are dependent on energy. When faced with a shortage, the ability to carry out basic functions can be greatly impaired.

During the 2021 winter storm and energy shortages, many citizens of the planning area lost power. Schools, businesses, and other services were unable to function without power. The inability to use heating systems during the extreme cold event posed a risk to public health. Similar impacts are expected during future energy and fuel shortage events, with an emphasis on the incapacity to carry out basic or necessary functions.

3.2.7. Gas Well Incident

A **gas well** is a well that produces natural gas. Gas drilling operations are currently active in the City of Grand Prairie. A gas well incident could involve the uncontrolled release of natural gas, or the release of hydrogen sulfide gas, a by-product of production wells.

Common causes of gas well accidents include the following:

- High winds and other severe weather conditions
- Defective equipment
- Structural failures
- Improper safety procedures

3.2.7.1. Location

Grand Prairie lies atop a natural gas reserve known as the Barnett Shale formation. The Barnett Shale is a natural gas rich geological formation in Texas that spans 5,000 square miles across at least 20 counties. Some experts have suggested the Barnett Shale may be the largest onshore natural gas field in the United States. The field is proven to have 2.5 trillion cubic feet of natural gas and is widely estimated to contain as much as 40 trillion cubic feet of natural gas resources.⁴⁰

3.2.7.2. Previous Occurrences

There have been no reports of gas well accidents within the planning area. However, the probability for future accidents exists with the current status gas drilling operations in the City.

³⁹ [U.S. Energy Information Administration - EIA - Independent Statistics and Analysis](#)

⁴⁰ [About Gas Drilling City of Grand Prairie \(gptx.org\)](#)

3.2.7.3. Maximum Extent/Intensity

The intensity of a gas well accident depends on the location of the well and the cause of the accident. However, based on current operations and the location of gas wells in the City, the planning area could experience the maximum extent of a gas well accident.

3.2.7.4. Impact and Vulnerabilities

Gas well accidents can cause fatalities, fires, explosions, exposure to noxious odors, and releases of greenhouse gases that accelerate climate change.⁴¹ Gas well operations have the ability to cause significant environmental impacts. Concerns related to water contamination, wastewater disposal, use of toxic chemicals, air pollution, deforestation, and surface water runoff are prominent. The City currently enforces the Gas Well Drilling and Production Ordinance to help reduce environmental impacts.

All of the City of Grand Prairie is vulnerable to a gas well accident due to the location of gas lines and wells located across the city.

3.2.8. Hazardous Materials Spill

Hazardous materials are substances that are harmful to the health and safety of people and property. Hazardous materials spills are common along roadways, highways, and railways.

3.2.8.1. Location

Since the City is an area of highly concentrated transportation networks, hazardous materials spills occur frequently. Over 50 of the recorded spills in Grand Prairie have been transportation related, in any given year. This is due to the presence of two interstate highways (I-30 and I-20), one major railway (Union Pacific), and several multilane highways (Hwy 303, 180, 161).

3.2.8.2. Previous Occurrences

Since 2018, 11 hazardous materials spill incidents have occurred within the planning area. These incidents were related to natural gas ruptures, illegal gasoline dumping, industrial hazardous materials release, natural gas release, and more.

3.2.8.3. Maximum Extent/Intensity

Based on historical analysis, it is possible that the planning area will experience the maximum extent and intensity of a hazardous materials spill.

3.2.8.4. Impact and Vulnerabilities

Facilities that produce, process, store, treat, or dispose of hazardous materials are at risk. There are 102 of these facilities in Grand Prairie. The Grand Prairie Fire Department keeps a list of identified facilities that are required to report their hazardous materials list through the Superfund Amendments and Reauthorization Act (SARA) Title III Program.

Hazardous materials can include explosives, flammable and combustible substances, poisons, and radioactive materials. Impacts of a hazardous materials spill are also a great concern to the environment. Toxic chemicals can impact ground and surface waters. This can contaminate the water supply, which is used by plants, animals, and humans. Airborne toxins can also be harmful. People may experience

⁴¹ [Many More People Live Closer To Underground Gas Storage Wells Than Previously Thought – C-CHANGE | Harvard T.H. Chan School of Public Health](#)

difficulty breathing, eye irritation, loss of coordination, nausea or burning in the nose, throat, and lungs. The presence of chemical agents may also result in many dead insects or animals.

Three of the hazardous materials spill incidents resulted in mass evacuations. One of these events occurred in the Fort Worth downtown area and another in the Fort Worth hospital district. Grand Prairie provided mutual aid assistance to an incident in Ellis County, where an unknown toxic material that resulted in two deaths was present in a home. Similar impacts can be expected in the future.

3.2.9. Infectious Diseases

Infectious diseases occur worldwide and are caused by organisms such as bacteria or viruses. The cause, nature, and treatment of each disease varies, but all create an increased demand for public health resources and government services. A disease outbreak can immensely impact the community's safety and security.

There are three common terms used to classify disease impacts:⁴²

- **Endemic:** The amount of a particular disease that is usually present in the community. This is the baseline level of disease.
- **Epidemic:** This refers to a sudden increase in the number of reported diseases above what is normally expected within a specific population or area.
- **Pandemic:** This refers to an epidemic that has spread over several countries or continents, affecting a large number of people.

3.2.9.1. Location

Infectious disease outbreaks are not limited by geographic boundaries and could occur anywhere within the planning area and beyond.

3.2.9.2. Previous Occurrences

According to the Texas State Historical Association, Texas has experienced numerous infectious disease outbreaks spanning from the early 1800s to now. Each epidemic and pandemic listed below has impacted the planning area.⁴³

- **1833:** Cholera appeared in Texas in 1833 and caused some deaths but was far more destructive during an epidemic in 1849.
- **1839:** There was a Yellow Fever outbreak in Texas, and it lasted for many years.
- **1918:** An influenza pandemic occurred and caused 20 million deaths worldwide.⁴⁴
- **2012:** While the Zika virus was around much sooner, Texas suffered a severe outbreak in 2012, with 1,868 reported cases.
- **2020:** Texas identified its first case of COVID-19, which quickly became a pandemic, impacting millions of people worldwide.

As of 2023, the City of Grand Prairie has reported over 56,000 cases of COVID-19 and nearly 500 deaths. The planning area is also home to more than 40 mosquito species, making the West Nile Virus an

⁴² [Principles of Epidemiology | Lesson 1 - Section 11 \(cdc.gov\)](#)

⁴³ [TSHA | Epidemic Diseases \(tshaonline.org\)](#)

⁴⁴ [History of flu \(influenza\): Outbreaks and vaccine timeline \(mayoclinic.org\)](#)

annual and ongoing concern. Influenza cases appear every year in the planning area, especially during the winter season.

New infectious diseases are consistently emerging worldwide, and a persistent occurrence of infectious disease outbreaks are expected over time.

3.2.9.3. Maximum Extent/Intensity

In terms of extent, an outbreak can range from a local endemic to a worldwide pandemic. Intensity is dependent on the type of disease, susceptibility of the population, and other factors related to the severity of an outbreak. Based on historical analysis, the planning area could be exposed to the maximum extent of an infectious disease outbreak.

3.2.9.4. Impact and Vulnerabilities

An epidemic or pandemic in the planning area would cause morbidity and mortality rates to increase. Medical services and government agencies may become overwhelmed. Social and economic disruptions are possible, ranging from short-term to long-term damage. Pandemics have the ability to shut down large segments of the population for long periods of time, further exacerbating the economic effects. Impacts similar to this occurred in the planning area in the early part of 2020 when non-essential city services and local businesses were suspended due to the COVID-19 pandemic.

3.2.10. Terrorism

Terrorism is defined in the Code of Federal Regulations as "The unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."

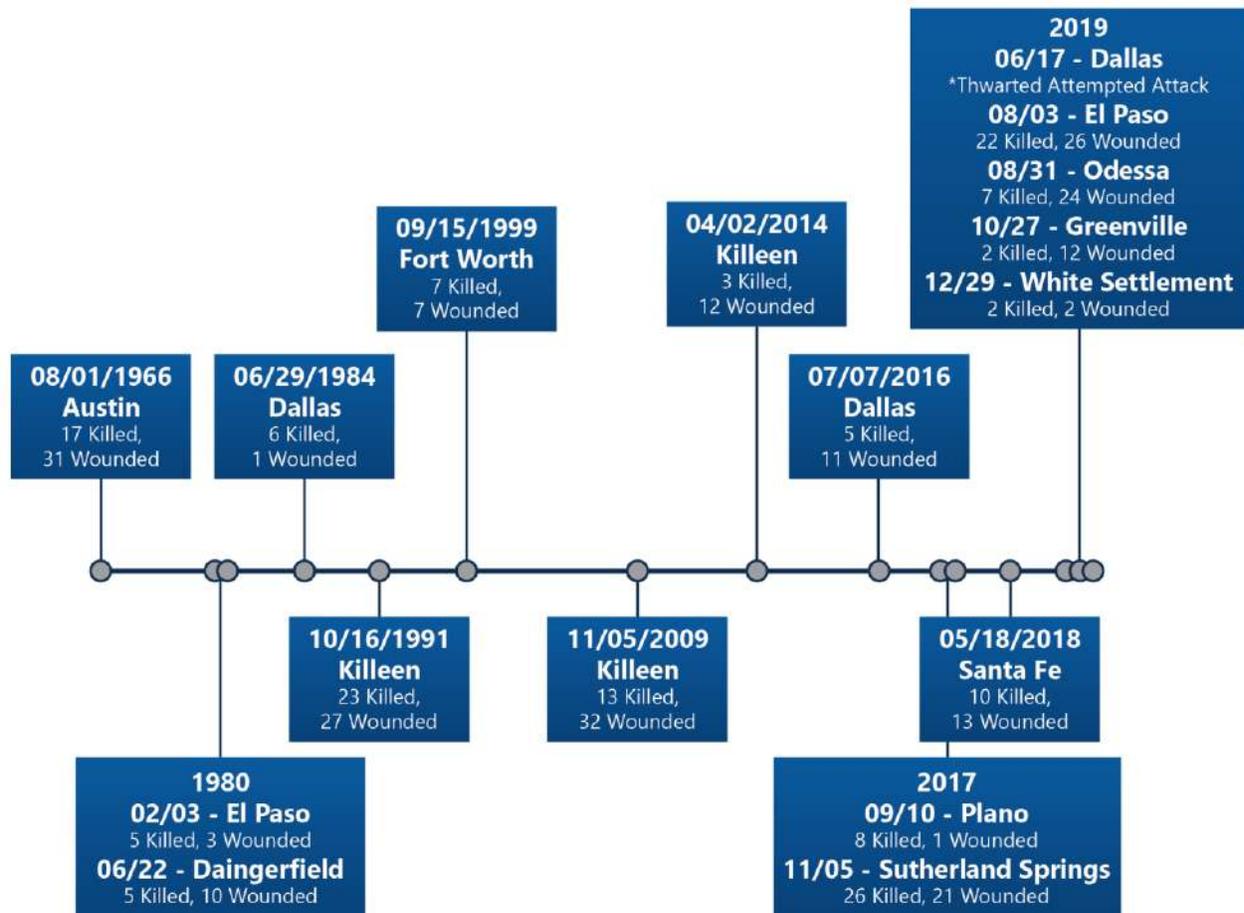
3.2.10.1. Location

Terrorism is not limited to any geographical barrier and may occur anywhere within the planning area and beyond. However, acts of terrorism are common in high population density areas, public spaces, and areas of governmental importance. Since the City of Grand Prairie is located in the highly populated DFW Metroplex and is in close proximity to the DFW International Airport, the planning area may experience the impacts or a terrorist threat or attack.

3.2.10.2. Previous Occurrences

According to the FBI, in recent years there have been more domestic terrorism subjects arrested and more deaths caused by domestic terrorists than international terrorists.⁴⁵ The graphic below shows all domestic terrorist attacks that have occurred in Texas since 1966. This includes several events in Dallas County and in neighboring areas.

⁴⁵ [txmassattackassessment.pdf \(texas.gov\)](#)



(U) Timeline depicts examples of conducted and thwarted mass attacks in Texas since 1966. Image is not a comprehensive list of all attacks during this time period. Casualty counts represent best available data at the time of this report's production and are subject to change.

Figure 31: Timeline of Mass Attacks⁴⁶

3.2.10.3. Maximum Extent/Intensity

The intensity of terrorist attacks depends on many factors, such as type and cause of attack, location, and scope of the event. It is possible that the planning area could experience the maximum extent of terrorism.

3.2.10.4. Impact and Vulnerabilities

Impacts of terrorism the planning area may experience include immense physical and environmental damage. Terrorists often target transportation systems, utility systems, and other critical infrastructure and buildings. These attacks may injure or kill many people. First response systems may be overwhelmed, and people in and surrounding the area may develop extreme stress or PTSD. Terrorism can also cause immense economic loss. Environmental impacts include the interruption of water supply and secondary events such as fires and hazardous materials accidents (such as gas pipelines rupturing, rupture of hazardous material containers at facilities, etc.).

⁴⁶ [txmassattackassessment.pdf \(texas.gov\)](https://www.texas.gov/publications/txmassattackassessment.pdf)

All critical facilities, assets, and people within the City of Grand Prairie are susceptible to being affected by a terrorist event.

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3.3. Community Assets

Figure 32 illustrates the concept of risk as the relationship, or overlap, between hazards and community assets. The smaller the overlap, the lower the risk.



Figure 32: Community Risk from Natural Hazards⁴⁷

Community assets that are at risk and vulnerable to hazards include the following:

- **People:** People are the most important asset. The risk assessment can identify areas of greater population density, as well as populations that may have unique vulnerabilities or be less able to respond and recover during a disaster. These include visiting populations and access and functional needs populations.
- **Economy:** After a disaster, economic resiliency drives recovery. Every community has specific economic drivers that are important to understand when planning to reduce the impacts of hazards and disasters to the local economy. Economic assets can be described in terms of direct or indirect losses; for example, building or inventory damage is direct, but functional downtime and loss of employment wages are indirect losses that can be calculated. In addition to the primary economic sectors in the community, such as manufacturing, agricultural, or service sectors, major employers and commercial centers also support the local economy.
- **Built environment:** The built environment includes existing structures, infrastructure systems, community lifelines, and cultural resources. Areas of future growth and development are also an important component when assessing the built environment.
- **Natural environment:** Environmental assets and natural resources are important to community identity and quality of life and support the economy through agriculture, tourism and recreation, and a variety of other ecosystem services, such as clean air and water. The natural environment also provides protective functions that reduce hazard impacts and increase resiliency. For instance, wetlands and riparian areas help absorb flood waters; soils and landscaping contribute to stormwater management; and vegetation provides erosion control and reduces runoff. Conservation of environmental assets may present opportunities to meet mitigation and other community objectives, such as protecting sensitive habitat, developing parks and trails, or contributing to the economy.

⁴⁷ https://www.fema.gov/sites/default/files/2020-06/fema-local-mitigation-planning-handbook_03-2013.pdf.

Although all assets may be affected by hazards, some assets are more vulnerable because of their physical characteristics or socioeconomic uses. The purpose of an asset inventory is to identify specific vulnerable assets in the planning area.

3.3.1. People

An increase in population also means a potential increase in vulnerability to hazards, for there are more people exposed to the elements. An increase in the socially vulnerable populations increases vulnerability even more. In addressing population trends, it is critical to identify vulnerable groups when planning for disasters. In the context of emergencies, vulnerable groups may include individuals with disabilities, pregnant women, children, elderly persons, prisoners, certain members of ethnic minorities, people with language barriers, and the impoverished. For these populations, emergency response failures can have catastrophic consequences, including loss of the ability to work or live independently, permanent injury, and death. Without appropriate preparation, vulnerable individuals may not be able to evacuate as instructed, reach points of distribution for medical countermeasures, understand written or verbal communications during an emergency, or find suitable housing if their residences are destroyed during a disaster.

New technologies that provide 9-1-1 and public safety officials with the ability to proactively engage the community have had a dramatic effect on mortality rates during these increasing amounts and strength of natural disasters. Identifying at-risk populations and providing them with information and assistance when they most need it can make a significant difference, especially in the event of an evacuation or when seeking shelter. One measure of the strength of a community’s response and recovery system is its attentiveness to its most vulnerable citizens. It is a cruel fact: disasters discriminate.

The following tables reflect the demographic profile of the City based on the data provided on the City’s website.

Table 15: Demographics (2021)⁴⁸

Category	Facts
Population	200,640*
Households	69,720
Average Household Size	2.9
Median Age	32.7
Median Household Income	\$69,408
Land Area	81 square miles

* North Central Texas Council of Governments (NCTOG) Population Estimate - January 1, 2021

Table 16: Race and Ethnicity

Group	Percentage
White Alone	29.3%
Black Alone	24.1%
American Indian Alone	1.2%

⁴⁸ [About Grand Prairie, Texas City of Grand Prairie \(gptx.org\)](https://www.gptx.org/about-grand-prairie)

Group	Percentage
Asian Alone	7.6%
Pacific Islander Alone	0.1%
Some Other Race Alone	19.4%
Two or More Races	18.1%
Hispanic Origin (Any Race)	45.3%

Sources: For Population, Households, Grand Prairie Planning and North Central Texas Council of Governments. All other, Census 2020

According to the Comprehensive Plan, the City’s population has grown by 8.5 percent since 2010, with a compound annual growth rate (CAGR) of 1.4 percent. When extrapolating the population to predict future capacity (based on recommended land uses), CAGR will be the basis for the growth rate calculation.

When it comes to **Grand Prairie ISD**, the District has a diverse student population, as shown in Table 17. Grand Prairie ISD educates more than 29,000 students each year and employs approximately 4,100 staff members. Along with diverse backgrounds, approximately 30.51 percent of the student body is designated as LEP (Limited English Proficiency).⁴⁹

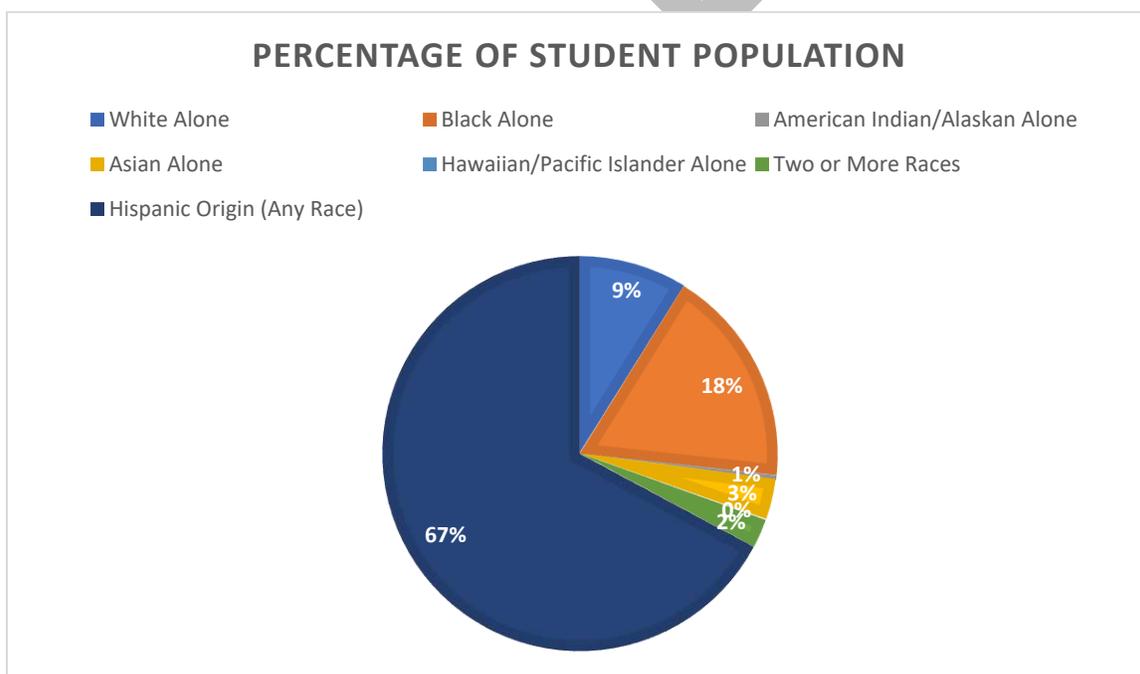


Figure 33: Percentage of Student Population

Table 17: Grand Prairie ISD Student Race and Ethnicity⁵⁰

Group	Percentage
White Alone	8.82%
Black Alone	17.88%

⁴⁹ <https://www.gpsid.org/cms/lib/TX01001872/Centricity/Domain/17230/District%20Plan%202022-2023.pdf>.

⁵⁰ <https://www.gpsid.org/Domain/17166>.

Group	Percentage
American Indian/Alaskan Alone	0.38%
Asian Alone	3.27%
Hawaiian/Pacific Islander Alone	0.11%
Two or More Races	2.35%
Hispanic Origin (Any Race)	67.19%

As an open-enrollment district, GPISD invites students from across the Metroplex to attend any school for free. Students living within GPISD attendance zones also have the freedom to apply to any school along with the added benefit of free district transportation.

3.3.2. Economy

After a disaster, economic resiliency drives recovery. Every community has specific economic drivers that are important to understand when planning to reduce the impacts of hazards and disasters to the local economy. To build economic resilience, communities must understand their risk to economic disruptions. They must evaluate what and how economic assets may be affected. Being in the heart of the DFW Metroplex, Grand Prairie’s workforce and economy is large and diverse, as shown in the following tables.

Table 18: Top Employers 2021⁵¹

Company	Jobs	Business Activity
Grand Prairie Independent School District	4,000	Administration of Education Programs
Lockheed Martin Missiles and Fire Control HQ	4,000	Research and Development in the Physical, Engineering, and Life Sciences
Poly-America Inc.	2,000	Unsupported Plastics Film and Sheet (except Packaging) Manufacturing
City of Grand Prairie	1,300	Public Administration
Flex-N-Gate	1,200	Auto Accessory Manufacturing
Lear Seating	1,100	Manufacturer of automotive seating and related components
Lone Star Park at Grand Prairie	950	Racetracks
Forterra Pipe & Products, Inc.	950	Concrete Pipe Manufacturing
K & N Filters	800	Trademark High Performance Automotive Filters
Republic National Distributing	800	Wine and Distilled Alcoholic Beverage Wholesalers
Bell	734	Helicopter Aircraft Manufacturing
Arnold Transportation Services	650	General Freight Trucking
Airbus Helicopter	600	Aircraft Manufacturing
Walmart	500	Warehouse Clubs and Superstores

⁵¹ <https://www.gptx.org/About-Grand-Prairie>.

Company	Jobs	Business Activity
Siemens Energy & Automation, Inc.	500	Switchgear and Switchboard Apparatus Manufacturing
Mission Foods	500	Food Manufacturing
General Motors LOC Center	500	Process, Physical Distribution, and Logistics Consulting Services
Bureau of Prisons, U.S. Department of Justice	500	Public Administration
Pitney Bowes Presort Services	450	Business Support Services
SAIA Motor Freight Line Inc.	400	General Freight Trucking, Long-Distance, Truckload
Safran Helicopters	400	Aircraft Engine and Engine Parts Manufacturing
CarParts.com	360	Online Provider of Aftermarket Automotive Parts

The following businesses are some chief economic generators described in the Comprehensive Plan:

- **IKEA**
 - Located southeast corner of State Highway (SH) 161 and Mayfield Road.
 - Opened in December 2017.
 - 333,000 SF store expected to generate 372 trips in PM peak hour on weekdays and 686 trips on Saturday peak hour.
 - New traffic signal added on Mayfield at IKEA Place.
- **Walmart**
 - Located on the southeast corner of SH 161 NBFR and Pioneer Parkway (SH 303).
 - 190,000 SF retail center, 8 out parcels with a range of fast food restaurants, banking, retail, and gas stations.
 - Opened in 2017.
 - Expected to generate 824 trips in PM peak hour on weekdays and 982 trips on Saturday peak hour (including pad sites).
 - Access through 6 driveways including 2 existing.
- **Epic Towne Crossing - East**
 - Located on the northeast corner of SH 161 and Mayfield Road.
 - 102,500 SF shopping center, 35,065 SF of restaurant, and a 12 fueling position gas station.
 - The site is expected to be built out by 2018.
 - Expected to generate 519 trips in PM peak hour on weekdays and 693 trips on Saturday peak hour.
 - No new roadways other than driveways are expected to be added.
- **Epic Towne Crossing - West**
 - Located west of SH 161 between Mayfield Road and Warrior Drive.

- 275,683 SF of shopping center, 47,750 SF of restaurant, a 33,912 SF movie theater, and a 20 fueling position gas station.
- The site is expected to be built out by 2018.
- Expected to generate 1,229 trips in PM peak hour on weekdays and 1,602 trips on Saturday peak hour.
- SH 161 SBFR at Mayfield: Addition of SBRT lane to accommodate background plus IKEA traffic. In addition, signal retiming is needed to accommodate site traffic.
- A signal is warranted at Esplanade Drive at Mayfield Road.
- Located along west side of SH 161 between Arkansas Lane and Warrior Trail; site access via proposed extension of Waterwood Drive.
- **The Epic**
 - A 120,000 SF recreation center/wellness/library/enrichment center
 - Opened in 2018.
- **Epic Waters Indoor Waterpark**
 - An 80,000 SF indoor water park
 - Opened in January 2018.
- **PlayGrand Adventures**
 - A 5-acre playground for all ages and abilities.
 - Phase One is anticipated to be completed in Summer 2018.

In Table 19, a comparison between the City and Dallas County economy is presented. Occupation information describes what people do, while employment by industry describes where people work.

Table 19: Occupations and Industry⁵²

Occupancy	Grand Prairie, TX	Dallas County, TX
Civilian employees > 16 years, 2021*	97,078	1,307,329
Management, professional, and related	32,562	482,118
Service	14,646	213,029
Sales and office	21,982	282,027
Farming, fishing, and forestry	44	1,280
Construction, extract, maintenance, and repair	7,198	108,839
Production, transportation	17,043	180,489
Percent of Total	Grand Prairie, TX	Dallas County, TX
Management, professional, and related	33.5%	36.9%
Service	15.1%	16.3%
Sales and office	22.6%	21.6%

⁵² <https://headwaterseconomics.org/eps>.

Farming, fishing, and forestry	0.0%	0.1%
Construction, extract, maintenance, and repair	7.4%	8.3%
Production, transportation	17.6%	13.8%
Industry Type	Grand Prairie, TX	Dallas County, TX
Civilian employees > 16 years, 2021*	97,078	1,307,329
Agriculture, forestry, fishing & hunting, mining	649	7,608
Construction	8,291	135,898
Manufacturing	12,479	106,787
Wholesale trade	3,645	39,800
Retail trade	10,299	138,874
Transport, warehousing, and utilities	8,898	90,990
Information	1,622	26,195
Finance and insurance, and real estate	7,638	116,944
Professional management, administration, and waste management	8,997	194,750
Education, health care, and social assistance	18,352	235,155
Arts, entertain, recreation, accommodations, and food	7,408	116,953
Other services, except public administration	4,490	65,603
Public administration	4,310	31,772
Percent of Total	Grand Prairie, TX	Dallas County, TX
Agriculture, forestry, fishing & hunting, mining	0.7%	0.6%
Construction	8.5%	10.4%
Manufacturing	12.9%	8.2%
Wholesale trade	3.8%	3.0%
Retail trade	10.6%	10.6%
Transport, warehousing, and utilities	9.2%	7.0%
Information	1.7%	2.0%
Finance and insurance, and real estate	7.9%	8.9%
Professional management, administration, and waste management	9.3%	14.9%
Education, health care, and social assistance	18.9%	18.0%
Arts, entertain, recreation, accommodations, and food	7.6%	8.9%
Other services, except public administration	4.6%	5.0%
Public administration	4.4%	2.4%

High Reliability: Data with coefficients of variation (CVs) <12% are in black to indicate that the sampling error is relatively small.

Medium Reliability: Data with CVs between 12% and 40% are in orange to indicate that the values should be interpreted with caution.

Low Reliability: Data with CVs >40% are displayed in red to indicate that the estimate is considered very unreliable.

* American Community Survey 5-year estimates used. 2021 represents average characteristics from 2017 to 2021.

3.3.3. Built Environment

The built environment includes existing structures, infrastructure systems and critical facilities in the form of community lifelines, and cultural resources. Areas of future growth and development are also an important component when assessing the building environment.

3.3.3.1. Existing Structures

Grand Prairie ISD boasts 39 campuses, including 22 elementary schools, 6 middle schools, 4 high schools, 3 grades 6–12 campuses, 1 grade PK–8 campus, 2 early education schools, and one alternative education school, as shown in Figure 34.

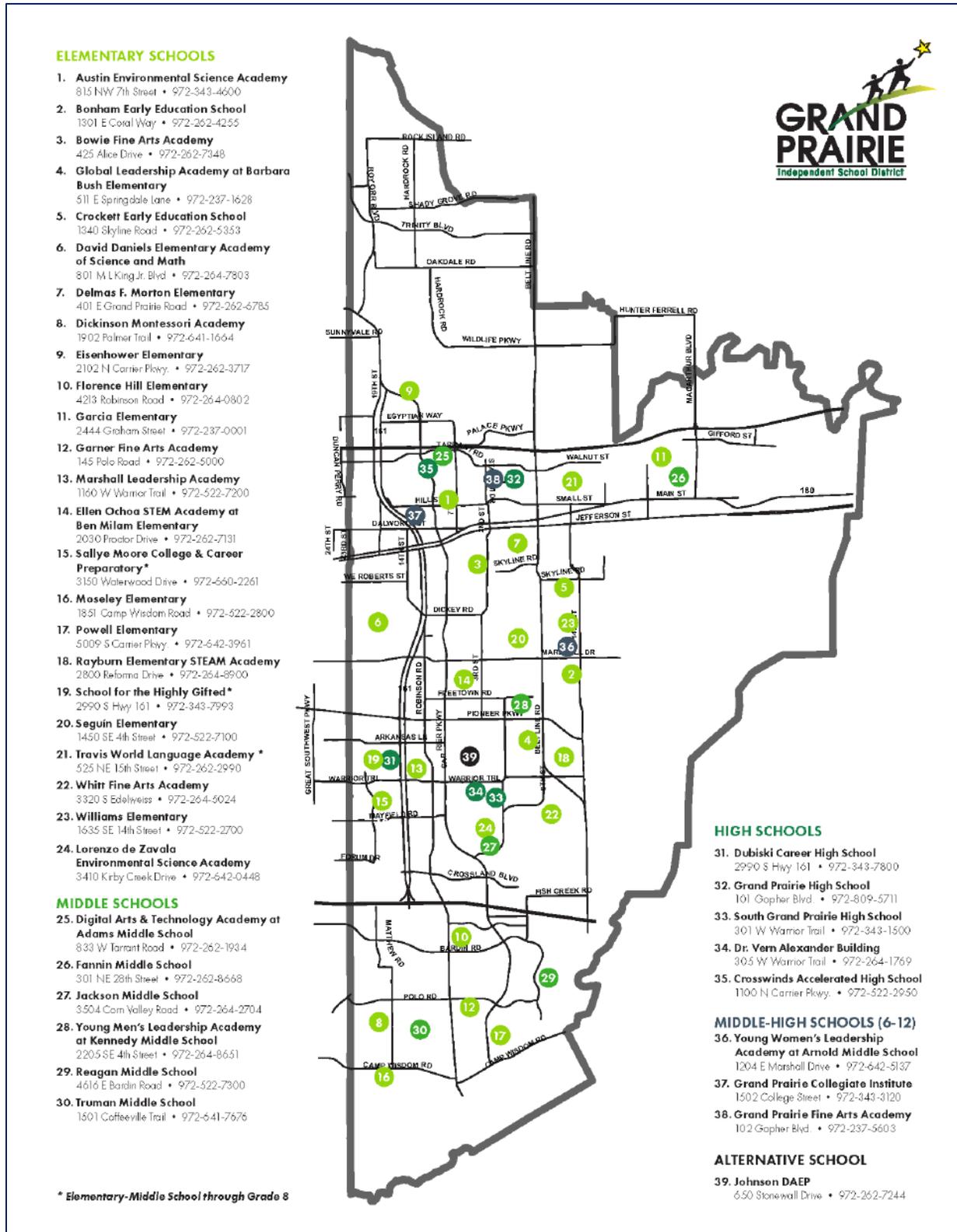


Figure 34: Grand Prairie ISD Campuses

In the City, there are many city-owned facilities that promote economic activity and community involvement. These facilities are identified in the following sections.

3.3.3.2. Critical Facilities & Community Lifelines

As described by FEMA, community lifelines are systems that allow critical government and essential business operations to continue. Lifelines are essential to human health and safety or economic security. These often-interconnected systems are, simply put, essential for communities to keep the “lights on.” Lifelines include the following sectors:

- **Safety and Security:** Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety
- **Food, Hydration, Shelter:** Food, Water, Shelter, Agriculture
- **Health and Medical:** Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management
- **Energy:** Power Grid, Fuel
- **Communications:** Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch
- **Transportation:** Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime
- **Hazardous Materials :** Facilities, HAZMAT, Pollutants, Contaminants
- **Water Systems:** Potable Water Infrastructure, Wastewater Management

City-owned critical facilities include 10 fire stations, the City Hall, Police Department, 3 libraries, the Grand Prairie Municipal Airport, the Baylor Scott and White Emergency Hospital, and more. Each facility is identified below in Table 20 and Figure 35.

Table 20: Critical Facilities

Name	Address	Type
C.V. E. Train Center	310 W College St	City
Chamber of Commerce	900 Conover Dr	City
City Hall	300 W Main St	City
City Hall Annex	318 W Main St	City
Development Center	206 W Church St	City
Environmental Services Field Office	1225 S Highway 161	City
Housing and Neighborhood	205 W. Church	City
Landfill-Solid Waste	1102 Macarthur Blvd	City
Municipal Airport	3116 S GSW Pkwy	City
Municipal Court	200 W Main St	City
Parks And Recreation	400 College St	City
Police Safety Building	1525 Arkansas Ln	City
Street Services	1821 S Highway 161	City
Water Distribution Facility	620 Small Hill St	City

Name	Address	Type
Water Training Facility	317 N Belt Line Rd	City
The Theatre at Grand Prairie	1001 Performance Pl	Entertainment
Uptown Theatre	120 E Main St	Entertainment
Fire Station 1	510 W Main St	Fire Station
Fire Station 10	2645 S Grand Peninsula Dr	Fire Station
Fire Station 2	3102 Bowles St	Fire Station
Fire Station 3	1702 Robinson Rd	Fire Station
Fire Station 4	1602 Duncan Perry	Fire Station
Fire Station 5	3202 S GSW Pkwy	Fire Station
Fire Station 6	602 Stonewall Dr	Fire Station
Fire Station 7	5610 Lake Ridge Pkwy	Fire Station
Fire Station 8	3017 Roy Orr Blvd	Fire Station
Fire Station 9	315 E Polo Road Rd	Fire Station
Baylor Scott & White Emergency Hospital	3095 Kingswood Blvd	Hospital
Medical City ER Grand Prairie	5203 Lake Ridge Pkwy	Hospital
Library - Grand Prairie Memorial	901 Conover Dr	Library
Library - Warmack Branch	760 W Bardin Rd	Library
Library - Shotwell Branch	2750 Graham St	Library/Emergency Shelter
Air Hogs Ball Park	1651 Lone Star Pkwy	Other
Animal Shelter	2222 W Warrior Trl	Other
Copeland Home	125 SW Dallas St	Other
County Health Facility	801 Conover Dr	Other
Dallas County Court House	106 W Church St	Other
DPS	550 S Carrier Pkwy #570	Other
Driver License Bureau	550 S Carrier Pkwy	Other
Farmer Market	120 W Main St	Other
GP Historical Org	1516 W Main St	Other
GP Nutrition Center	503 W Church St	Other
GP Sportsman Center	2330 Lower Tarrant Rd	Other
Lone Star Park	1000 Lone Star Pkwy	Other
Memorial Gardens	3001 S Belt Line Rd	Other
Park And Ride	1067 E IH 30	Other
Police Auto Pound	3010 Hardrock Rd	Other
Police Dept Storefront	617 Royal Av	Other

Name	Address	Type
Post Office	802 S Carrier	Other
Tourist Info Center	2170 N Belt Line Rd	Other
Veteran's Event Center	925 Conover Dr	Other
Epic Waters	2970 Epic Pl	Recreation Center
Kirby Creek Natatorium	3201 Corn Valley Rd	Recreation Center
Prairie Lakes Golf	3202 Se 14th St	Recreation Center
Ruthe Jackson Center	3113 S Carrier Pkwy	Recreation Center
Shotwell Life Center	2750 Graham St	Recreation Center
Tangle Ridge Golf	818 Tangle Ridge Dr	Recreation Center
The Epic	2960 Epic Pl	Recreation Center
The Summit	2975 Esplanade	Recreation Center
Charley Taylor Center	601 E Grand Prairie Rd	Recreation Center/Emergency Shelter
Dalworth Rec Center	2012 Spikes St	Recreation Center/Emergency Shelter

DRAFT

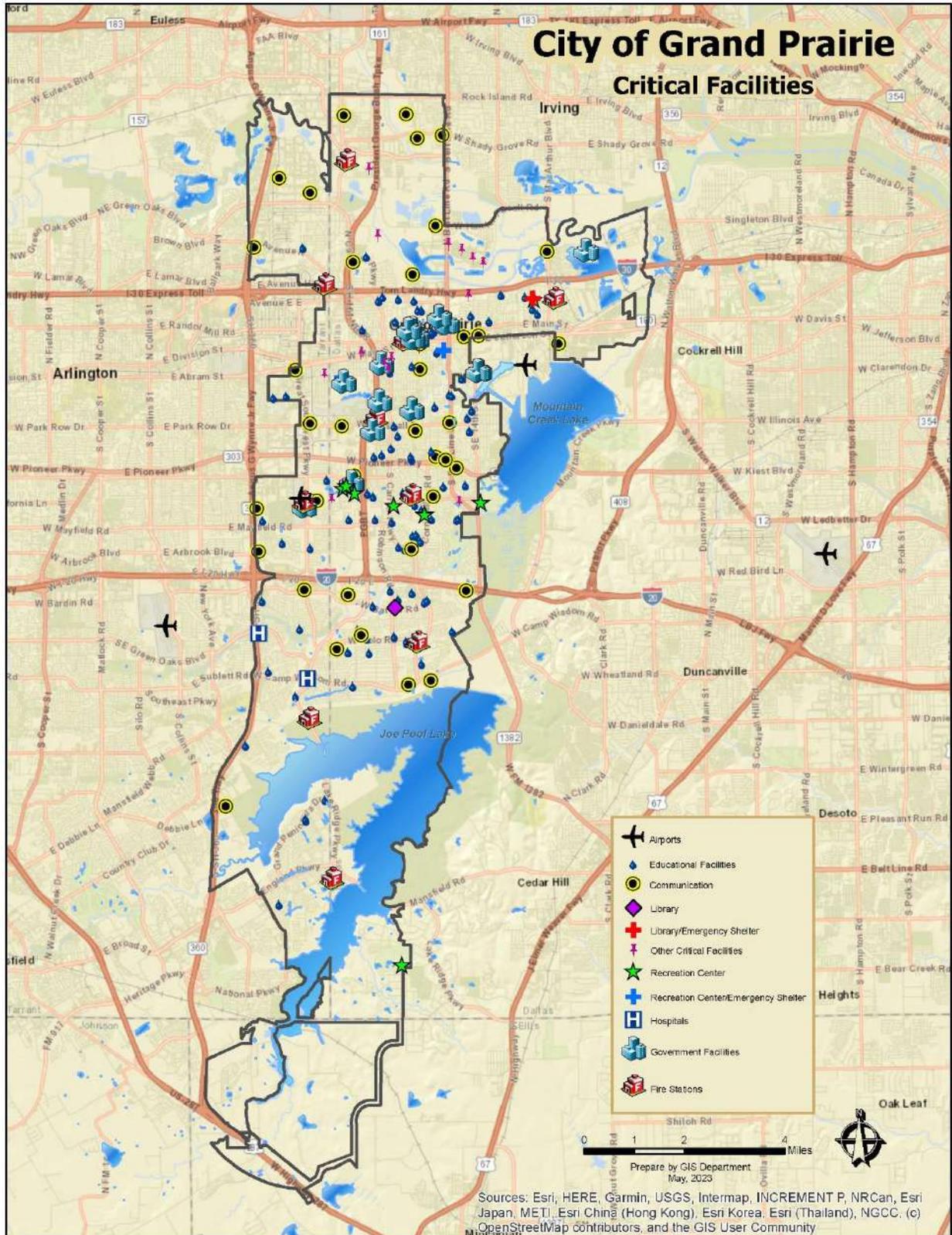


Figure 35: Critical Facilities

3.3.3.3. Cultural and Historical Sites

Often not considered are the potentially devastating effects of disasters on historic properties and cultural resources. Historic buildings and structures, artwork, monuments, family heirlooms, and historic documents are often irreplaceable and may be lost forever in a disaster if not considered in the mitigation planning process. The loss of these resources is all the more painful considering how often residents rely on their presence after a disaster, to reinforce connections with neighbors and the larger community, and to seek comfort in the aftermath of a disaster.

Historic properties and cultural resources are also valuable economic assets that increase property values and attract businesses and tourists. Far from being at odds with economic development, preservation of these assets is often an important catalyst for economic development (e.g., historic downtown revitalization programs leading to growth in heritage tourism). The following table lists the significant, historical landmarks throughout the City.

Table 21: Significant Landmarks⁵³

Landmark No.	Structure/Site	Location	Historic Date
1	Jordan/Bowles Home*(PDF, 253KB)	700 Block NE 28th and Bowles	1845
2	Goodwin Cabin at McFalls Park*(PDF, 279KB)	1500 Block S Carrier Parkway	1846
3	Cross Timbers*(PDF, 65KB)	2602 Mayfield Road – Traders Village	1800
4	West Fork United Presbyterian Church(PDF, 219KB)	905 Santerre Drive	1870
5	Shady Grove Cemetery*(PDF, 265KB)	Shady Grove Road at Hardrock Road	1877
6	Copeland Home*(PDF, 250KB)	125 SW Dallas Street	1904
7	Ford Cemetery*(PDF, 66KB)	602 Fountain Pkwy	1879
8	First Baptist Church Site(PDF, 220KB)	122 NE 2nd Street	1880
9	First Methodist Church Site(PDF, 188KB)	Center St and Church St	1880
10	Jordan-Hight Cemetery*(PDF, 3MB)	MacArthur Road at Johnson Street	1886
11	Ophelia Wilson Cemetery*(PDF, 60KB)	Ragland Road (Lake Joe Pool area)	1872
12	Small-Upchurch Cemetery(PDF, 59KB)	322 NE 8th	1890
13	Turck Plot(PDF, 56KB)	Fairmont at Hemmingway	1890
14	Vernoy Cemetery(PDF, 56KB)	Boxwood Road	1895
15	Old Southland Cemetery*(PDF, 273KB)	SW Third and Dickey Road	1910

⁵³ <https://www.gptx.org/About-Grand-Prairie/History/Significant-Landmarks>.

Landmark No.	Structure/Site	Location	Historic Date
17	Thomas/Wright Home(PDF, 233KB)	402 S. Center and Grand Prairie Road	1890
18	Trimble/Martin Home(PDF, 274KB)	301 SW 4th St and SW Dallas Street	1897
19	Motley/Payne Home(PDF, 306KB)	117 Motley Street	1900
20	GPISD 12 grade Bldg. Site/Auditorium(PDF, 272KB)	202 College	1905
21	Keith/Baker Home(PDF, 279KB)	213 NE 2nd	1907
22	Moore/Scoggins Home(PDF, 246KB)	130 Moore Street	1909
23	Swadley/Thate Home(PDF, 237KB)	216 North Street	1910
24	Layton/Irvin Home(PDF, 88KB)	209 North Street	1910
25	United Broom Factory Site(PDF, 845KB)	1204 W Main Street	1911
26	Preston/Misener Home(PDF, 272KB)	433 E Dallas Street	1911
27	Moore/Plattner Home(PDF, 262KB)	214 Moore Street	1912
28	Florence Hill School(PDF, 180KB)	4213 S Beltline Road	1914
29	Anderson/Hart Bldg.(PDF, 218KB)	1502 Houston Street	1915
30	Graham/Paxton Home(PDF, 250KB)	509 College Street	1918
31	Liggett/Underwood Home(PDF, 218KB)	401 College Street	1931
32	Young/Savage Home(PDF, 202KB)	1902 Ft Worth Street	1914
33	Turner/Iley Home(PDF, 249KB)	202 Moore Street	1912
34	Livestone Masonic Lodge*(PDF, 233KB)	SW 18th and Beaumont	1903/1944
35	Spikes/Wolf Home(PDF, 244KB)	1826 Ft Worth Street	Pre-1914
36	All Saints Chapel/St. Joseph's Epis. Church(PDF, 235KB)	4829 S Carrier Pkwy	1949
37	Estes Cemetery(PDF, 60KB)	Arlington-Webb-Britton Road (Co Rd # 2017) (Lake Joe Pool Area)	1855
38	Moore-North Street Neighborhood(PDF, 60KB)	Moore-North Street	1863
39	Spikes/Owen Home(PDF, 273KB)	401 NW 16th Street	1915
40	Avion Village*(PDF, 189KB)	800 Skyline Road	1941
41	Greater Allen Temple A.M.E. Church(PDF, 242KB)	3538 Gilbert Road	1889?
42	Sunset Baptist Church(PDF, 544KB)	721 Manning road	1952
43	Buffalo Wallow(PDF, 124KB)	Corn Valley and Freetown	1900s
44	Millar Drug Store(PDF, 224KB)	106 W Main Street	1927

Landmark No.	Structure/Site	Location	Historic Date
45	First Presbyterian Church(PDF, 263KB)	310 SW 3rd Street	1912
46	Barbara's Cake and Cookie Boutique(PDF, 103KB)	421 W Main Street	1946
47	Loyd Home(PDF, 356KB)	3401 Ragland Road	1857
48	Old G.P. Airport/149th Aviation Bat./etc.*(PDF, 87KB)	Main Library/901 Conover	1929
49	Liberty Bell(PDF, 247KB)	City Hall Plaza	1976
50	Sam R. Hamilton Masonic Lodge(PDF, 115KB)	110 1/2 N Center Street	1946
51	Graff Chevrolet(PDF, 98KB)	1405 E Main Street	1952
52	Lennox House(PDF, 147KB)	110 NW 2nd St.	1951
53	Lighthouse Church of God(PDF, 224KB)	1913 WE Roberts	1945
54	Cypert-Swadley Home(PDF, 47KB)	505 Hill Street	1932
55	Gopher-Warrior Bowl(PDF, 40KB)	101 High School Drive	1956
56	The Steen's Motel(PDF, 44KB)	913 Manning Street	1959
57	Don Juan's Romantic Mexican Restaurant(PDF, 256KB)	325 E Main Street	1950
58	St John Baptist Church(PDF, 167KB)	1701 W Jefferson	1921
59	McIntosh Chapel CME Church(PDF, 123KB)	2129 Beaumont Street	1949
60	Morning Star Baptist Church(PDF, 103KB)	2251 El Paso	1952
61	Uptown Theater(PDF, 101KB)	120 E Main Street	1950
62	Evening Chapel AME Church(PDF, 453KB)	1832 WE Roberts Street	
63	Dalworth Recreation Center(PDF, 3MB)	2012 Spikes St	1962
64	Antioch Cemetery(PDF, 51KB)	Avenue D	1881
65	Bankhead Highway (Reserved)(PDF, 107KB)	East Main	1959

* Denotes State Historical Markers 2/10/03

The National Park Service (NPS) offers technical assistance to disaster-impacted communities to help rebuild impacted sites and, when funding is available from Congress, grants from the [Emergency Supplemental Historic Preservation Fund](#) provide financial assistance. Other programs across the NPS support disaster response and recovery for historic buildings and collections.

The NPS also requires State Historic Preservation Offices (SHPO) to develop statewide preservation plans every 10 years, under the National Historic Preservation Act of 1966. The Texas [Statewide Historic Preservation Plan](#) was updated in 2022 by the Texas Historic Commission.

3.3.3.4. Future Development

Special areas within the City were identified and described in the City's Comprehensive Plan for focused planning efforts, known as Focus Areas, chosen based on the opportunities for economic development and the need to assess changing traffic conditions. The following areas were designated as Focus Areas:

- Interstate Highway (I) 30 Corridor from the eastern to western city limits
- Northwest Sector of the I-30 Corridor
- SH 161 Corridor from Pioneer Parkway to I-20
- Southern Sector in the ETJ

Supporting the Focus Areas, the Grand Prairie City Council hired Dallas-based OMNIPLAN to establish a vision for the I-30/Belt Line Road Corridor, as part of the City's agreement to construct the extension of Palace Parkway through the intersection's northeast corner to the I-30 frontage road. This "Gateway at Grand Prairie Masterplan" (previewed in Figure 36) is intended to help foster public-private partnerships between existing land owners, developers and the City of Grand Prairie.



Figure 36: Gateway at Grand Prairie Masterplan⁵⁴

Detailed information regarding future land use designations and a map of existing and future land uses are included below in Section 3.4.1.4.

3.3.4. Natural Environment

3.3.4.1. Public Parks and Open Spaces

Grand Prairie's Parks, Arts & Recreation Department manages over 5,000 acres of open space. The City's 58 parks include hiking and biking trails along with the following:

⁵⁴ [Grand Prairie Gateway Masterplan City of Grand Prairie \(gptx.org\)](https://www.gptx.org/Grand-Prairie-Gateway-Masterplan)

- One senior center
- The Ruthe Jackson Conference Center
- Five recreation centers
- One dog park
- Five public swimming pools (including one indoor pool)
- Two beaches on Joe Pool Lake
- One campground
- Five softball and baseball complexes
- Thirty-two tennis courts
- Eighteen soccer fields

3.3.4.2. Trees

In addition to the extensive parks system, the City has had the Tree City USA designation for 36 years. Trees play an important role in cooler temperatures, cleaner air, higher property values, and healthier residents. To qualify for Tree City USA, a community must meet these four standards established by the National Arbor Day Foundation and the National Association of State Foresters:

1. Maintaining a tree board or department
2. Having a community tree ordinance
3. Spending at least \$2 per capita on urban forestry
4. Celebrating Arbor Day

3.3.4.3. Endangered Wildlife & Ecosystems

Texas Parks and Wildlife Department (TPWD) is the steward of the [Texas Conservation Action Plan \(TCAP\)](#), a conservation plan for species most at risk. TCAP [Handbooks](#) contain information on species of greatest conservation need (SGCN), regionally important habitats, local conservation goals and projects, regional and statewide activities, contact information for conservation partners, and maps. The activities in each handbook are starting points to engage landowners, land-use planners, natural resources professionals, and the public in regional and local community-based conservation.⁵⁵

TPWD established a [list](#) of SGCN within the state. While unable to provide data at the city level, the list could provide data at county levels. According to the list, Dallas County is home to 61 rare, threatened, and endangered species, identified in Table 22.

⁵⁵ https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/tcap/

Table 22: Number of Species of Greatest Conservation Need in Dallas County

State Conservation Ranks	Amphibians	Arachnids	Birds	Crustaceans	Fish	Insects	Mammals	Mollusks	Plants	Reptiles
S1 (Critically Imperiled)	1		1	1			1	4		1
S2 (Imperiled)			5			1	3	1	4	4
S3 (Vulnerable)	2		4				1		6	5
S4 (Apparently Secure)			1		2		3			1
S5 (Secure)							4			
SH/SU (Possibly Extirpated)	1		1						1	
SNR (Unranked)						2				
SNA (Not Applicable)										

In addition to wildlife, less than 1 percent of the original Blackland Prairies remain, according to Texas Parks and Wildlife Department, due to development, row-crop agriculture, and overgrazing. It is one of the most endangered ecosystems in the country, and, while Texas Blackland Prairie creates problems due to its expansive nature, it is in need of rehabilitation.

3.3.4.4. Bodies of Water

Part of the Trinity River Basin, the City’s water resources include Joe Pool Lake, Mountain Creek Lake, the West Fork Trinity River. Table 23 reflects reservoir storage data, collected by the Texas Water Development Board, as of August 14, 2023.

Table 23: Current Reservoir Storage⁵⁶

Reservoir	Percent Full	Water Level (ft)	Reservoir Storage (acre-ft)	Conservation Capacity (acre-ft)	Surface Area (acres)
Joe Pool	95.9	521.06	144,831	149,629	6,423
Mountain Creek	98.9	456.89	22,600	22,850	2,671

Major watersheds, including Cottonwood Creek, Fish Creek, and Johnson Creek are also in the planning area. A watershed is the area of land where all of the water that is under it or drains off of it goes into the same place – this includes water that flows on the surface and water located underground.

The levels of water are susceptible to the amount of annual rainfall. Too much water will make them overflow, while too little water will make them shrink.

⁵⁶ [Water Data For Texas](#)

3.4. Vulnerabilities

According to FEMA, vulnerability is the susceptibility of people, property, industry, resources, ecosystems, or historic buildings and artifacts to the negative impact of a disaster. This section identifies elements that increase the planning area's vulnerability to hazards as well as elements that decrease their vulnerability.

3.4.1. Factors That Increase Vulnerability

3.4.1.1. Climate Change

Climate change is impacting Texas statewide in a variety of ways. According to the [Texas Tribune](#),

- Texas is getting hotter (even at night);
- Hurricanes that hit the Texas coast are getting more powerful;
- Sea levels are rising along the Texas Gulf coast;
- Other extreme weather events in Texas could get worse;
- Water is becoming scarce;
- The risk of illnesses is growing; and
- Climate change is driving more migration.

It goes on to say experts told The Texas Tribune that a hotter Texas will threaten public health, squeeze the state's water supply, strain the electric grid, and push more species toward extinction. "If you have situations where more parts of the state are pulling from lower reservoirs, rivers that are flowing less and warmer water temperatures, there's a real concern about what pathogens end up in [the water] system," said Gabriel Collins, a Baker Botts fellow in energy and environmental affairs at Rice University.

Figure 37, provided by the NCEI's Billion Dollar Weather and Climate Disasters Report, shows that natural disasters in the State of Texas have been increasing in both frequency and cost since the 1980s due to climate change. Between 1980 and 2023, there have been 163 confirmed weather and climate disaster events with losses exceeding \$1 billion each to affect Texas. This includes 18 drought events, 9 flooding events, 1 freeze event, 104 severe storm events, 14 tropical cyclone events, 7 wildfire events, and 10 winter storm events. Overall, these events resulted in the deaths of 6,874 people and had significant economic effects on the areas impacted. Many of these severe weather events and winter storm events directly impacted the City of Grand Prairie and the North Texas region.⁵⁷ Based on these trends, we can expect both the frequency and cost of natural disaster events to increase, especially as climate conditions continue to change.

⁵⁷ [Texas Summary | Billion-Dollar Weather and Climate Disasters | National Centers for Environmental Information \(NCEI\) \(noaa.gov\)](#)

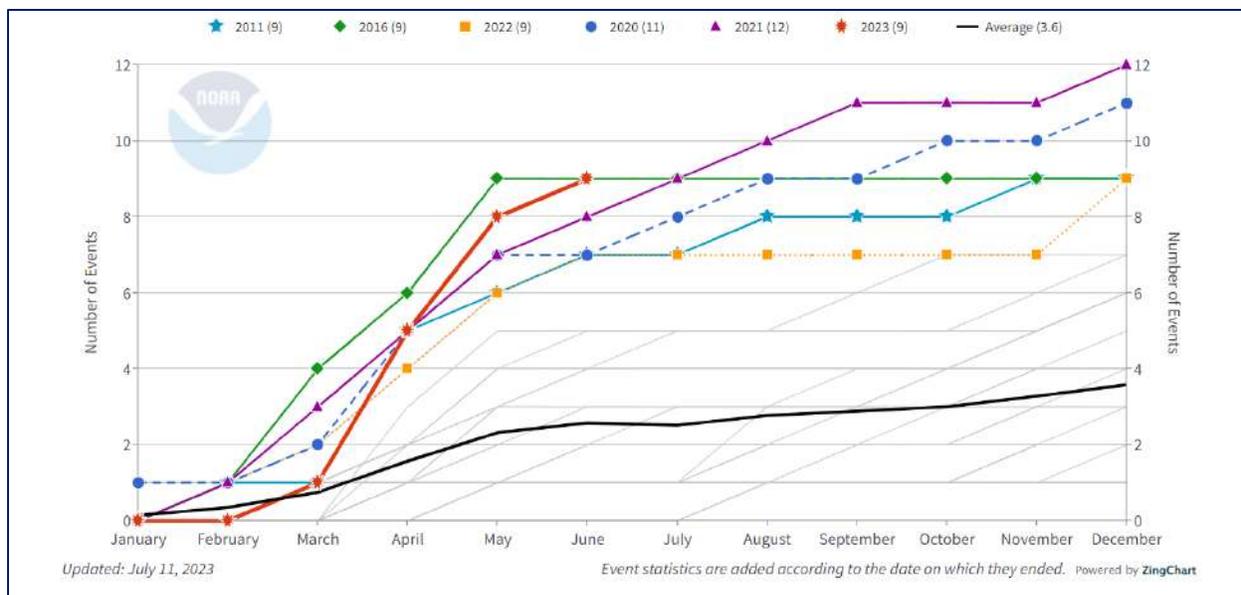


Figure 37: Texas Billion Dollar Disaster Events 1980–2023

3.4.1.2. Population Increase

Population growth and distribution, especially increased population density and urbanization, increases vulnerability to disasters. Table 24, sourced by the NCTCOG Regional Data Center, describes the population increase in Grand Prairie since 2000.

Table 24: Population Changes⁵⁸

Year	Population
2000	127,427
2010	175,396
2020	196,100
2022	199,779
2023	204,973

Source: April 1, 2000, 2010, and 2020 - U.S. Census Bureau
 January 1, 2022 and 2023 - [NCTCOG Annual Population Estimates](#)

The elderly, very young, those without air conditioning or heating, and outdoor laborers are most at risk to the effects of extreme heat and winter storms; residents living in a floodplain are most at risk to flooding; and residents living in the WUI are most at risk to wildfires. Those living in poverty and in homes not built using enhanced building codes are most susceptible to damages from all the natural hazards.

3.4.1.3. NFIP Repetitive Loss and Severe Repetitive Loss Properties

Among the National Flood Insurance Policy (NFIP) policyholders are thousands whose properties have flooded multiple times. Two kinds of properties are the biggest draw on the NFIP Fund:

⁵⁸ [Income/Pop by City \(dfwmaps.com\)](#)

- **Repetitive loss (RL) properties** are buildings and/or contents for which the NFIP has paid at least two claims of more than \$1,000 in any 10-year period since 1978.
- **Severe repetitive loss (SRL) properties** are those for which the program has either made at least four payments for buildings and/or contents of more than \$5,000 or at least two building-only payments that exceeded the value of the property.

These properties not only increase the NFIP's annual losses and the need for borrowing, but they drain funds needed to prepare for catastrophic events. Community leaders and residents should also be concerned with the Repetitive Loss problem because residents' lives are disrupted and may be threatened by the continual flooding. The primary objective of identifying these properties is to eliminate or reduce the damage to property and the disruption to life caused by repeated flooding of the same properties.

There are currently five residential repetitive/severe repetitive loss properties. Details about these properties are not available to the public.

3.4.1.4. Changes in Development

According to the City's 2018 Comprehensive Plan, it is estimated that 21.3 percent of the land in the City is residential, 14.4 percent of the land is non-residential (commercial, industrial, retail, and office), and 11.6 percent of the land dedicated to institutional uses (parks, open space, private recreation, and public space). This leaves 52.6% of the land undeveloped and consisting of lakes, utilities, railroads, and vacant space. The City's ETJ also remains mostly undeveloped.

In 2022 alone, Grand Prairie has issued 322 new single-family building permits and added 2.5 million square feet of new commercial and industrial space.⁵⁹ Significant development has occurred since the last plan update, and the impact of this continued growth will be felt in the delivery of City services, infrastructure, green space, and the need for public facilities.

Future land use projections show the land use will be 55.3 percent residential, 14.7 percent nonresidential (mix use, commercial, and industrial), and 30 percent undeveloped (parks, open space, lakes, and recreation) by or before the year 2038. Significant development is expected to continue, with the largest land use remaining residential. New development in hazard-prone areas increases the risk and vulnerability of damage and injury from the identified hazards. All new and future development is vulnerable to severe weather events and related hazards.

Areas of existing and future development and their land use are detailed in Figure 38.

⁵⁹ <https://www.gptx.org/About-Grand-Prairie>

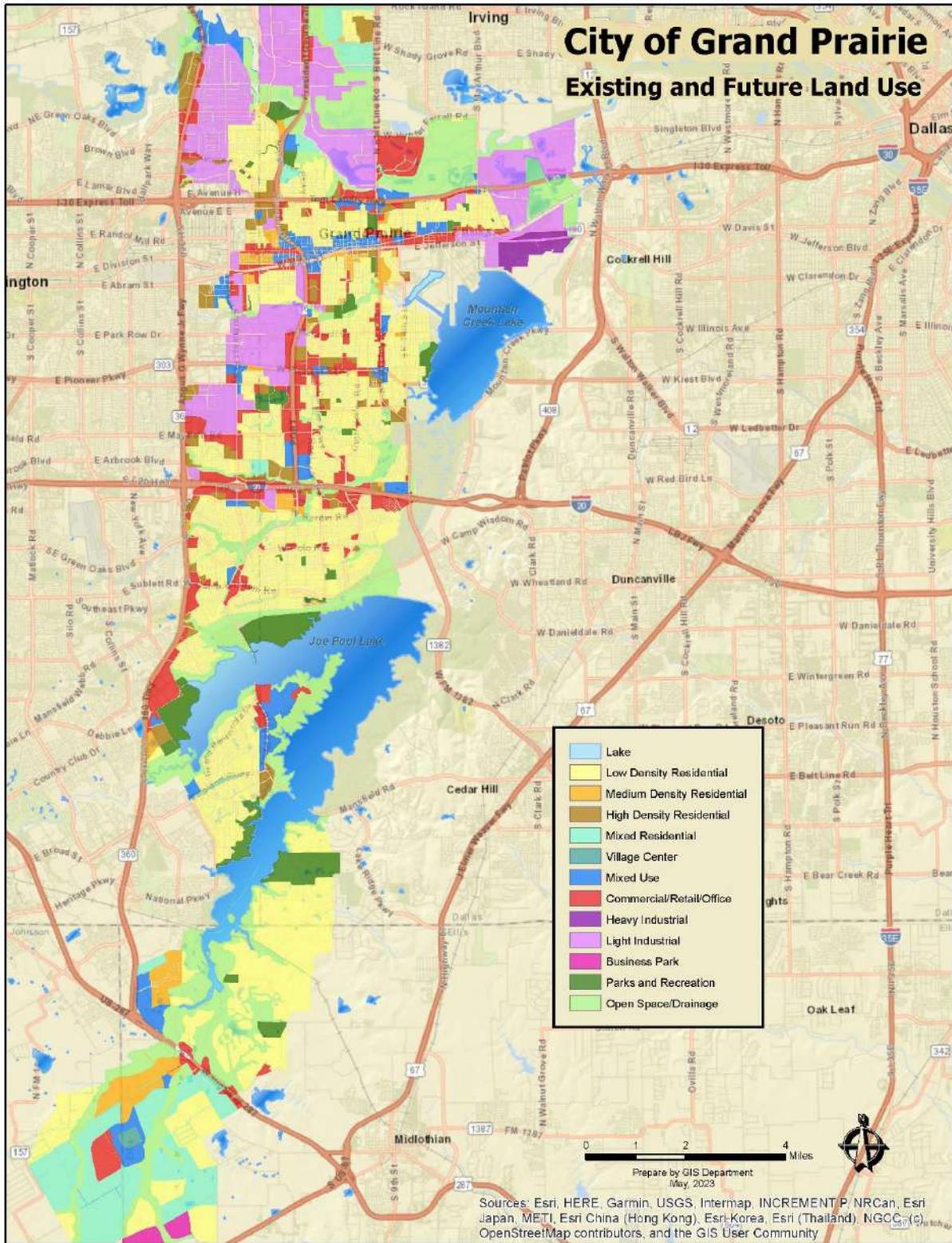


Figure 38: Grand Prairie Existing and Future Land Use Map

3.4.1.5. Wildland–Urban Interface

Over the past century, housing growth has outpaced population growth in the United States, with extensive residential development in the outlying fringes of metropolitan areas and in rural areas with attractive recreational and aesthetic amenities, such as forests. This development is increasing the WUI, that area where structures and other human development meet or intermingle with undeveloped wildland. The expansion of the WUI in recent decades has significant implications for wildfire management and impact, as well as broader natural resource concerns such as pollution, spread of invasive species, and loss of biodiversity.

Texas is one of the fastest growing states in the nation, with much of this growth occurring adjacent to metropolitan areas. Population growth within the WUI substantially increases the risk from wildfire. In Texas, nearly 85 percent of wildfires occur within 2 miles of a community. It is estimated by the Texas A&M Forest Service that approximately 52,440 Grand Prairie residents live within the WUI.

The following WUI Map (Figure 39) reflects housing density, depicting where humans and their structures meet or intermix with wildland fuels. WUI housing density is categorized based on the standard Federal Register and U.S. Forest Service SILVIS data set categories.

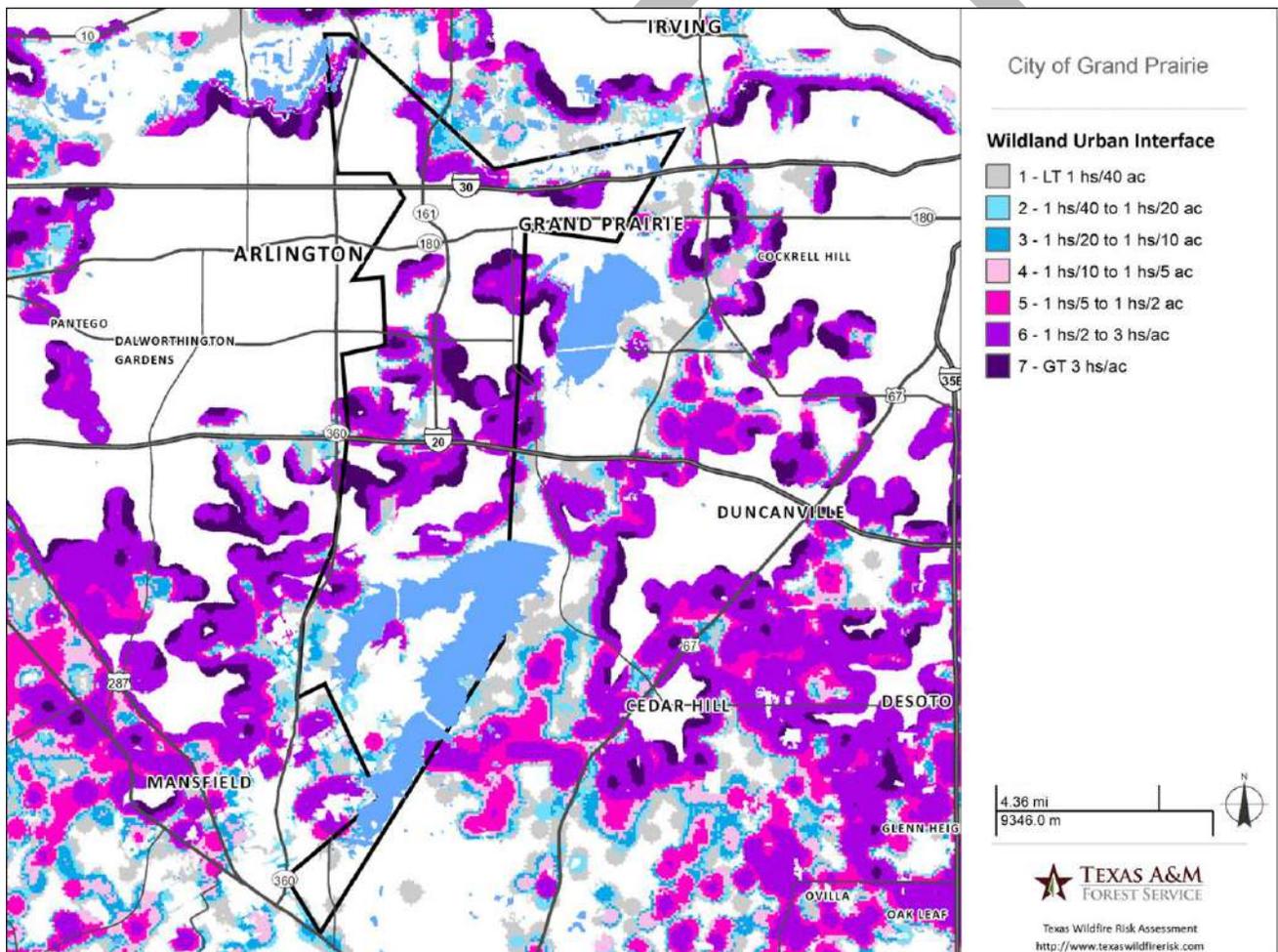


Figure 39: Wildland–Urban Interface Map

Wildfires can cause significant damage to property and threaten the lives of people who are unable to evacuate WUI areas. All improved property, critical facilities, and critical structures and infrastructure located in these wildfire-prone areas are considered vulnerable and can be exposed to this hazard.

3.4.2. Factors That Decrease Vulnerability

There are also several codes and ordinances in place to maintain safe and resilient development methods. Additional factors that decrease vulnerability to hazards include the mitigation actions that have been implemented, the adoption of new codes and policies, and the participation in regional projects.

3.4.2.1. Implemented Mitigation Activities

FEMA’s Hazard Mitigation Assistance (HMA) grants have funded two projects (Figure 25) in the City of Grand Prairie. HMGP Post Fire, BRIC, HHPD, or PA Mitigation funding have not been utilized due to projects not meeting qualifications for some programs, competing prioritized projects from other subgrantees, or the City not applying to funding due to current capabilities.

Table 25: FEMA HMA-Funded Projects

Program Area	Program FY	Disaster Number	Project Type	Status	Project Amount	Federal Share Obligated
HMGP	2015	4223	602.1: Other Equipment Purchase and Installation	Closed	\$46,200.00	\$34,649.70
HMGP	2015	4223	403.3: Stormwater Management - Flapgates/Floodgates	Closed	\$160,118.00	\$120,088.50

3.4.2.2. National Policy

On October 5, 2018, President Trump signed the Disaster Recovery Reform Act of 2018 (DRRA) into law as part of the Federal Aviation Administration Reauthorization Act of 2018. These reforms acknowledge the shared responsibility of disaster response and recovery, aim to reduce the complexity of FEMA, and build the nation’s capacity for the next catastrophic event. The law contains more than 50 provisions that require FEMA policy or regulation changes for full implementation, as they amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

It has yet to be seen how the DRRA will be implemented and how it will impact state and local agencies, but highlights from the DRRA include the following:

- Greater investment in mitigation, before a disaster: Authorizing the National Public Infrastructure Pre-Disaster Hazard Mitigation Grant Program, which will be funded through the Disaster Relief Fund as a 6 percent set-aside from disaster expenses.
 - This program will focus on funding public infrastructure projects that increase community resilience before a disaster occurs.
 - Previously, funding for pre-disaster mitigation grants relied on congressional appropriations, which varied from year to year. Now, with a reliable stream of sufficient funding, communities will be able to plan and execute mitigation programs to reduce disaster risk nationwide.
 - According to a 2017 National Institute of Building Sciences report, the nation saves six dollars in future disaster costs for every one dollar invested in mitigation activities.

- Reducing risk from future disasters after fire: Providing hazard mitigation grant funding in areas that received Fire Management Assistance Grants as a result of wildfire. Adding 14 new mitigation project types associated with wildfires and windstorms.
- Increasing state capacity to manage disaster recovery: Allowing for higher rates of reimbursement to state, local, and tribal partners for their administrative costs when implementing public assistance (12 percent) and hazard mitigation projects (15 percent). Additionally, the legislation provides flexibility for states and tribes to administer their own post-disaster housing missions, while encouraging the development of disaster housing strategies.
 - States, tribes, territories, and local governments bear significant administrative costs implementing disaster recovery programs. Often, these costs can be high and substantially burdensome for the impacted entity to meet. Increasing the funding for administrative costs will enable faster, more effective delivery of vital recovery programs to communities.
 - State and tribal officials have the best understanding of the temporary housing needs for survivors in their communities. This provision incentivizes innovation, cost containment, and prudent management by providing general eligibility requirements while allowing them the flexibility to design their own programs.
- Providing greater flexibility to survivors with disabilities: Increasing the amount of assistance available to individuals and households affected by disasters, including allowing accessibility repairs for people with disabilities, without counting those repairs against their maximum disaster assistance grant award.
- Retaining skilled response and recovery personnel: Authorizing FEMA to appoint certain types of temporary employees who have been with the agency for three continuous years to full-time positions in the same manner as federal employees with competitive status. This allows the agency to retain and promote talented, experienced emergency managers.

In 2021, President Biden approved more than \$3.46 billion to increase resilience to the potential impacts of climate change nationwide. This significant investment will be available for natural hazard mitigation measures across the 59 major disaster declarations issued due to the COVID-19 global pandemic.

With the growing climate change crisis facing the nation, FEMA's [Hazard Mitigation Grant Program](#) will provide funding to states, tribes, and territories for mitigation projects to reduce the potential impacts of climate change. Every state, tribe, and territory that received a major disaster declaration in response to the COVID-19 pandemic will be eligible to receive 4 percent of those disaster costs to invest in mitigation projects that reduce risks from natural disasters.

This influx of funding will help communities prioritize mitigation needs for a more resilient future, including underserved communities that are most vulnerable to the potential impacts of climate change. These projects can help address effects of climate change and other unmet mitigation needs, including using funds to promote equitable outcomes in underserved communities.

As dollar losses increase along with the number of disaster declarations, it is expected that national policy will continue playing a huge part in community resilience.

3.4.2.3. National Flood Insurance Program

NFIP aims to reduce the impact of flooding on private and public structures. It does so by providing affordable insurance to property owners, renters, and businesses and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socioeconomic impact of disasters by promoting the purchase and retention of general risk insurance, but also of flood insurance, specifically. When a community participates in the NFIP, it participates in one of two phases/programs: Emergency Program or Regular Program.

- Emergency Program: Entry-level participation phase.
 - Limited coverage
 - Flat rates
 - Basic Flood Hazard Boundary Map (FHBM)*
*Initial flood hazard identification
- Regular Program: Most participating communities are in this phase.
 - Full participation
 - Detailed Flood Insurance Rate Map (FIRM)
 - NFIP's full limits of insurance

Flood Insurance Risk Zones means zone designations on Flood Hazard Boundary Maps (FHBM) and Flood Insurance Rate Maps (FIRM) that indicate the magnitude of the flood hazard in specific areas of a community. The zone categories are provided in Table 26.

Table 26: Flood Insurance Risk Zones

High Risk Area	Description
In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones.	
Zone A	Special flood hazard areas inundated by the 100-year flood; base flood elevations (BFEs) are not determined. Areas with a 1% annual chance of flooding and a 26% 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 AE	Special flood hazard areas inundated by the 100-year flood; base flood elevations are determined. The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
Zone A1-30	Special flood hazard areas inundated by the 100-year flood; base flood elevations are determined. These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
Zone AO	Special flood hazard areas inundated by the 100-year flood; with flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. River or stream flood hazard areas, and areas with a 1% or greater chance 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% 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	Special flood hazard areas inundated by the 100-year flood; flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations are determined. Areas with a 1% 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% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Zone A99	Special flood hazard areas inundated by the 100-year flood to be protected from the 100-year flood by a federal flood protection system under construction; no base flood elevations are determined. Areas with a 1% annual chance of flooding that will be protected by a federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
Moderate to Low Risk Area	Description
In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones.	
Zone B and Zone X (shaded)	Areas of 500-year flood; areas subject to the 100-year flood with average depths of less than 1 foot or with a contributing drainage area less than 1 square mile; and areas protected by levees from the base flood. Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
Zone C and Zone X (un-shaded)	Areas determined to be outside the 500-year floodplain. Area of minimal flood hazard usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.
Undetermined Risk Area	Description
Zone D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

The following table reflects the number of active NFIP policies in force within the City of Grand Prairie.⁶⁰

Table 27: National Flood Insurance Program Policies in Grand Prairie as of April 30, 2022

County	Community Name (Number)	Policies in Force	Total Coverage	Total Written Premium + FPF
DALLAS COUNTY	GRAND PRAIRIE, CITY OF (485472)	174	\$54,604,600	\$150,238
TARRANT COUNTY	GRAND PRAIRIE, CITY OF (485472)	119	\$40,882,200	\$68,148
Unknown	GRAND PRAIRIE, CITY OF (485472)	3	\$1,050,000	\$1,401

⁶⁰ [nfip_policy-information-by-state_20220430.xlsx \(live.com\)](#)

3.4.2.4. State Programs

Along with national programs, like the NFIP, state programs can increase the resiliency of communities in Texas. The Hazard Mitigation Section of the Texas Division of Emergency Management (TDEM) supports Texas communities as they reduce their risk and increase their resilience. The section is comprised of two units, the Plans Unit and the Grants Unit. The two units provide a comprehensive program to support local jurisdictions as they assess the risks they face, plan to mitigate them, and fund those plans to implement mitigation projects that reduce risk across the state.

3.4.2.5. Regional Programs

The City of Grand Prairie is a member of the [North Central Texas Council of Governments \(NCTCOG\)](#), a voluntary association of, by, and for local governments, established to assist in regional planning. NCTCOG's purpose is to strengthen both the individual and collective power of local governments and to help them recognize regional opportunities, eliminate unnecessary duplication, and make joint decisions. NCTCOG consists of many departments that implement programs and projects that address the mitigation goals of the participating jurisdictions.

The Environment & Development Department at NCTCOG plays a major role in regional coordination and management of reports and projects that improve regional resilience to natural hazards through the following programs:

- **The Corridor Development Certificate (CDC)** – The CDC process aims to stabilize flood risk along the Trinity River. The CDC process does not prohibit floodplain development but ensures that any development that does occur in the floodplain will not raise flood water levels or reduce flood storage capacity. A CDC permit is required to develop land within a specific area of the Trinity floodplain called the Regulatory Zone, which is similar to the 100-year floodplain.
 - Under the CDC process, local governments retain ultimate control over floodplain permitting decisions, but other communities along the Trinity River Corridor are given the opportunity to review and comment on projects in their neighbor's jurisdiction. As the Metroplex economy continues to grow and develop, the CDC process will prevent increased flood risks.
- **NCTCOG-OneRain Conrail Flood Warning Software** – Conrail software that delivers automated real-time data collection, processing, validation, analysis, archiving and visualization of hydrometeorological and environmental sensor data.
- **The *integrated* Stormwater Management (iSWM) Program** – The iSWM™ Program for Construction and Development is a cooperative initiative that assists cities and counties to achieve their goals of water quality protection, streambank protection, and flood mitigation, while also helping communities meet their construction and post-construction obligations under state stormwater permits.
 - Development and redevelopment by their nature increase the amount of imperviousness in our surrounding environment. This increased imperviousness translates into loss of natural areas, more sources for pollution in runoff, and heightened flooding risks. To help mitigate these impacts, more than 60 local governments are cooperating to proactively create sound stormwater management guidance for the region through the *integrated* Stormwater Management (iSWM) Program.
- **16-County Watershed Management Initiative** – Communities from across the region come together to collaborate on how to reduce the risks of flooding in their communities.
- **Texas SmartScape** – Texas SmartScape™ is a landscape program crafted to be "smart" for North Central Texas. Based on water-efficient landscape principles, it promotes the use of plants suited to our region's soil, climate, and precipitation that don't require much—if any—additional irrigation, pesticides, fertilizer, or herbicides to thrive. The two main goals of the program are to:
 - Improve stormwater runoff quality

- Conserve local water supplies

The Transportation Department promotes the following programs:

- **[Bicycle-Pedestrian](#)** – The passage of the 1991 Intermodal Surface Transportation Efficiency Act prompted NCTCOG to include non-motorized transportation network improvements in regional planning efforts. NCTCOG established the Bicycle and Pedestrian program in 1992 to address the various activities related to implementing bicycle and pedestrian facilities as an alternative mode of regional transportation.
- **[Sustainable Development](#)** – As land uses influence regional travel patterns and demand on the transportation system, and transportation connects land uses and provides access to developments, both need to be planned in conjunction with one another. NCTCOG supports Sustainable Development: mixed-use, infill, and transit-oriented developments that reduce vehicle miles traveled, enable the use of alternative modes of transportation, promote economic development, and improve air quality.

3.4.3. Overall Vulnerability

At a minimum, the level of vulnerability remains the same in the planning area as the previous plan, though is impacted by the factors previously mentioned. The most vulnerable assets include the following:

- Socially vulnerable populations
- Historical properties and structures over 50 years old
- Non-mitigated structures in the floodplains and coastal flood zone
- Endangered and protected species

Another concern is that a large event could quickly overwhelm the area's response capabilities and resources.

Social vulnerability can be assessed using the Center for Disease Control and Agency for Toxic Substances and Disease Registry (CDC/ATSDR) Social Vulnerability Index (SVI) Tool.⁶¹ The CDC/ATSDR SVI Tool uses data from the 2020 U.S. Census and accounts for the community's socioeconomic status, household characteristics (age, disability status, language proficiency, etc.), racial and ethnic minority status, and housing and transportation types. As depicted in the following map (Figure 40), Grand Prairie is identified as having a medium to high level of vulnerability.

⁶¹ [CDC/ATSDR Social Vulnerability Index \(SVI\)](#)

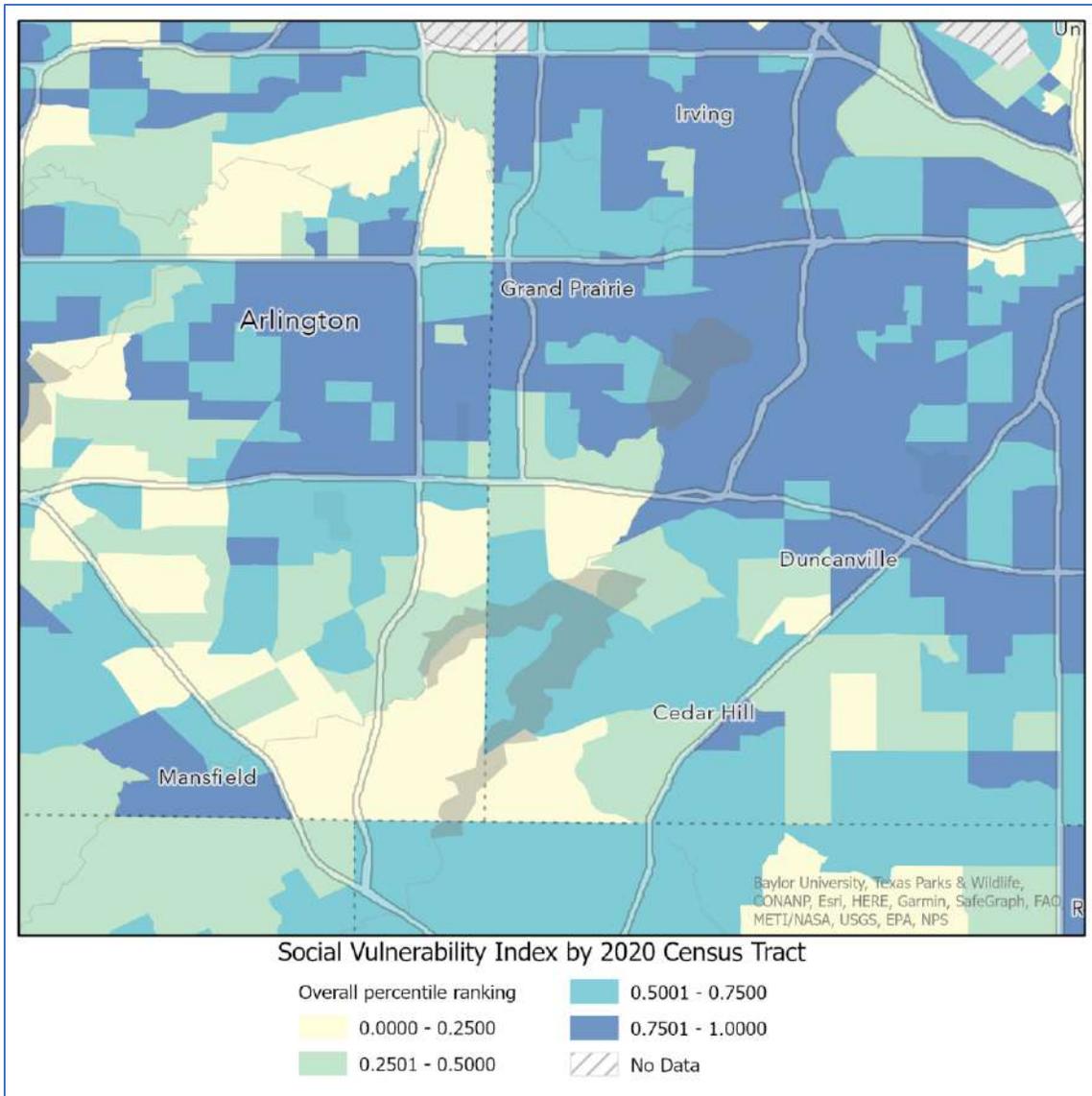


Figure 40: CDC/ATSDR Social Vulnerability Index

Overall vulnerability can be assessed using the Climate and Economic Justice Screening Tool from the U.S. Climate Resilience Toolkit. This toolkit is helpful in identifying what vulnerabilities or factors burden a specific community. These burdens are categorized as the following: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. The City of Grand Prairie is identified as a disadvantaged community because it meets more than one burden threshold and the associated socioeconomic threshold. These burdens include the following:⁶²

- **Health**
 - Grand Prairie is in the 93rd percentile for people ages 18 and older who have diabetes.
- **Transportation**
 - Grand Prairie is in the 94th percentile of transportation barriers (the average of cost and time spent on transportation).

⁶² [Explore the map - Climate & Economic Justice Screening Tool \(geoplatform.gov\)](https://geoplatform.gov)

- **Workforce Development**

- Grand Prairie is in the 98th percentile of linguistic isolation, where no one in a household over the age of 14 speaks English very well.
- Grand Prairie is in the 92nd percentile of having a low median income population.
- Grand Prairie is in the 91st percentile of people in households where income is at or below 100 percent of the federal poverty level.
- Grand Prairie is in the 93rd percentile of people in low-income households.
- Thirty-eight percent of people in Grand Prairie have an education level less than a high school diploma.

These disparities and burdens may be exacerbated in a disaster, and these identified groups are at the most risk of harm. As climate change potentially increases the strength and number of disaster events, the City must remain aware of their vulnerabilities, mitigate potential risks as their capabilities allow, and strive to enhance their mitigation program in order to create a more resilient state.

3.5. SWOT Analysis of North Central TX Region

Comparing the results of the risk assessment with the region’s economic development strategy’s Strength, Weakness, Opportunity and Threat (SWOT) Analysis will help the Planning Team better align the team’s mitigation strategy with the region’s economic goals.

The NCTCOG Comprehensive Economic Development Strategies (CEDS) Committee organized itself into eight clusters based on regional geography. Each cluster then performed a SWOT Analysis of their sub-region or function. The City of Grand Prairie participated in the SWOT Analysis in Cluster 3 (Johnson, Ellis, Navarro) and Cluster 6 (Dallas). Below are the 2022 SWOT Analysis results of Clusters 3 and 6.

Table 28: Cluster 3 (Johnson, Ellis, Navarro) SWOT Analysis 2022

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Power grid • Transportation infrastructure: I-35E, I-35W, I-45, Highway 287, Highway 67, Highway 77, Chisholm Trail Parkway • Water availability and low cost • Skilled workforce (need a better-skilled one to compete, however) • Access to job training • Plenty of land • Proximity to markets • Higher education availability (highest return on investment) • Competitive tax burden • Strong pro-business climate • Local infrastructure and capacity • Access to airports • High quality of life and lower cost of living • Growing arts and entertainment • Access to outdoor recreation: lakes and parks 	<ul style="list-style-type: none"> • Low median household incomes (good for manufacturing) • Limited rail spurs • Limited incentive options and funding for incentives • Destination retail (commerce) • Lack of social services • Education attainment • Broadband access

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Rail (BNSF and Union Pacific) • Proximity to ports • Growing healthcare options • Growing population 	
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Reshoring/onshoring/offshoring (some companies are coming back) • Foreign direct investment (opportunities for FDIs who want to invest/buy a piece of the action in the region) • Power grid • Expand diverse housing options • Take advantage of metro business industry leakage • Retail opportunities • The southern region of DFW Metroplex growth opportunities • Expansion of utility infrastructure • Utilization of federal infrastructure funds 	<ul style="list-style-type: none"> • Weather (tornadoes) • Increased incentives from other states • A decline in standard manufacturing base (being replaced with automation) • Offshoring (financial and manufacturing) • Tighter environmental regulations (i.e., air quality) • Poorly educated workforce • Aging infrastructure • Uncertainty in the future of electrical infrastructure • Housing bubble • Financial market volatility • Construction materials cost and availability • Disruption of retail due to e-commerce • Diverse housing options • Lack of water for manufacturing and all development

Table 29: Cluster 6 (Dallas) SWOT Analysis 2022

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Location as a regional, national, and international logistical hub • Location as a submarket to a major city (Dallas) with great connectivity via rail and roadway • Centrally located major business center within North America and central time zone • Affordable and competitive cost of living • Diverse economy • Vibrant downtown urban and suburban centers • Comprehensive transportation system (DART, interstate highways, thoroughfares, toll roads, etc.) • DFW International Airport, Dallas Love Field Airport, and large hub, medium hub, and general aviation airports located in Dallas County 	<ul style="list-style-type: none"> • The aging housing stock in many areas • Aging and older infrastructure in need of repair/replacement • The declining supply of undeveloped land in established, developed areas • Inadequate public transit access to growth areas • Unequal public health access (healthcare deserts) • Unequal access to food/general groceries (food deserts) • Aging malls • Perceptions of blight/crime • Broadband infrastructure • Land Use: prohibition of Accessory Dwelling Units (ADUs) in most single-family residential zoning districts limits the development of moderate-income housing units

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Throughput of passengers and freight through the airports. In 2020, Over 47 million passengers came through DFW, and Love Field Airports combined. Over 871,593 metric tons of cargo passed through DFW Airport • Multimodal access to Dallas Fort Worth International Airport • Internationally known and nationally ranked colleges and research universities; Dallas County Promise Program • Quality of life amenities supported by strong investment in amenities (museums, concert/entertainment venues, hike and bike trail system, extensive retail, restaurants, etc.) • Quality of life – work-life balance; a high percentage of parkland • Topographical variety • Overall moderate climate • Diverse neighborhoods and a diverse range of housing options • Strong entrepreneurship and innovation hub • Major convention destination • The population continues to grow – 4th largest market in the country with a diverse and young population • Young, educated workforce and population • Broad population diversity – diverse racial, international, and ethnic • Encouraging environment for creative class growth • Number of Fortune 500 and Fortune 1000 headquartered in Dallas County • Regional chamber • Strong public–public and public–private partnerships and collaboration • Strong private investment • ISD leader in implementing HB-5 career paths in aviation, culinary, and robotic fields • Forward-thinking and innovative ISD programs (Career and Technology Programs, Pathways in Technology Early College High programs, Community College skills programs) along with partnerships with industries • Developable land along major highways • Diverse commercial, office, logistical, and manufacturing base • Land use: mixed-use districts 	<ul style="list-style-type: none"> • Non-attainment air status

OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • A desirable urban environment with significant development and redevelopment activity • STEM-related industries provide growth opportunities • Growing entrepreneur ecosystem • Trinity River area • Diverse and international population • Availability of older areas for preservation and revitalization • Continued investment in reuse and redevelopment of existing buildings • Investments and expansion of existing highways and tollways and expansion of diverse transportation network • Continued development of the inland port area • Southern region development opportunities, for example, the areas serviced by Loop 9 • Several sites with potential for transit-oriented development adjacent to DART (Dallas Area Rapid Transit) lines and Trinity Railway Express station • Ongoing development of entertainment venues • Expand education training partnerships between local employers, and higher education • Expand training collaboration between secondary and higher education • Upskilling • Repurposing aging malls for new uses (examples: Collin Creek, Redbird Mall, Valley View) • Proximity to Dallas County Inland Port • Continued opportunity to explore and refine housings programs and tools for diverse housing options • Increased exploration and enhanced housing programs, including tools for diverse and affordable housing options and linkages to land-use policies • Encourage public-private partnerships to support affordable and moderate housing options • Focused investments in areas of the county with little or no development/advancement • STEM (science, technology, engineering, and mathematics) related growth • Adaptive reuse, and revitalization • Land use: available opportunities exist to create additional districts and/or reposition 	<ul style="list-style-type: none"> • Need for a diversely educated and trained workforce for future technology and industries • Infrastructure, for example, transportation • Lack of sufficient funding to support multi-modal options within the region (sidewalks, bike lanes, connective trails) • Funding limitations • Many of the remaining land sites have development encumbrances • Urban sprawl • Housing challenges, including homeownership and affordable housing • A competitive environment for business attraction • Housing bubble • Non-attainment status/air quality • Workforce – trade industry’s workforce is retiring and there isn’t sufficient workforce to fill those trade jobs

OPPORTUNITIES	THREATS
established commercial districts as mixed-income/mixed-use districts	

3.6. Assessment Results

The Risk Assessment was conducted to review and characterize the impacts of these hazards on local assets and populations, along with the likelihood of future events, the potential impact on lives and property, and the potential geographic location of the hazards. Table 30 reflects the overall results of the Risk Assessment.

The assessment provides the foundation for the rest of the mitigation planning process, which is focused on identifying and prioritizing actions to reduce risk to hazards. In addition, the risk assessment also can be used to establish emergency preparedness and response priorities, inform land use and comprehensive planning, and facilitate decision making by elected officials, city and county departments, businesses, and organizations in the community.

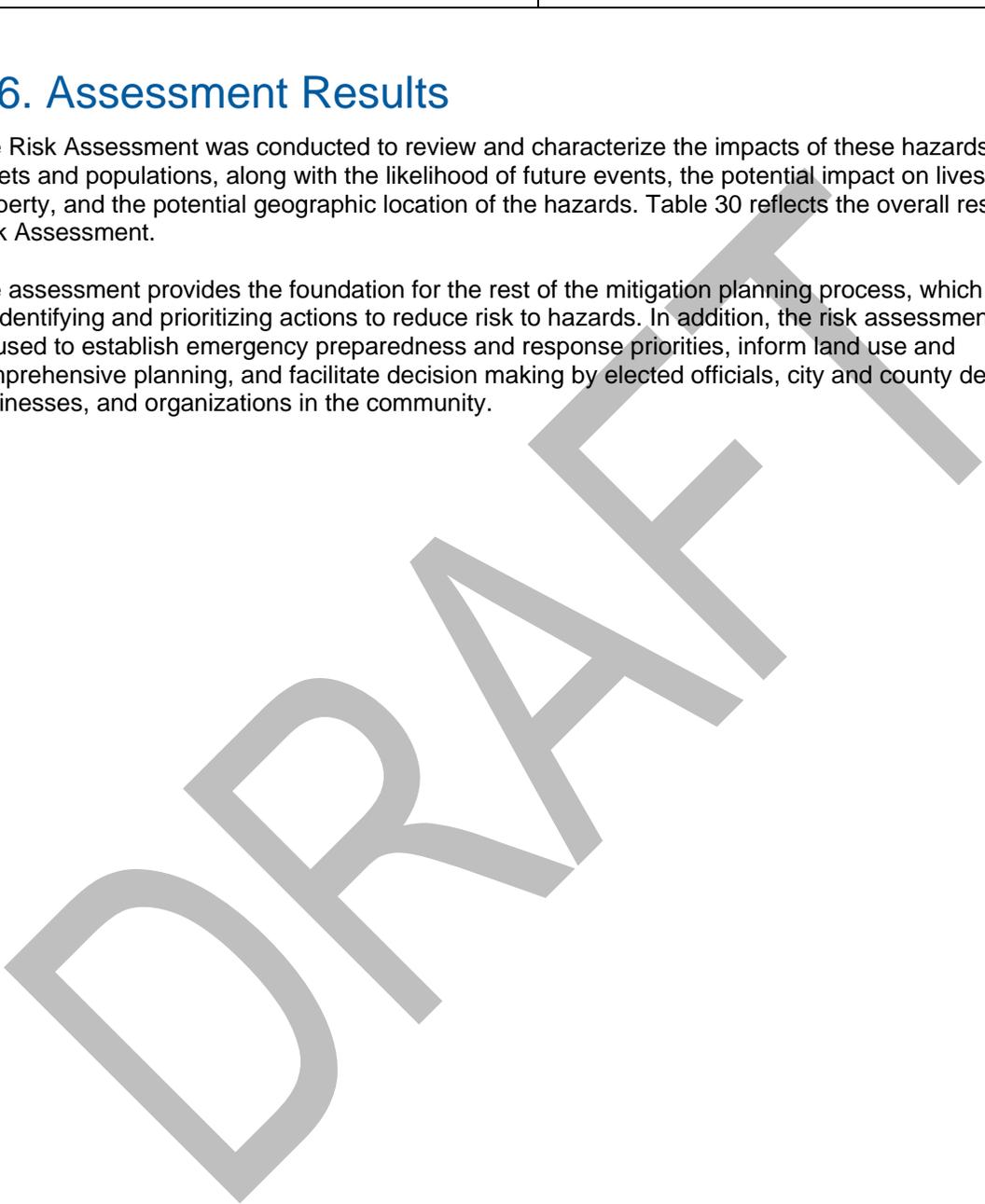


Table 30: Natural Hazard Risk Assessment Results

Hazard	Probability	Life Impact		Property Impact		Location		Maximum Intensity		
	City	ISD	City	ISD	City	ISD	City	ISD	City	ISD
Drought	Highly Likely	Highly Likely	Minor	Minor	Minor	Minor	Extensive	Extensive	Major	Major
Earthquake	Unlikely	Unlikely	Catastrophic	Catastrophic	Catastrophic	Catastrophic	Extensive	Extensive	Weak	Weak
Expansive/Corrosive Soils	Occasional	Occasional	Minor	Minor	Limited	Limited	Extensive	Extensive	Weak	Weak
Extreme Temperatures	Highly Likely	Highly Likely	Critical	Critical	Limited	Limited	Extensive	Extensive	Major	Major
Flood	Likely	Occasional	Critical	Critical	Critical	Critical	Significant	Significant	Moderate	Moderate
Severe Thunderstorm	Highly Likely	Highly Likely	Limited	Limited	Limited	Limited	Extensive	Extensive	Moderate	Moderate
Severe Winter Weather	Highly Likely	Highly Likely	Limited	Limited	Limited	Limited	Extensive	Extensive	Moderate	Moderate
Tornado	Highly Likely	Highly Likely	Critical	Critical	Catastrophic	Catastrophic	Significant	Significant	Moderate	Moderate
Wildfire	Occasional	Occasional	Minor	Minor	Critical	Critical	Significant	Minimal	Major	Major
Assessment Level	Criteria									
<i>Probability of Future Events</i>										
Unlikely	Recurrence interval of greater than every 100 years									
Occasional	Recurrence interval of 11 to 100 years									
Likely	Recurrence interval of 1 to 10 years									
Highly Likely	Recurrence interval of less than 1 year									
<i>Potential Life Impact</i>										
Minor	Very few injuries, if at all									
Limited	Minor injuries									
Critical	Multiple deaths/injuries									
Catastrophic	High number of deaths/injuries									

Potential Property Impact	
Minor	Only minor property damage and minimal disruption of life and/or temporary shutdown of critical facilities
Limited	More than 10% of property in affected area damaged/destroyed and/or complete shutdown of critical facilities for more than one day
Critical	More than 25% of property in affected area damaged/destroyed and/or complete shutdown of critical facilities for more than one week
Catastrophic	More than 50% of property in affected area damaged/destroyed and/or complete shutdown of critical facilities for 30 days or more
Potential Location	
Negligible	Less than 10% of the planning area or isolated single-point occurrences
Minimal	10% to 25% of the planning area or limited single-point occurrences
Significant	26% to 74% of planning area or frequent single-point occurrences
Extensive	75% to 100% of planning area or consistent single-point occurrences
Maximum Probable Intensity	
Weak	Minor classification on the scientific scale, slow speed of onset or short duration of event, resulting in little to no damage
Moderate	Moderate classification on the scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days
Major	Major classification on the scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months



Section 4:

Capability Assessment

4. Capability Assessment

The capability assessment is a critical part of the mitigation planning process. It helps the community identify and evaluate the resources that are in place, or need to be in place, to reduce risk and improve resilience. Capability assessment findings will help the City and ISD develop a stronger mitigation strategy based on a more realistic understanding of their ability to take action. Evaluating the effectiveness of hazard mitigation capabilities will help participants:

- Identify a framework for executing mitigation activities;
- Create a realistic mitigation strategy that has adequate resources; and
- Identify needs for more program support to enhance capabilities or build capacity.

The Capability Assessment is organized into four types of capabilities:

1. **Planning and Regulatory:** Plans, policies, statutes, or regulations that could affect resilience to future natural hazard events and other future conditions, including the potential effects of climate change.
2. **Administrative and Technical:** Staff, skills, and tools that can reduce the risk of hazards in the planning area.
3. **Financial:** Potential funding resources to support hazard mitigation. These may be local funds and programs, FEMA or other federal programs, and private and non-profit resources.
4. **Education and Outreach:** Existing programs that support mitigation and communicate risk. These could include technical assistance, training and education, and awareness campaigns that build capacity.

The following tables reflect the various types of local capabilities available to mitigate hazards. All capabilities are available pre- and post-disaster. With these capabilities, the participants can reduce risk and improve resilience.

The City and ISD may expand upon and improve these existing capabilities by:

- Budgeting and passing policies and procedures for mitigation actions.
- Adopting and implementing stricter mitigation ordinances and regulations.
- Identifying opportunities for cross-training or increasing the technical expertise of staff.
- Updating existing plans as necessary to ensure they are current and reflect the needs of the City.
- Creating and implementing additional public education and outreach offerings.
- Applying for more funding opportunities and ensuring grant opportunities are capitalized upon to meet mitigation goals.

Table 31: Planning and Regulatory Assessment

Planning and Regulatory Assessment			
<i>Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of natural hazards.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Capital Improvement Plans	City Manager	The City of Grand Prairie has a Capital Improvement Plan (CIP) in place to budget for major City projects and programs.	The CIP utilizes the risk assessment information from the hazard mitigation plan; it will assist in determining what areas are safe to build and what areas need stricter building codes.
Emergency Action Plan	Emergency Management	This plan defines event types that may occur within the planning area and how to address them.	An Emergency Action Plan promotes overall disaster resiliency by outlining proper actions and procedures in response to a future hazard event.
All-Hazards Operation Plan	Emergency Management	The All-Hazards Operation Plan identifies how facilities, supplies, and other resources will be used during emergency response and recovery.	This capability improves resiliency to hazard events by ensuring smooth response and recovery operations.
Continuity of Operations Plan	Emergency Management	This plan identifies efforts to ensure essential functions can be performed during emergencies and disasters.	A continuity of operations plan reduces disaster risk and ensures resiliency by identifying ways basic operations can function during future hazard events.

Planning and Regulatory Assessment <i>Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of natural hazards.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Comprehensive Master Plan	City Manager	The Comprehensive Plan serves as a policy guide for the development of a city, establishing the legal foundation for enactment and systematic application of zoning, subdivision regulations and other development regulations. It is an effective instrument for budgeting local development funds, coordinating development, and making decisions based upon well-researched and well-conceived criteria.	This plan supports reducing risk by setting city-wide goals and policies related to future land use, a healthy community, and more.
161 Corridor Plan	City Manager	This Grand Prairie SH-161 Corridor Plan is an extension of the 2018 City of Grand Prairie Comprehensive Plan. It is a planning tool intended to be used by city staff, decision-makers, and citizens to guide the growth and physical development of the community for the next 10 to 20 years.	This plan supports reducing risk by evaluating existing conditions and identifying alternative land use opportunities.
Downtown Master Plan	City Manager	The Downtown Plan outlines the vision and strategic actions that can catalyze and set the vision for Downtown Grand Prairie in motion. This plan builds upon the goals outlined in the 2018 Comprehensive Plan update, current assets, and existing character.	This plan supports risk by setting frameworks for downtown zoning, traffic flow, and open space.

<u>Planning and Regulatory Assessment</u> <i>Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of natural hazards.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Pioneer Parkway Urban Design Strategy Plan	City Manager	The purpose of this plan is to formulate recommendations and outline steps that will help the city continue to guide the physical development of this roadway and to expand on its "international corridor" appeal. The planning process will provide the city with recommendations on physical improvements, design, and programming to promote new activity while championing the unique cultural aspects already found along this busy arterial.	This plan identifies physical designs, public policies, coordinating public investments with private development, and managing the use of right-of-way in a manner to maximize safety, among other goals.
Southgate 360 Corridor Plan	City Manager	The small area plan update encompasses the area south of Ragland Road to the southern limits of the city extraterritorial jurisdiction (ETJ). The plan updates a portion of the 2018 Comprehensive Plan to reflect current development in the southern section of Grand Prairie and examine desired and potential land uses for remaining parcels in this subject area.	By addressing potential land uses and zoning requirements for the southern part of the city, the plan plays a role in the greater risk reduction strategies of the Comprehensive Plan.
Housing Analysis Policy	City Council	As a result of significant high-density development, City Council initiated a city-wide housing stock analysis to determine the appropriate development approach for future housing development.	The analysis and resulting policy guidelines are intended to set a foundation for future housing recommendations and approvals that reduce risk.

<u>Planning and Regulatory Assessment</u> <i>Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of natural hazards.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
2019–2023 Stormwater Management Program	Department of Public Health and Environmental Quality	The SWMP will facilitate the City's and Dallas County Flood District's efforts in reducing stormwater pollutants and protecting the City's stormwater quality. Included in the SWMP are specific best management practices (BMPs) that will be implemented to reduce pollutants, measurable goals for each BMP, and an implementation schedule developed for the 5-year permit term.	This plan directly outlines control measures and action items to reduce hazard risk.
Grand Prairie Gateway Masterplan City of Grand Prairie (gptx.org)	City Council	The resulting Gateway at Grand Prairie Masterplan envisions an urban, pedestrian-friendly plan for all four corners of this intersection—within a new development district.	The goals of this plan align with various risk reduction strategies, such as creating green spaces, and maximize all site potentials.
Floodplain Management Plan 2021-2026	Floodplain Department	The Floodplain Management Plan addresses flood risk, NFIP compliance, sets floodplain management goals, and action items for the City.	This plan directly incorporates the local hazard mitigation plan with the goal to reduce flood risk and addresses current HMP flood project action items.
Floodplain Development Permit	Engineering Department	A Floodplain Development Permit shall be required for all proposed development within 200 feet of a Special Flood Hazard Area	Directly reduces risk by addressing flood hazard concerns.

<u>Planning and Regulatory Assessment</u> <i>Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of natural hazards.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Stormwater Pollution Prevention Plan (Permit Program)	Engineering Department	Prior to any earth disturbing activities, the owner/operator is responsible for the preparation of the Stormwater Pollution Prevention Plan (SWP3).	This program ensures that new development meets stormwater pollution and prevention standards.
International Code Council Building Codes	Building Inspections Department	The International Code Council develops the codes used to construct residential and commercial buildings, including homes and schools.	These codes reduce risk by ensuring building safety, emergency preparedness, and more.
Fire Prevention and Code Regulations	Fire Department	The Fire Department has implemented a broad range of codes and regulations regarding testing, occupancy requirements, water supplies and more.	Each fire code and regulation are directly intended to reduce the risk of fire related hazards.
Unified Development Code City of Grand Prairie (gptx.org)	Planning and Development Department	The Unified Development Code is a single comprehensive document that is used as the primary guide for development within the city. The Unified Development Code incorporates procedures, standards, and regulations for zoning and land use applications.	This set of codes addresses zoning, building, floodplain management and more. Specific risk reduction codes are detailed in the following.
Article 3: Zoning Districts	Planning and Development Department	This article sets developmental and zoning regulations for the City.	This code specifically restricts development in areas where are unsuitable due to health and hazard concerns.

<u>Planning and Regulatory Assessment</u> <i>Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of natural hazards.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Article 14: Drainage	Engineering Department	The purpose of drainage policies and standards are to protect the general health, safety, and welfare of the public by reducing flooding potential, controlling excessive runoff, minimizing erosion and siltation problems, and eliminating damage to public facilities resulting from uncontrolled stormwater runoff.	Directly reduces risk by addressing flood hazard concerns.
Article 15: Floodplain Management	Engineering Department	The purpose of floodplain regulations is to promote the public health, safety, and welfare and to minimize public and private losses due to flood conditions	Directly reduces risk by addressing flood hazard concerns.
Article 23: Master Transportation Plan	Planning and Development Department	The Master Transportation Plan is designed and developed to provide a sound structural framework for future growth and development. This plan coordinates the use of streets and on road bicycle routes. It is a guide used to coordinate individual developments in the City of Grand Prairie to the overall community.	These standards and are intended to ensure consistent design practices in new development or the redevelopment of land in Grand Prairie, specifically addressing measures to reduce risk.
Drought Contingency Plan	Water Service Department	This plan outlines emergency water use plans and restrictions for the city.	This plan addressed drought and other natural hazard risk by defining water contingency and conservation measures for the City.

Planning and Regulatory Assessment			
<i>Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of natural hazards.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Water Conservation Ordinance	Water Service Department	The Grand Prairie Water Conservation Plan, required by state law, outlines year-round water conservation efforts for residents and businesses. These requirements are in place regardless of whether drought conditions exist or not. Should a drought occur, stricter requirements could be enacted.	This ordinance directly mitigates and reduces the impact of drought impacts.

Table 32: Administrative and Technical Assessment

Administrative and Technical Assessment			
<i>Administrative and technical capabilities include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
CASA WX Radar System	North Central Texas Council of Governments (NCTCOG) - Multi-sector Partnership	This is a low altitude weather sensing system in the DFW used by local NWS forecasters and emergency managers to provide early storm warning to the public.	The implementation of the Collaborative Adaptive Sensing of the Atmosphere (CASA) radar system reduces the risk severe weather related loss by providing longer warning times.
GIS Survey Monuments City of Grand Prairie (gptx.org)	Engineering Department	The City of Grand Prairie survey group provides survey information support to the Engineering Division and other City departments on a prioritized basis.	These surveys are used by Engineering to design CIP street, drainage, water, and wastewater projects.

Administrative and Technical Assessment <i>Administrative and technical capabilities include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Hazard Mitigation Plan Planning Team	City Manager	The Planning Team ensures the schedule of the plan for monitoring, evaluating, and updating is strictly followed and by being present during budget meetings to advocate for the needs for mitigation funds for actions outlined in the plan. During implementation, monitoring and evaluation, these members will present at commissioner and city council meetings their findings as well as any changes to the plan or priorities.	The team improves resiliency by ensuring all local hazard mitigation plan and priorities are followed before, during, and after the planning process.
Flood Crossing Gates City of Grand Prairie (gptx.org)	Floodplain Department	Automated low water crossing gates have been installed on Carrier Parkway between Dickey Road on the north and Phillips Court to the south. The gates will lower to block northbound and southbound traffic on Carrier Parkway when Cottonwood Creek floods over the road near McFalls Park West. The gates have flashing lights and emit a warning sound as they lower.	This tool provides technical risk reduction measures during a flood hazard event.
iSWM™	Floodplain Department	<p>The City of Grand Prairie was awarded the silver iSWM designation in December 2016. Some of the iSWM outcomes the City of Grand Prairie has focused on and implemented include the following:</p> <ul style="list-style-type: none"> • Incorporating hydrologic methods to properly determine the design of drainage facilities • Requiring a preliminary drainage study of proposed development sites • Designing the drainage capacities of street and gutters to manage the flow of water 	This tool reduces flooding, protects property values, and improves water quality.

Administrative and Technical Assessment			
<i>Administrative and technical capabilities include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Future Land Use Map	City Manager	The Future Land Use Map is designed to facilitate the efficient, sustainable, and fiscally sound development and redevelopment of Grand Prairie. This land use framework will enable the city to coordinate development and guide the many land use decisions that the city ultimately makes.	This planning tool promotes development that aims to be sustainable and resilient.
Economic Development Director	City of Grand Prairie	The Economic Development Director works with the city manager to set strategic economic goals for the City.	The Director has the capability to set and implement economic goals that support city wide risk reduction measures.
Finance Director	City of Grand Prairie	The Finance Director sets City budgets and allocates jurisdictional funding.	The Director has the capability to budget for programs and projects that support city wide risk reduction measures.
Public Health Specialist	City of Grand Prairie	Public Health Specialists address complex health issues related to infectious diseases, pollution, air quality, and food safety.	These specialists are committed to reducing the risk of health issues in the planning areas.
Environmental Quality Manager	City of Grand Prairie	The Environmental Quality Manager ensures the proper protection of the environment.	The Manager may advise policy makers of environmental protection measures or implement programs that align with other environmental risk reduction strategies.
Environmental Stormwater Specialists	City of Grand Prairie	There are two Environmental Stormwater Specialists that maintain the City stormwater systems.	The City stormwater systems directly reduce flood risk.
Environmental Specialists	City of Grand Prairie	Environmental Specialists work to keep the City environment safe and address concerns such as pollution hazards, and more.	These specialists support resiliency and risk reduction by protecting and promoting a safe and healthy environment.

Administrative and Technical Assessment			
<i>Administrative and technical capabilities include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Fire Chief and Staff	City of Grand Prairie	The Fire Chief and Staff are responsible for all fire prevention, protection, and response capabilities in the City.	The Chief and Staff directly support resiliency and risk reduction for fire hazards.
Emergency Manager & Emergency Management Staff	City of Grand Prairie	The Emergency Manager and Emergency Management staff are responsible for the mitigation, preparedness, response, and recovery functions of the city before, during, and after an emergency.	The Emergency Manager and staff directly build resiliency and reduce risk to all hazards.
Utility Services Director	City of Grand Prairie	The Utility Services Director is responsible for all waste and wastewater programs and procedures.	This Director promotes resiliency through addressing wastewater and other utility and hazard related concerns.
Planning and Development Director	City of Grand Prairie	The Planning and Development Director is responsible for a broad range of activities including building inspections and planning.	The work of the director helps address safety and hazard concerns in the City.
Chief City Planner	City of Grand Prairie	The Chief City Planner manages the City's infrastructure and urban resources.	This role assists in risk reduction measures, especially with land use planning.
Planners & Senior Planners	City of Grand Prairie	There are six planners and senior planners on staff that assist in the management of City developments and infrastructure.	This role assists in risk reduction measures, especially with land use planning.
GIS Planning Tech	City of Grand Prairie	The GIS Planning Tech uses Geographic Information Systems to support City mapping and development.	Mapping services can be utilized in identifying and reducing risk.
Engineering Services Director	City of Grand Prairie	The Engineering Services director is responsible for engineering, construction inspection, stormwater management services.	This Director directly addresses stormwater management and flood risk reduction.

Administrative and Technical Assessment			
<i>Administrative and technical capabilities include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Transportation and Mobility Services Director	City of Grand Prairie	The Transportation and Mobility services Director is responsible for public/grand connection transit, streets, and traffic services.	This Director supports risk reduction and resiliency in regard to public transportation services and safe travel ways.

Table 33: Financial Assessment

Financial Assessment			
<i>Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.</i>			
Capability	Lead/Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Fiscal Year Proposed Budget	City Manager	The Budget and Research Department prepares and monitors the operating and capital projects budgets to allocate revenues in a cost-effective manner; facilitates effective decision making and fiscal responsibility by providing accurate analysis, operation evaluation and timely reports to meet the needs of the City Council and city departments.	This budget allocates funding for risk reduction projects and programs.
Drainage Plan Review Fee	City Council	The City of Grand Prairie enacted the Drainage Fee Ordinance requiring developers to provide escrow funds for a third party to perform drainage reviews for development projects within the City limits.	This fee promotes risk reduction for new City development.
Impact Fees	Public Works Department	Impact fees are a charge for roadway, water, and wastewater facilities.	Fees have the potential to fund facilities and projects that align with risk reduction strategies, especially with flood risks.

Financial Assessment			
<i>Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.</i>			
Capability	Lead/ Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Building Permit Fees	City of Grand Prairie	These fees cover the cost of administrative and structural systems, with new and existing development.	These fees support building inspections and fire protection system installations, among other risk reduction activities.
Disaster Warning Siren Fee	City of Grand Prairie	This ordinance is adopted to insure that adequate early warning sirens are provided to meet the additional need created by new development.	Any payments made to the Early Warning Siren Fund shall be used solely for the acquisition, development, expansion, or upgrading of early warning sirens, which builds disaster resiliency.

Table 34: Education and Outreach Assessment

Education and Outreach Assessment			
<i>Education and outreach programs and methods can be used to implement mitigation activities and communicate hazard-related information.</i>			
Capability	Lead/ Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Know the Hazards City of Grand Prairie (gptx.org)	Emergency Management Department	This website describes hazard types and explains how individuals should prepare for them and respond to warnings.	Providing educational hazard information for the community promotes overall disaster resilience.
Make a Plan	Emergency Management Department	This website encourages residents to create their own emergency plans and link additional resources that provide an emergency plan template.	Encouraging residents to make their own emergency plans promotes overall disaster resiliency.
Make a Kit	Emergency Management Department	This website encourages residents to make their own 72-hour emergency supply kit and includes ideas for key items. It also provides additional resources.	Encouraging residents to make their own emergency kits promotes overall disaster resiliency.

Education and Outreach Assessment <i>Education and outreach programs and methods can be used to implement mitigation activities and communicate hazard-related information.</i>			
Capability	Lead/ Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
Alert GP City of Grand Prairie (gptx.org)	Emergency Management Department	Alert GP is a free service that will notify residents about severe weather, emergencies and other important news affecting the Grand Prairie area.	Warning information is a key part of preparedness and promotes overall disaster resiliency and risk reduction.
Emergency Management Presentation Request Form City of Grand Prairie (gptx.org)	Emergency Management Department	The department offers presentations over emergency preparedness topics to keep families, businesses, and other organizations safe.	This is an opportunity to build relationships between public and private stakeholders, while educating the community on emergency preparedness.
Flood Safety Tips City of Grand Prairie (gptx.org)	Floodplain Department	This website provides residents with flood hazard safety information. There are resources residents can use to stay safe before, during, and after a flood event.	Providing educational hazard information for the community promotes overall disaster resilience.
Flood Insurance Rate Maps City of Grand Prairie (gptx.org)	Floodplain Department	The City provides a map information service enabling all residents to determine the flood zone of a specific property.	This mapping tool promotes resilience by ensuring residents further understand their flood risks.
Smart Water Pledge	Water Service Department	Grand Prairie has a Water Smart Pledge that encourages residents to take proactive measures in water conservation activities.	Water conservation programs and activities promote resiliency. Especially when there risks of drought or other hazards in which conservation protocols may be utilized.
Community Rating System (CRS)	Floodplain Department	The City of Grand Prairie participates in the Community Rating System (CRS). The CRS is a subset of the NFIP. It is a voluntary incentive program, which recognizes and encourages community floodplain management activities which exceed the minimum NFIP requirements.	This program reduces flood loss, facilitates accurate insurance ratings, and promotes the awareness of flood insurance.

Education and Outreach Assessment			
<i>Education and outreach programs and methods can be used to implement mitigation activities and communicate hazard-related information.</i>			
Capability	Lead/ Responsible Organization	Description of Capability	Effectiveness for Reducing Risk
ISO Rating City of Grand Prairie	Fire Department	The City joins the top 1% of communities in the United States for excellence in fire protection, which is used by most insurance companies to predict and analyze risk when establishing insurance premiums.	The ISO 1 rating score represents the effort the community takes to address fire risk. Homeowners and local business owners may qualify to receive a lower insurance renewal rate as a result.
How Safe Is Your Home?	Fire Department	This website provides fire safety and prevention information for residents.	Providing educational hazard information for the community promotes overall disaster resilience.
Home Electrical Fire Prevention	Fire Department	This website provides home electrical fire prevention information.	Providing educational hazard information for the community promotes overall disaster resilience.
Protect Yourself and Your Family	Fire Department	This website provides home fire preparedness and prevention information for residents and families.	Providing educational hazard information for the community promotes overall disaster resilience.
City of Grand Prairie Radio Amateur Civil Emergency Service	Emergency Management Department	The Radio Amateur Civil Emergency Service is an organization of licensed amateur radio operators who volunteer their time and equipment to provide supplemental communication to local, county and state governments in times of emergency or natural disaster.	Having a community volunteer group dedicated to ensuring communication operations in times of disaster promote overall resiliency.

4.1. National Flood Insurance Program and Community Rating System

The NFIP provides flood insurance to property owners, renters, and businesses, and having this coverage helps them recover faster when floodwaters recede. The NFIP works with communities required to adopt and enforce floodplain management regulations that help mitigate flooding effects.

Flood insurance is available to anyone living in one of the 23,000 participating NFIP communities.

The CRS is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the NFIP. In CRS communities, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community's efforts. Flood insurance premium discounts in CRS communities range from 5 percent to 45 percent and are discounted in increments of 5 percent. The City of Grand Prairie participates in both the NFIP and CRS programs. See the table below for information regarding the City's CRS participation.

Table 35: City of Grand Prairie CRS Participation⁶³

CRS Information	City of Grand Prairie Status
CRS Entry Date	October 1, 1991
Current Effective Date	May 1, 2012
Current Class	5
% Discount Special Flood Hazard Area (SFHA)	25%
% Discount Non-SFHA	10%

4.1.1. FEMA Flood Program Assessment

The administration of FEMA's NFIP Community Rating System (CRS) and Risk Mapping, Assessment and Planning (Risk MAP) programs are a key component of community hazard mitigation capabilities.

This assessment provides questions for the City to consider when evaluating their involvement in these FEMA programs. The assessment is provided below along with each response from the City's representative. Grand Prairie ISD, as a school district, is not an NFIP participant and does not utilize Risk MAP.

Which City agencies or departments administer the NFIP? How do these agencies or departments work together?

- Engineering Services: development review, permits, drainage concerns, drainage studies, Capital Projects.
- Code Enforcement (PD): citations for floodplain management violations,
- Emergency Management: flood mitigation, warning and response
- Marketing: public outreach and information before and during an emergency.
- Planning: future land use planning
- Public Health and Environmental Services?
- Transportation and Mobility Services: maintenance of drainage systems and levees by street and drainage crews; protecting motorists by barricading roadways at flooded creek crossings.

Do these agencies or departments have the right resources and staff in place to administer the programs effectively? If not, what are the opportunities to improve the capacity and capability?

- The City currently has sufficient resources, yet additional staff will be needed as the City continues to grow. Additional training is also helpful.

⁶³ [Community Status Book | FEMA.gov](#)

How does Grand Prairie ensure compliance with minimum NFIP standards for community-owned properties?

- All permits, including City-owned projects, are reviewed by staff to ensure they meet City floodplain management requirements, which are higher standards than minimum NFIP standards.

Has Grand Prairie's NFIP participation or insurance coverage changed? If so please describe.

- The City recently qualified for a Class 4 standing in the CRS program, which will provide a 30% discount to residents beginning Oct 1, 2023.

Does Grand Prairie use Community Assistance Visits (CAVs) or Community Assistance Contacts (CACs)* to support local communities?

**CAVs and CACs are two ways FEMA and state agencies (acting on behalf of FEMA) can identify challenges in a community's floodplain management program. They can also be used to provide technical assistance to resolve these issues. They are a key part of making sure communities meet the requirements of the NFIP.*

- Yes

Does Grand Prairie incorporate higher standards into community laws/regulations such as community building code requirements? If so, please describe.

- Yes, for example, new buildings must be elevated at least 2 feet higher than the nearest adjacent base flood elevation.

What structures are at high risk of flooding including repetitive and severe repetitive loss structures?

- There are currently five residential repetitive/severe repetitive loss properties. Details about these properties are not available to the public.

Does Grand Prairie coordinate with the State's Floodplain Management Association? If so, please describe.

- Yes, the City has multiple certified floodplain managers who attend the Texas Floodplain Management Association conferences each year.

What are some obstacles, challenges, and proposed solutions related to the NFIP and CRS program?

- Keeping up with documentation.

Have your NFIP and CRS program capabilities changed since the last plan update?

- Yes, the City has added a CRS coordinator, and has become a Class 4, which includes additional requirements.

4.1.2. Risk Mapping, Assessment and Planning (Risk MAP)

Risk MAP supports community resilience by providing data, building partnerships, and supporting long-term hazard mitigation planning. In particular, Risk MAP's Flood Risk Products work alongside regulatory products to provide flood risk information and support the community's overall floodplain management and hazard mitigation strategies.

Which City agencies or departments participate in the Risk MAP program? How do they work together and with FEMA?

- The City Engineering Services and Planning departments use the Risk MAP program.

Do these agencies and departments have the right resources and staff to participate in the program effectively? If not, what are the opportunities to improve capacity and capability?

- The City currently has sufficient resources, yet additional staff will be needed as City continues to grow. Additional training is helpful.

How does Grand Prairie share data and information to support the creation of Risk MAP products?

- The City participates in the process of updating mapping and hires consultants to study creeks, which the data is then used to generate better mapping.

How does Grand Prairie teach people about communitywide flood risk through Risk MAP?

- The City implements outreach programs to teach the public and stakeholders.

Does Grand Prairie have any active mapping update projects? If so, where?

- The City has multiple projects that will revise the effective mapping. They are located throughout the City.

How does Grand Prairie identify areas that need to be studied or restudied for flood risk?

- The City uses a yearly rotation process and may focus on a creek sooner than scheduled depending on development needs and/or erosion issues.

Does Grand Prairie use Risk MAP as an opportunity to build partnerships with communities or community and federal agencies or others? If so, how?

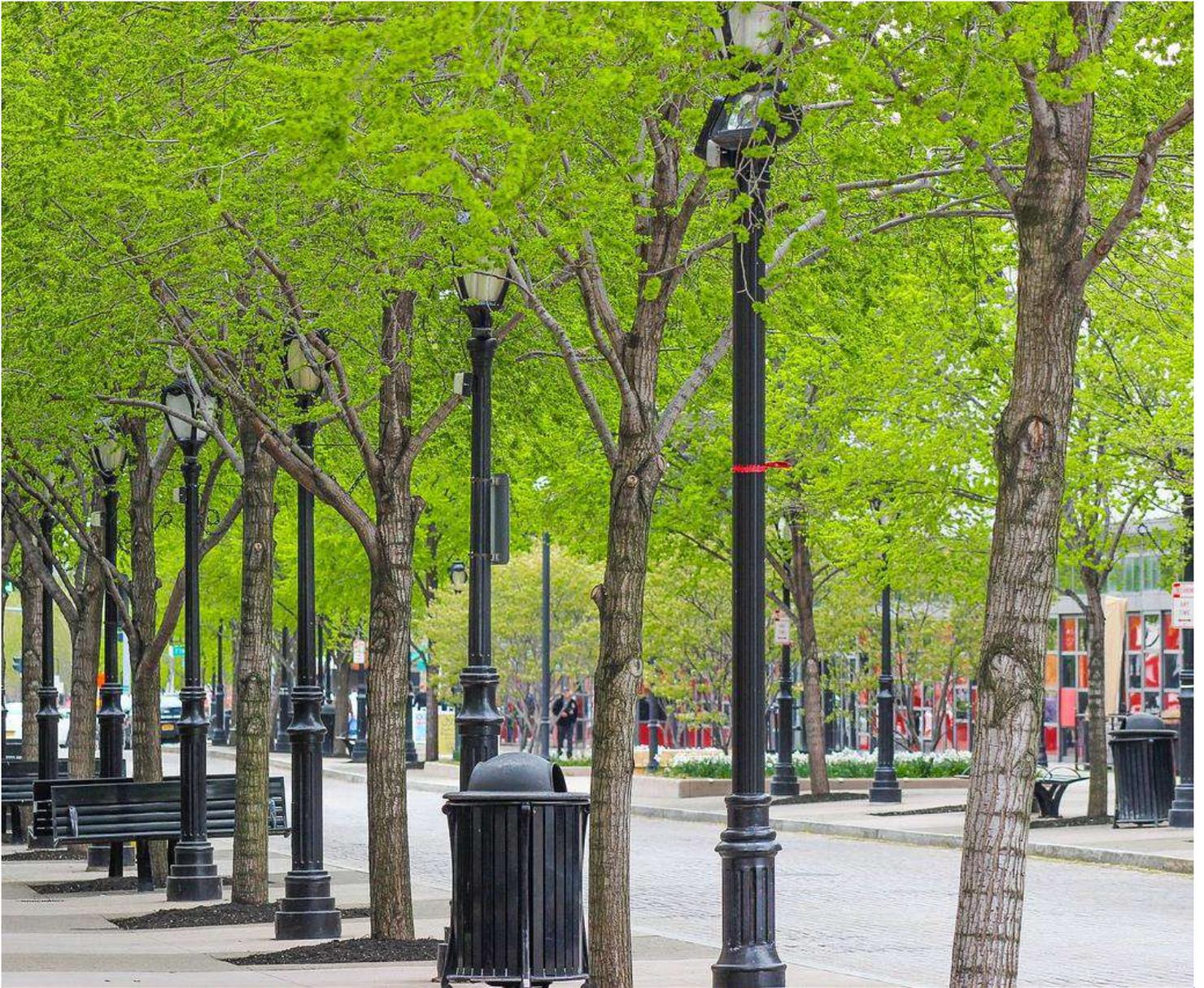
- When a letter of map change affects an adjacent city, staff works with our counterparts to ensure they are aware of the proposed changes as well.

What are some obstacles challenges and proposed solutions related to Grand Prairie's flood hazard mapping program capabilities?

- Challenges include helping residents how to interpret information presented on the mapping products.
- Proposed solutions include public meetings and outreach to provide education.

Have the flood hazard mapping program capabilities changed since the last plan update?

- No, not that the City is aware of.



Section 5: Mitigation Strategy

5. Mitigation Strategy

The mitigation strategy is made up of three main required components: mitigation goals, mitigation actions, and an action plan for implementation. These provide the framework to identify, prioritize, and implement actions to reduce risk to hazards. The strategy will support the city's desire to be a healthy, smart, sustainable community and support stakeholder's visions for the Focus Areas within the City, identified in Figure 41 from the City's Comprehensive Plan.

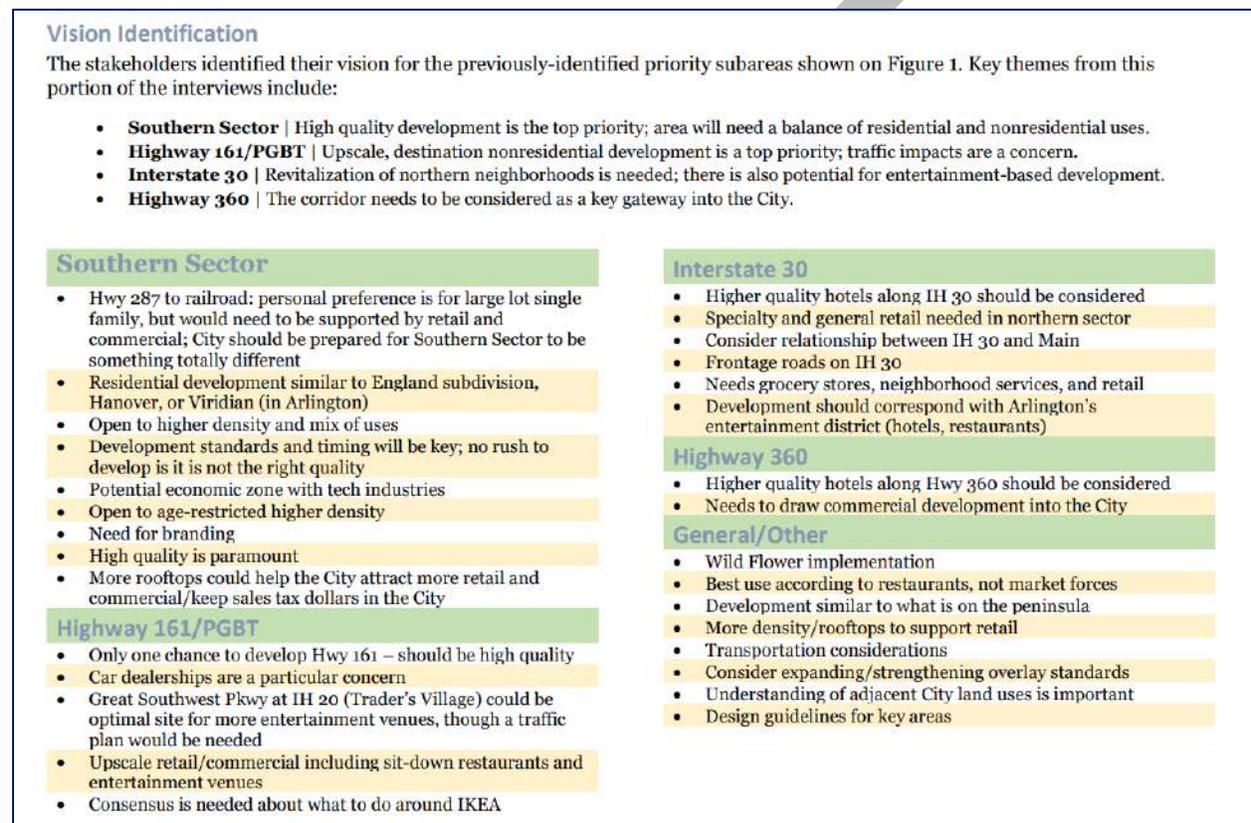


Figure 41: Stakeholder Vision Identification

5.1. Mitigation Goals

While the previous plan has goals for each hazard, the Planning Team has chosen to forego those goals and, instead, adopted the following four goals from the State's Hazard Mitigation Plan as the goals of this Plan.

1. Save lives and reduce public risk exposure from hazard events.
2. Reduce or prevent damage to public and private property from natural, technological, and human-caused hazard events.
3. Reduce adverse environmental, natural resource, and economic impacts from hazard events.

4. Empower citizens and businesses to make risk-informed decisions through public education and outreach activities.

5.1.1. Estimated Benefits

During the capability assessment and hazard analysis, previously impacted assets and populations were analyzed to determine the highest probability of damage and potential of loss of life per hazard.

To determine the estimated benefit of each action item, data from the National Institute of Building Science (NIBS) 2017 Interim Report was used to develop a cost-benefit analysis. The report states that every \$1 spent in mitigation saves a community an average of \$6 in recovery.⁶⁴ With this method, the estimated cost of every action can be multiplied by six to determine the estimated benefit of each action.

5.2. Mitigation Actions

A mitigation action is a specific action, project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan’s mission and goals. The actions to reduce vulnerability to threats and hazards form the core of the plan and are a key outcome of the planning process.

Numerous actions can be taken, and hazard mitigation interventions put in place, to minimize the impacts of hazards and reduce the overall risk of disasters, while also increasing community resilience.

A comprehensive range of action types (Figure 42) will be identified in this mitigation strategy, including plans and regulations, structure and infrastructure projects, natural systems protection, and education and awareness programs. There have been no changes in priorities regarding local mitigation efforts since the last plan update, and the progress of these efforts are detailed in Table 36 below.



Figure 42: Mitigation Action Types

5.2.1. Previously Identified Actions

The status of each active action item identified in the 2016 HMP is provided in Table 36. Over the past 5 years, capabilities and priorities prevented the Planning Team from implementing the identified mitigation actions, so the actions have been **deferred** to this edition of the HMP. The full description of each action can be found in the 2016 HMP.

⁶⁴ <https://www.nibs.org/page/mitigationsaves>

Table 36: 2023 Status of 2016 Action Items

Action Item #	2016 Action	2023 Status
8.2.6	Increase in number of flood insurance policies.	Deferred
8.2.7	Establish City Disaster Response Team.	Deferred
8.2.10	Install flood sirens with stream level triggers in flood-prone areas.	Deferred
11.1.1	Replace all cast iron water lines in the City of Grand Prairie.	Deferred
11.1.2	Stabilization of all city streets and sidewalks.	Deferred
11.1.3	Replace wastewater and sewer lines.	Deferred
11.1.4	Restore stream banks.	Deferred
11.1.5	Pursue voluntary buyouts associated with erosion.	Deferred
11.1.6	Restore channel beds.	Deferred
11.1.7	Stabilization of all streambeds.	Deferred
11.1.8	Participate in voluntary buyouts with the public.	Deferred
12.2.2	Install automatic floodgate motors for Dorchester Levee.	Deferred
12.2.3	Install generator at Dorchester Levee.	Deferred
16.1.1	Provide training for all first responders for gas well events.	Deferred
16.1.2	Provide Personal Protective Equipment to First Responders for gas well events.	Deferred
19.1.1	Provide education and training of ISD and city employees on Civil Disturbance Awareness.	Deferred
19.1.2	Continue training of fire department and EMS to provide for a Mobile Field Force.	Deferred
19.1.3	Provide protective vests for EMS and Fire Department personnel.	Deferred
19.1.4	Provide Riot Equipment for Police Department Personnel.	Deferred
20.1.1	Maintain sufficient anti-virus software and patch management programs for city systems.	Deferred
20.1.2	Conduct regular penetration tests to expose gaps in critical systems.	Deferred
20.1.3	Complete a business impact analysis (BIA) to analyze and prioritize essential functions of IT operations, including potential impacts of a disruption.	Deferred
20.1.4	Organize tabletop exercises focused on cyber-attacks for Information Technology Services (ITS) that integrate multiple stakeholder groups, including local emergency management.	Deferred
20.1.5	Conduct user awareness training to help employees understand and detect potential cyber risks – collaborate with emergency management and larger stakeholder groups on streamlining this training to apply across City agencies.	Deferred

Action Item #	2016 Action	2023 Status
20.1.6	Supplement security policies and procedures with specific plans such as a Continuity of Operations Plan (COOP) and/or Cyber Incident Disruption Plan that specifically outline operations for mitigating the cyber threat.	Deferred
20.1.7	Train City geographic information systems (GIS) personnel to ensure proper incorporation of HAZUS-MS in GIS databases.	Deferred
21.2.4	Purchase a four-wheel drive mobile command vehicle for areas severely impacted by all natural and technological hazards.	Deferred

5.2.2. New Actions

New actions were identified by the Planning Team after reviewing their risk and capability assessments. These actions address the following hazards, when applicable.

- Dam/Levee Failure
- Drought
- Earthquakes
- Expansive/Corrosive Soils
- Extreme Heat
- Flooding
- Severe Thunderstorms
- Severe Winter Weather
- Tornadoes
- Wildfires

Many of the actions have a “primary” community lifeline they could impact, though multiple lifelines could be impacted. Community Lifelines can be a powerful tool for state, local, tribal, and territorial governments to use in evaluating risk and developing strategies to reduce hazard impacts.

Table 37 lists the new mitigation action items for the City, and Table 37 lists the new mitigation action items for Grand Prairie ISD. These mitigation actions will be implemented as capabilities and community support allows.

Table 37: City of Grand Prairie New Mitigation Action Items

Action Item #1:	Improve existing and future infrastructure to reduce hazard impacts using risk-reduction measures.
Responsible Agency/Department:	Planning and Development
Action Type:	Structure and Infrastructure
Goal(s):	1,2,3

Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$1,000,000
Potential Funding Source(s):	City Budget, Grant Funding (HMGP, BRIC, HMA, FMAG)
Implementation Schedule:	5 Years
Priority:	High
Action Item #2:	Promote and enhance the City's Water Smart program.
Responsible Agency/Department:	Water Service
Action Type:	Education and Outreach
Goal(s):	4
Hazard(s) Addressed:	Drought
Primary Community Lifeline Addressed:	Food, Hydration, Shelter
Estimated Cost:	\$50,000
Potential Funding Source(s):	City Budget
Implementation Schedule:	3 Years
Priority:	Medium
Action Item #3:	Educate citizens on water conservation measures and property protection during drought and heat related events.
Responsible Agency/Department:	Water Service
Action Type:	Education and Outreach
Goal(s):	4
Hazard(s) Addressed:	Drought, Expansive/Corrosive Soils, Extreme Heat
Primary Community Lifeline Addressed:	Food, Hydration, Shelter
Estimated Cost:	\$5,000
Potential Funding Source(s):	City Budget
Implementation Schedule:	3 Years
Priority:	Medium

Action Item #4:	Implement resilient landscaping ordinances and design, incorporating hazard resilient and native plants and trees.
Responsible Agency/Department:	Planning and Development
Action Type:	Natural Systems Protection
Goal(s):	3
Hazard(s) Addressed:	Drought, Expansive/Corrosive Soils, Extreme Heat, Flooding, Severe Winter Weather, Wildfires
Primary Community Lifeline Addressed:	Food, Hydration, Shelter
Estimated Cost:	\$300,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	3 Years
Priority:	Low
Action Item #5:	Expand the City's Rain Barrel Education Program and obtain funding to provide rain barrels for the City's low income and underserved population.
Responsible Agency/Department:	Water Services
Action Type:	Education and Outreach
Goal(s):	4
Hazard(s) Addressed:	Drought
Primary Community Lifeline Addressed:	Food, Hydration, Shelter
Estimated Cost:	\$100,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #6:	Expand existing resources and provide new programs to help vulnerable and underserved populations during extreme temperature events.
Responsible Agency/Department:	Emergency Management
Action Type:	Planning and Regulations
Goal(s):	1,2
Hazard(s) Addressed:	Extreme Heat, Severe Winter Weather
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$250,000
Potential Funding Source(s):	City Budget, Grant Funding
Implementation Schedule:	3 Years
Priority:	Medium

Action Item #7:	Obtain portable water trailers and related equipment to provide water to vulnerable populations and livestock when existing water systems are damaged or obstructed.
Responsible Agency/Department:	Emergency Management, Water Services
Action Type:	Structure and Infrastructure
Goal(s):	1,2,3
Hazard(s) Addressed:	Drought, Extreme Heat, Severe Winter Weather
Primary Community Lifeline Addressed:	Food, Hydration, Shelter
Estimated Cost:	\$200,000
Potential Funding Source(s):	City Budget, Grant Funding
Implementation Schedule:	3 Years
Priority:	High
Action Item #8:	Update and adopt the most current version of building codes (<i>International Code Council's International Residential Code (IRC), the International Building Code (IBC), the International Fire Code (IFC) and the International Wildland-Urban Interface Code (IWUIC)</i>) to strengthen buildings, improve energy usage, and mitigate damages from hazards.
Responsible Agency/Department:	Engineering
Action Type:	Planning and Regulations
Goal(s):	1,2
Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Food, Hydration, Shelter
Estimated Cost:	\$5,000
Potential Funding Source(s):	City Budget
Implementation Schedule:	5 Years
Priority:	Low
Action Item #9:	Install permanent generators and/or solar panels to existing and future facilities to protect infrastructure and cooling/warming centers during extreme temperature events.
Responsible Agency/Department:	Engineering
Action Type:	Structure and Infrastructure
Goal(s):	1,2
Hazard(s) Addressed:	Extreme Heat, Severe Thunderstorms, Severe Winter Weather
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$750,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	Medium

Action Item #10:	Coordinate with city departments to reduce the impacts of flooding across City and ETJ areas.
Responsible Agency/Department:	Water Services, Economic Development
Action Type:	Planning and Regulations
Goal(s):	1,2
Hazard(s) Addressed:	Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$500,000
Potential Funding Source(s):	City Budget, Grant Funding
Implementation Schedule:	5 Years
Priority:	High
Action Item #11:	Expand and utilize the CASA Radar System capability to better prepare for and warn residents of incoming severe weather.
Responsible Agency/Department:	Emergency Management
Action Type:	Structure and Infrastructure
Goal(s):	1
Hazard(s) Addressed:	Severe Thunderstorms, Severe Winter Weather, Tornadoes
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$50,000
Potential Funding Source(s):	City Budget, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #12:	Create a tax rebate or incentive program to promote the development of saferooms.
Responsible Agency/Department:	Economic Development
Action Type:	Planning and Regulations
Goal(s):	1,2
Hazard(s) Addressed:	Tornadoes
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$750,000
Potential Funding Source(s):	City Budget, Grant Funding
Implementation Schedule:	5 Years
Priority:	Medium

Action Item #13:	Create land development districts for undeveloped areas in the City. Along with other utility master planning efforts for these undeveloped areas, studies could be performed on these districts prior to development to determine the appropriate storm drainage and floodplain features and improvements necessary for site development based on the current site zoning. [City-Wide Drainage Master Plan Road Map]
Responsible Agency/Department:	Floodplain
Action Type:	Planning and Regulations
Goal(s):	1,2,3
Hazard(s) Addressed:	Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$50,000
Potential Funding Source(s):	City Budget
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #14:	Establish guidelines for map revision and map amendment submittals, according to the CTP guidelines to ensure that all future submittals are in accordance to the digital mapping standards.
Responsible Agency/Department:	Floodplain
Action Type:	Planning and Regulations
Goal(s):	1,2,3
Hazard(s) Addressed:	Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$5,000
Potential Funding Source(s):	City Budget
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #15:	Fund projects identified in the watershed master plan's that are listed in the City's Capital Improvement Plan to mitigate flooding and erosion due to flooding.
Responsible Agency/Department:	Planning and Development, Floodplain
Action Type:	Structure and Infrastructure
Goal(s):	1,2,3
Hazard(s) Addressed:	Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$1,000,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	3 Years
Priority:	High

Action Item #16:	Build an energy-efficient, well-insulated, secured Emergency Operations Center that is built to withstand an EF3 tornado. This EOC will include all possible hazard mitigation techniques, including backup power systems and surge protection.
Responsible Agency/Department:	Emergency Management, Planning and Development
Action Type:	Planning and Regulations
Goal(s):	1,2
Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$5,000,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	3 Years
Priority:	High
Action Item #17:	Provide more protection from severe weather and extreme heat to the public by installing more trees, shade clothes, covered patios and walkways, and gazebos throughout the City.
Responsible Agency/Department:	Planning and Development
Action Type:	Structure and Infrastructure
Goal(s):	1,2
Hazard(s) Addressed:	Extreme Temperatures, Severe Thunderstorms
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$1,000,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	High
Action Item #18:	Create a multi-agency collaboration flood control project, similar to Panther Island/Central City Flood Project, that would safely bring a mix of modern homes and retail along acceptable watersheds, serving a dual purpose of enhancing flood protection and improving economic development.
Responsible Agency/Department:	Planning and Development, Economic Development
Action Type:	Structure and Infrastructure
Goal(s):	1,2,3
Hazard(s) Addressed:	Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$20,000,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	High

Action Item #19:	Use incentivizing methods, such as micro-grants, tax credits, or rebates, to encourage homeowners and developers to voluntarily install ignition-resistant retrofits.
Responsible Agency/Department:	Fire Department, Code Compliance
Action Type:	Planning and Regulations
Goal(s):	1,2
Hazard(s) Addressed:	Wildfire
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$300,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #20:	Reduce fuels in outdoor spaces, ditches and seasonal waterways by mowing, grazing, clearcutting, thinning vegetation and through periodic prescribed fires by trained professionals.
Responsible Agency/Department:	Fire Department
Action Type:	Natural Systems Protection
Goal(s):	1,2
Hazard(s) Addressed:	Wildfire
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$100,000
Potential Funding Source(s):	City Budget, Grant Funding
Implementation Schedule:	3 Years
Priority:	Medium
Action Item #21:	Remove or relocate outbuildings, accessory structures and vehicles that could create a pathway for fire to spread between properties or from structure-to-structure.
Responsible Agency/Department:	Fire Department, Planning and Development
Action Type:	Structure and Infrastructure
Goal(s):	1,2
Hazard(s) Addressed:	Wildfire
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$700,000
Potential Funding Source(s):	City Budget, Grant Funding
Implementation Schedule:	5 Years
Priority:	Medium

Action Item #22:	Provide opportunities and conduct activities that support the City's NFIP Community Rating System score.
Responsible Agency/Department:	Fire Department, Planning and Development
Action Type:	All
Goal(s):	1,2
Hazard(s) Addressed:	Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$500,000
Potential Funding Source(s):	City Budget, Grant Funding
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #23:	Upgrade road safety elements to improve visibility on city-owned roads for motorists during severe weather and evacuations. Elements could include reflective guard rails, signs, lane reflectors, and contrasting, high-visibility pavement markings that are wider, more durable, and designed for high visibility and reflectivity, no matter the weather.
Responsible Agency/Department:	Public Works
Action Type:	Structure and Infrastructure
Goal(s):	1
Hazard(s) Addressed:	Extreme Heat, Flooding, Tornado, Severe Thunderstorms
Primary Community Lifeline Addressed:	Transportation
Estimated Cost:	\$800,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	3 Years
Priority:	Medium
Action Item #24:	Procure drones that would allow for the inspection of water and wastewater utilities that cannot be inspected during and after natural disasters, identify the extent of flooding and storm damage throughout the City, better inspect dams and inundation zones, and locate hot spots not visible from the ground.
Responsible Agency/Department:	Wastewater and Water Services
Action Type:	Structure and Infrastructure
Goal(s):	2
Hazard(s) Addressed:	Dam Failure, Flood, Severe Thunderstorms, Tornado, Wildfire
Primary Community Lifeline Addressed:	Water Systems
Estimated Cost:	\$700,000
Potential Funding Source(s):	City Budget
Implementation Schedule:	1 Year
Priority:	High

Action Item #25:	Add flood protection, such as berms, floodwalls or floodproofing, to properties in dam inundation zones.
Responsible Agency/Department:	Floodplain
Action Type:	Structure and Infrastructure
Goal(s):	1,2,3
Hazard(s) Addressed:	Dam Failure, Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$1,000,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	High
Action Item #26:	Create bicycle/pedestrian/wildlife bridges (using green infrastructure in every opportunity) over main roads and thoroughfares to provide additional evacuation methods for non-motorists and to protect non-motorists and animals from traffic during severe weather.
Responsible Agency/Department:	Planning and Development, Engineering
Action Type:	Structure and Infrastructure
Goal(s):	1,2,3
Hazard(s) Addressed:	Severe Thunderstorm, Flooding, Wildfire
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$1,000,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	High
Action Item #27:	Support existing ideas and recommendations identified regional and city planning mechanisms, including the City's Comprehensive Plan's Stakeholder Vision Identification and Regional Comprehensive Economic Development Strategy's SWOT Analysis, by funding those ideas and recommendations that could help mitigate future damages from hazards.
Responsible Agency/Department:	Planning and Development, Engineering
Action Type:	Structure and Infrastructure
Goal(s):	1,2,3
Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$1,000,000
Potential Funding Source(s):	City Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years

Priority:	High
Action Item #26:	Partner with the Grand Prairie ISD and the Arts League to commission artists and student artists to create public art that illustrates historic hazard events or beautifies hazard mitigation structures.
Responsible Agency/Department:	City Council
Action Type:	Education and Outreach
Goal(s):	2,3
Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$500,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	3 Years
Priority:	Medium

Table 38: Grand Prairie ISD New Mitigation Action Items

Action Item #1:	Purchase and install electric roll down shutters on doors/windows of ISD buildings to protect schools from wind damage, water damage, and flying debris during severe weather.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	1,2
Hazard(s) Addressed:	Flooding, Severe Thunderstorms, Tornadoes
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$500,000
Potential Funding Source(s):	District Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	3 Years
Priority:	Medium
Action Item #2:	Require the consideration of natural hazards whenever siting new facilities and locate new facilities outside of high hazard areas.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Planning and Regulations
Goal(s):	1,2
Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$5,000
Potential Funding Source(s):	District Budget
Implementation Schedule:	5 Years
Priority:	High

Action Item #3:	Conduct structural mitigation of buildings, especially if the school is located in an area that has little or no advanced warning of a threat or hazard (e.g., earthquake, tornado).
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	1,2
Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$5,000,000
Potential Funding Source(s):	District Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	High
Action Item #4:	Secure building content to prevent movement and damage in the event of severe weather or earthquakes.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	1,2
Hazard(s) Addressed:	Earthquakes, Flooding, Severe Thunderstorms, Tornadoes
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$100,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #5:	Incorporate a tornado safe room into existing and future schools, or building additions, which would be large enough to accommodate all students, staff, visitors to a school, as well as nearby community members whose residences do not have suitable shelter.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	1,2
Hazard(s) Addressed:	Tornadoes
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$1,000,000
Potential Funding Source(s):	District Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	Medium

Action Item #6:	Elevate or dry floodproof school structures to protect the building and its contents from flood damage, including utility equipment.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	1,2
Hazard(s) Addressed:	Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$1,000,000
Potential Funding Source(s):	District Budget, Grant Funding, Public-Private Partnerships
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #7:	Replace carpet and vinyl floors with sealed epoxy flooring to mitigate damage from flooding or fires.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	2
Hazard(s) Addressed:	Flooding, Wildfire
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$500,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	3 Years
Priority:	Medium
Action Item #8:	Replace metal lockers with high density polyethylene lockers to mitigate damage from flooding.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	2
Hazard(s) Addressed:	Flooding
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$500,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	3 Years
Priority:	Medium

Action Item #9:	Equip every campus with weather radios so that office personnel will be aware when the National Weather Service issues tornado watches and warnings.
Responsible Agency/Department:	Security and Emergency Preparedness
Action Type:	Education and Outreach
Goal(s):	1,4
Hazard(s) Addressed:	Tornado, Severe Thunderstorms
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$10,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	3 Years
Priority:	Medium
Action Item #10:	Create defensible spaces involving non-vegetated areas or areas populated by fire-resistant vegetation around buildings to mitigate fire damage and reduce water usage.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	2,3
Hazard(s) Addressed:	Drought, Wildfire
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$100,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	5 Years
Priority:	Medium
Action Item #11:	Partner with subject matter experts to create a youth program focused on educating students on sustainable/resilient practices they can apply to everyday life to mitigate impacts from severe weather.
Responsible Agency/Department:	School Board
Action Type:	Education and Outreach
Goal(s):	2,3
Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$500,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	2 Years
Priority:	Medium

Action Item #12:	Upgrade or reinforce doors and windows on all campuses to mitigate potential damages from severe weather and man-made hazards.
Responsible Agency/Department:	Operations and Facilities
Action Type:	Structure and Infrastructure
Goal(s):	2,3
Hazard(s) Addressed:	All Hazards
Primary Community Lifeline Addressed:	Safety and Security
Estimated Cost:	\$3,000,000
Potential Funding Source(s):	District Budget, Grant Funding
Implementation Schedule:	2 Years
Priority:	Medium

5.2.3. Action Prioritization

Actions in this update will be prioritized relative to the plan’s goals and the participant’s risks and capabilities.

Priority of mitigation actions will go toward projects that are most cost-effective with 1) the highest positive impact on vulnerable populations and 2) the highest impact on overall community resilience by using the STAPLEE method to evaluate and prioritize actions when applying for funding.

The STAPLEE evaluation method uses seven criteria for evaluating a mitigation action: Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Within each of those criteria are additional considerations. Actions with the highest score will be considered to have higher success potential.

In 2016, the actions used numerical ranking to distinguish priorities. This edition of the HMP will instead use the priority score of High, Moderate, or Low.

Prioritization may change over time in response to changes in community characteristics and risks and to take advantage of available resources.

5.2.4. Potential Funding Sources

Under the Hazard Mitigation Assistance (HMA) program, FEMA manages the HMGP, PDM (now BRIC), and Flood Mitigation Assistance (FMA) programs. These funding streams may be matched to pre- and post-disaster conditions for mitigation projects, the development or update of hazard mitigation plans, and management costs. HMGP funding can also be used for planning-related activities that do not result in an approvable mitigation plan. Instead, they focus on updating or enhancing sections of a FEMA-approved mitigation plan (e.g., updating the risk assessment based on new data or strengthening the mitigation strategy), integrating information from mitigation plans with other planning efforts, building capability through the delivery of technical assistance and training, or evaluating adoption and/or implementation of ordinances that reduce risk or increase resilience.

The HMA program also provides funding for “climate resilient mitigation activities,” which support communities in reducing risks associated with climate change. There are four eligible activities: aquifer storage and recovery, floodplain and stream restoration, flood diversion and storage, and green infrastructure methods. While focused on addressing the long-term impacts of flooding and drought, these activities can mitigate any natural hazard.

Many other agencies and organizations support hazard mitigation and community resilience through funding and technical assistance. Two prominent federal funding programs include the U.S. Department of Housing and Urban Development's (HUD) Community Development Block Grant (CDBG) program and the EPA's Smart Growth program. The CDBG program aims to develop viable communities through an annual block grant to states, cities, and urban counties, but additional disaster recovery (DR) funds can also be appropriated following a Presidentially declared disaster for the purpose of recovery and mitigation. CDBG-DR prioritizes low- and moderate-income persons, but funding is fairly flexible and can be used to supplement other programs.

[Mitigation Funding Resource Guides | FEMA.gov](#) and the Texas State Hazard Mitigation Plan identify potential state and federal resources to fund local mitigation actions.

Sources of local funding may include the general operating budget, capital improvement budgets, staff time, impact fees, special assessment districts, and more. The Planning Team will also consider opportunities for private sector funding and partnerships, as well as resources that may be provided by academic institutions.

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Section 6:

Plan Maintenance and Implementation

6. Plan Maintenance and Implementation

6.1. Plan Maintenance

The Disaster Mitigation Act of 2000 requires that the Hazard Mitigation Plan (HMP) be updated at least once every 5 years. During this process, all sections of the plan will be updated by the Planning Team with current information, and analyses and new and/or modified mitigation actions will be developed under the direction of the City's Emergency Management Specialist, or their designee. The revised plan will be submitted for state and federal review and approval. The plan will be updated every 5 years in accordance with federal requirements.

All members of the Planning Team will be responsible for ensuring that the HMP is evaluated as required. Specifically, the Grand Prairie Office of Emergency Management will convene the Planning Team on an annual basis and ensure an evaluation is conducted in a thorough manner. This evaluation (see Table 39) will include analysis of current mitigation projects, evaluation of success, reevaluation of future mitigation needs, and prioritization based upon changes in needs and/or capabilities of the City.

Table 39: Plan Maintenance and Evaluation Schedule

Task	Schedule
Assist participating jurisdictions in updating their individual contributions to the Hazard Mitigation Plan (HMP).	Every 5 Years
Facilitate the HMP meetings and disseminating information.	Annually
Collaborate on data collections and record keeping.	Annually
Request updates and status reports on planning mechanisms.	Annually
Track status of the identified mitigation actions by working with the lead department assigned to the action(s).	Annually
Provide public outreach opportunities and seek public involvement through social media, public events, and town hall meetings.	Annually
Provide mitigation training opportunities.	Annually
Maintain documentation of adoption resolution for the Hazard Mitigation Plan.	Every 5 Years

Primary contact to the Planning Team and stakeholders will be through emails and conference calls, with strategy meetings to occur at least annually. All sections of the plan will be reviewed and updated with current information and analyses and new and/or modified mitigation actions will be developed. The City will continue to provide public outreach opportunities after the plan has been approved through various community events, public hearings, and online platforms to seek public participation and feedback.

6.2. Incorporation into Existing Planning Mechanisms

Where possible, the City and ISD will implement elements of this plan through existing plans and policies that already have support from the community and policy makers. From the 2016 HMP list of planning mechanisms, the City of Grand Prairie Floodplain Management Plan 2021-2026 fully incorporated risk and vulnerability data and addresses flood related mitigation projects identified in the 2016 HMP. All other plans mentioned in the 2016 HMP were not actively integrated due to limited capabilities.

The planning lead for the City, or their designee, is responsible for plan incorporation and will work with the Planning Team to ensure incorporation is completed. The primary means for incorporating mitigation strategies into other local planning mechanisms will be through the review and update of existing planning mechanisms that require specific planning and administrative tasks (for example, plan amendments, ordinance revisions, and capital improvement projects).

See the tables below for existing planning mechanisms in the City and Grand Prairie ISD and their corresponding update schedules. During the update of these planning mechanisms, the authors will review this HMP and incorporate plan elements and mitigation actions relevant to the respective plan and ensure all goals and strategies of the respective planning documents are consistent with and support the mitigation goals and will not contribute to increased vulnerability to hazards.

Table 40: City of Grand Prairie Planning Mechanisms

Planning Mechanisms	Update Schedule
Grand Prairie Approved Budget Book	Annually
Annual Report	Annually
Comprehensive Plan	Every 10 Years
Floodplain Management Plan	Every 5 Years
Stormwater Management Plan	Every 5 Years

Table 41: Grand Prairie ISD Planning Mechanisms

Planning Mechanisms	Update Schedule
Key Control Procedures	Annually
Energy Management Program Philosophies and Guidelines	Annually
District Improvement Plan	Annually
Campus Improvement Plans	Annually
Elementary and Secondary School Emergency Relief III (ESSER III)	Annually
Recruitment Plan	Annually
Annual Training and Professional Development Calendar and Plan for Teachers	Annually

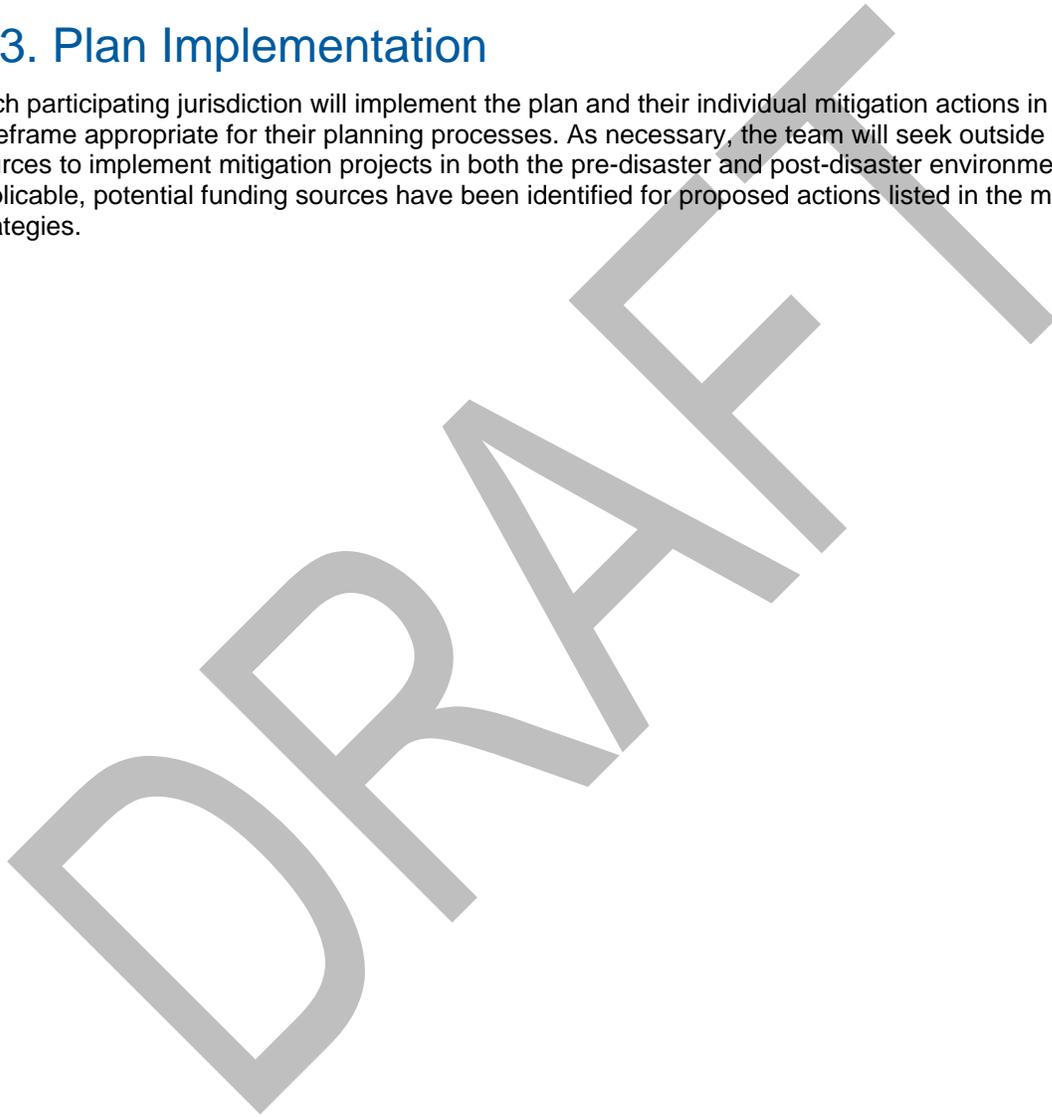
Additionally, regional planning mechanisms from NCTCOG rely on input from member jurisdictions. The City of Grand Prairie could potentially incorporate the HMP into these planning mechanisms during their scheduled updates. Table 42 lists these planning mechanisms.

Table 42: Regional Planning Mechanisms

Planning Mechanisms	Update Schedule
Regional Comprehensive Economic Development Strategy	Every 5 Years
The Metropolitan Transportation Plan	Every 5 Years
Public Works Construction Standards - North Central Texas	Every 10 Years

6.3. Plan Implementation

Each participating jurisdiction will implement the plan and their individual mitigation actions in the timeframe appropriate for their planning processes. As necessary, the team will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified for proposed actions listed in the mitigation strategies.



Appendix A: Public Outreach

On July 21st, 2023, a public survey was published on the City's website to provide an opportunity for the public to provide input during our planning process.

There were 2 responses to the survey which asked a variety of questions regarding hazards of concern and community assets. Hazards were ranked and those considered "very likely" to cause impacts included drought, expansive soils, extreme heat, flood, thunderstorm, and tornado. Community assets were also ranked and those considered "most important" included critical response facilities, hospitals, and utility infrastructure. Respondents were also asked to identify which type of mitigation actions they would like to see occur in the planning area. The responses included structure and infrastructure projects, natural systems protection, and public education. All other questions, and more detailed responses and comments were shared with the City of Grand Prairie Planning Team and the responses were taken into consideration during the planning process.



Figure 43: Public Survey Advertisement

During the final draft, members of the public had the opportunity to review the HMP to make final comments before it was submitted to the Texas Division of Emergency Management (TDEM) for the state review.

Appendix B: Plan Adoption

Once the Hazard Mitigation Plan (HMP) has received FEMA “Approvable Pending Adoption,” the governing body will formally adopt the HMP at a public meeting. A copy of the adoption resolution will be inserted into the approved HMP.

After FEMA has determined that all plan requirements have been met, including receipt of the formal adoption documentation, FEMA will provide a letter indicating the plan is approved. A copy of the adoption resolution and approval letter are included in this appendix.

{Adoption letter will be inserted HERE}

{Approval letter will be inserted HERE}

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