

****PUBLIC NOTICE****



CITY COUNCIL WORKSHOP AND REGULAR SESSION

Thursday, April 06, 2023 at 5:45 PM

City Hall | 3300 Corinth Parkway

Pursuant to section 551.127, Texas Government Code, one or more council members or employees may attend this meeting remotely using videoconferencing technology.

View live stream: www.cityofcorinth.com/remotesession

- A. NOTICE IS HEREBY GIVEN** of a Workshop Session and Regular Meeting of the Corinth City Council.
- B. CALL TO ORDER**
- C. WORKSHOP AGENDA**
 - 1. Receive a report, hold a discussion, and provide staff direction on Pumpkin Palooza and the City’s special event program.
 - 2. Discuss items on the Regular Session Agenda, including the consideration of Executive Session items.
- D. ADJOURN WORKSHOP**
- E. CALL TO ORDER, INVOCATION, PLEDGE OF ALLEGIANCE & TEXAS PLEDGE**
- F. PROCLAMATIONS AND PRESENTATIONS**
 - 1. Presentation - Recognition to Chris Lee who provided valuable assistance to Corinth first responders during the February ice storm.
 - 2. Proclamation supporting Child Abuse Prevention Month – 2023.
 - 3. Proclamation Supporting Denton County’s Mental Health Month, May 2023, and Children’s Mental Health Awareness Day, May 7, 2023.
- G. CITIZENS COMMENTS**

Please limit your comments to three minutes. Comments about any of the Council agenda items are appreciated by the Council and may be taken into consideration at this time or during that agenda item. Council is prohibited from acting on or discussing items brought before them at this time.
- H. CONSENT AGENDA**

All matters listed under the consent agenda are considered to be routine and will be enacted in one motion. Should the Mayor or a Council Member desire discussion of any item, that item will be removed from the Consent Agenda and will be considered separately.

 - 4. Consider and act on minutes from the March 2, 2023, City Council Meeting.
 - 5. Consider approval of abandoning a 24’ Access Easement, as dedicated on Instrument Number 2021-456, in relation to the future development of a property owned by the Economic Development Foundation of the City of Corinth.

6. Consider approval of abandoning a Water/Sewer Easement, as dedicated on Instrument Number 1972-11587, in relation to the future development of a property owned by the Economic Development Foundation of the City of Corinth.

I. PUBLIC HEARING

7. Conduct a public hearing and act on a request by the Applicant, Homeyer Engineering, Inc., to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, from MX-C Mixed-Use Commercial to a Planned Development with a base zoning district of MX-C Mixed Use Commercial, to accommodate a proposed expansion of the Destiny RV Resort, on approximately ±18.96 acres located at 7100 S I-35E. (Case No. ZAPD22-0005 – Destiny RV)

J. BUSINESS AGENDA

8. Consider approval of change order number 1 to DDM construction for the Agora/TOD Streets project in the amount of \$247,937.76 for a total project award of \$7,981,710.76 and authorize the City Manager to execute any necessary documents.
9. Consider a resolution adopting the Denton County Hazard Mitigation Plan and authorize the Mayor to execute any necessary documents.
10. Consider approval of the Liquid Waste Ordinance to ensure the City of Corinth meet the Texas Commission on Environmental Quality (TCEQ).
11. Consider approval of the Sewer Indirect Discharge Ordinance to ensure the City of Corinth meet the Texas Commission on Environmental Quality (TCEQ).

K. COUNCIL COMMENTS & FUTURE AGENDA ITEMS

The purpose of this section is to allow each Council Member the opportunity to provide general updates and/or comments to fellow Council Members, the public, and/or staff on any issues or future events. Also, in accordance with Section 30.085 of the Code of Ordinances, at this time, any Council Member may direct that an item be added as a business item to any future agenda.

L. EXECUTIVE SESSION**

In accordance with Chapter 551, Texas Government Code, Section 551.001, et seq., (the “Texas Open Meetings Act”), the City Council will recess into Executive Session (closed meeting) to discuss the following items. Any necessary final action or vote will be taken in public by the City Council in accordance with this agenda.

Section 551.071 - Legal Advice. (1) Private consultation with its attorney to seek advice about pending or contemplated litigation; and/or settlement offer; and/or (2) a matter in which the duty of the attorney to the government body under the Texas Disciplinary Rules of Professional Conduct of the State of Texas clearly conflict with Chapter 551.

- a. Unauthorized third-party use of City-owned property and authorization of eviction proceedings.

Section 551.074 - Personnel Matters. To deliberate the appointment, employment, evaluation, reassignment, duties, discipline, or dismissal of a public officer or employee, or to hear a complaint or charge against an officer or employee.

- a. Review - Municipal Judge - Chenault.

b. Review - Municipal Attorneys.

c. City Manager.

Section 551.087 - Economic Development. To deliberate or discuss regarding commercial or financial information that the governmental body has received from a business prospect that the governmental body seeks to have locate, stay, or expand in or near the territory of the governmental body and with which the governmental body is conducting economic development negotiations; or to deliberate the offer of a financial or other incentive to a business project.

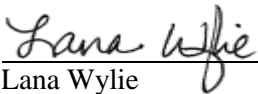
a. Project Agora.

M. RECONVENE IN OPEN SESSION TO TAKE ACTION, IF NECESSARY, ON EXECUTIVE SESSION ITEMS

N. ADJOURN

**The City Council reserves the right to recess into closed session at any time during the course of this meeting to discuss any of the matters posted on this agenda, as authorized by the Texas Open Meetings Act, Texas Government Code, Section 551.071, "Consultation with Attorney" for the purpose of receiving legal advice.

Posted on this 3rd day of April 2023, at 5:00 P.M., on the bulletin board at Corinth City Hall.



Lana Wylie
City Secretary
City of Corinth, Texas



CITY OF CORINTH Staff Report

Meeting Date:	3/16/2023	Title:	Pumpkin Palooza
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development		
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission Click to enter recommendation/decision of supporting group.		

Item/Caption

Receive a report, hold a discussion, and provide staff direction on Pumpkin Palooza and the City’s special event program.

Item Summary/Background/Prior Action

Pumpkin Palooza is the City of Corinth's largest annual special event. Pumpkin Palooza debut in 2016 with an estimated 7,000 in attendance. Since then, the event has grown to an estimated 15,000 in 2022. This free event includes musical entertainers, multiple amusement park rides, vendors on site, and food vendors.

Staff will present a recap of the 2022 event, discuss the 2023 event, and planning for events at Agora..

Staff Recommendation/Motion

N/A



CITY OF CORINTH Staff Report

Meeting Date:	4/6/2023	Title:	Citizen Recognition – Chris Lee – February Ice Storm
Strategic Goals:	<input checked="" type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development		
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission		

Item/Caption

Presentation - Recognition to Chris Lee who provided valuable assistance to Corinth first responders during the February ice storm.

Item Summary/Background/Prior Action

During the recent ice storm Mr. Chris Lee provided unsolicited assistance to Corinth first responders by using his own vehicle to tow at least 20 stalled vehicles off of Interstate 35E and the immediate vicinity when tow trucks were temporarily unavailable or greatly delayed in response. His actions without doubt prevented accidents and, likely, avoided serious injuries to stranded motorists as well as first responders.

Financial Impact

None

Applicable Policy/Ordinance

N/A

Staff Recommendation/Motion

N/A



CITY OF CORINTH Staff Report

Meeting Date:	4/6/2023	Title:	Proclamation Child Abuse Prevention Month - 2023
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development		
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission		

Item/Caption

Proclamation supporting Child Abuse Prevention Month – 2023.



PROCLAMATION

Child Abuse Prevention Month 2023

WHEREAS *there were 589 children affected by abuse and neglect served by CASA of Denton County in 2022; and*

WHEREAS *more than 240 volunteers from Denton County work with the organization annually by giving their time to ensure safety for our community’s children; and*

WHEREAS *our youngest citizens need and deserve to be surrounded by love and positive relationships, while being given guidance and protection.*

Now, Therefore, *in honor of all children in Denton County, I, Bill Heidemann, Mayor of the City of Corinth, do hereby proclaim the month of April 2023, as “Child Abuse Prevention Month” in the City of Corinth, Texas and commend the work of CASA of Denton County volunteers in advocating for children during this difficult time in their lives.*

IN WITNESS WHEREOF, *I have hereunto set my hand and caused the official seal to be affixed this the 6th day of April, 2023.*

*Bill Heidemann, Mayor
City of Corinth, Texas*

ATTEST:

*Lana Wylie, City Secretary
City of Corinth, Texas*



CITY OF CORINTH Staff Report

Meeting Date:	4/6/2023	Title:	Proclamation Denton County Mental Health Month
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input checked="" type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development		
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission		

Item/Caption

Proclamation Supporting Denton County’s Mental Health Month, May 2023, and Children’s Mental Health Awareness Day, May 7, 2023.

Item Summary/Background/Prior Action

For the past several years, the City of Corinth has made a habit of announcing May as Mental Health Month and the May 7th as Children’s Mental Health Awareness Day. This proclamation falls in line with recent steps the City has taken with addressing the mental health needs of our community.



PROCLAMATION

Mental Health Month in the City of Corinth 2023

- WHEREAS,** *addressing the complex mental health needs of children, youth, and families today is fundamental to the future of the City of Corinth; and*
- WHEREAS,** *the citizens of the City of Corinth value their overall health and that of their families and fellow citizens and are proud to support observances such as Mental Health Month and Children’s Mental Health Awareness Day; and*
- WHEREAS,** *one in five adults has a diagnosable mental health condition; and*
- WHEREAS,** *only half of Denton County parents are not familiar with mental health services in their community; and*
- WHEREAS,** *the need for comprehensive, coordinated mental health services for individuals and families places upon our community is a critical responsibility; and*
- WHEREAS,** *there is a strong body of research that supports specific tools that all Americans can use, to better handle challenges, and protect their overall health and well-being; and*
- WHEREAS,** *each citizen, local business, school, government agency, healthcare provider, and faith-based organization shares the burden of mental health concerns and has a responsibility to promote mental wellness, recovery, and support prevention efforts; and*
- WHEREAS,** *the Denton County Behavioral Health Leadership Team, Denton County MHMR Center, United Way of Denton County and the Wellness Alliance for Total Children’s Health of Denton County led by Cook Children’s, through their unique partnership and prevention-based approaches to serving children and adolescents, are effectively addressing the mental health needs of children, youth, and families in our community; and*
- WHEREAS,** *it is appropriate that a month should be set apart each year for the direction of our thoughts toward mental health education and the support of treatment and recovery; and*
- WHEREAS,** *it is appropriate that a day should be set apart each year for the direction of our thoughts toward our children’s mental health and well-being; and*

THEREFORE, BE IT RESOLVED that, I, Bill Heidemann, Mayor of the City of Corinth, do hereby proclaim:

May 2023 as Mental Health Month and May 7th, 2023 as Children’s Mental Health Awareness Day and I call upon our citizens and all agencies and organizations interested in meeting every person’s mental health needs to unite this month in the observance of such exercises as will commit the people of Corinth to increasing awareness and understanding of mental health, the steps our citizens can take to protect their mental health, and the need for appropriate and accessible services for all people mental health conditions.

Signed this 6th day of April 2023.

Bill Heidemann, Mayor
City of Corinth, Texas



CITY OF CORINTH Staff Report

Meeting Date:	4/6/2023	Title: Minutes Approval of Meeting Minutes
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development	
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission	

Item/Caption

Consider and act on minutes from the March 2, 2023, City Council Meeting.

Item Summary/Background/Prior Action

Attached are the minutes, in draft form, and are not considered official until formally approved by the City Council.

Staff Recommendation/Motion

Staff recommends approval of the minutes.



CITY COUNCIL WORKSHOP AND REGULAR SESSION - MINUTES

Thursday, March 02, 2023 at 5:45 PM

City Hall | 3300 Corinth Parkway

View Meeting: No recording available due to inclement weather.

**STATE OF TEXAS
COUNTY OF DENTON
CITY OF CORINTH**

On this, the 2nd day of March 2023, the City Council of the City of Corinth, Texas, met in Workshop & Regular Session at the Corinth City Hall at 5:45 P.M., located at 3300 Corinth Parkway, Corinth, Texas. The meeting date, time, place, and purpose as required by Title 5, Subtitle A, Chapter 551, Subchapter C, Section 551.041, Government Code, with the following members to wit:

Council Members Present:

- Bill Heidemann, Mayor
- Sam Burke, Mayor Pro Tem
- Steve Holzwarth, Council Member
- Tina Henderson, Council Member
- Kelly Pickens, Council Member

Council Members Absent:

- Scott Garber, Council Member

Staff Members Present:

- Scott Campbell, City Manager
- Lana Wylie, City Secretary
- Patricia Adams, City Attorney
- Jerry Garner, Police Chief
- Chad Thiessen, Fire Chief
- Greg Ward, Assistant Fire Chief
- Lee Ann Bunselmeyer, Director of Finance & Strategic Services
- Glenn Barker, Director of Public Works
- John Webb, Director of Development Services
- Elise Back, Director of Economic Development
- Guadalupe Ruiz, Director of Human Resources
- Michelle Mixell, Planning Manager
- Andrea Parker, Engineering Services Coordinator
- Brenton Copeland, Chief Technology Officer
- Cesar Balderas, Technology Services Specialist III
- Lance Stacy, City Marshal

CALL TO ORDER

Mayor Heidemann called the Workshop Meeting to order at 5:45 P.M.

WORKSHOP AGENDA

1. Receive a report, hold a discussion, and provide staff direction on EV Charging Stations.

The item was not discussed and will be on a future agenda.

2. Receive a report, hold a discussion, and provide staff direction on the 2023 Pumpkin Palooza Festival.

The item was presented and discussed.

3. Receive a report, hold a discussion, and provide staff direction on the Fire Department operations and staffing.

The item was presented and discussed.

4. Discuss items on the Regular Session Agenda, including the consideration of Executive Session items.

No items for the Regular Session Meeting were discussed.

ADJOURN WORKSHOP

Mayor Heidemann adjourned the Workshop Session at 6:50 P.M. and convened into Executive Session at 6:51 P.M.

EXECUTIVE SESSION**

In accordance with Chapter 551, Texas Government Code, Section 551.001, et seq., (the “Texas Open Meetings Act”), the City Council will recess into Executive Session (closed meeting) to discuss the following items. Any necessary final action or vote will be taken in public by the City Council in accordance with this agenda.

Section 551.071 - Legal Advice. (1) Private consultation with its attorney to seek advice about pending or contemplated litigation; and/or settlement offer; and/or (2) a matter in which the duty of the attorney to the governmental body under the Texas Disciplinary Rules of Professional Conduct of the State of Texas clearly conflict with Chapter 551.

- a. Unauthorized third-party use of City-owned property and authorization of eviction proceedings.

Section 551.087 - Economic Development. To deliberate or discuss regarding commercial or financial information that the governmental body has received from a business prospect that the governmental body seeks to have locate, stay, or expand in or near the territory of the governmental body and with which the governmental body is conducting economic development negotiations; or to deliberate the offer of a financial or other incentive to a business project.

- b. Assignment and Assumption of the Chapter 380 Economic Development Incentive Agreement and Consent – Realty Capital.

RECONVENE IN OPEN SESSION TO TAKE ACTION, IF NECESSARY, ON EXECUTIVE SESSION ITEMS

Mayor Heidemann recessed the Executive Session at 7:04 P.M.

CALL TO ORDER, INVOCATION, PLEDGE OF ALLEGIANCE & TEXAS PLEDGE

Mayor Heidemann called the Regular Session Meeting to order at 7:11 P.M.

PROCLAMATIONS AND PRESENTATIONS

1. Award of a Certificate of Appreciation to Trent Tapley, Instructor, and Students Jason Spina, Angel Hernandez, and Stephen Klingsheim of LaGrone Academy for their collaborative efforts in design and creation of the new City Logo for the City Council Chambers.

The item was not presented and will be placed on a future agenda.

CITIZENS COMMENTS

Please limit your comments to three minutes. Comments about any of the Council agenda items are appreciated by the Council and may be taken into consideration at this time or during that agenda item. Council is prohibited from acting on or discussing items brought before them at this time.

No citizen comments were made.

CONSENT AGENDA

All matters listed under the consent agenda are considered to be routine and will be enacted in one motion. Should the Mayor or a Council Member desire discussion of any item, that item will be removed from the Consent Agenda and will be considered separately.

2. Consider and act on minutes from the February 16, 2023, City Council Meeting.
3. Consider and act on a reimbursement to Lake Cities Municipal Utility Authority (LCMUA) for the Parkridge Drive water interconnect in accordance with the Interlocal Agreement executed June 2, 2016, in an amount not to exceed \$90,000 and authorize the City Manager to execute any necessary documents.

Motion made by Mayor Pro Tem Burke to approve the Consent Agenda as presented. Seconded by Council Member Henderson.

Voting Yea: Mayor Pro Tem Burke, Council Member Holzwarth, Council Member Henderson, Council Member Pickens

PUBLIC HEARING

4. Conduct a Public Hearing to consider testimony and act on an ordinance amending the City of Corinth Comprehensive Plan "Envision Corinth 2040," adopted by Ordinance No. 20.07-16-22 and amended by Ordinance No. 20-12-17-40, to amend the Land Use & Development Strategy Map by changing the designation of the Corinthian Park Subdivision and the Boulevard Apartments Addition Subdivision located at the northwest corner of Lake Sharon Drive and Corinth Parkway, from the Mixed-Residential Place Type to the Mixed-Use TOD Place Type. Case No. CPA22-0002 – Land Use & Development Strategy Amendment: The Boulevard and Corinthian Park.

Items 4 and 5 were presented together and acted on individually. Mayor Heidemann opened the Public Hearing at 7:56 P.M. and closed the Public Hearing at 7:56 P.M.

No comments were made.

Motion made by Council Member Henderson to approve Ordinance No. 23-03-02-04 amending the Land Use & Development Strategy Map of the Comprehensive Plan by changing the designation of the Corinthian Park Subdivision and the Boulevard Apartments Addition Subdivision located at the northwest corner of Lake Sharon Drive and Corinth Parkway, from the Mixed-Residential Place Type to the Mixed-Use TOD Place Type. Seconded by Mayor Pro Tem Burke.

Voting Yea: Mayor Pro Tem Burke, Council Member Holzwarth, Council Member Henderson, Council Member Pickens

5. Conduct a Public Hearing to consider testimony and act on an ordinance for a rezoning request by the Applicant, Boulevard 2010, LLC, to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, to repeal Planned Development No. 30 and amend Planned Development No. 31 to accommodate a proposed expansion of an existing multifamily development on approximately ±19.55 acres located at the northwest corner of Lake Sharon Drive and Corinth Parkway. Case No. ZAPD22-0010 – Oxford at the Boulevard.

Items 4 and 5 were presented together and acted on individually. Mayor Heidemann opened the Public Hearing at 7:56 P.M. and closed the Public Hearing at 7:56 P.M.

No comments were made.

Motion made by Mayor Pro Tem Burke to approve Ordinance No. 23-03-02-05 amending the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, to repeal Planned Development No. 30 (PD-30) and amend Planned Development No. 31 (PD-31) to accommodate a proposed expansion of existing multifamily development on approximately ±19.55 acres located at the northwest corner of Lake Sharon Drive and Corinth Parkway. Seconded by Council Member Henderson.

Voting Yea: Mayor Pro Tem Burke, Council Member Holzwarth, Council Member Henderson
Voting Nay: Council Member Pickens

- 6. Conduct a Public Hearing to consider testimony and act on an ordinance amending the City of Corinth Comprehensive Plan “Envision Corinth 2040,” by amending the Land Use & Development Strategy Map by changing the Place Type designation of multiple parcels of land located within the City of Corinth. Case No. CPA22-0001 – Land Use Map Amendments

Item 6 was presented before Items 4 and 5. Mayor Heidemann opened the Public Hearing at 7:24 P.M. and closed the Public Hearing at 7:24 P.M.

No comments were made.

Motion made by Council Member Henderson to approve Ordinance No. 23-03-02-06 amending the City of Corinth Comprehensive Plan “Envision Corinth 2040,” by amending the Land Use & Development Strategy by changing the Place Type designation on the Future Land Use Map as follows: As depicted on Exhibit A, Area 2, change the designation to Neighborhood, Area 3, change the designation to Mixed-Residential Area 4, change the designation to Office/Employment, Area 5, change the designation to Retail/Commercial, Area 7, change the designation to Office/Employment. Seconded by Council Member Pickens.

Voting Yea: Mayor Pro Tem Burke, Council Member Henderson, Council Member Pickens
Voting Abstaining: Council Member Holzwarth

- 7. Conduct a Public Hearing to consider testimony and consider an ordinance amending Section 4.01, Sign Regulations, of the Unified Development Code to allow additional attached wall signs for non-residential developments. Case No. ZTA22-0002 – Sign Code Amendments

The item was presented.

Mayor Heidemann opened the Public Hearing at 8:04 P.M. and closed the Public Hearing at 8:04 P.M.

No comments were made.

Motion made by Mayor Pro Tem Burke to approve Ordinance No. 23-03-02-07 amending Section 4.01, Sign Regulations, of the Unified Development Code to allow additional attached wall signs for non-residential developments. Case No. ZTA22-0002 – Sign Code Amendments. Seconded by Council Member Pickens.

Voting Yea: Mayor Pro Tem Burke, Council Member Holzwarth, Council Member Henderson, Council Member Pickens

BUSINESS AGENDA

- 8. Consider and act on a contract with Rangeline Utility Services, LLC, for the installation of a third pump in the amount not to exceed \$113,494 and authorize the City Manager to execute the necessary documents.

Motion made by Council Member Pickens to approve the contract with Rangeline Utility Services, LLC, in an amount not to exceed \$113,494. Seconded by Mayor Pro Tem Burke.

Voting Yea: Mayor Pro Tem Burke, Council Member Holzwarth, Council Member Henderson, Council Member Pickens

- 9. Consider ratification of the Amended Unimproved Property Contract with RCM Corinth Land, LLC for the purchase of 20.859 acres for a mixed-use development.

Motion made by Mayor Pro Tem Burke to ratify the Amended Unimproved Property Contract with RCM Corinth Land, LLC for the purchase of 20.859 acres for a mixed-use development. Seconded by Council Member Pickens.

Voting Yea: Mayor Pro Tem Burke, Council Member Holzwarth, Council Member Henderson, Council Member Pickens

- 10. Consider and act on the Amended and Restated Chapter 380 Economic Development Incentive Agreement - Reality Capital Management LLC and RCM Corinth Land, LLC for a mixed-use development on 20.859 acres.

Motion made by Mayor Pro Tem Burke to approve the amended and restated Chapter 380 Economic Development Incentive Agreement, assigning the rights and duties to RCM Corinth Land, LLC, to include the default remedies as outlined in Article XII. Default, Termination, and Remedies, as discussed in Executive Session. Seconded by Council Member Pickens.

Voting Yea: Mayor Pro Tem Burke, Council Member Holzwarth, Council Member Henderson, Council Member Pickens

COUNCIL COMMENTS & FUTURE AGENDA ITEMS

The purpose of this section is to allow each Council Member the opportunity to provide general updates and/or comments to fellow Council Members, the public, and/or staff on any issues or future events. Also, in accordance with Section 30.085 of the Code of Ordinances, at this time, any Council Member may direct that an item be added as a business item to any future agenda.

ADJOURN

Mayor Heidemann adjourned the Regular Session Meeting at 8:18 P.M.

Approved by the Council on the _____ day of _____ 2023.

Lana Wylie

Lana Wylie
City Secretary
City of Corinth, Texas



CITY OF CORINTH
Staff Report

Meeting Date:	4/6/2023	Title: 24' Access Easement Abandonment
Ends:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development	
Governance Focus:	<i>Focus:</i> <input checked="" type="checkbox"/> Owner <input type="checkbox"/> Customer <input type="checkbox"/> Stakeholder	
	<i>Decision:</i> <input type="checkbox"/> Governance Policy <input checked="" type="checkbox"/> Ministerial Function	
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission Click to enter recommendation/decision of supporting group.	

Item/Caption

Consider approval of abandoning a 24' Access Easement, as dedicated on Instrument Number 2021-456, in relation to the future development of a property owned by the Economic Development Foundation of the City of Corinth.

Item Summary/Background/Prior Action

In 2021 Skorburg Development planned & constructed the Walton Ridge subdivision. They platted their property and included a sliver of a lot in which a 24' access easement was established in the possibility that the sliver lot was ever sold off from the larger parcel.

With the future sale of the property from the Economic Development Foundation of the City of Corinth to a private developer, it is necessary to abandon this easement to remove the unnecessary encumbrance.

Financial Impact

None

Staff Recommendation/Motion

Recommend approval of abandoning the 24' Access Easement identified on Instrument 2021-456, and cause the recording of said documents in the Denton County Records.

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF CORINTH, TEXAS ABANDONING A 24’ ACCESS EASEMENT RECORDED IN THE DENTON COUNTY LAND RECORDS INSTRUMENT 2021-456, AND MORE SPECIFICALLY DESCRIBED IN EXHIBIT “A” HERETO; PROVIDING FOR THE INCORPORATION OF PREMISES; PROVIDING FOR THE FURNISHING OF A CERTIFIED COPY OF THIS ORDINANCE FOR RECORDING IN THE REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS, TO SERVE AS A QUITCLAIM DEED AND AUTHORIZING THE CITY MANAGER TO EXECUTE ALL DOCUMENTS NECESSARY TO EFFECT THE ABANDONMENT OF THE EASEMENT; PROVIDING FOR THE INDEMNIFICATION OF THE CITY OF CORINTH AGAINST DAMAGES ARISING OUT OF THE ABANDONMENT; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, the City of Corinth is a home rule municipality and pursuant to its Charter and state law, the City is authorized to own property and sell property and to divest itself of any and all interests in property, including without limitation its interest in easements granted to the City for public purposes; and

WHEREAS, The Economic Development Foundation of the City of Corinth is the owner of an approximate 6.504 acre tract of land situated in the J.P. Walton Survey, Abstract 1389, City of Corinth, Denton County, Texas, as depicted in a Final Plat instrument Number 2021-456 (the “Property”); and

WHEREAS, The Economic Development Foundation of the City of Corinth (the “Property Owner”) intends to sell the subject Property and the purchaser has requested that the City abandon a certain 24’ Access Easement on the Property that was previously granted to the City of Corinth and that is recorded in the **Denton County Land Records at Instrument 2021-456**, and more specifically described in **Exhibit “A”**, a copy of which is attached hereto and incorporated herein, (the “Access Easement” or “Easement”); and

WHEREAS, the City Council has determined that no public infrastructure is located within the Easement, and that the Easement as located upon the Property is not necessary for future use by the City for the location of public infrastructure, and thus the City Council finds that abandonment of the Easement as requested by the Property Owner is appropriate; and

WHEREAS, the City Council has determined it appropriate to adopt this Ordinance abandoning and quitclaiming to the Property Owner any and all interest in the Easement described in **Exhibit “A”** hereto;

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CORINTH, TEXAS:

SECTION 1.

That the foregoing recitals are findings of the Corinth City Council and are incorporated into this Ordinance as if written word for word.

SECTION 2.

That the City of Corinth hereby abandons the 24' Access Easement as more specifically described in **Exhibit "A"** hereto and filed in the **Denton County Land Records at instrument 2021-456**, a copy of the recorded Easement document being attached hereto and included as part of **Exhibit "A"** and the City does hereby quitclaim in favor of Property Owner The Economic Development Foundation of the City of Corinth, such Access Easement.

SECTION 3.

That the Access Easement is abandoned, vacated, and closed, insofar as the right title and interest of the public to such easement are concerned. That the City of Corinth does not abandon any other interest other than that described in **Exhibit "A"**, but does hereby abandon all of its right, title and interest in and to that certain Easement described in **Exhibit "A"**, together with any and all improvements thereon.

SECTION 4.

That upon passage hereof, the City Secretary is authorized and directed to prepare a certified copy of this ordinance and furnish the same to The Economic Development Foundation of the City of Corinth, and the recording of this abandonment ordinance in the real property records of Denton County, Texas shall serve as the quitclaim deed of the City of Corinth, Texas to The Economic Development Foundation of the City of Corinth of all right, title, or interest of the City of Corinth in and to the Easement described in **Exhibit "A"**. The City Manager is further authorized to execute any additional documents necessary to effect the abandonment of the Easement.

SECTION 5.

As a condition of this abandonment and as a part of the consideration for the quitclaim to Grantee herein, Grantee agrees to indemnify, defend, release and hold the City of Corinth whole and harmless against any and all claims for damages, costs or expenses to persons or property that may arise out of or be occasioned by or from, the abandonment, closing, vacation, and quitclaim by the City of Corinth of the Easement described in **Exhibit "A"** and the Grantee hereby agrees to defend any and all suits, claims, or causes, of action brought against the City on account of the same, and to discharge any judgment or judgments that may be rendered against the City of Corinth in connection therewith.

SECTION 6.

This Ordinance shall take effect from and after its adoption.

DULY PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF CORINTH, TEXAS on this _____ day of _____, 2023.

APPROVED:

Bill Heidemann, Mayor

ATTEST:

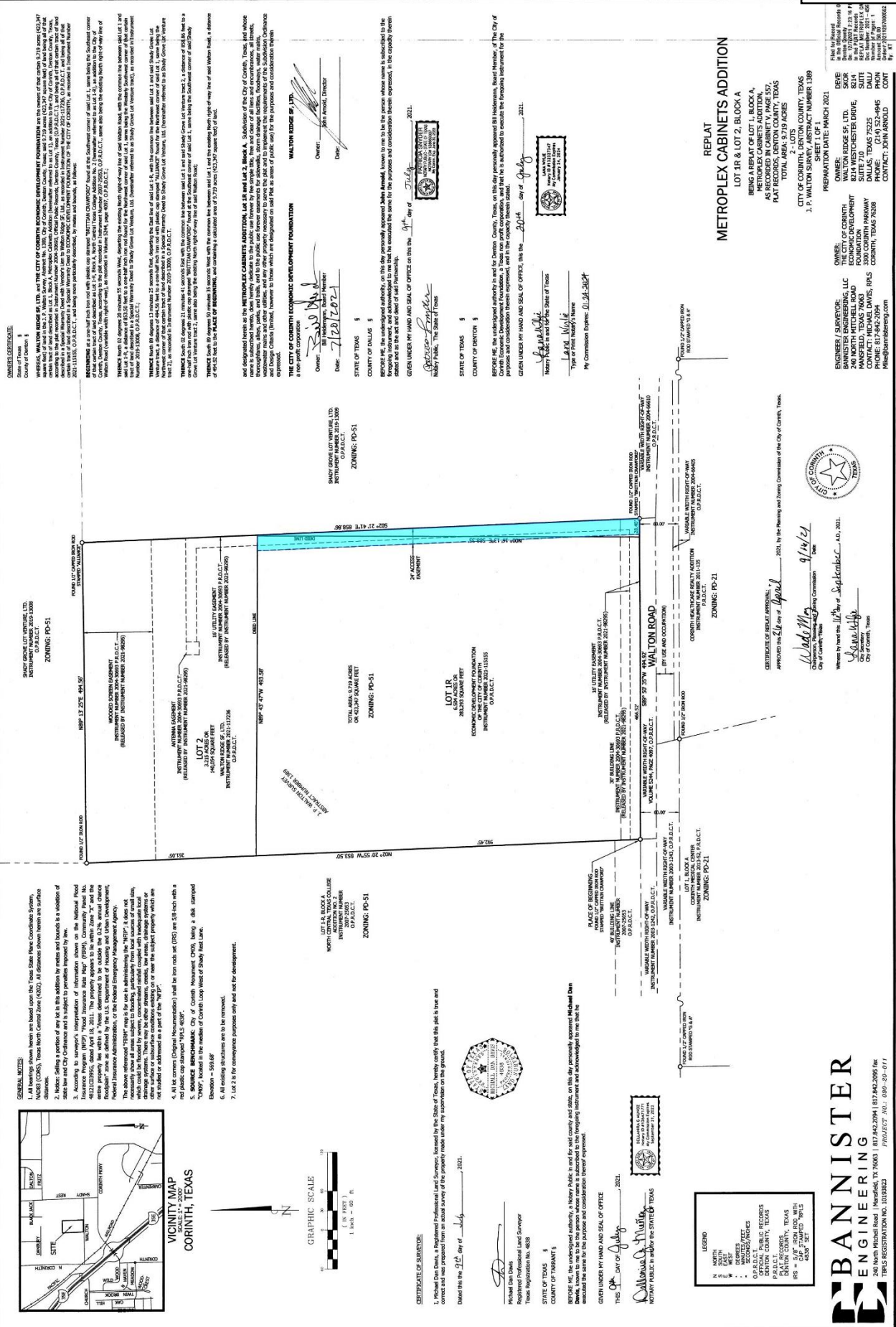
Lana Wylie, City Secretary

APPROVED AS TO FORM:

Patricia A. Adams, City Attorney

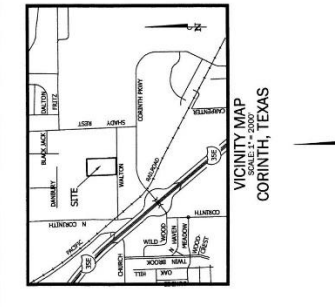
EXHIBIT “A”

Section H, Item 5.



GENERAL NOTES:

- All bearings shown herein are based upon the Texas State Plane Coordinate System, (NAD 83), Texas North Central Zone (4527). All distances shown herein are surface distances.
- Notice: Selling a portion of any lot in the addition by metes and bounds is a violation of state law and City Ordinance and is subject to penalties imposed by law.
- According to surveyor's interpretation of information shown on the National Flood Insurance Map (NFIRM) for the City of Corinth, Texas, the subject property is in a Special Flood Hazard Area (SFHA) of 0.2% annual chance flood. The subject property is also in a Special Flood Hazard Area (SFHA) of 1% annual chance flood. The subject property is also in a Special Flood Hazard Area (SFHA) of 1% annual chance flood. The subject property is also in a Special Flood Hazard Area (SFHA) of 1% annual chance flood.
- All lot corners (Original Monumentation) shall be iron rods set (RIS) are 18" high with a red plastic cap stamped "HLS 6818".
- SOURCE BENCHMARK:** City of Corinth Monument CH09, being a disk stamped "CH09", located in the median of Corinth Loop West of Shady Rest Lane. Elevation = 556.68'
- All existing structures are to be removed.
- Lot 2 is for convenience purposes only and not for development.



LEGEND

- 1. NORTH
- 2. SOUTH
- 3. WEST
- 4. EAST
- 5. UNDEVELOPED AREAS
- 6. METES AND BOUNDS
- 7. EASEMENTS
- 8. PUBLIC RECORDS
- 9. PUBLIC CORNERS
- 10. DENON COUNTY, TEXAS
- 11. IRS - CIP STAMPED "HLS 4828" 2017

CERTIFICATE OF SURVEY

I, Michael Dan Davis, a Registered Professional Land Surveyor, licensed by the State of Texas, hereby certify that this plat is true and correct and was prepared from an actual survey of the property made under my supervision on the ground.

Dated this 21st day of July, 2021.

Michael Dan Davis
Registered Professional Land Surveyor
Texas Registration No. 4828

STATE OF TEXAS
COUNTY OF DENON

BEFORE ME, the undersigned authority, a Notary Public in and for said county and state, on this day personally appeared Michael Dan Davis and acknowledged to me that he executed the foregoing instrument and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

Given Under My Hand and Seal of Office this 21st day of July, 2021.

Notary Public in and for the State of Texas

STATE OF TEXAS
COUNTY OF DENON

BEFORE ME, the undersigned authority, a Notary Public in and for said county and state, on this day personally appeared Bill Holdeman, Board Member of The City of Corinth Economic Development Foundation, a Texas non profit corporation, and that he is authorized to execute the foregoing instrument for the purposes and consideration therein expressed, and in the consideration stated and in the act and deed of said Partnership.

Given Under My Hand and Seal of Office this 21st day of July, 2021.

Notary Public in and for the State of Texas

STATE OF TEXAS
COUNTY OF DENON

BEFORE ME, the undersigned authority, a Notary Public in and for said county and state, on this day personally appeared Bill Holdeman, Board Member of The City of Corinth Economic Development Foundation, a Texas non profit corporation, and that he is authorized to execute the foregoing instrument for the purposes and consideration therein expressed, and in the consideration stated and in the act and deed of said Partnership.

Given Under My Hand and Seal of Office this 21st day of July, 2021.

Notary Public in and for the State of Texas

STATE OF TEXAS
COUNTY OF DENON

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Notary Public in and for the State of Texas

STATE OF TEXAS
COUNTY OF DENON

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STATE OF TEXAS
COUNTY OF DENON

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Notary Public in and for the State of Texas

STATE OF TEXAS
COUNTY OF DENON

BEFORE ME, the undersigned authority, a Notary Public in and for said county and state, on this day personally appeared Bill Holdeman, Board Member of The City of Corinth Economic Development Foundation, a Texas non profit corporation, and that he is authorized to execute the foregoing instrument for the purposes and consideration therein expressed, and in the consideration stated and in the act and deed of said Partnership.

Given Under My Hand and Seal of Office this 21st day of July, 2021.

Notary Public in and for the State of Texas

REPLAT
METROPLEX CABINETS ADDITION
LOT 1B & LOT 2, BLOCK A
BEING A REPLAT OF LOT 1, BLOCK A
AS RECORDED IN CABINET V, PAGE 557,
PLAT RECORDS, DENON COUNTY, TEXAS
TOTAL ACRES
2. - LOTS

CITY OF CORINTH, DENON COUNTY, TEXAS
J. P. WALTON SURVEY, INSTRUMENT NUMBER 1389

PREPARATION DATE: MARCH 2021

OWNER:
WALTON SURVEY, LTD.
1000 WEST 103RD W
DALLAS, TEXAS 75225

ENGINEER/SURVEYOR:
BANNISTER ENGINEERING, LLC
1000 WEST 103RD W
DALLAS, TEXAS 75225

CONTRACT: MICHAEL DAVIS, RPLS
CORINTH, TEXAS 75024

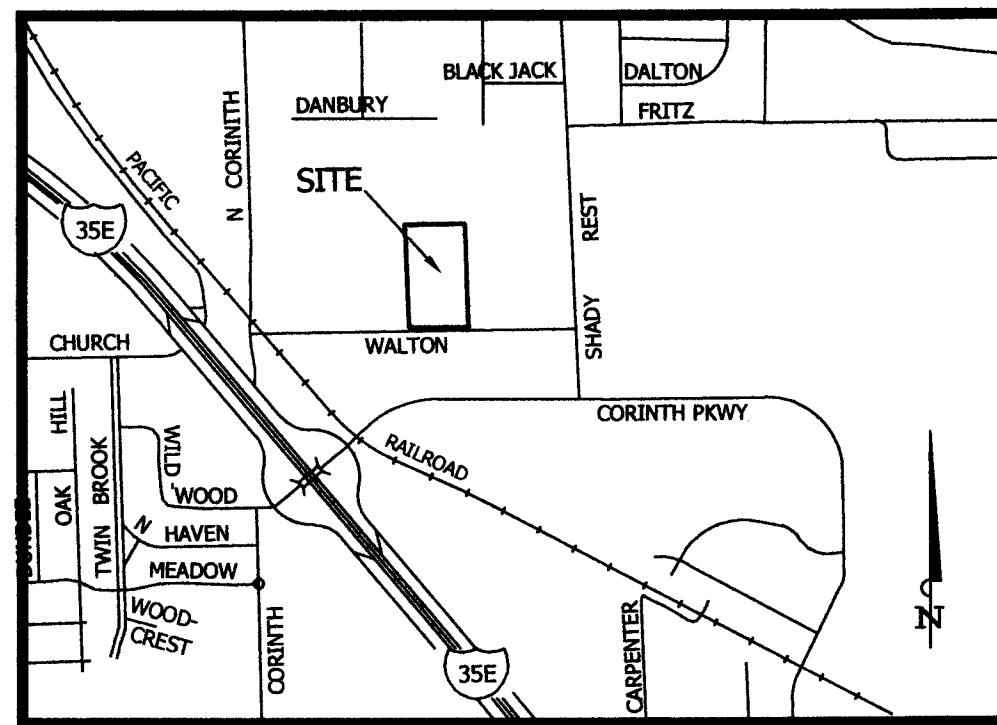
CONVEY: JOHN VERBOLD
CORINTH, TEXAS 75024

ENGINEER/SURVEYOR:
BANNISTER ENGINEERING, LLC
1000 WEST 103RD W
DALLAS, TEXAS 75225

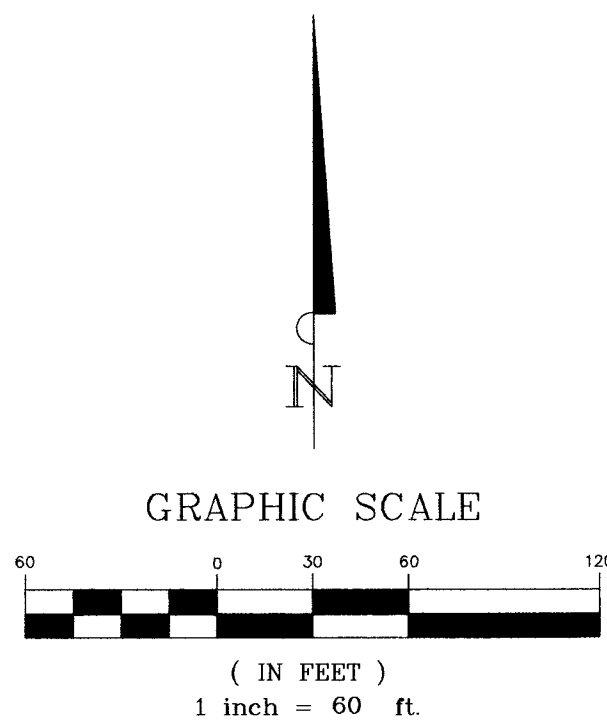
CONTRACT: MICHAEL DAVIS, RPLS
CORINTH, TEXAS 75024

CONVEY: JOHN VERBOLD
CORINTH, TEXAS 75024

BANNISTER ENGINEERING
1000 WEST 103RD W
DALLAS, TEXAS 75225
PHONE: 817-662-2094
FAX: 817-662-2094
PROJECT NO.: 699-201-071
TXRS REGISTRATION NO. 1039323



VICINITY MAP
SCALE: 1" = 2000'
CORINTH, TEXAS



GENERAL NOTES:

- All bearings shown herein are based upon the Texas State Plane Coordinate System, NAD83 (CORS), Texas North Central Zone (4202). All distances shown herein are surface distances.
 - Notice: Selling a portion of any lot in this addition by metes and bounds is a violation of state law and City Ordinance and is subject to penalties imposed by law.
 - According to surveyor's interpretation of information shown on the National Flood Insurance Program (NFIP) "Flood Insurance Rate Map" (FIRM), Community Panel No. 48121C0395G, dated April 18, 2011. The property appears to lie within Zone "X" and the entire property lies within a "Areas determined to be outside the 0.2% annual chance floodplain" zone as defined by the U.S. Department of Housing and Urban Development, Federal Insurance Administration, or the Federal Emergency Management Agency.
- The above referenced "FIRM" map is for use in administering the "NFIP"; it does not necessarily show all areas subject to flooding, particularly from local sources of small size, which could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. There may be other streams, creeks, low areas, drainage systems or other surface or subsurface conditions existing on or near the subject property which are not studied or addressed as a part of the "NFIP".
- All lot corners (Original Monumentation) shall be iron rods set (IRS) are 5/8-inch with a red plastic cap stamped "RPLS 4838".
 - SOURCE BENCHMARK:** City of Corinth Monument CM09, being a disk stamped "CM09", located in the median of Corinth Loop West of Shady Rest Lane.
Elevation = 569.68'
 - All existing structures are to be removed.
 - Lot 2 is for conveyance purposes only and not for development.

LOT 1-R, BLOCK A
NORTH CENTRAL TEXAS COLLEGE
ADDITION NO. 2
INSTRUMENT NUMBER
2007-25053
O.P.R.D.C.T.
ZONING: PD-51

LOT 2
3.215 ACRES OR
140,054 SQUARE FEET
WALTON RIDGE SF, LTD.
INSTRUMENT NUMBER 2021-117236
O.P.R.D.C.T.

TOTAL AREA: 9.719 ACRES
OR 423,347 SQUARE FEET
ZONING: PD-51

LOT 1R
6.504 ACRES OR
283,293 SQUARE FEET
ECONOMIC DEVELOPMENT FOUNDATION
OF THE CITY OF CORINTH
INSTRUMENT NUMBER 2021-115155
O.P.R.D.C.T.

SHADY GROVE LOT VENTURE, LTD.
INSTRUMENT NUMBER 2019-13008
O.P.R.D.C.T.

ZONING: PD-51

OWNER'S CERTIFICATE:

State of Texas §
County of Denton §

WHEREAS, WALTON RIDGE SF, LTD. and THE CITY OF CORINTH ECONOMIC DEVELOPMENT FOUNDATION are the owners of that certain 9.719 acres (423,347 square feet) of land in the J. P. Walton Survey, Abstract No. 1389, City of Corinth, Denton County, Texas; said 9.719 acres (423,347 square feet) of land being all of that certain tract of land described as Lot 1, Block A, Metroplex Cabinets Addition (hereinafter referred to as Lot 1), an addition to the City of Corinth, Denton County, Texas, according to the plat recorded in Instrument Number 2004-30693, O.P.R.D.C.T., and being all of that certain tract of land described in a Special Warranty Deed with Vendor's Lien to Walton Ridge SF, Ltd., as recorded in Instrument Number 2021-117236, O.P.R.D.C.T. and being all of that certain tract of land described in a Special Warranty Deed to ECONOMIC DEVELOPMENT FOUNDATION OF THE CITY OF CORINTH, as recorded in Instrument Number 2021-115155, O.P.R.D.C.T., and being more particularly described, by metes and bounds, as follows:

BEGINNING at a one-half inch iron rod with plastic cap stamped "BRITTIAN CRAWFORD" found at the Southwest corner of said Lot 1, same being the Southeast corner of that certain tract of land described as Lot 1-R, Block A, North Central Texas College Addition No. 2 (hereinafter referred to as Lot 1-R), an addition to the City of Corinth, Denton County, Texas, according to the plat recorded in Instrument Number 2007-25053, O.P.R.D.C.T., and being all of that certain tract of land described in a Special Warranty Deed to Shady Grove Lot Venture, Ltd. (hereinafter referred to as Shady Grove Lot Venture tract), as recorded in Instrument Number 2019-13008, O.P.R.D.C.T.;

THENCE North 02 degrees 20 minutes 55 seconds West, departing the existing North right-of-way line of said Walton Road, with the common line between said Lot 1 and said Lot 1-R, a distance of 853.50 feet to a one-half inch iron rod found for the Northwest corner of said Lot 1, same being the Westery Southwest corner of that certain tract of land described in a Special Warranty Deed to Shady Grove Lot Venture, Ltd. (hereinafter referred to as Shady Grove Lot Venture tract), as recorded in Instrument Number 2019-13008, O.P.R.D.C.T.;

THENCE North 89 degrees 13 minutes 25 seconds East, departing the East line of said Lot 1-R, with the common line between said Lot 1 and said Shady Grove Lot Venture tract, a distance of 494.56 feet to a one-half inch iron rod with plastic cap stamped "ALLIANCE" found for the Northeast corner of said Lot 1, same being the Northwest corner of that certain tract of land described in a Special Warranty Deed to Shady Grove Lot Venture, Ltd. (hereinafter referred to as Shady Grove Lot Venture tract 2), as recorded in Instrument Number 2019-13009, O.P.R.D.C.T.

THENCE South 02 degrees 21 minutes 41 seconds East with the common line between said Lot 1 and said Shady Grove Lot Venture tract 2, a distance of 858.86 feet to a one-half inch iron rod with plastic cap stamped "BRITTIAN CRAWFORD" found at the Southeast corner of said Lot 1, same being the Southwest corner of said Shady Grove Lot Venture tract 2, same also being the existing North right-of-way line of said Walton Road;

THENCE South 89 degrees 50 minutes 35 seconds West with the common line between said Lot 1 and the existing North right-of-way line of said Walton Road, a distance of 494.92 feet to the **PLACE OF BEGINNING**, and containing a calculated area of 9.719 acres (423,347 square feet) of land.

and designated herein as the **METROPLEX CABINETS ADDITION, Lot 1R and Lot 2, Block A**, Subdivision of the City of Corinth, Texas, and whose name is subscribed hereto, does hereby dedicate to the public use forever by fee simple title, free and clear of all liens and encumbrances, all streets, thoroughfares, alleys, parks, and trails, and to the public use forever easements for sidewalks, storm drainage facilities, floodways, water mains, wastewater mains and other utilities, and any other property necessary to serve the plat and to implement the requirements of the Subdivision Ordinance and Design Criteria (limited, however to those which are designated on said Plat as areas of public use) for the purposes and consideration therein expressed.

THE CITY OF CORINTH ECONOMIC DEVELOPMENT FOUNDATION
a non-profit corporation

WALTON RIDGE SF, LTD.

Owner: Bill Heidemann, Board Member
Date: 7/20/2021

Owner: John Arnold, Director
Date: _____

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared **John Arnold**, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed, in the capacity therein stated and as the act and deed of said Partnership.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this the 9th day of July, 2021.

Patricia Snyder
Notary Public, The State of Texas

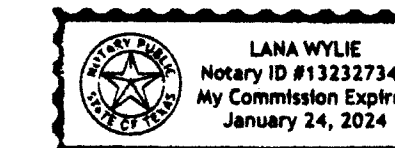


STATE OF TEXAS §
COUNTY OF DENTON §

BEFORE ME, the undersigned authority in and for Denton County, Texas, on this day personally appeared **Bill Heidemann**, Board Member, of The City of Corinth Economic Development Foundation, a Texas non profit corporation, and that he is authorized to execute the foregoing instrument for the purposes and consideration therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 20th day of July, 2021.

Lana Wylie
Notary Public in and for the State of Texas



Lana Wylie
Type or Print Notary's Name
My Commission Expires: 01-24-2024

CERTIFICATE OF SURVEYOR:

I, Michael Dan Davis, a Registered Professional Land Surveyor, licensed by the State of Texas, hereby certify that this plat is true and correct and was prepared from an actual survey of the property made under my supervision on the ground.

Dated this 9th day of July, 2021.

Michael Dan Davis
Registered Professional Land Surveyor
Texas Registration No. 4838



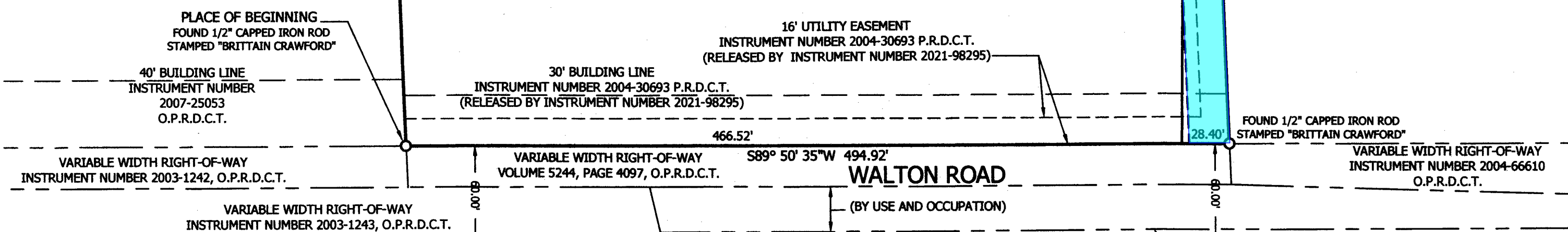
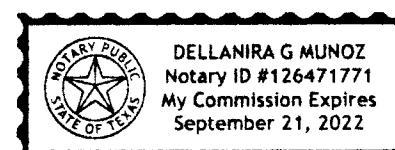
STATE OF TEXAS §
COUNTY OF TARRANT §

BEFORE ME, the undersigned authority, a Notary Public in and for said county and state, on this day personally appeared **Michael Dan Davis**, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purpose and consideration thereof expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE

THIS 9th DAY OF July, 2021.

Dellanra G Munoz
NOTARY PUBLIC in and for the STATE OF TEXAS



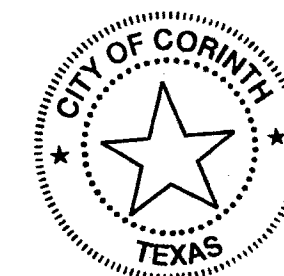
CERTIFICATE OF REPLAT APPROVAL:

APPROVED this 26th day of April, 2021, by the Planning and Zoning Commission of the City of Corinth, Texas.

Wade May 9/16/21
Chairperson, Planning and Zoning Commission Date
City of Corinth, Texas

Witness by hand this 16th day of September, A.D., 2021.

Lana Wylie
City Secretary
City of Corinth, Texas



REPLAT
METROPLEX CABINETS ADDITION

LOT 1R & LOT 2, BLOCK A

BEING A REPLAT OF LOT 1, BLOCK A,
METROPLEX CABINETS ADDITION,
AS RECORDED IN CABINET V, PAGE 557,
PLAT RECORDS, DENTON COUNTY, TEXAS
TOTAL AREA: 9.719 ACRES
2 - LOTS

CITY OF CORINTH, DENTON COUNTY, TEXAS
J. P. WALTON SURVEY, ABSTRACT NUMBER 1389

SHEET 1 OF 1
PREPARATION DATE: MARCH 2021

ENGINEER / SURVEYOR:
BANNISTER ENGINEERING, LLC
240 NORTH MITCHELL ROAD
MANSFIELD, TEXAS 76063
CONTACT: MICHAEL DAVIS, RPLS
PHONE: 817-842-2094
Mike@bannistereng.com

OWNER:
THE CITY OF CORINTH
ECONOMIC DEVELOPMENT
FOUNDATION
3300 CORINTH PARKWAY
CORINTH, TEXAS 76208

OWNER:
WALTON RIDGE SF, LTD.
8214 WESTCHESTER DRIVE,
SUITE 710
DALLAS, TEXAS 75225
PHONE: (214) 522-4945
CONTACT: JOHN ARNOLD

DEVE
SKOR
8214
SUITE
DALL
PHON
CONT

Filed for Record
in the Official Records Of:
Denton County
On: 12/7/2021 2:23:16 PM
in the PLAT RECORDS
REPLAT METROPLEX CABINETS
Doc Number: 2021-456
Number of Pages: 1
Amount: \$0.00
Order#: 20211207000562
By: KT



CITY OF CORINTH
Staff Report

Meeting Date:	4/6/2023	Title: CA-Water Sewer Easement Abandonment
Ends:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development	
Governance Focus:	<i>Focus:</i> <input checked="" type="checkbox"/> Owner <input type="checkbox"/> Customer <input type="checkbox"/> Stakeholder	
	<i>Decision:</i> <input type="checkbox"/> Governance Policy <input checked="" type="checkbox"/> Ministerial Function	
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission Click to enter recommendation/decision of supporting group.	

Item/Caption

Consider approval of abandoning a Water/Sewer Easement, as dedicated on Instrument Number 1972-11587, in relation to the future development of a property owned by the Economic Development Foundation of the City of Corinth.

Item Summary/Background/Prior Action

In 2021 The Economic Development Foundation of the City of Corinth purchased a parcel indicated in Instrument 2021-115155.

In 1972 a blanket easement for water and sewer was dedicated to the City of Corinth as indicated in instrument 1972-11587.

With the future sale of the property from the Economic Development Foundation of the City of Corinth to a private developer, it is necessary to abandon this easement to remove the unnecessary encumbrance.

Financial Impact

None

Staff Recommendation/Motion

Recommend approval of abandoning the a Water/Sewer Easement, as dedicated on Instrument Number 1972-11587, and cause the recording of said documents in the Denton County Records.

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF CORINTH, TEXAS ABANDONING A WATER/SEWER EASEMENT RECORDED IN THE DENTON COUNTY LAND RECORDS INSTRUMENT 1972-11587, AND MORE SPECIFICALLY DESCRIBED IN EXHIBIT “A” HERETO; PROVIDING FOR THE INCORPORATION OF PREMISES; PROVIDING FOR EASEMENT ABANDONMENT, AUTHORIZATION OF RECORDATION AND FURTHER AUTHORIZING THE CITY MANAGER TO EXECUTE ALL DOCUMENTS NECESSARY TO EFFECT THE ABANDONMENT OF THE EASEMENT; PROVIDING A CUMULATIVE REPEALER, PROVIDING SEVERABILITY; PROVIDING A SAVINGS/CONFLICT CLAUSE; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, the City of Corinth is a home rule municipality and pursuant to its Charter and state law, the City is authorized to own property and sell property and to divest itself of any and all interests in property, including without limitation its interest in easements granted to the City for public purposes upon determination by the City Council that the property or interest therein is no longer required for public use or purpose; and

WHEREAS, the Economic Development Foundation of the City of Corinth (“Property Owner”) is the owner of an approximate 6.504 acre tract of land situated in the J.P. Walton Survey, Abstract 1389, City of Corinth, Denton County, Texas, as depicted in a Final Plat, instrument Number 2021-456 (the “Property”); and

WHEREAS, burdening the Property is an easement and right-of-way conveyed to the City for the construction and maintenance of a water/sewer system, authorizing the City to construct, operate and maintain public infrastructure upon the Property, and providing a construction easement, along with right of ingress and egress over adjacent property to access the easement and right of way granted, such easement and right of way are more particularly described at Instrument 1972-11587 of the Denton County Land Records, a copy of which is attached hereto and incorporated herein as Exhibit “A”, (the “Water/Sewer Easement” or “Easement”); and

WHEREAS, the Property Owner intends to sell the Property, and the purchaser of the Property has requested that the City abandon the Water/Sewer Easement on the Property previously granted to the City of Corinth for public use; and

WHEREAS, the City Council has determined that no public infrastructure is located within the Easement, and that the Easement as located upon the Property is not necessary for future use by the City for the location of public infrastructure, and thus the City Council finds that the Easement does not serve a public purpose and abandonment of the Easement as requested by the Property Owner is appropriate; and

WHEREAS, in order to effect the abandonment, the City Council has determined it appropriate to adopt this Ordinance abandoning any and all interest in the Easement described in **Exhibit “A”** hereto;

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CORINTH, TEXAS:

**SECTION 1.
INCORPORATION OF PREMISES**

The foregoing recitals are findings of the Corinth City Council and are incorporated into this Ordinance as if written word for word.

**SECTION 2.
EASEMENT ABANDONMENT AND RECORDATION AUTHORIZED**

2.01. Easement Abandoned. The City of Corinth hereby finds that the Water/Sewer Easement described in Exhibit “A” hereto serves no public purpose, contains no public infrastructure, and will not be necessary for future construction of public infrastructure; therefore, the City hereby abandons all rights and interests in the Easement, including all rights to ingress and egress, use and maintenance as specifically identified in **Exhibit “A”** attached hereto and incorporated herein. ,

2.02. Recordation Authorized. The City Council directs that a certified copy of this Ordinance be filed in the Denton County Land Records to identify the abandonment of the Water/Sewer Easement (Instrument 1972-11587) and authorizes the City Manager or his designee to execute any necessary documents to fully effect the abandonment of the Easement and filing of documents in the Denton County land records.

SECTION 3
CUMULATIVE REPEALER

This Ordinance shall be cumulative of all other Ordinances of the City of Corinth and shall not repeal any of the provisions of such Ordinances except for those instances where there are direct conflicts with the provisions of this Ordinance or where expressly repealed hereby. Ordinances or parts thereof in force at the time this Ordinance shall take effect and that are inconsistent with this Ordinance are hereby repealed to the extent that they are inconsistent with this Ordinance.

SECTION 4
SEVERABILITY

If any section, subsection, clause, phrase, or provision of this Ordinance, or the application thereof to any person or circumstance, shall to any extent be held by a court of competent jurisdiction to be invalid, void, or unconstitutional, the remaining sections, subsections, clauses, phrases, and provisions of this Ordinance, or the application thereof to any person or circumstance, shall remain in full force and effect and shall in no way be affected, impaired or invalidated.

SECTION 5
SAVINGS/CONFLICT

In the event of a conflict between the provisions of this Ordinance and any other regulation or rule prescribed by charter, another ordinance, resolution or other authorization of the City, the provisions of this ordinance shall control. Notwithstanding the foregoing, all rights and remedies of the City are expressly saved as to any and all complaints, actions, claims, or lawsuits, which have been initiated or have arisen

under or pursuant to such conflicting Ordinance, or portion thereof, on the date of adoption of this Ordinance shall continue to be governed by the provisions of that Ordinance and for that purpose the conflicting Ordinance shall remain in full force and effect.

**SECTION 6.
EFFECTIVE DATE**

This Ordinance shall take effect from and after its adoption in accordance with the law.

DULY PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF CORINTH, TEXAS on this _____ day of _____, 2023.

APPROVED:

Bill Heidemann, Mayor

ATTEST:

Lana Wylie, City Secretary

APPROVED AS TO FORM:

Patricia A. Adams, City Attorney

EXHIBIT “A”

Section H, Item 6.

THE STATE OF TEXAS

COUNTY OF Denton

KNOW ALL MEN BY THESE PRESENTS:

That Iranis and wife, Oleta Ford 11587

of the County of Denton, State of Texas, hereinafter called "Grantor", for a good and valuable consideration, the receipt of which is hereby acknowledged, does hereby grant to the City of Spurlock, hereinafter called "City", an easement and right-of-way for the purpose of constructing a water/sewer line, the term of such easement to end when the City of Spurlock accepts the entire water/sewer system when construction of same is completed; and Grantor does also grant to said City a perpetual easement and right-of-way for the purpose of operating and maintaining such water/sewer line; easements and rights-of-way over and across Grantor's land in (Denton) G.P. Walton Survey, Abstract No. 1389, Denton County, Texas, more particularly described in deed from E.A. Garrison to Oleta Ford's,

dated _____, 19____, and recorded in Volume 218, Page 166, of the Deed Records of said County and containing 77 acres.

The Construction Easement being a strip of land across the tract referred to above, twenty-five (25) feet in width, with the Grantee herein being hereby authorized to designate the course of the easement herein conveyed. When the pipe line is installed, the Operation and Maintenance Easement herein granted shall be limited to a strip of land ten (10) feet in width, with the center line thereof being the pipe line as installed.

Together with the right of ingress and egress over Grantor's adjacent lands to or from said right-of-way for the purpose of constructing, improving, reconstructing, repairing, inspecting, maintaining and removing said water/sewer line and appurtenances; the right to relocate said line in the same relative position to any adjacent road, if same is widened in the future; the right to prevent possible interference with the operation of said line and to remove possible hazard thereto; the right to prevent the construction, for a distance of one-half the width of the easement on each side of the actual center of where said water/sewer line is laid, of any building, structures or other obstructions which may endanger or interfere with the efficiency, safety or convenient operation of said water/sewer line and its appurtenances. If such buildings, structures or other obstructions are constructed by Grantor, as above mentioned, without written consent of the City, the City shall have the right to remove same from such space, and this agreement, together with other provisions of this grant shall constitute a covenant running with the land for the benefit of the City, its successors and assigns.

The right is reserved to Grantor to use the land over which a right-of-way or easement is herein granted, provided such use shall not include any use which might interfere with the exercise by the City of the rights hereby granted. The consideration recited herein shall constitute payment in full for all damages sustained by Grantor by reason of the installation of the structures referred to herein and the Grantee will maintain such easement in a state of good repair and efficiency so that no unreasonable damages will result from its use to Grantor's premises.

VOL 650 PAGE 287

TO HAVE AND TO HOLD the above described easement and rights unto the said City of Spartan, its successors and assigns, forever.

And Grantor does hereby bind himself, his heirs and legal representatives, to Warrant and Forever Defend all and singular the above described easement and rights unto the Said City, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof.

EXECUTED THIS 6th day of December, 19 71.

J. J. Ford
Oleta Ford

(JOINT ACKNOWLEDGMENT)

THE STATE OF TEXAS }
COUNTY OF }

Before me, the undersigned authority, on this day personally appeared Travis Ford and Oleta Ford his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument, and acknowledged to me that they each executed the same for the purposes and consideration therein expressed. And the said Oleta Ford wife of said Travis Ford having been examined by me privily and apart from her husband, and having the same by me fully explained to her, she, the said Oleta Ford acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

Given under my hand and seal of office on this the 6th day of December, A. D. 19 71



Janette Corn
Notary Public in and for Denton County, Texas.

FILED FOR RECORD: 11th DAY OF July A.D. 1972 at 9:02 o'clock P. M.
RECORDED: 19th DAY OF July A.D. 1972 at 9:37 o'clock A. M.
BY _____ DEPUTY THETA PARKER, COUNTY CLERK
DENTON COUNTY, TEXAS

THE STATE OF TEXAS

Section H, Item 6.

COUNTY OF Denton

KNOW ALL MEN BY THESE PRESENTS:

That Iranis and wife, Oleta Ford

11587

of the County of Denton, State of Texas, hereinafter called "Grantor", for a good and valuable consideration, the receipt of which is hereby acknowledged, does hereby grant to the City of Spurlock, hereinafter called "City", an easement and right-of-way for the purpose of constructing a water/sewer line, the term of such easement to end when the City of Spurlock accepts the entire water/sewer system when construction of same is completed; and Grantor does also grant to said City a perpetual easement and right-of-way for the purpose of operating and maintaining such water/sewer line; easements and rights-of-way over and across Grantor's land in (Denton) D.P. Walton Survey, Abstract No. 1389, Denton County, Texas, more particularly described in deed from E.A. Harrison to Oleta Ford,

dated _____, 19____, and recorded in Volume 2181, Page 166, of the Deed Records of said County and containing 77 acres.

The Construction Easement being a strip of land across the tract referred to above, twenty-five (25) feet in width, with the Grantee herein being hereby authorized to designate the course of the easement herein conveyed. When the pipe line is installed, the Operation and Maintenance Easement herein granted shall be limited to a strip of land ten (10) feet in width, with the center line thereof being the pipe line as installed.

Together with the right of ingress and egress over Grantor's adjacent lands to or from said right-of-way for the purpose of constructing, improving, reconstructing, repairing, inspecting, maintaining and removing said water/sewer line and appurtenances; the right to relocate said line in the same relative position to any adjacent road, if same is widened in the future; the right to prevent possible interference with the operation of said line and to remove possible hazard thereto; the right to prevent the construction, for a distance of one-half the width of the easement on each side of the actual center of where said water/sewer line is laid, of any building, structures or other obstructions which may endanger or interfere with the efficiency, safety or convenient operation of said water/sewer line and its appurtenances. If such buildings, structures or other obstructions are constructed by Grantor, as above mentioned, without written consent of the City, the City shall have the right to remove same from such space, and this agreement, together with other provisions of this grant shall constitute a covenant running with the land for the benefit of the City, its successors and assigns.

The right is reserved to Grantor to use the land over which a right-of-way or easement is herein granted, provided such use shall not include any use which might interfere with the exercise by the City of the rights hereby granted. The consideration recited herein shall constitute payment in full for all damages sustained by Grantor by reason of the installation of the structures referred to herein and the Grantee will maintain such easement in a state of good repair and efficiency so that no unreasonable damages will result from its use to Grantor's premises.

TO HAVE AND TO HOLD the above described easement and rights unto the said City of Spring, its successors and assigns, forever.

And Grantor does hereby bind himself, his heirs and legal representatives, to Warrant and Forever Defend all and singular the above described easement and rights unto the Said City, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof.

EXECUTED THIS 6th day of December, 19 71.

J. J. Ford

Olita Ford

(JOINT ACKNOWLEDGMENT)

THE STATE OF TEXAS }
COUNTY OF }

Before me, the undersigned authority, on this day personally appeared Travis Ford and Olita Ford his wife, both known to me to be the persons whose names are subscribed to the foregoing instrument, and acknowledged to me that they each executed the same for the purposes and consideration therein expressed. And the said Olita Ford wife of said Travis Ford having been examined by me privily and apart from her husband, and having the same by me fully explained to her, she, the said Olita Ford acknowledged such instrument to be her act and deed, and she declared that she had willingly signed the same for the purposes and consideration therein expressed, and that she did not wish to retract it.

Given under my hand and seal of office on this the 6th day of December, A. D. 19 71



Joannette Corn
Notary Public in and for Denton County, Texas.

FILED FOR RECORD: 11th DAY OF July A.D. 1972 at 9:02 o'clock A. M.
RECORDED: 19th DAY OF July A.D. 1972 at 9:37 o'clock A. M.
BY _____ DEPUTY THETA PARKER, COUNTY CLERK
DENTON COUNTY, TEXAS



CITY OF CORINTH
Staff Report

Meeting Date:	4/6/2023	Title:	Destiny RV Resort Planned Development (PD) Rezoning Request (Case No. ZAPD22-0005)
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development		
Owner Support:	<input checked="" type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission At the February 27, 2023, Regular Session, the Planning & Zoning Commission voted to recommend approval of the request as presented.		

Item/Caption

Conduct a public hearing and act on a request by the Applicant, Homeyer Engineering, Inc., to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, from MX-C Mixed-Use Commercial to a Planned Development with a base zoning district of MX-C Mixed Use Commercial, to accommodate a proposed expansion of the Destiny RV Resort, on approximately ±18.96 acres located at 7100 S I-35E. (Case No. ZAPD22-0005 – Destiny RV)



Location Map - Case No. ZAPD22-0005

Prior Action

At their February 27, 2023, Regular Session, the Planning & Zoning Commission voted to recommend approval of the PD request as presented.

On March 16, 2023, the City Council met in a workshop session at the request of the Applicant to discuss their proposed Planned Development prior to the public hearing.

As a result of the March 16th workshop, the Applicant revised the PD Design Statement to add a provision in the proposed use regulations to set aside five (5) stalls in the expansion area for daily or weekly occupancy to state as follows:

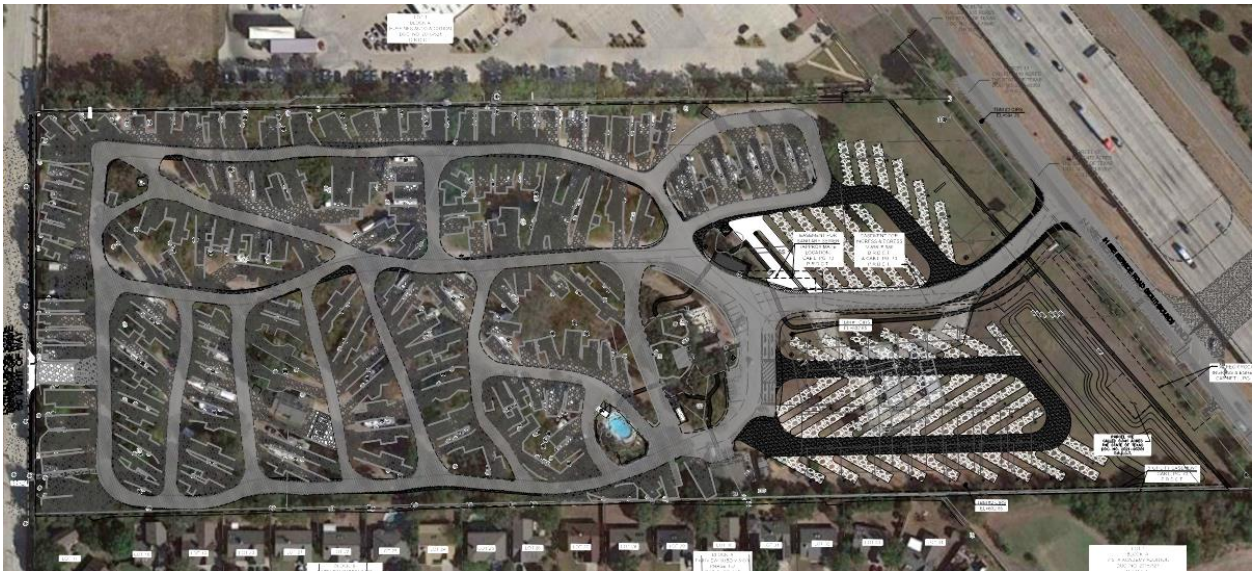
“Within the expanded area of the park, a minimum of five (5) spaces shall be provided for daily or weekly occupancy, not to exceed 30 days.”

In 2014, the owner of the RV Park at that time (not the current owner), submitted a Specific Use Permit (SUP) application to allow the park to add 33 spaces in the northeast section of the property in closer proximity to I-35E. At that time, the Zoning Ordinance permitted RV Parks upon approval of a SUP. That allowance was later removed from the Zoning Ordinance. The plan did not include the removal of the car wash. The City Council unanimously denied the SUP request on November 20, 2014, citing non-conformance with the Comprehensive Plan.

Item Summary/Background

The applicant is requesting the rezoning of approximately ±18.96 acres to a Planned Development (PD) District with a base Zoning District of MX-C Mixed Use Commercial to accommodate a proposed expansion of the existing recreational vehicle (RV) park. The PD rezoning process is the only option to allow the expansion due to the nonconforming status of the RV Park. Should the PD be approved, the property will convert from a nonconforming use to a legal use. Section 2.07.06.A.1.c. of the UDC states, “It is the declared intent of this section that nonconforming uses and structures eventually be eliminated and be required to comply with the regulations of the UDC, having due regard for the property rights of the person affected, the public welfare, and the character of the surrounding area.”

The site was originally developed in 1967 as a KOA Campground and consists of 176 full-service RV sites, an office building, recreation hall, convenience store, fitness center, swimming pool and spa, laundry facilities, and a self-service vehicle wash center. On or before July 1972, the site was zoned C-2 Commercial, and the property became a nonconforming use. In July, 2013 the City initiated Zoning Map changes along I-35E, and the RV Park was one of many parcels that were rezoned to the Mixed Use Commercial (MX-C) District. The RV Park continued to remain as a nonconforming use. The expansion area will be located in the mostly vacant eastern quarter of the property and will include the removal of the existing self-service vehicle wash facility.



Excerpt from Concept Plan Overlay with Aerial Image

The following are key elements of the proposed expansion project:

- Removal of the self-service vehicle wash facility.
- Addition of 52 RV sites, for a total of 228 RV sites.
- All new RV parking lanes will be 14' feet wide with a 10' wide landscaped area between each lane.
- Widening of existing paving at certain location to establish a minimum 20' wide fire lane throughout the existing development and providing a gated emergency access driveway from Tower Ridge Drive on the west side of the property.
- Adding fire hydrants in the existing development.
- Adding a drainage facility on southeast corner of site adjacent to I-35E.

Please refer to Exhibit C - Concept Plan for the graphic layout of the development.

RV Park and Permitted Uses

The current zoning of MX-C Mixed Use Commercial was applied in 2013, when the Unified Development Code (UDC) was adopted. UDC Subsection 2.07.03, Use Chart, currently does not list RV Park as a permitted use within the MX-C zoning district. The Applicant is requesting to remain under the base zoning of MX-C Mixed Use Commercial by adding RV Park to the list of permitted uses in this property. The Applicant is proposing a different definition of "Recreational Vehicle Park" for this Planned Development, which differs from that of the UDC. The existing and proposed definitions are listed below:

Existing Definition – Recreational Vehicle Park: "A parcel of land designed, improved, or intended to be used for short- or long-term occupancy by recreational vehicles (including travel trailers) in designated spaces. Facility may include a residence for the owner/manager of the premises, utility hook-ups, accessory structures, playgrounds and open space areas, fenced yard areas for pets, and other similar amenities."

Proposed Definition – Recreational Vehicle Park: A Recreational Vehicle Park, for this PD, is defined as:

"A parcel of land designed, improved, or intended to be used for short- or long-term occupancy by recreational vehicles (including travel trailers) in designated spaces not to exceed 24 months. Facility may include employee stalls, utility hook-ups, accessory structures, playgrounds and open space areas, fenced yard areas for pets, and other similar amenities."

Maximum Length of Stay

- Maximum stay of 24 months
- Employee-occupied stalls are exempt from maximum stay and there shall be a maximum of one (1) stall per employee
- Once the maximum stay of 24 months is reached, an RV shall leave the RV park for minimum of 30 days, before returning
- Existing recreational vehicles that have been at the site on or before June 30, 2021 may stay indefinitely.
- Those who began their stay on or after July 1, 2021 will be subject to the defined maximum stay, beginning on the date of the adoption of the PD Ordinance.
- Owner/operator of the RV park shall submit a yearly roll reporting compliance of arrival and departures.

Accessory Uses

Prohibited Accessory Uses. The storage or parking of unoccupied recreational vehicles, including water motor craft, will be listed as a prohibited use in the PD. The installation of new permanent and semi-permanent structures other than steps or ramps, such as storage sheds, decks, and carports in both existing and expansion areas will be prohibited.

Permitted Accessory Uses. Repairs and modifications to existing structures in the existing development will be permitted. Additionally, the PD proposes to include the following accessory uses in addition to those listed in the proposed definition of “Recreational Vehicle Park”:

- Office uses for the resort
- Maintenance facilities/structures
- Playgrounds
- Incidental sales of supplies for recreational vehicles and camping activities in the existing office building

Accessory Buildings

Prohibited Accessory Buildings. The installation of new permanent and semi-permanent structures other than steps or ramps, such as storage sheds, decks, and carports in both existing and expansion areas will be prohibited.

Permitted Accessory Buildings. Existing permanent and semi-permanent structures in the development shall be allowed to remain as currently exists. Repairs or modifications to permanent and semi-permanent structures are permitted in the existing development. Additionally, Temporary Vehicle Tents, as generally depicted in Exhibit G – Vehicle Tents, shall be permitted.

Landscaping

The Applicant seeks exemptions from the requirements of UDC Subsection 2.09.01, Landscape Regulations, including the requirement of a landscape edge buffer along Tower Ridge Drive due to the existing fencing/limited area, and the requirement that all landscaping be protected by a concrete curb to maintain a character similar to the existing portion of the development. Alternative landscaping proposed by the Applicant includes the planting of one (1) ornamental or shade tree between each of the new RV stalls, which is an increase from the UDC standard requiring one (1) tree for every 10 spaces.

Additional landscaping not required by the UDC that the Applicant has agreed to provide includes a 20-foot landscape buffer adjacent to residential Lots 32-34 of Block 9 of the Fairview Subdivision. More specific details of the landscape planting schedule are contained in Exhibit E - Conceptual Landscape Plan.

Tree Preservation

The Applicant seeks to be exempt from the mitigation requirements of UDC Subsection 2.09.02, Tree Preservation, for trees in the existing development that need to be removed to provide for a suitable paving width for emergency access, the provision of fire hydrants/waterlines, and utility easements.

Parking

The Applicant is proposing alternative parking standards than those of UDC Subsection 2.09.03, Vehicular Parking Regulations, which require two (2) parking spaces for each recreational vehicle space. The proposed rate one (1) space for each recreational vehicle and supporting documentation from various sources demonstrates that the proposed parking ratio is adequate. Additionally, the Applicant is requesting to be exempt from the requirement that all parking areas be curbed, paved concrete because of the use of the property. The Applicant proposes an alternative standard allowing for gravel to be used as a permitted surface in RV Parking areas, as generally depicted in Exhibit D – Concept Plan.

Signs and Fencing

The Applicant seeks departures and exemptions from UDC Subsection 4.01.15, General Sign Requirements. The proposed PD would increase the maximum allowed height for a monument sign from eight (8) feet to eleven (11) feet and exempt the Applicant from the requirement that signs be framed by a minimum of six (6) inches of masonry material.

The Applicant is requesting to be exempt from multiple provisions of UDC Subsection 4.02, Fence and Screening Regulations, including the requirement to install new masonry screening walls at the site. The site is currently screened by wood fencing on the south, west, and north boundaries. The Applicant incorporated a provision in the PD Design

Statement related to fencing on Tower Ridge Drive: if 50% or more of the existing fence along Tower Ridge Drive needs to be repaired or replaced, the entire fence shall be replaced with a new board-on-board cedar fence with a minimum height of eight (8) feet.

Mobility

The Applicant will construct a five (5) foot wide sidewalk along Tower Ridge Drive, construct a sidewalk along I-35E within the landscape edge buffer, and provide a pedestrian access easement at time of platting.

The Applicant is required to construct a deceleration lane, warranted by the proposed traffic counts. The construction of this deceleration lane will occur when the Texas Department of Transportation project to widen I-35E is completed.

Fire Protection

To provide increased fire protection in the existing development, the Applicant will install water lines to serve new fire hydrants and additional paving in existing drives to maintain a minimum width of 20 feet. The Fire Marshal of the Lake Cities Fire Department has reviewed the proposed Fire Safety improvements.

Public Safety

From January 1, 2022 to December 12, 2022, there were 55 calls for service (excluding traffic stops) to the subject property, out of which approximately 15 of the calls involved a report of a potential crime.

The table provides a summary of the requested departures to the development standards contained within the UDC. Also, see Attachment 1 – PD Design Statement for the detailed development standards and “justification statement” supporting each request.

Summary of Proposed Departure Requests:		
Development Standard Category	MX-C Base District/UDC Standard	Proposed Destiny RV Resort PD standard
Use Chart (2.07.03)	Permitted Uses in MX-C Mixed Use Commercial Zoning District	Permitted Uses in MX-C Mixed Use Commercial Zoning District, with the addition of RV Park as defined in PD, and prohibition on the installation of new accessory structures and the parking/storage of unoccupied RVs
Landscape Edge Buffer (2.09.01.A.1.a)	Shade trees required to be planted 30’ on center based on linear feet of buffer (2.09.01.A.1.a)	Exempting Tower Ridge Drive from this requirement
Landscape Plantings (2.09.01.A.1.d)	Landscape Plantings Encouraged (no specific requirements)	Established specific plantings to be provided (see Exhibit C)
Concrete Curb Protection for Landscaping (2.09.01.A.2.d)	All landscaped areas shall be protected by a raised six (6) inch concrete curb	Exempt
Parking and Driveway Surface (2.09.03 B.1)	Parking areas and driveways shall be curbed, paved concrete	Surfaces may include concrete, asphalt, or gravel.
Vehicle Parking Schedule (2.09.03 E.25)	Two (2) spaces for each recreational vehicle	One (1) space for each recreational vehicle

Monument Sign Maximum Height (4.01.15 E.3)	Eight (8) feet	Eleven (11) feet
Monument Sign Framing (4.01.13.E.7.e)	The sign face shall be framed by a minimum of six (6) inches of brick, stone, or masonry material matching the front facade of the building.	Exempt
Screening Requirements – Nonresidential Construction Abuts Residential Zoning Classification (4.02.11.C)	Nonresidential construction which abuts the boundary of any property in a residential zoning classification shall require the Developer of the nonresidential use to erect a minimum six (6) foot high masonry screening wall along the common boundary	Exempt

Compliance with the Comprehensive Plan

The 2040 Comprehensive Plan designates this area as “Office/Employment.” The Land Use and Development Strategy for the Office/Employment identifies lodging within its land use types and densities. Higher intensity uses identified in this place type, such as corporate/flex office campuses, for the land proposed to be developed do not appear to be supported by the market due to several factors, including the “mid-block” location and the present traffic configuration. The proposed expansion is compatible with the existing development, as well as the auto dealership to the north and the small number of single-family homes to the south.

The Active Transportation Plan identifies an east-west trail to be constructed along the southern boundary of the property between Tower Ridge Drive and I-35E, which the plan proposes to connect through the existing underpass to the east side of I-35E. Because the existing development will remain and the I-35E expansion project will eliminate the “U-turn” underpass, the Applicant will not be required to construct the trail.

Neighborhood Outreach

On March 15, 2022, the Applicant hosted a neighborhood meeting. The Applicant notified the property owners within 200 feet of the subject property to inform residents of this meeting. Per the Applicant, a few neighbors attended the meeting and were in support of the proposed expansion.

Public Notice

Notice of the public hearing was provided in accordance with the City Ordinance and State Law by,

- Publishing in the Denton Record-Chronicle.
- Written public notices were mailed to the owners of all properties located within 200 feet of the subject property and to the Lake Dallas ISD.
- The Applicant posted a “Notice of Zoning Change” sign along I-35E and Tower Ridge Drive.
- The Public Hearing notice was posted on the City’s Website.

Letters of Support/Opposition

As of the date of this report, the City has received one (1) letter in support and one (1) letter in opposition from property owners located within 200 feet of the subject property (see Attachment 2).

Planning & Zoning Commission Recommendation

At the February 27, 2023, Regular Session, the Planning & Zoning Commission voted to recommend approval of the request as presented.

Motion

“I move to _____ (see Possible Motion Options below) _____ of Case No. ZAPD22-0005 – Destiny RV Resort PD”

Possible Motions by the City Council

- Approve as presented and direct staff to draft an ordinance
- Approve as presented with additional stipulations (state each stipulation) and direct staff to draft an ordinance
- Continue the Public Hearing and table action on the request to a definitive or non-defined date
- Deny the request (state reasons)

Supporting Documentation

Attachment 1 – PD Design Statement

- Exhibit “A” – Legal Description
- Exhibit “B” – Zoning Map
- Exhibit “C” – Concept Plan
- Exhibit “D” – Concept Plan Overlay with Aerial
- Exhibit “E” – Conceptual Landscape Plans, Screening, and Tree Survey/Removal Plans.
- Exhibit “F” – Signage
- Exhibit “G” – Vehicle Tents
- Exhibit “H” – Rent Roll

Attachment 2 – Correspondence from Property Owners within 200 feet of the subject property

Attachment 3 – Minutes of Planning & Zoning Commission meetings

- December 12, 2022
- January 13, 2023
- February 27, 2023

Attachment 4 – Correspondence with Applicant Regarding Neighboring Property Owner Concerns

Financial Impact

N/A

Applicable Policy/Ordinance

Comprehensive Plan



**ATTACHMENT 1:
PD DESIGN STATEMENT
DESTINY RV RESORT PLANNED DEVELOPMENT**

**DESTINY DALLAS RV RESORT
PD DESIGN STATEMENT**

SECTION 1 - OVERVIEW

A. PROJECT NAME/TITLE: Destiny Dallas RV Resort

B. LIST OF OWNERS/DEVELOPERS:

Shorebreak Holdings 1, LLC
Boardwalk at Palm Bluffs, LP
1061 E. 4th Street
Santa Ana, California 92701

C. PROJECT ACREAGE AND LOCATION:

Site Acreage: 18.96 Total Acres
Number of Tracts/Lots: 1 Tract, 2 platted lots
Site Location: 7100 S. Interstate Highway 35E

D. PROJECT OVERVIEW: The existing Destiny Dallas RV Resort began operating in 1967 and has seen several structure additions over the years and consists of 176 full-service RV sites, an office building, recreation hall, fitness center, swimming pool and spa, laundry facilities, and a self-service RV and automobile wash center. The proposed expansion will include 52 new sites for a total of 228 RV sites. It is the developer’s desire to make an expansion investment in the RV resort to improving the fire safety/emergency access within the existing area and adding more RV sites and amenities in the proposed addition. The park is very successful and enlarging it will benefit the City of Corinth by drawing users that will frequent food and entertainment venues in the immediate area.

E. PROJECT DESCRIPTION: Destiny Dallas RV Resort is a distinctive leisure and recreation campsite community in Corinth attracting users from all over. The property is conveniently located on IH 35E and easily connects to various regional thoroughfares. The owners and employees take pride in providing a highly desirable RV Resort and the site’s amenities are enjoyed by patrons. The property is currently zoned Mixed Use Commercial (MX-C) which is intended to permit the establishment of standalone nonresidential activities and limited residential activities along Interstate Highway 35. Based on existing conditions, the Destiny Dallas RV Resort development is situated on approximately 14 acres of the overall 18.96 acre site. Since the site was developed long ago, before the property was in the city limits, zoning was applied after construction and annexation by the City of Corinth. The current MX-C zoning district does not list an “RV Park” as a permitted use. The requested Planned Development District will allow for an RV Park use and will provide development regulations for the existing resort park and proposed expansion.

The proposed PD District outlines specific features in the development regulations for the expansion area that include campsite functions/details, a landscaped detention area that will provide for open play/passive recreation areas, additional sidewalks and connections to roadways, landscape buffers, a second point of emergency fire access to Tower Ridge Drive, signage, and improved fire/emergency access.

The developer has removed the existing pole sign at the entry demonstrating the desire to be a partner with the City in aesthetic appeal. The proposed expansion will eliminate the RV/auto wash facility that is highly visible from IH 35E and it will be replaced with RV sites. The new additions will include the installation of four (4) fire hydrants, waterline to service the hydrants, and improve the accessibility for

emergency services equipment and the safety of the residents. Additionally, the landscape buffer in the expansion area will be provided adjacent to the Fairview Subdivision (Phase 2, beginning at Lot 32 and extending to Lot 34 of Block 9) even though properties along IH 35E are exempted from the Residential Adjacency Standards, Section 2.09.05 of the Corinth UDC.

SECTION 2: PROJECT DESIGN

A. BASE ZONING DISTRICT:

Destiny Dallas RV Resort is intended to provide development standards for the expansion of a high-quality recreational vehicle community resort taking advantage of its ideal location and the concepts outlined in Envision Corinth 2040 Comprehensive Plan by promoting a unique use through design to support recommended lodging uses as described in the Office/Employment land use category. Destiny Dallas RV Resort PD currently provides 184 full-service RV sites, an office building, recreation hall, fitness center, swimming pool and spa, laundry facilities, and a self-service RV and automobile wash center. The PD for Destiny Dallas RV Resort will allow for an expansion to a total of 220 full-service sites and will remove the existing RV/automobile wash facility. Additionally, the project includes standards for suitable parking and landscape standards for the RV site along with an amenitized detention area. The base zoning district for the PD will remain Mixed Use Commercial (MX-C) and allowances are outlined herein to address the existing development and the expansion.

Except as otherwise set forth in these Development Standards the regulations of Subsection 2.06.02, MX-C Mixed Use Commercial of Subsection 2.06, Nonresidential Zoning Districts, of the UDC, for the MX-C District and all other requirements of the UDC shall apply to all development within Destiny Dallas PD.

B. DEVELOPMENT REGULATIONS:

The regulations set forth herein provide development standards for a recreational vehicle park and accessory uses within the Destiny Dallas RV Resort Planned Development. The boundaries of the PD are identified in the Legal Description, Exhibit “A” and the Property shall be developed in accordance with these regulations and the PD Concept Plan as depicted on Exhibit “C”, the concept presented in the Concept Plan with Aerial Imagery on Exhibit “D”, the concepts presented in the Conceptual Landscape Plans, Screening, and Tree Survey/Removal Plans on Exhibit “E, Signage as depicted on Exhibit “F”. A use that is not expressly authorized herein is expressly prohibited in the Destiny Dallas Resort Planned Development.

The “MX-C” Mixed Use Commercial District regulations of the Corinth Unified Development Code (UDC), Ordinance No. 13-05-02-08, as amended, shall apply to the Property except as modified herein. If a change to the PD Concept Plan, and/or Ancillary Concept Plans is requested, the request shall be processed in accordance with the UDC and development standards in effect at the time the change is requested for the proposed development per the Planned Development Amendment Process.

1. Permitted Uses and Use Regulations

- a. The Permitted Uses in the MX-C District as listed in Subsection 2.07.03 Use Chart, shall apply, with the addition of a Recreational Vehicle Park use. A Recreational Vehicle Park, for this PD, is defined as:

“A parcel of land designed, improved, or intended to be used for short- or long-term occupancy by recreational vehicles (including travel trailers) in designated spaces not to exceed 24 months. Facility may include employee stalls, utility hook-ups, accessory structures, playgrounds and open space areas, fenced yard areas for pets, and other similar amenities.”

- b. A Recreational Vehicle shall be defined as:
 - “A vehicle which is:
 - i. Built on a single chassis;
 - ii. Four hundred square feet or less when measured at the chassis;
 - iii. Designed to be self-propelled or permanently towable by a light duty truck; and
 - iv. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.”

- c. The following Use Regulations shall apply:
 - i. Employee occupied stalls are exempt from maximum stay and there shall be a maximum of one stall per employee.
 - ii. Once the maximum stay of 24 months is reached, an RV shall leave the RV park for minimum of 30 days, before returning.
 - iii. Existing recreational vehicles that have been at the site on or before June 30, 2021 may stay indefinitely. Those who began their stay on or after July 1, 2021 will be subject to the defined maximum stay, which shall begin on the date the Planned Development Ordinance is adopted by the City Council.
 - iv. Within the expanded area of the park, a minimum of five (5) spaces shall be provided for daily or weekly occupancy, not to exceed 30 days.
 - v. Owner/operator of the RV park shall submit a yearly roll reporting compliance of arrival and departures.

- d. Accessory Uses to be permitted in addition to those listed in the proposed definition of the use “Recreational Vehicle Park”, as defined in this Planned Development, shall include the following:
 - i. Office uses for the resort;
 - ii. Maintenance facilities/structures;
 - iii. Playgrounds; and
 - iv. Incidental sales of supplies for recreational vehicles and camping activities in the existing office building.

- e. Prohibited Uses in the Destiny Dallas PD include:
 - Unoccupied Recreational Vehicle Parking/Storage, including water motorcraft, is prohibited.

Justification: The existing RV resort has been in use for over 40 years. Since the site was initially developed as a RV resort, the city has grown and developed around it. The current property owner would like to continue this historical use and expand the resort to include the current undeveloped areas.

2. Dimensional Regulations

The Dimensional Regulations described in Subsection 2.08.05, “Nonresidential Dimensional Regulations Chart” of Subsection 2.08, “Zoning Dimensional Regulations” of the UDC, for the base zoning district MX-C Mixed Use Commercial shall apply.

3. Accessory Buildings

The Accessory Buildings and Uses as described in Subsection 2.07.07 “Accessory Buildings and Uses” of the UDC, for Nonresidential Accessory Buildings shall apply, except as modified below:

- a. Existing permanent and semi-permanent structures in the development shall be allowed to remain as currently exists. Repairs or modifications to permanent and semi-permanent structures are permitted in the existing development.
- b. New permanent or semi-permanent structures, with the exception of steps or ramps to access recreational vehicles, shall not be permitted in the boundaries of this Planned Development.
- c. Temporary Vehicle Tents, as generally depicted in Exhibit “G” - Vehicle Tents, shall be permitted.

Justification: The existing site contains a number of accessory structures that will not be removed and provisions permitting them need to be provided for. The RV sites in the expansion area will not have accessory structures other than ramps or steps to serve the RV’s.

4. Landscaping Regulations

The Landscaping Regulations as described in Subsection 2.09.01 “Landscape Regulations” of the UDC, for Nonresidential Landscaping Regulations shall apply, except as modified below:

- a. The existing development shall be exempt from Landscaping Regulations and allowed to remain as it currently exists. Improvements and landscape installation in the existing development is permitted.
- b. A landscape buffer along a collector street (Tower Ridge Drive) of fifteen (15) feet per Section 2.09.01 A.1.a.i. (b) shall not be required.
- c. Landscape area protection with a raised six (6) in concrete curb per Section 2.09.01 A.2.d. shall not be required.
- d. The expansion area of the PD shall provide for landscaping as outlined below and generally depicted in Exhibit “E” Conceptual Landscape Plans, Screening, and Tree Survey/Removal Plans.
 - i. A minimum of 42 shrubs (2-inch caliper and 8-foot minimum height at 15 feet spacing) shall be required along IH 35E. Shrubs may be grouped and clustered.
 - ii. A minimum of 34 trees (3-inch caliper and 12-14-foot minimum height at 30 foot spacing) shall be required along IH 35E. Trees may be grouped and clustered.
 - iii. Landscaping and Screening along IH 35E may be staggered, grouped, and arranged for interest along the regional thoroughfare. It is not the intent to plant a wall of trees along this frontage. In no case shall the number of tree and shrub required quantities be reduced.
 - iv. A minimum of one (1) ornamental tree of a minimum of two (2) caliper inches and eight (8) foot minimum height, or one (1) shade tree of a minimum of three (3) caliper inches shall be planted between each RV parking stall.

Additional landscaping to be provided by the Developer includes: A 20 foot wide landscape buffer in the expansion area will be provided adjacent to the Fairview Subdivision (Phase 2, beginning at Lot 32 and extending to Lot 34 of Block 9).

Justification: The existing site cannot be retrofitted to meet present day requirements. An RV resort is a unique use and not a traditional commercial development with uniform parking lots and landscaping. Provisions have been made to provide adequate space between RV sites including the

addition of ornamental trees. Trees and shrubs along IH 35E have been added to the Conceptual Landscape Plans to provide for an attractive and appealing view from the roadway and through the main drive. There are existing trees east of the existing fence along Tower Ridge Drive that provide landscape edge. A sidewalk in the Tower Ridge Drive right-of-way is being constructed by the developer.

5. Tree Preservation

Tree Preservation regulations outlined in Subsection 2.09.02 “Tree Preservation” of the UDC shall apply, except as modified below:

- a. Trees in the existing development that need to be removed to provide for a suitable paving width for emergency access, the provision of fire hydrants/waterlines, and utility easements shall be exempt from mitigation requirements.
- b. Tree removal and mitigation shall be in general conformance with Exhibit “E” Conceptual Landscape Plans, Screening, and Tree Survey/Removal Plans, which may be subject to change at the time of Site Plan approval.

Justification: When the park was originally developed, fire hydrants were not required. As part of this development, an internal water line will be installed to provide fire protection to both the expansion area and existing portions of the development. As a result of the proposed water line installation in the existing development, some of the existing trees will need to be removed to allow for the excavation of the utility trench.

6. Vehicular Parking Regulations

Vehicular Parking Regulations outlined in Subsection 2.09.03 “Vehicular Parking Regulations” of the UDC shall apply, except as modified below:

- a. The parking provided in the existing development shall be permitted to remain as it presently exists.
- b. The parking for the expansion area of the PD shall be parked at one (1) space per recreational vehicle site.
- c. Parking stalls in the expansion area shall be a minimum of 14 feet wide and include a ten (10) foot wide green space on each side of the spaces.
- d. Parking for the office, visitors, laundry facilities, pool/spa area shall be twenty-one (21) spaces as identified on Exhibit “C” PD Concept Plan for the existing development and expansion area of the PD.
- e. Section 2.09.03 B.1, requiring that parking areas and driveways shall be curbed, paved concrete, shall not apply. Parking surfaces shall be permitted as outlined in Exhibit “C” PD Concept Plan. Surfaces may include concrete, asphalt pavement, and gravel.

Table B – Parking Requirements

Regulation:	Base Regulations by Use RV PARK	Proposed Parking Standards/Modifications
Parking Standard:	Two (2) spaces for each recreational vehicle space	One (1) space for each recreational vehicle space

Justification:

- a. Research establishing a suitable parking ratio is outlined below:

City	Use Title	Requirement
Corinth	RV Park	2 spaces for each RV space
Corpus Christi	RV Park	1 space per 4 pads
Fredericksburg	Campground	1 space per camping unit
Galveston	RV Park	1 space for each lot + 1 for each 6 lots
San Antonio	RV Park	0
Fort Worth	RV Park	1 off street space

- b. **American Planning Association**
Parking Standards, Edited by Michael Davidson and Fay Dolnick
 American Planning Association
 Planning Advisory Service, PAS Report 510/511, December 2002

Recreation vehicle (RV) park (see also campground)

- 1 space per recreational vehicle space not including parking space for RV (El Paso County, Colo., pop. 516,929)
 - 1 space per vehicle (St. Cloud, Minn., pop. 59,107)
 - 1 per each unit, plus 1 guest space for every 10 recreational vehicle sites, plus 1 space for each employee (Reno, Nev., pop. 180,480)
 - 1 per camp space (Hickory, N.C., pop. 37,222)
 - 1 space for recreation vehicle stall, plus 1 space for each 2 employees (Thomasville, Ga., pop. 18,162)
 - 1.1 spaces for each recreational vehicle space (Phoenix, Ariz., pop. 1,321,045)
- c. The center pull-through sites are typically 135 feet long and will easily accommodate 2, Class A motorhome vehicles (20-40 feet, average 30 feet, max. 45 feet) with room for a parked vehicle.
 - d. The other single user sites are generally 65+ feet in length and will accommodate a Class A vehicle and a parked vehicle.
 - e. The Resort requires reservations and is booked months in advance. The staff assigns appropriate campsites based on vehicle types. They know what is coming and how to accommodate the numbers and types of vehicles.

7. Building Façade Material Standards

Building Façade Material Standards outlined in Subsection 2.09.04 “Building Façade Material Standards” of the UDC shall apply.

8. Nonresidential Architectural Standards

Nonresidential Architectural Standards outlined in Subsection 2.09.06. “Nonresidential Architectural Standards” shall apply, except as modified below:

- a. Existing structures shall be exempt from nonresidential architectural standards.
- b. New structures may be constructed similar to the existing structures.

Justification: The existing development contains structures that do not meet present requirements and retrofitting or rebuilding the structures is not desired or economically feasible.

9. Residential Adjacency Standards

Residential Adjacency Standards outlined in Subsection Section 2.09.05 “Residential Adjacency Standards” shall apply, except as modified below:

- a. Nonresidential uses adjacent to Interstate 35 are exempt from the residential adjacency standards (2.09.05. B. Applicability 3.). Destiny Dallas PD shall provide a 20 foot landscape buffer to be adjacent to Fairview Subdivision, Phase 2, beginning at Lot 32 and extending to Lot 34 of Block 9, as illustrated on Exhibit “C” Concept Plan.

10. Screening of Outdoor Waste Storage for Nonresidential, Single-Family Attached, and Multi-Family Residential Properties

Screening of Outdoor Waste Storage for Nonresidential, Single-Family Attached, and Multi-Family Residential Properties” outlined in Subsection 4.02.13 of the UDC shall apply to the Destiny Dallas PD.

11. Lighting and Glare Regulations

Lighting and Glare Regulations outlined in Subsection 2.09.07 of the UDC shall apply.

12. Sign Regulations

Sign Regulations as outlined in Section 4.01 “Sign Regulations” shall apply, except as modified below:

- a. Signage shall be permitted in accordance with Exhibit “F” Signage.

Monument Sign on IH 35E

	Base Sign Regulations	Proposed Sign Regulations
Maximum Height	8 feet	11 feet overall total 5 feet, 5 in. sign 4 feet base
Maximum Length	NA	NA
Maximum Sign Size (Overall)	160 SF	160 SF
Maximum Sign Face	80 SF	80 SF
Setback	15 feet	15 feet
Framing (masonry)	6"	0
Landscaping	1 to 1	1 to 1

Justification: The signage is comparable to the signage approved and provided to the north for the Huffines auto dealership.

13. Fence and Screening Regulations

Fence and Screening Regulations as outlined in Section 4.02, “Fence and Screening Regulations” shall apply, except as modified below:

- a. Fencing requirements for Screening Height, requiring a minimum of six (6) feet between Nonresidential and Residential requirements per Section 4.02.11.A. shall not apply.
- b. Masonry Screening Walls, per Section 4.02.11.B shall not apply. The existing wood fencing on the north, south, and west shall remain. If fifty (50) percent or more of the existing fence along Tower Ridge Drive needs to be repaired or replaced, the entire fence shall be replaced with a new board-on-board cedar fence. Entire fence replacement shall be board-on-board cedar and a minimum of eight (8) feet in height.
- c. Nonresidential Construction Abutting a Residential Zoning Classification per Section 4.02.11.C shall not apply.
- d. Residential Construction Abuts a Collector or an Arterial Street per Section 4.02.11.E, which requires a six (6) foot high masonry wall, shall not apply.

Justification: The site is an existing development and there is an existing screening fence along the southern property boundary, on the residential property and along Tower Ridge Drive. A twenty (20) foot landscape buffer along the new expansion is being provided adjacent to the single-family residential properties. Provisions have been made for required fencing when the fencing along Tower Ridge Drive needs to be replaced.

14. Other

- a. The existing development area shall be allowed a reduction in the fire lane width to 20 feet.
- b. An emergency access only connection to Tower Ridge Drive has been added as a site requirement and will be fitted with the required Knox lock, or other Fire Department approved access device. The emergency drive width shall be a minimum of 30 feet with 30 foot internal turning radii.
- c. A sidewalk, a minimum of five (5) feet in width, shall be installed by the developer within the landscape edge buffer (within the property boundary) and shall be constructed at the time of the Destiny RV Resort expansion. A pedestrian access easement shall be established at time of platting for this sidewalk.
- d. A sidewalk, a minimum of five (5) feet in width, shall be installed from the IH 35E roadway to the main office.
- e. A sidewalk meeting the standards set forth in Section 3.05.12, Sidewalks, shall be installed in the right-of-way of Tower Ridge Drive.

C. OTHER DEVELOPMENT CONSIDERATIONS:

1. Phasing

- a. The proposed expansion and proposed existing site improvements will be developed as one project.
- b. The deceleration lane at the IH 35E main entry requires TXDOT approval. The deceleration lane will be paid for by the Destiny RV Resort owner through an agreement with the City. The City will contract directly with TXDOT for the installation of the deceleration lane.

2. Impacts

- a. A Traffic Impact Assessment has been submitted to Engineering and the data is outlined on Exhibit “C” PD Concept Plan. The City of Corinth staff has requested a deceleration lane be provided at the main entry at IH 35E and the developer of the PD will pay for a deceleration lane if TXDOT approves the deceleration lane.
- b. The main entry drive is proposed to be widened and provide increased turning radii at IH 35E as illustrated on Exhibit “C” PD Concept Plan.

- c. The existing RV sites have full-service utility connections which consist of water, sewer, and electricity. The proposed expansion sites will include full-service connections. In order to provide these services, new water and sewer service lines will be installed within the limits of the proposed development area. These service lines will be owned and operated by the developer. In addition to these services lines, a new 8-inch water line is being installed throughout the entire RV resort in order to provide for fire hydrant coverage. At the present time, the existing park does not have fire hydrant service.
- d. Drainage and Detention has been provided for onsite as required. A section of the proposed detention area has been submitted for review.
- e. Destiny Dallas RV Resort is an exceptionally safe and monitored community and police reports are very few. The employees and residents conduct themselves as caring and responsible neighbors.
- f. The Resort requires reservations.
- g. The reservation system allows the coordination of vehicle types by sites.

SECTION 3 - BACKGROUND INFORMATION

A. EXISTING SITE CONDITIONS

The site is currently developed as an RV resort with 176 full-service sites. The site has an existing office building, recreation hall, fitness center, swimming pool and spa, laundry facilities and a self-service RV and automobile wash center. The wash center will be removed to make way for the proposed expansion of the resort.

Describe and discuss all topics that apply to the subject site:

- Street boundaries: The site currently has access to the IH 35E Service Road along the eastern property boundary. There is also an existing street, Tower Ridge Drive, along the western property boundary. However, the existing site does not have access to this street.
- Surrounding properties: As stated above there are streets located on the east and west sides of the property. There are single family residential properties to the south of this site and a car dealership to the north.
- Tree cover: The existing development area is heavily treed in and around the existing RV sites. There are a few existing trees sporadically located within the limits of the proposed expansion area.
- Drainage: The site generally drains to the southeast corner of the site.
- Existing easements: There are various utility and drainage easements currently located on the property. Additional easements will be dedicated for the proposed expansion.
- Existing signage/buildings/etc.: The existing pole sign has been removed and a new monument sign will be installed as part of this PD development.
- Existing site access: The site currently has access to the IH 35E Service Road. This access point will remain with some improvements being made to widen the entry drive as well increasing the driveway radii to improve the access into and out of the property. A new emergency access only ingress/egress is being proposed onto Tower Ridge Drive. This driveway will only be used by emergency vehicles and will provide a secondary access point to the site.

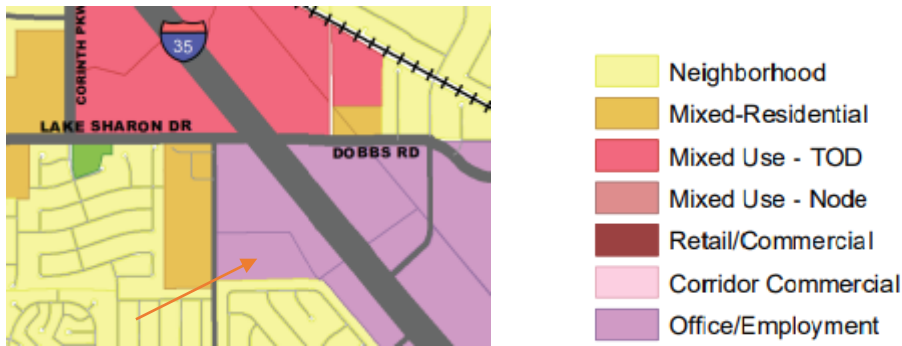
B. CURRENT ZONING

The site is currently zoned Mixed Use Commercial, MX-C which allows at least 90% nonresidential uses and a maximum of 10% residential uses.

The existing zoning on the subject site permits the following:

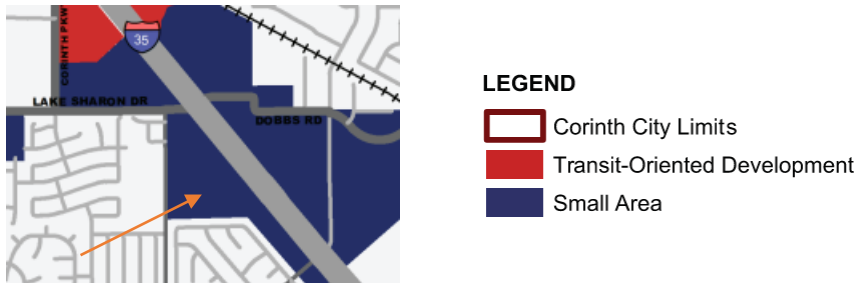
Minimum Front Yard Setback	40'
Minimum Side Yard Setback: Interior Lot	0'/15' adjoining residential
Corner Lot	10'/15' adjoining residential
Minimum Rear Yard Setback	20'
Minimum Lot Area	20,000 SF
Maximum Density	NA
Minimum Lot Width:	150'
Minimum Lot Depth	100'
Minimum Floor Area	NA
Maximum Height (feet/stories)	2.5 stories/40' or SUP
Maximum Building Area (all buildings)	50%

C. FUTURE LAND USE



Source: [Envision Corinth 2040 Comprehensive Plan \(Adopted July 2020\)](#)

1. Strategic Focus Areas



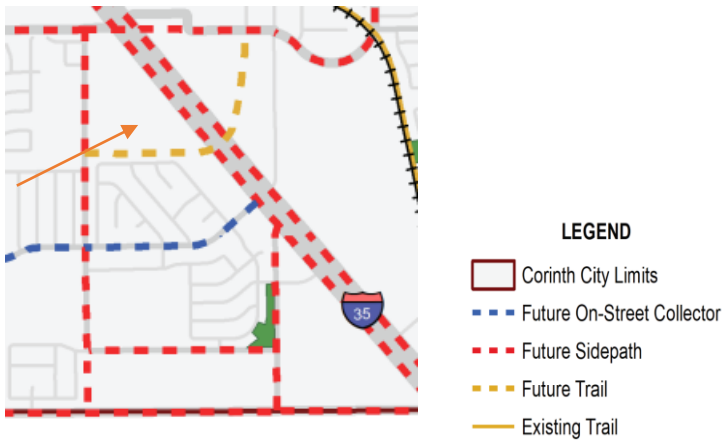
Source: [Envision Corinth 2040 Comprehensive Plan-Strategic Focus Area \(Adopted July 2020\)](#)

2. Mobility – Master Thoroughfare Plan



Source: [Envision Corinth 2040 Comprehensive Plan - Master Thoroughfare Plan \(Adopted July 2020\)](#)

3. Mobility – Active Transportation Plan



A Future Sidepath on Tower Ridge Drive is indicated on the plan. A Future Trail is illustrated on the south side of the subject property.

Source: [Envision Corinth 2040 Comprehensive Plan \(Adopted July 2020\)](#)

SECTION 4 - SUPPORTING APPLICATION DOCUMENTS

- | | |
|-----------|--|
| Exhibit A | Legal Description/Metes & Bounds |
| Exhibit B | Zoning Map (By City) |
| Exhibit C | Concept Plan |
| Exhibit D | Concept Plan Overlay with Aerial |
| Exhibit E | Conceptual Landscape Plans, Screening, and Tree Survey/Removal Plans |
| Exhibit F | Signage |
| Exhibit G | Vehicle Tents |
| Exhibit H | Rent Roll |

Being an 18.96 acre tract of land out of the E. A. Garrison Survey, Abstract No. 511, situated in the City of Corinth, Denton County, Texas, and being a portion of a called 19.931 acre tract of land conveyed to Shorebreak Holdings 1, LLC, by deed of record in Document Number 2021-123192 of the Official Records of Denton County, Texas, and being a portion of Lots 1 and 2, Block 1, of Dallas KOA Campground Addition, a subdivision of record in Cabinet L, Page 73 of the Plat Records of Denton County, Texas, and being more particularly described by metes and bounds as follows:

BEGINNING, at a 1/2 inch iron rod with cap stamped "RPLS 4567" found in the East right-of-way line of Tower Ridge Drive (60-foot right-of-way), being the Northwest corner of Lot 17, Block 9, of Fairview Subdivision, Phase II, a subdivision of record in Cabinet E, Page 67 of said Plat Records, and being the Southwest corner of said 19.931 acre tract;

THENCE, N00°09'12"E, along the East right-of-way line of Tower Ridge Drive, being the common West line of said 19.931 acre tract, a distance of 575.05 feet to a 1/2 inch iron rod with cap stamped "GNS" found at the Southwest corner of Lot 1, Block A, of Huffines Auto Addition, a subdivision of record in Document Number 2018-521 of said Official Records;

THENCE, N89°13'46"E, along the South line of said Lot 1, Block A, of Huffines Auto Addition, being the common North line of said 19.931 acre tract, a distance of 1210.61 feet to an aluminum-capped TxDOT monument found in the West right-of-way line of Interstate Highway 35-E, being the Southeast corner of said Lot 1, Block A, of Huffines Auto Addition, also being the Southwest corner of a called Parcel 14 – 1.635 acre tract of land conveyed to The State of Texas by deed of record in Document Number 2014-78948 of said Official Records, and being the Northwest corner of a called Parcel 13 – 0.119 acre tract of land conveyed to The State of Texas by deed of record in Document Number 2021-93303 of said Official Records;

THENCE, along the West right-of-way line of Interstate Highway 35-E, being in part, the common West line of said 0.119 acre tract, in part, the common West line of a called Parcel 12 – 0.472 acre tract of land conveyed to The State of Texas by deed of record in Document Number 2021-93302 of said Official Records, and in part, the common West line of a called Parcel 10 – 0.391 acre tract of land conveyed to The State of Texas by deed of record in Document Number 2021-93301 of said Official Records, the following two (2) courses and distances:

1. S40°39'42"E, a distance of 479.91 feet to an aluminum-capped TxDOT monument found;
2. S42°20'07"E, a distance of 257.37 feet to an aluminum-capped TxDOT monument found at the Southwest corner of said 0.391 acre tract, being the Northwest corner of a called Parcel 6 – 0.569 acre tract of land conveyed to the State of Texas by deed of record in Document Number 2022-71773 of said Official Records;

THENCE, S88°45'04"W, leaving the West right-of-way line of Interstate Highway 35-E, in part, along the South line of said Lot 1, Block 1, of Dallas KOA Campground Addition, and in part, along the South line of said 19.931 acre tract, being in part, the common North line of Lot 1, Block A, of Vista Academy Addition, a subdivision of record in Document Number 2015-327 of said Plat Records, in part, the common North line of Fairview Subdivision, Phase II-D, a subdivision of record in Cabinet E, Page 116 of said Plat Records, and in part, the common North line of said Fairview Subdivision, Phase II, a distance of 1698.48 feet to the **POINT OF BEGINNING**, and containing an area of 18.96 acres (825,853 square feet) of land, more or less.

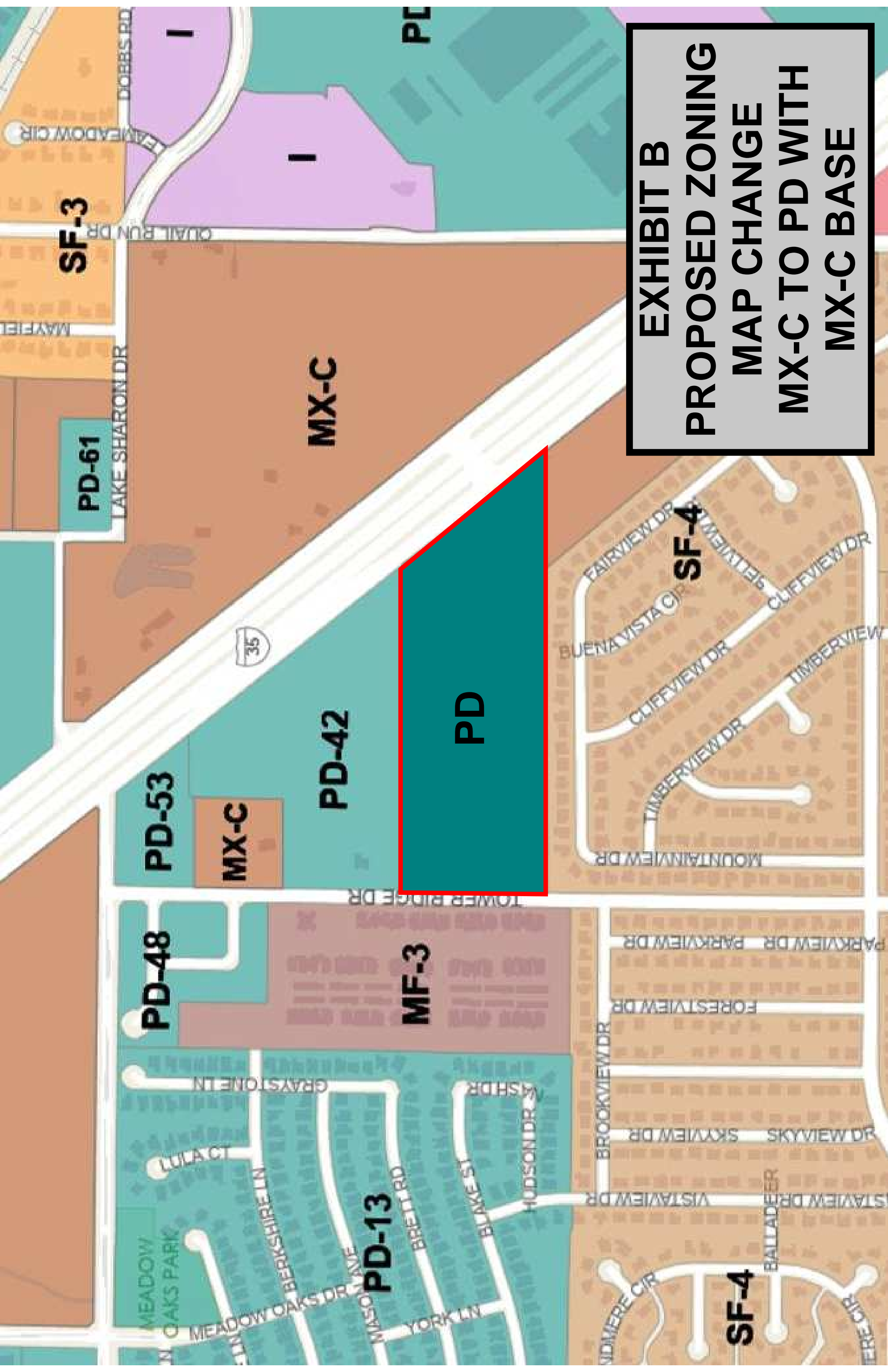


EXHIBIT B
PROPOSED ZONING
MAP CHANGE
MX-C TO PD WITH
MX-C BASE

LOT1
BLOCK A
HUFFINES AUTO ADDITION
DOC.NO. 2018-521
O.R.D.C.T.

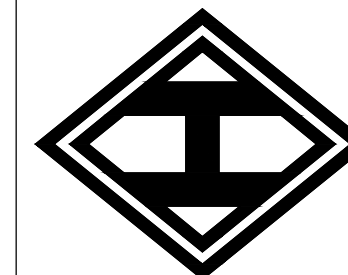
PARCEL 13
CALLED 0.19 ACRES
THE STATE OF TEXAS
DOC. NO. 2021-93303
O.R.D.C.T.

PARCEL 12
CALLED 0.472 ACRES
THE STATE OF TEXAS
DOC. NO. 2021-93302
O.R.D.C.T.

PARCEL 10E
CALLED 0.041 ACRES
THE STATE OF TEXAS
DOC. NO. 2021-93301
O.R.D.C.T.

LOT 1
BLOCK A
VISTA ACADEMY ADDITION
DOC. NO. 2015-327
P.R.D.C.T.

**HOMEYER
ENGINEERING, INC.**
TYPE FIRM REGISTRATION NO. F-8440
P.O. BOX 294527 LEWISVILLE, TEXAS 75029
972-906-9985 PHONE 972-906-9987 FAX
WWW.HEI.US.COM



DESTINY DALLAS
LOTS 1 & 2, BLOCK 1
DALLAS KOA CAMPGROUND EDITION
18.98 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

PD CONCEPT
PLAN

DRAWN: SCD
DATE: 05/01/22
HEI #: 21-0702

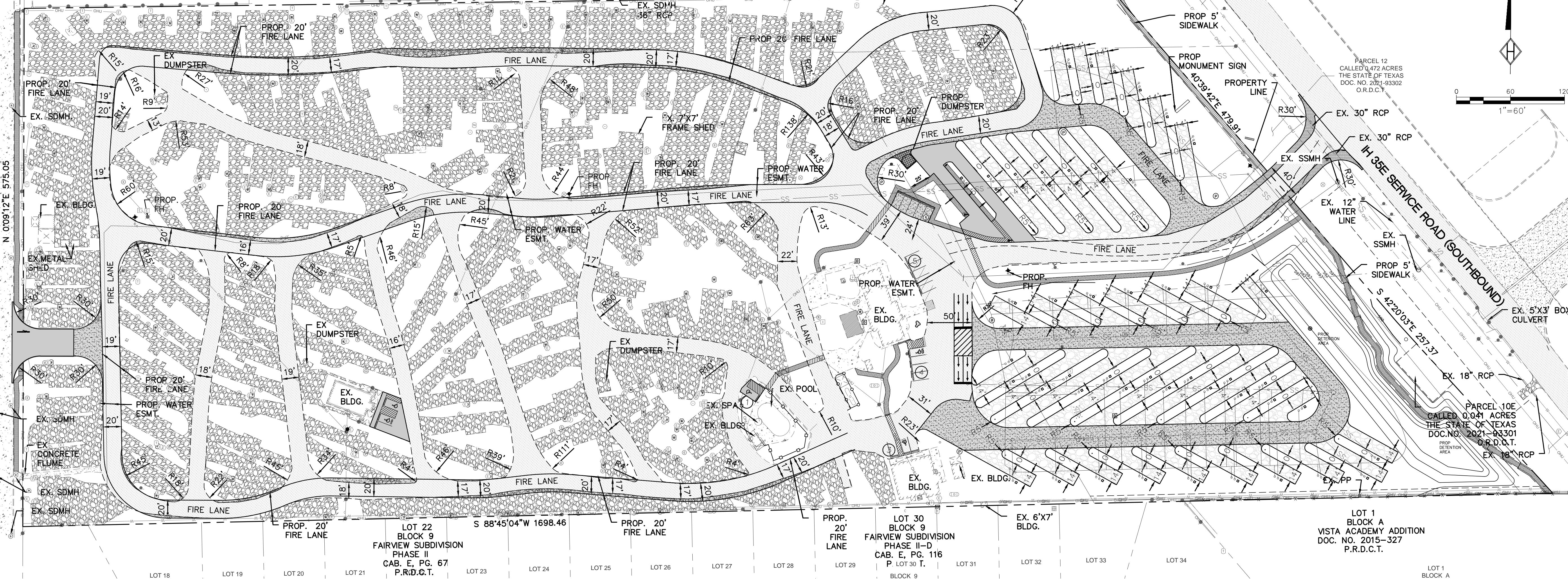
SHEET NO:
C2

LOWER RIDGE DRIVE
60' RIGHT OF WAY

N 0°09'12"E 575.05

N 89°13'46"E 1210.61

S 88°45'04"W 1698.46



PAVEMENT LEGEND

- DUMPSTER PAVEMENT**
PROPOSED 8" 4,000 PSI CONCRETE AT 28 DAYS
W/ #4 BARS @ 18" OCEW (DOUBLE MAT).
- HEAVY DUTY PAVEMENT DRIVE AISLE**
PROPOSED 8" 3,600 PSI CONC. @ 28 DAYS WITH
#3 BARS @ 18" O.C.E.W.
- ASPHALT PAVEMENT**
PROPOSED 2" TY "D" HMACH OVER 2" TY "B" HMACH
COMPACTED TO AN OPTIMUM DENSITY OF 96% PER
LIFT IN ACCORDANCE WITH TXDOT ITEM 340. THE
HMACH SHALL BE INSTALLED ON 6" OF COMPACTED
FLEXIBLE BASE (MINIMUM 95% STANDARD PROCTOR
DENSITY) IN ACCORDANCE WITH TXDOT ITEM 247.
- GRAVEL PAVEMENT**
PROPOSED 2" WASHED STONE. THE WASHED STONE
SHALL BE INSTALLED ON 6" COMPACTED FLEXIBLE
BASE (MINIMUM 95% STANDARD PROCTOR
DENSITY) IN ACCORDANCE WITH TXDOT ITEM 247.
- SIDEWALK PAVEMENT**
PROPOSED 4" 3,000 PSI CONC. @ 28 DAYS WITH
#3 BARS @ 18" O.C.E.W.
- EXISTING ASPHALT**

PAVEMENT NOTES:

1. ALL PAVEMENT SUBGRADE SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 6" AND COMPACTED TO A MINIMUM 95% STANDARD PROCTOR DENSITY AT OR ABOVE OPTIMUM MOISTURE.
2. CONNECT PROPOSED ASPHALT PAVEMENT TO EXISTING ASPHALT PAVEMENT USING A SMOOTH SAWCUT W/TACK COAT.

LEGEND

- I.R.F. IRON ROD FOUND
- I.R.S. IRON ROD SET
- CUT X IN CONCRETE
- F.C.P. FENCE CORNER POST
- ASPHALT
- TELEPHONE MANHOLE
- POWER POLE
- LIGHT POLE
- WATER VALVE
- SANITARY SEWER MANHOLE
- FIRE HYDRANT
- WATER METER

ITE TRIP GENERATION CALCULATIONS

PROPOSED LAND USE	ITE CODE	QUANTITY	UNIT OF MEASURE	WEEKDAY	AM			PM		
					TOTAL	ENTER	EXIT	TOTAL	ENTER	EXIT
CAMPGROUND/ RECREATIONAL VEHICLE PARK	416	220	OCCUPIED CAMP SITE	NA	Ln(T)=0.81Ln(X)-0.50	36%	64%	T=0.41(X)	62%	38%
SOURCE: 10th EDITION, I.T.E. TRIP GENERATION MANUAL					48	18	30	90	56	34

SITE NOTES:

1. THE EXISTING PHASE OF DESTINY RV SHALL BE ALLOWED TO REMAIN AS IS.
2. DEVELOPER SHALL INSTALL A 5 FOOT SIDEWALK IN TOWER RIDGE ROW. EXISTING DRAINAGE STRUCTURES, UTILITIES, AND RETAINING WALL SHALL REMAIN AND FLEXIBILITY WILL BE ALLOWED TO ACHIEVE A FIVE (5) FOOT SW WHERE POSSIBLE.
3. EMERGENCY ACCESS TO TOWER RIDGE ONLY. KNOX LOCK TO BE INSTALLED PER FIRE DEPARTMENT REQUIREMENTS.
4. DEVELOPER SHALL INSTALL DECELERATION LANE AFTER TXDOT IS COMPLETE WITH THE EXPANSION OF IH35E IF THE DECELERATION LANE IS APPROVED BY TXDOT.
5. THE SIDEWALK ALONG IH35E SHALL BE LOCATED IN A PEDESTRIAN/SIDEWALK EASEMENT ON DESTINY RV PROPERTY AND INSTALLED AT THE TIME OF DESTINY RV RESORT EXPANSION.
6. ADDITIONAL ASPHALT AREAS HAVE BEEN IDENTIFIED ON THE PLAN TO INCREASE THE FIRE LANE WIDTH/ACCESSIBILITY.

**EXHIBIT C
PAGE: 1 OF 6**

PRELIMINARY PLANS

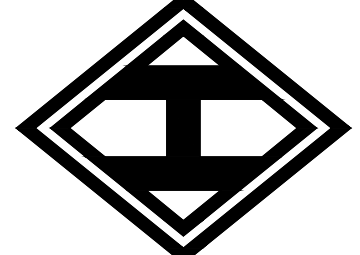
THIS DOCUMENT IS FOR INTERIM REVIEW AND IS NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.
STEVEN R. HOMEYER, PE # 86942
DATE: 02/14/2023

OWNER
Dallas RV, LLC
470 E. Herndon
Fresno, California 93720
Contact: Brett Fugman
Phon: 559-905-6151

ENGINEER
Homeyer Engineering, Inc.
P.O. Box 294527
Lewisville, Texas 75029
Contact: Steven R. Homeyer, PE
Phone: 972-906-9985

SURVEYOR
Eagle Surveying, LLC
210 S. Elm Street, Suite 104
Denton, Texas 76201
Contact: Mason Decker
Phone: 940-222-3009

HOMEYER
ENGINEERING, INC.
FIRM REGISTRATION NO. F-8440
T.B.P.E. NO. 294527
P.O. BOX 294527
LEWISVILLE, TEXAS 75027
972-906-9985 PHONE 972-906-9987 FAX
WWW.HEI.US.COM



DESTINY DALLAS
LOTS 1 & 2, BLOCK 1
DALLAS KOA CAMPGROUND EDITION
18.98 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

PD CONCEPT
PLAN EAST

DRAWN: SCD
DATE: 05/01/22
HEI #: 21-0702
SHEET NO:
C2.1

DOC. NO. 2021-93302
O.R.D.C.T.

PARCEL 12
CALLED 0.472 ACRES
THE STATE OF TEXAS
DOC. NO. 2021-93302
O.R.D.C.T.

IH 35E SERVICE ROAD (SOUTHBOUND)

PAVEMENT LEGEND

- DUMPER PAVEMENT**
PROPOSED 8" 4,000 PSI CONCRETE AT 28 DAYS
W/ #4 BARS @ 18" OCEW (DOUBLE MAT).
- HEAVY DUTY PAVEMENT DRIVE AISLE**
PROPOSED 8" 3,600 PSI CONC. @ 28 DAYS WITH
#3 BARS @ 18" O.C.E.W.
- ASPHALT PAVEMENT**
PROPOSED 2" TY "D" HMAC OVER 2" TY "B" HMAC
COMPACTED TO AN OPTIMUM DENSITY OF 96% PER
LIFT IN ACCORDANCE WITH TXDOT ITEM 340. THE
HMAC SHALL BE INSTALLED ON 6" OF COMPACTED
FLEXIBLE BASE (MINIMUM 95% STANDARD PROCTOR
DENSITY) IN ACCORDANCE WITH TXDOT ITEM 247.
- GRAVEL PAVEMENT**
PROPOSED 2" WASHED STONE. THE WASHED STONE
SHALL BE INSTALLED ON 6" COMPACTED FLEXIBLE
BASE (MINIMUM 95% STANDARD PROCTOR
DENSITY) IN ACCORDANCE WITH TXDOT ITEM 247.
- SIDEWALK PAVEMENT**
PROPOSED 4" 3,000 PSI CONC. @ 28 DAYS WITH
#3 BARS @ 18" O.C.E.W.
- EXISTING ASPHALT**

- PAVEMENT NOTES:**
- ALL PAVEMENT SUBGRADE SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 6" AND COMPACTED TO A MINIMUM 95% STANDARD PROCTOR DENSITY AT OR ABOVE OPTIMUM MOISTURE.
 - CONNECT PROPOSED ASPHALT PAVEMENT TO EXISTING ASPHALT PAVEMENT USING A SMOOTH SAWCUT W/TACK COAT.

LEGEND

- I.R.F.* IRON ROD FOUND
- I.R.S.* IRON ROD SET
- "X" CUT X IN CONCRETE
- F.C.P.* FENCE CORNER POST
- ASPHALT
- ⊕ TELEPHONE MANHOLE
- ⊙ POWER POLE
- ⊙ LIGHT POLE
- ⊗ WATER VALVE
- ⊙^{SSMH} SANITARY SEWER MANHOLE
- FIRE HYDRANT
- ⊗ WM WATER METER

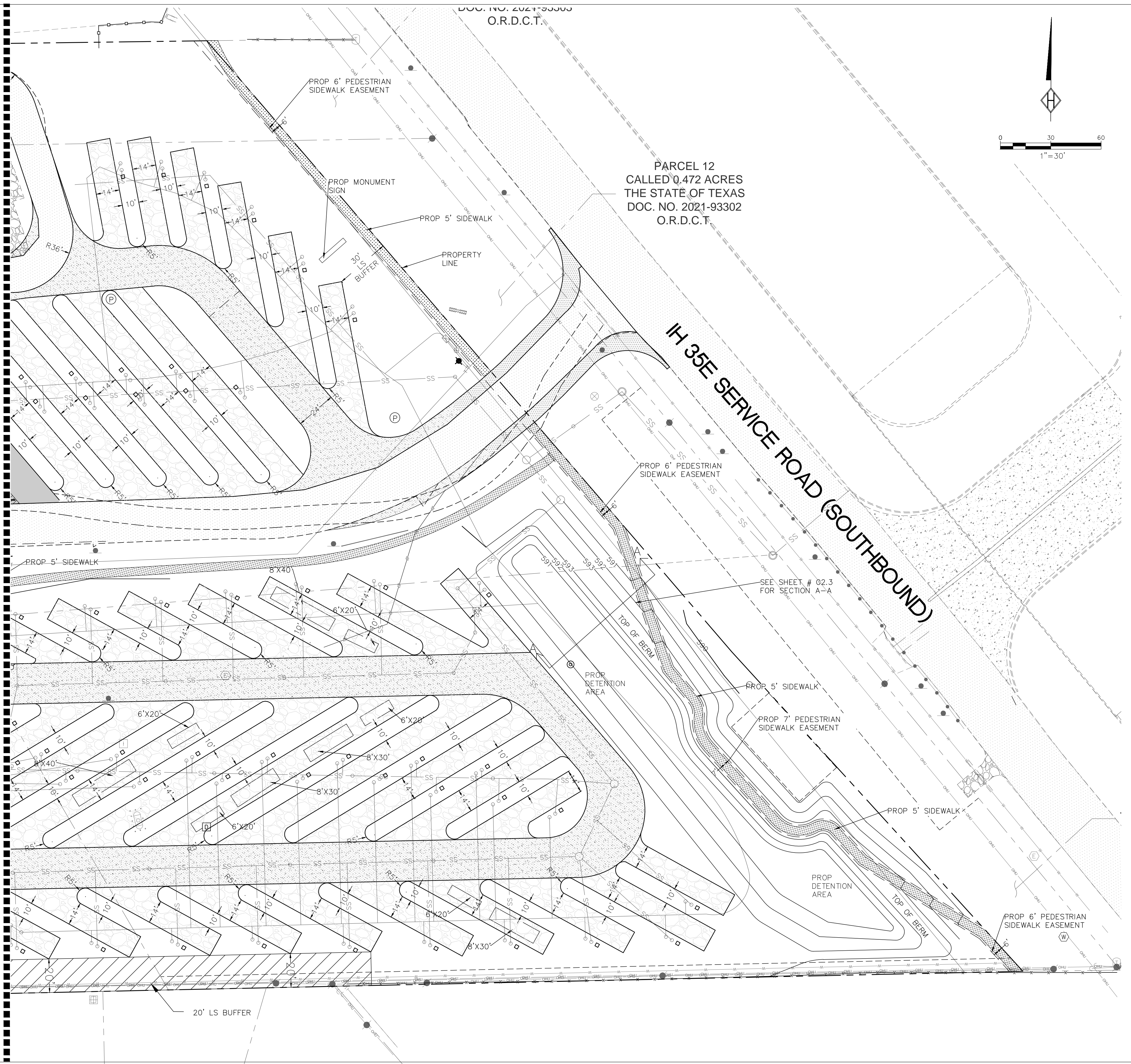
EXHIBIT C
PAGE: 2 OF 6

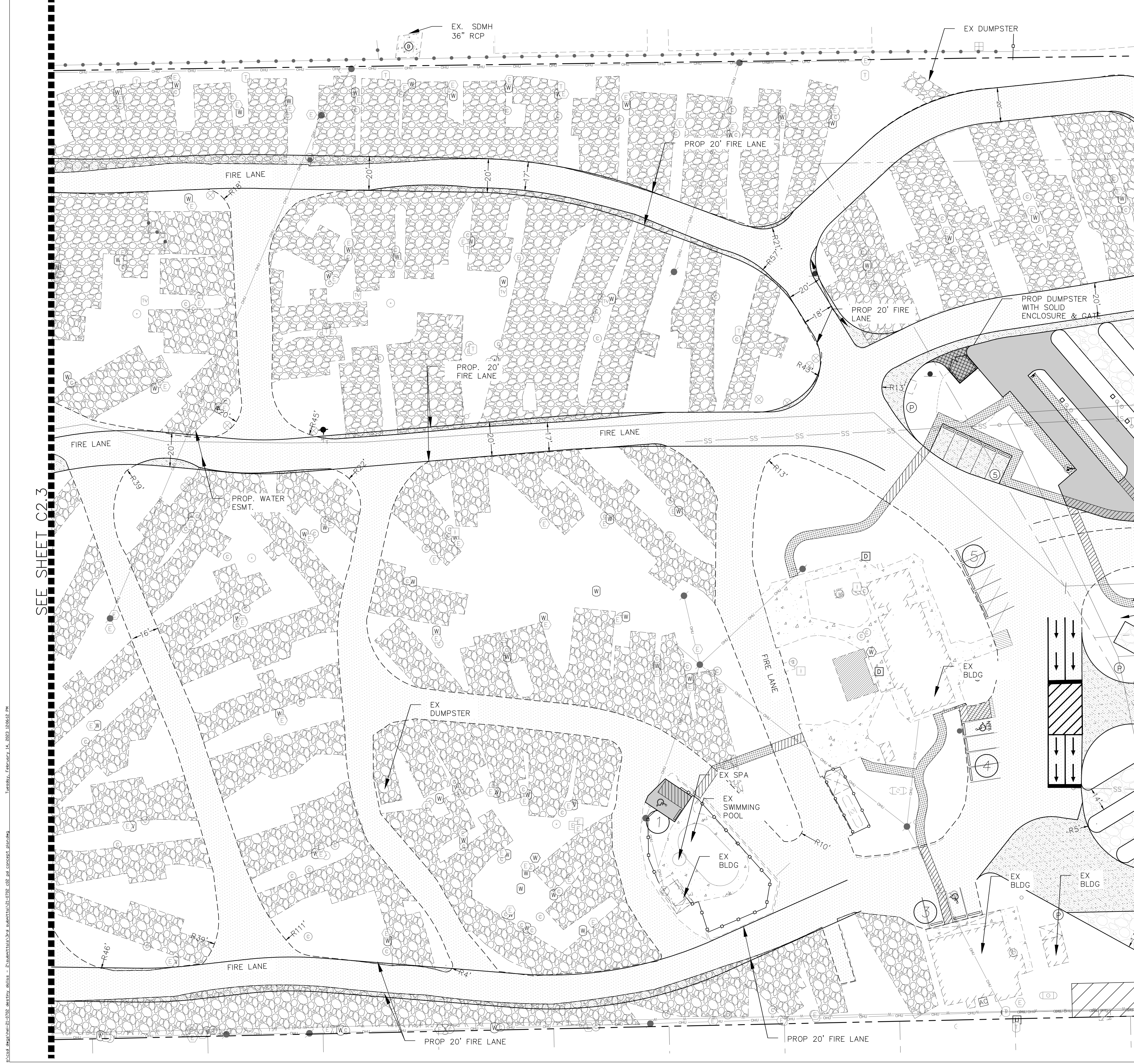
PRELIMINARY PLANS

THIS DOCUMENT IS FOR INTERIM REVIEW AND IS NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.
STEVEN R. HOMEYER, PE # 86942
DATE: 02/14/2023

SEE SHEET C2.2

V:\scd\drawings\21-0702_destiny_dallas - P:\projects\21-0702_destiny_dallas\21-0702_c02_c02.pd concept plan east.dwg, February 14, 2023, 8:05:05 PM





SEE SHEET C2.3

SEE SHEET C2.1

LEGEND	
I.R.F.	IRON ROD FOUND
I.R.S.	IRON ROD SET
"X"	CUT X IN CONCRETE
F.C.P.	FENCE CORNER POST
- - -	ASPHALT
⊕	TELEPHONE MANHOLE
⊖	POWER POLE
⊙	LIGHT POLE
⊗	WATER VALVE
⊝	SANITARY SEWER MANHOLE
●	FIRE HYDRANT
⊗	WM
⊗	WATER METER

PAVEMENT LEGEND	
	DUMPSTER PAVEMENT PROPOSED 8" 4,000 PSI CONCRETE AT 28 DAYS W/ #4 BARS @ 18" OCEW (DOUBLE MAT).
	HEAVY DUTY PAVEMENT (DRIVE AISLE) PROPOSED 8" 3,600 PSI CONC. @ 28 DAYS WITH #3 BARS @ 18" O.C.E.W.
	ASPHALT PAVEMENT PROPOSED 2" TY "D" HMAC OVER 2" TY "B" HMAC COMPACTED TO AN OPTIMUM DENSITY OF 96% PER LIFT IN ACCORDANCE WITH TXDOT ITEM 340. THE HMAC SHALL BE INSTALLED ON 6" OF COMPACTED FLEXIBLE BASE (MINIMUM 95% STANDARD PROCTOR DENSITY) IN ACCORDANCE WITH TXDOT ITEM 247.
	GRAVEL PAVEMENT PROPOSED 2" WASHED STONE. THE WASHED STONE SHALL BE INSTALLED ON 6" COMPACTED FLEXIBLE BASE (MINIMUM 95% STANDARD PROCTOR DENSITY) IN ACCORDANCE WITH TXDOT ITEM 247.
	SIDEWALK PAVEMENT PROPOSED 4" 3,000 PSI CONC. @ 28 DAYS WITH #3 BARS @ 18" O.C.E.W.
	EXISTING ASPHALT

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 - CONNECT PROPOSED ASPHALT PAVEMENT TO EXISTING ASPHALT PAVEMENT USING A SMOOTH SAWCUT W/TACK COAT.

EXHIBIT C
PAGE: 3 OF 6

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STEVEN R. HOMEYER, PE # 86942
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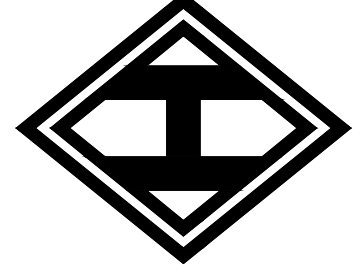
Section I, Item 7.

HOMEYER
ENGINEERING, INC.
TBPE FIRM REGISTRATION NO. F-8440
P.O. BOX 294527, LEWISVILLE, TEXAS 75027
972-906-9985 PHONE 972-906-9987 FAX
WWW.HEI.US.COM

DESTINY DALLAS
LOTS 1 & 2, BLOCK 1
DALLAS KOA CAMPGROUND EDITION
18.98 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

PD CONCEPT
PLAN CENTER

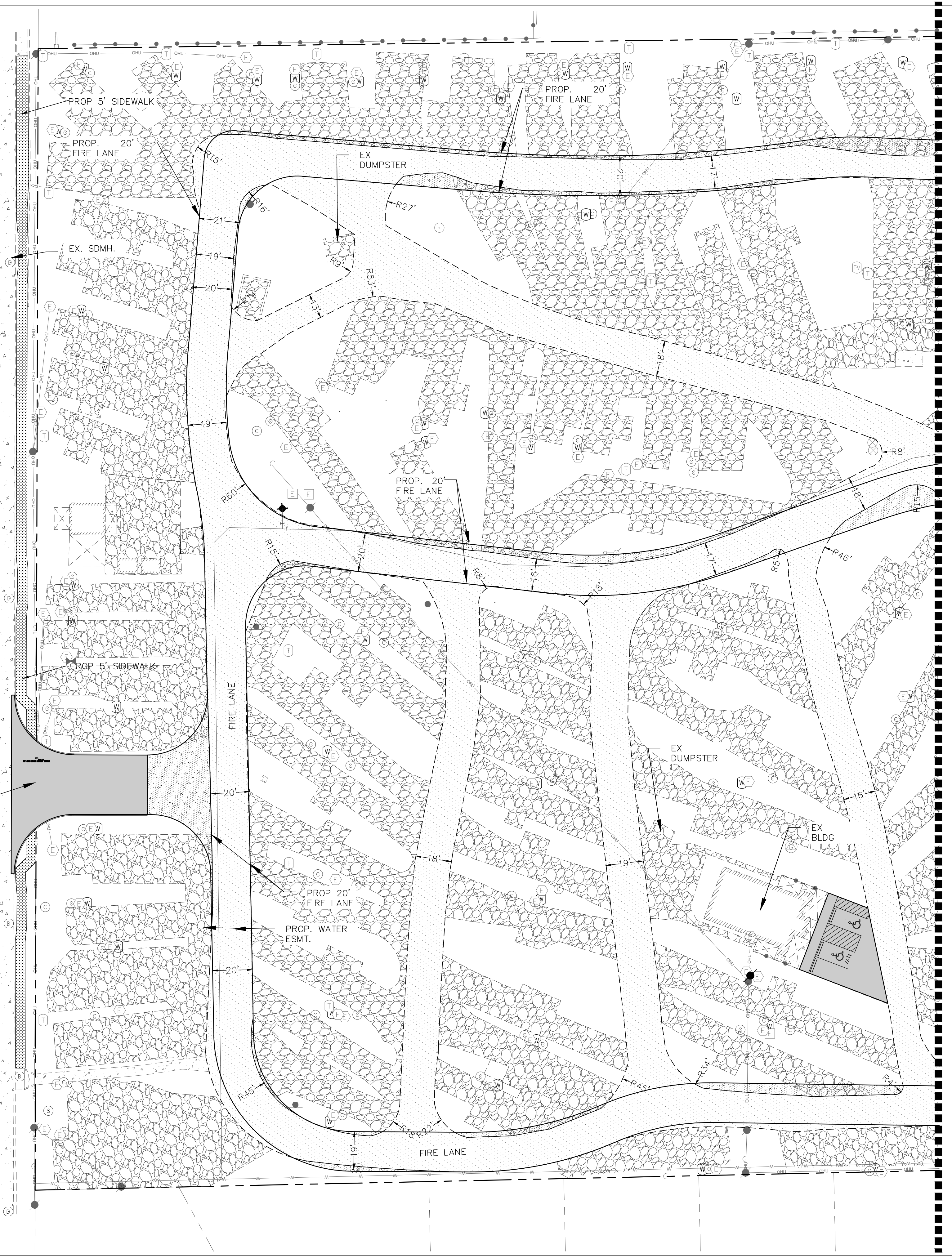
DRAWN: SCD
DATE: 05/01/22
HEI #: 21-0702
SHEET NO: C2.2



TOWER RIDGE DRIVE
60' RIGHT OF WAY

TOWER RIDGE DRIVE
60' RIGHT-OF-WAY

GATED EMERGENCY ACCESS ONLY



SEE SHEET C2.2

LEGEND

- I.R.F. IRON ROD FOUND
- I.R.S. IRON ROD SET
- "X" CUT X IN CONCRETE
- F.C.P. FENCE CORNER POST
- ASPHALT
- ⊙ TELEPHONE MANHOLE
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PAVEMENT NOTES:

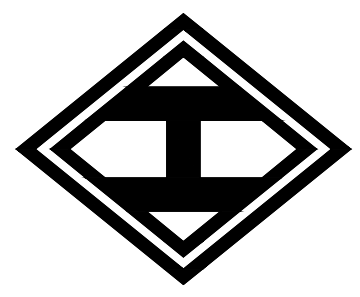
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EXHIBIT C
PAGE: 4 OF 6

PRELIMINARY PLANS
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PURPOSES.
STEVEN R. HOMEYER, PE # 86942
DATE: 02/14/2023

\\scd-arpa\p\21-0702_dms\101\101_sheets\101\101_C2.3_C2.4_C2.5_C2.6_C2.7_C2.8_C2.9_C2.10_C2.11_C2.12_C2.13_C2.14_C2.15_C2.16_C2.17_C2.18_C2.19_C2.20_C2.21_C2.22_C2.23_C2.24_C2.25_C2.26_C2.27_C2.28_C2.29_C2.30_C2.31_C2.32_C2.33_C2.34_C2.35_C2.36_C2.37_C2.38_C2.39_C2.40_C2.41_C2.42_C2.43_C2.44_C2.45_C2.46_C2.47_C2.48_C2.49_C2.50_C2.51_C2.52_C2.53_C2.54_C2.55_C2.56_C2.57_C2.58_C2.59_C2.60_C2.61_C2.62_C2.63_C2.64_C2.65_C2.66_C2.67_C2.68_C2.69_C2.70_C2.71_C2.72_C2.73_C2.74_C2.75_C2.76_C2.77_C2.78_C2.79_C2.80_C2.81_C2.82_C2.83_C2.84_C2.85_C2.86_C2.87_C2.88_C2.89_C2.90_C2.91_C2.92_C2.93_C2.94_C2.95_C2.96_C2.97_C2.98_C2.99_C2.100_C2.101_C2.102_C2.103_C2.104_C2.105_C2.106_C2.107_C2.108_C2.109_C2.110_C2.111_C2.112_C2.113_C2.114_C2.115_C2.116_C2.117_C2.118_C2.119_C2.120_C2.121_C2.122_C2.123_C2.124_C2.125_C2.126_C2.127_C2.128_C2.129_C2.130_C2.131_C2.132_C2.133_C2.134_C2.135_C2.136_C2.137_C2.138_C2.139_C2.140_C2.141_C2.142_C2.143_C2.144_C2.145_C2.146_C2.147_C2.148_C2.149_C2.150_C2.151_C2.152_C2.153_C2.154_C2.155_C2.156_C2.157_C2.158_C2.159_C2.160_C2.161_C2.162_C2.163_C2.164_C2.165_C2.166_C2.167_C2.168_C2.169_C2.170_C2.171_C2.172_C2.173_C2.174_C2.175_C2.176_C2.177_C2.178_C2.179_C2.180_C2.181_C2.182_C2.183_C2.184_C2.185_C2.186_C2.187_C2.188_C2.189_C2.190_C2.191_C2.192_C2.193_C2.194_C2.195_C2.196_C2.197_C2.198_C2.199_C2.200_C2.201_C2.202_C2.203_C2.204_C2.205_C2.206_C2.207_C2.208_C2.209_C2.210_C2.211_C2.212_C2.213_C2.214_C2.215_C2.216_C2.217_C2.218_C2.219_C2.220_C2.221_C2.222_C2.223_C2.224_C2.225_C2.226_C2.227_C2.228_C2.229_C2.230_C2.231_C2.232_C2.233_C2.234_C2.235_C2.236_C2.237_C2.238_C2.239_C2.240_C2.241_C2.242_C2.243_C2.244_C2.245_C2.246_C2.247_C2.248_C2.249_C2.250_C2.251_C2.252_C2.253_C2.254_C2.255_C2.256_C2.257_C2.258_C2.259_C2.260_C2.261_C2.262_C2.263_C2.264_C2.265_C2.266_C2.267_C2.268_C2.269_C2.270_C2.271_C2.272_C2.273_C2.274_C2.275_C2.276_C2.277_C2.278_C2.279_C2.280_C2.281_C2.282_C2.283_C2.284_C2.285_C2.286_C2.287_C2.288_C2.289_C2.290_C2.291_C2.292_C2.293_C2.294_C2.295_C2.296_C2.297_C2.298_C2.299_C2.300_C2.301_C2.302_C2.303_C2.304_C2.305_C2.306_C2.307_C2.308_C2.309_C2.310_C2.311_C2.312_C2.313_C2.314_C2.315_C2.316_C2.317_C2.318_C2.319_C2.320_C2.321_C2.322_C2.323_C2.324_C2.325_C2.326_C2.327_C2.328_C2.329_C2.330_C2.331_C2.332_C2.333_C2.334_C2.335_C2.336_C2.337_C2.338_C2.339_C2.340_C2.341_C2.342_C2.343_C2.344_C2.345_C2.346_C2.347_C2.348_C2.349_C2.350_C2.351_C2.352_C2.353_C2.354_C2.355_C2.356_C2.357_C2.358_C2.359_C2.360_C2.361_C2.362_C2.363_C2.364_C2.365_C2.366_C2.367_C2.368_C2.369_C2.370_C2.371_C2.372_C2.373_C2.374_C2.375_C2.376_C2.377_C2.378_C2.379_C2.380_C2.381_C2.382_C2.383_C2.384_C2.385_C2.386_C2.387_C2.388_C2.389_C2.390_C2.391_C2.392_C2.393_C2.394_C2.395_C2.396_C2.397_C2.398_C2.399_C2.400_C2.401_C2.402_C2.403_C2.404_C2.405_C2.406_C2.407_C2.408_C2.409_C2.410_C2.411_C2.412_C2.413_C2.414_C2.415_C2.416_C2.417_C2.418_C2.419_C2.420_C2.421_C2.422_C2.423_C2.424_C2.425_C2.426_C2.427_C2.428_C2.429_C2.430_C2.431_C2.432_C2.433_C2.434_C2.435_C2.436_C2.437_C2.438_C2.439_C2.440_C2.441_C2.442_C2.443_C2.444_C2.445_C2.446_C2.447_C2.448_C2.449_C2.450_C2.451_C2.452_C2.453_C2.454_C2.455_C2.456_C2.457_C2.458_C2.459_C2.460_C2.461_C2.462_C2.463_C2.464_C2.465_C2.466_C2.467_C2.468_C2.469_C2.470_C2.471_C2.472_C2.473_C2.474_C2.475_C2.476_C2.477_C2.478_C2.479_C2.480_C2.481_C2.482_C2.483_C2.484_C2.485_C2.486_C2.487_C2.488_C2.489_C2.490_C2.491_C2.492_C2.493_C2.494_C2.495_C2.496_C2.497_C2.498_C2.499_C2.500_C2.501_C2.502_C2.503_C2.504_C2.505_C2.506_C2.507_C2.508_C2.509_C2.510_C2.511_C2.512_C2.513_C2.514_C2.515_C2.516_C2.517_C2.518_C2.519_C2.520_C2.521_C2.522_C2.523_C2.524_C2.525_C2.526_C2.527_C2.528_C2.529_C2.530_C2.531_C2.532_C2.533_C2.534_C2.535_C2.536_C2.537_C2.538_C2.539_C2.540_C2.541_C2.542_C2.543_C2.544_C2.545_C2.546_C2.547_C2.548_C2.549_C2.550_C2.551_C2.552_C2.553_C2.554_C2.555_C2.556_C2.557_C2.558_C2.559_C2.560_C2.561_C2.562_C2.563_C2.564_C2.565_C2.566_C2.567_C2.568_C2.569_C2.570_C2.571_C2.572_C2.573_C2.574_C2.575_C2.576_C2.577_C2.578_C2.579_C2.580_C2.581_C2.582_C2.583_C2.584_C2.585_C2.586_C2.587_C2.588_C2.589_C2.590_C2.591_C2.592_C2.593_C2.594_C2.595_C2.596_C2.597_C2.598_C2.599_C2.600_C2.601_C2.602_C2.603_C2.604_C2.605_C2.606_C2.607_C2.608_C2.609_C2.610_C2.611_C2.612_C2.613_C2.614_C2.615_C2.616_C2.617_C2.618_C2.619_C2.620_C2.621_C2.622_C2.623_C2.624_C2.625_C2.626_C2.627_C2.628_C2.629_C2.630_C2.631_C2.632_C2.633_C2.634_C2.635_C2.636_C2.637_C2.638_C2.639_C2.640_C2.641_C2.642_C2.643_C2.644_C2.645_C2.646_C2.647_C2.648_C2.649_C2.650_C2.651_C2.652_C2.653_C2.654_C2.655_C2.656_C2.657_C2.658_C2.659_C2.660_C2.661_C2.662_C2.663_C2.664_C2.665_C2.666_C2.667_C2.668_C2.669_C2.670_C2.671_C2.672_C2.673_C2.674_C2.675_C2.676_C2.677_C2.678_C2.679_C2.680_C2.681_C2.682_C2.683_C2.684_C2.685_C2.686_C2.687_C2.688_C2.689_C2.690_C2.691_C2.692_C2.693_C2.694_C2.695_C2.696_C2.697_C2.698_C2.699_C2.700_C2.701_C2.702_C2.703_C2.704_C2.705_C2.706_C2.707_C2.708_C2.709_C2.710_C2.711_C2.712_C2.713_C2.714_C2.715_C2.716_C2.717_C2.718_C2.719_C2.720_C2.721_C2.722_C2.723_C2.724_C2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HOMEYER
ENGINEERING, INC.
T.B.P.E. FIRM REGISTRATION NO. F-8440
P.O. BOX 294527 LEWISVILLE, TEXAS 75027
972-906-9985 PHONE 972-906-9987 FAX
WWW.HEI.US.COM

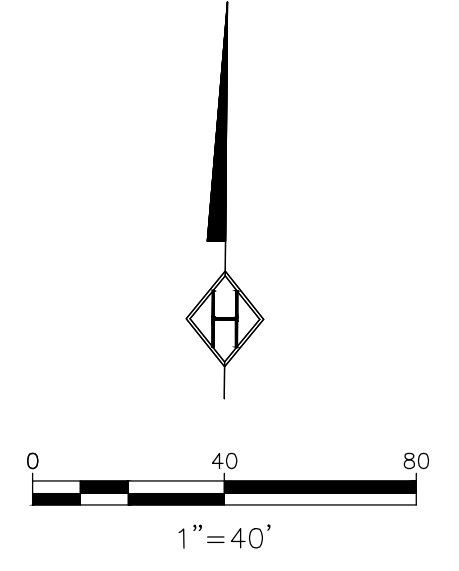
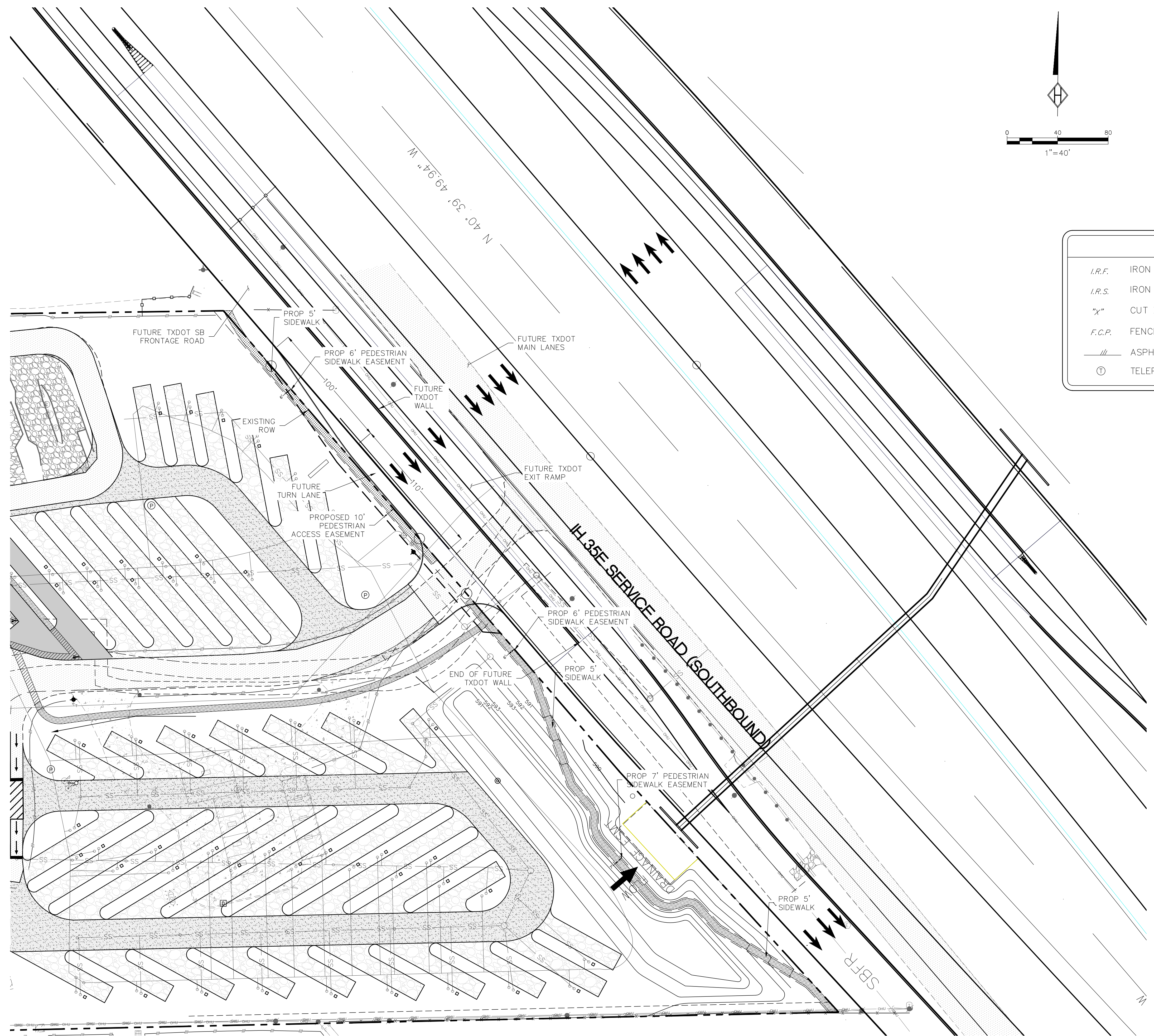


DESTINY DALLAS
LOTS 1 & 2, BLOCK 1
DALLAS KOA CAMPGROUND EDITION
18.98 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

PD CONCEPT
PLAN
TXDOT

DRAWN: SCD
DATE: 05/01/22
HEI #: 21-0702

SHEET NO:
C2.4



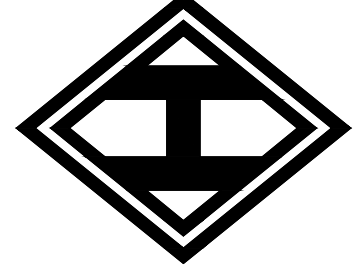
LEGEND			
I.R.F.	IRON ROD FOUND	Ø	POWER POLE
I.R.S.	IRON ROD SET	⊙	LIGHT POLE
"X"	CUT X IN CONCRETE	⊗	WATER VALVE
F.C.P.	FENCE CORNER POST	⊙ ^{SSMH}	SANITARY SEWER MANHOLE
///	ASPHALT	●	FIRE HYDRANT
Ⓣ	TELEPHONE MANHOLE	⊗ ^{WM}	WATER METER

EXHIBIT C
PAGE: 5 OF 6

PRELIMINARY PLANS
THIS DOCUMENT IS FOR INTERIM REVIEW AND IS NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.
STEVEN R. HOMEYER, PE # 86942
DATE: 12/07/2022

\\scd-arpa\p1\210702_destiny_dallas - P\destiny_dallas\21-0702_054_pd_concept_plan_txdot.dwg Wednesday, December 07, 2022 10:52 AM

HOMEYER
ENGINEERING, INC.
TBP# FIRM REGISTRATION NO. F-8440
P. O. BOX 294527 LEWISVILLE, TEXAS 7502
972-906-9985 PHONE 972-906-9987 FAX
WWW.HEI.US.COM



DESTINY DALLAS
LOTS 1 & 2, BLOCK 1
DALLAS KOA CAMPGROUND EDITION
18.98 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

PD CONCEPT
PLAN

DRAWN: SCD
DATE: 05/01/22
HEI #: 21-0702

SHEET NO:
C2.5

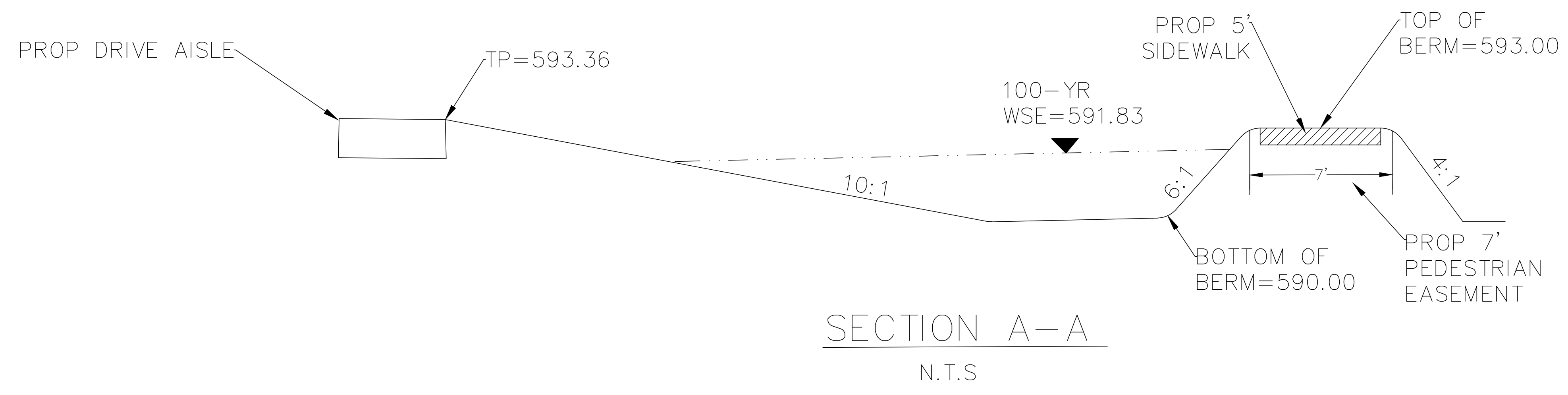
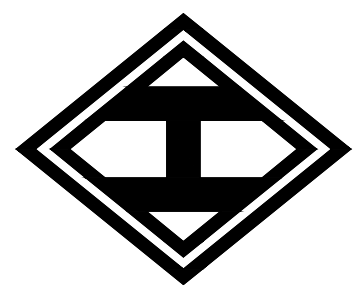


EXHIBIT C
PAGE: 6 OF 6

PRELIMINARY PLANS
THIS DOCUMENT IS FOR INTERIM REVIEW AND IS NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.
STEVEN R. HOMEYER, PE # 86942
DATE: 12/07/2022

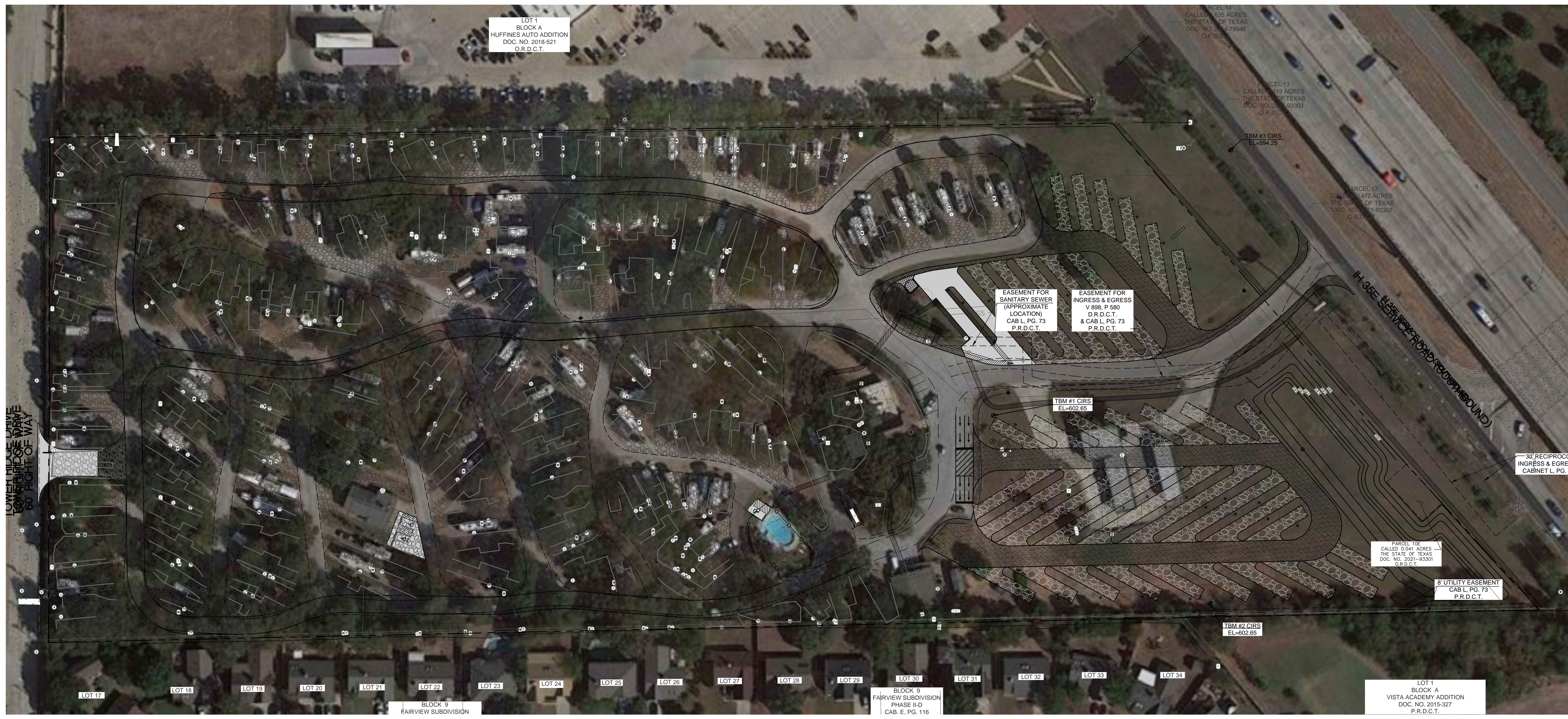
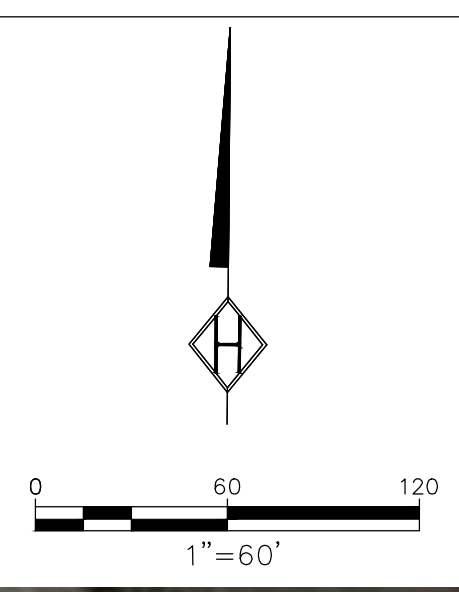
HOMEYER
ENGINEERING, INC.
T.B.P.E. FIRM REGISTRATION NO. F-8440
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DESTINY DALLAS
LOTS 1 & 2, BLOCK 1
DALLAS KOA CAMPGROUND EDITION
18.98 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

CONCEPT PLAN
OVERLAY WITH
AERIAL

DRAWN: SCD
DATE: 05/01/22
HEI #: 21-0702
SHEET NO:
C4



LEGEND

I.R.F.	IRON ROD FOUND	⊗	POWER POLE
I.R.S.	IRON ROD SET	⊙	LIGHT POLE
"X"	CUT X IN CONCRETE	⊗	WATER VALVE
F.C.P.	FENCE CORNER POST	⊙SSMH	SANITARY SEWER MANHOLE
---	ASPHALT	⊙	FIRE HYDRANT
⊙	TELEPHONE MANHOLE	⊗WM	WATER METER

OWNER
Dallas RV., LLC
470 E. Herndon
Fresno, California 93720
Contact: Brett Fugman
Phon: 559-905-6151

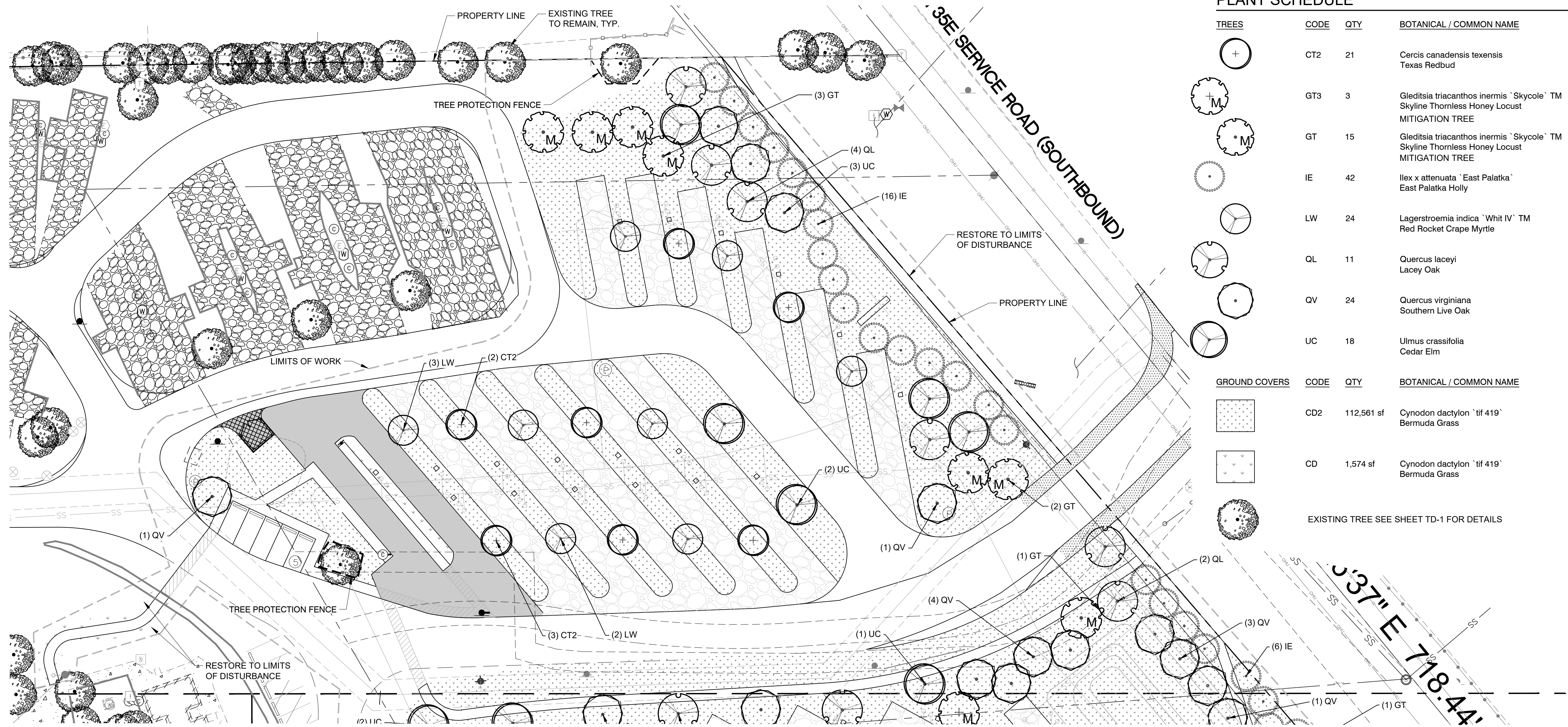
ENGINEER
Homeyer Engineering, Inc.
P.O. Box 294527
Lewisville, Texas 75029
Contact: Steven R. Homeyer, PE
Phone: 972-906-9985

SURVEYOR
Eagle Surveying, LLC
210 S. Elm Street, Suite 104
Denton, Texas 76201
Contact: Mason Decker
Phone: 940-222-3009

EXHIBIT D

PRELIMINARY PLANS
THIS DOCUMENT IS FOR INTERIM REVIEW AND IS NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.
STEVEN R. HOMEYER, PE # 86942
DATE: 11/14/2022

A:\2022\21-0702 DESTINY DALLAS - FAIRVIEW SUBDIVISION\21-0702-04 CONCEPT PLAN OVERLAY WITH AERIAL.dwg, 14, 2022, 4:00:14 PM



PLANT SCHEDULE

TREES	CODE	QTY	BOTANICAL / COMMON NAME	CAL.	CONT.	SIZE
	CT2	21	Cercis canadensis texensis Texas Redbud	2" Cal.	Cont. or B&B	7' Min.
	GT3	3	Gleditsia triacanthos inermis 'Skycole' TM Skyline Thornless Honey Locust MITIGATION TREE	3" Cal.	Cont. or B&B	12' -14'
	GT	15	Gleditsia triacanthos inermis 'Skycole' TM Skyline Thornless Honey Locust MITIGATION TREE	4" Cal.	Cont. or B&B	14' Min.
	IE	42	Ilex x attenuata 'East Palatka' East Palatka Holly	2" Cal.	Cont.	8' HT MIN
	LW	24	Lagerstroemia indica 'Whit IV' TM Red Rocket Crape Myrtle	3-5 CANES, 2.5" OVERALL	Cont.	8' HT MIN
	QL	11	Quercus laceyi Lacey Oak	3" Cal.	Cont. or B&B	12' -14' HT
	QV	24	Quercus virginiana Southern Live Oak	3" Cal.	Cont. or B&B	12' -14' HT
	UC	18	Ulmus crassifolia Cedar Elm	3" Cal.	Cont. or B&B	12' -14' HT

GROUND COVERS	CODE	QTY	BOTANICAL / COMMON NAME	CONT.	SPACING	SIZE
	CD2	112,561 sf	Cynodon dactylon 'tif 419' Bermuda Grass	Hydromulch		
	CD	1,574 sf	Cynodon dactylon 'tif 419' Bermuda Grass	Sod		

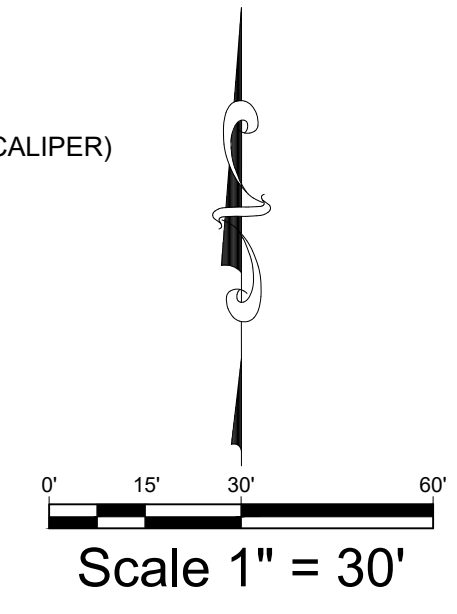
EXISTING TREE SEE SHEET TD-1 FOR DETAILS

MATCHLINE - SEE SHEET LP-2

LANDSCAPE CALCULATIONS

STREET TREES	
IH 35E SERVICE ROAD	737 LF
FRONTAGE LENGTH:	25 TREES (1 PER 30 LF OF FRONTAGE)
STREET TREES REQUIRED:	25 TREES
STREET TREES PROVIDED:	
PARKING LOT	5 PARKING SPACES
TREES REQUIRED:	1 TREES (1 PER 10 SPACES)
TREES PROVIDED:	1 TREES
SCREENING	
LENGTH:	207 LF
TREES REQUIRED:	8 TREES (1 PER 50 LF DOUBLE ROW)
TREES PROVIDED:	10 TREES
MITIGATION	
TREES REQUIRED:	69" (23 - 3" CALIPER)
TREES PROVIDED:	69" (15 - 4" CALIPER, 3 - 3" CALIPER)

- NOTES:**
- TREES AND SHRUBS MAY BE GROUPED BUT LINEAR FOOTAGE REQUIREMENTS QUANTITY SHALL NOT CHANGE.
 - LANDSCAPE PLANS ARE CONCEPTUAL AND FLEXIBILITY IN LOCATION/GROUPING PERMITTED DURING CONSTRUCTION.



ROOT BARRIERS

THE CONTRACTOR SHALL INSTALL ROOT BARRIERS NEAR ALL NEWLY-PLANTED TREES THAT ARE LOCATED WITHIN FIVE (5) FEET OF PAVING OR CURBS. ROOT BARRIERS SHALL BE "CENTURY" OR "DEEP-ROOT" 24" DEEP PANELS (OR EQUAL). BARRIERS SHALL BE LOCATED IMMEDIATELY ADJACENT TO HARDSCAPE. INSTALL PANELS PER MANUFACTURER'S RECOMMENDATIONS. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR USE ROOT BARRIERS OF A TYPE THAT COMPLETELY ENIRCLE THE ROOTBALL.

MULCHES

AFTER ALL PLANTING IS COMPLETE, CONTRACTOR SHALL INSTALL 3" THICK LAYER OF 1-1/2" SHREDDED WOOD MULCH, NATURAL (UNDYED), OVER LANDSCAPE FABRIC IN ALL PLANTING AREAS (EXCEPT FOR TURF AND SEEDED AREAS). CONTRACTOR SHALL SUBMIT SAMPLES OF ALL MULCHES TO LANDSCAPE ARCHITECT AND OWNER FOR APPROVAL PRIOR TO CONSTRUCTION. ABSOLUTELY NO EXPOSED GROUND SHALL BE LEFT SHOWING ANYWHERE ON THE PROJECT AFTER MULCH HAS BEEN INSTALLED (SUBJECT TO THE CONDITIONS AND REQUIREMENTS OF THE "GENERAL GRADING AND PLANTING NOTES" AND SPECIFICATIONS).

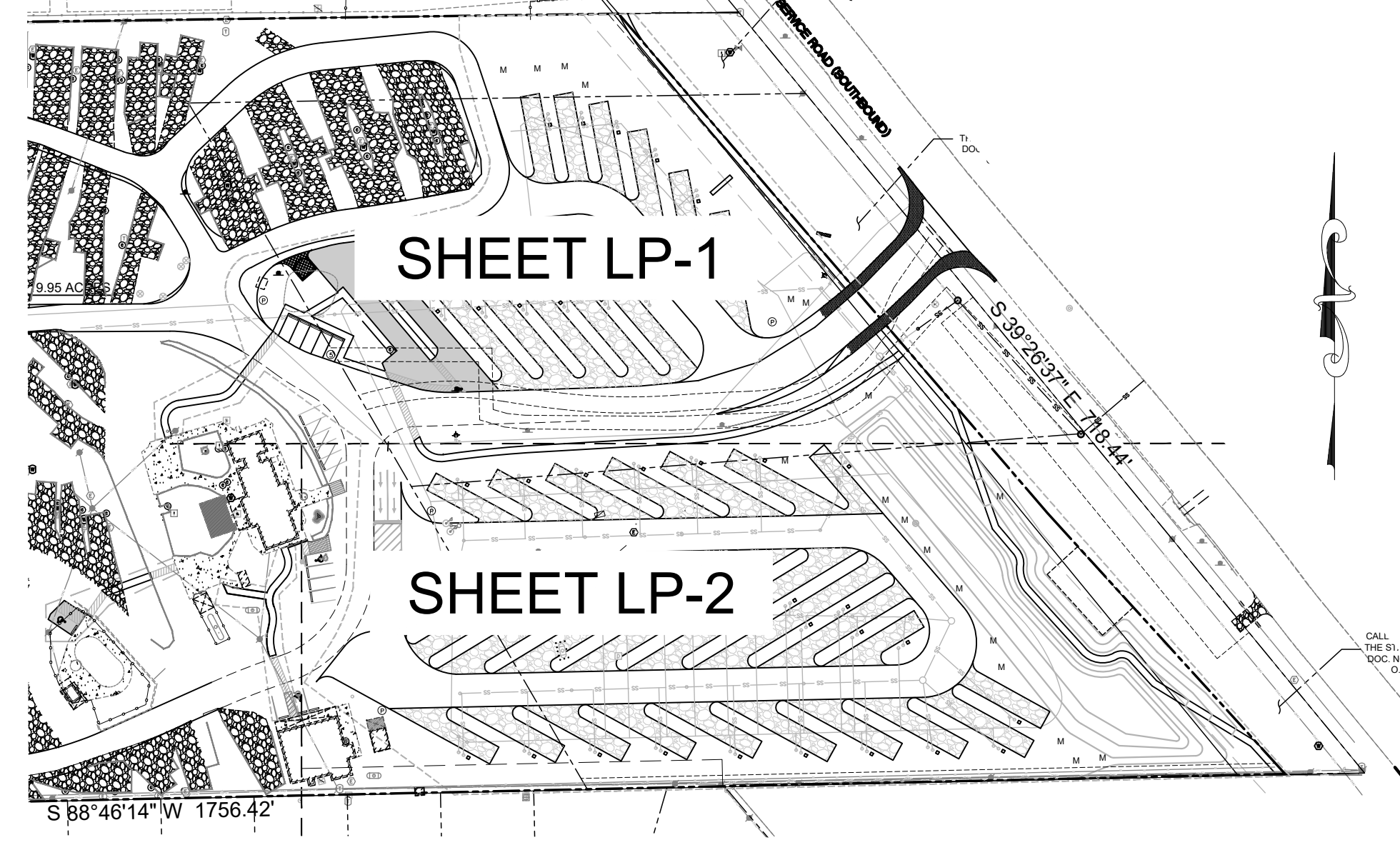
LANDSCAPE NOTES

- ALL REQUIRED LANDSCAPE AREAS SHALL BE PROVIDED WITH AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM WITH RAIN AND FREEZE SENSORS AND EVAPOTRANSPIRATION (ET) WEATHER BASED CONTROLLERS AND SAID IRRIGATION SYSTEM SHALL BE DESIGNED BY A QUALIFIED PROFESSIONAL AND INSTALLED BY 12 STREET TREES REQUIRED, A LICENSED IRRIGATOR.
- THE CONTRACTOR SHALL VERIFY WATER RESTRICTIONS WITHIN THE CITY OF MCKINNEY AT TIME OF PLANTING. SHOULD WATER RESTRICTIONS NOT ALLOW HYDRO-MULCH, HYDRO-SEEDING, OR SPRIGGING (STAGE 3 AND STAGE 4 WATER RESTRICTIONS), AN APPROVED ALTERNATIVE FOR GRASSING SHALL BE INSTALLED.

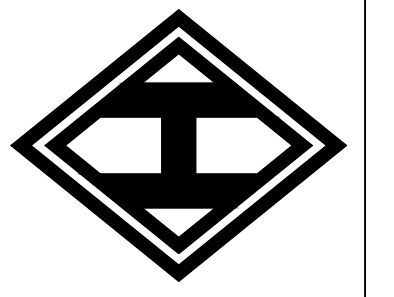
GENERAL GRADING AND PLANTING NOTES

- BY SUBMITTING A PROPOSAL FOR THE LANDSCAPE PLANTING SCOPE OF WORK, THE CONTRACTOR CONFIRMS THAT HE HAS READ, AND WILL COMPLY WITH, THE ASSOCIATED NOTES, SPECIFICATIONS, AND DETAILS WITH THIS PROJECT.
- THE GENERAL CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL EXISTING VEGETATION (EXCEPT WHERE NOTED TO REMAIN).
- IN THE CONTEXT OF THESE PLANS, NOTES, AND SPECIFICATIONS, "FINISH GRADE" REFERS TO THE FINAL ELEVATION OF THE SOIL SURFACE (NOT TOP OF MULCH) AS INDICATED ON THE GRADING PLANS.
 - BEFORE STARTING WORK, THE LANDSCAPE CONTRACTOR SHALL VERIFY THAT THE ROUGH GRADES OF ALL LANDSCAPE AREAS ARE WITHIN +/-0.1' OF FINISH GRADE. SEE SPECIFICATIONS FOR MORE DETAILED INSTRUCTION ON TURF AREA AND PLANTING BED PREPARATION.
 - CONSTRUCT AND MAINTAIN FINISH GRADES AS SHOWN ON GRADING PLANS, AND CONSTRUCT AND MAINTAIN SLOPES AS RECOMMENDED BY THE GEOTECHNICAL REPORT. ALL LANDSCAPE AREAS SHALL HAVE POSITIVE DRAINAGE AWAY FROM STRUCTURES AT THE MINIMUM SLOPE SPECIFIED IN THE REPORT AND ON THE GRADING PLANS, AND AREAS OF POTENTIAL PONDING SHALL BE REGRADED TO BLEND IN WITH THE SURROUNDING GRADES AND ELIMINATE PONDING POTENTIAL.
 - THE LANDSCAPE CONTRACTOR SHALL DETERMINE WHETHER OR NOT THE EXPORT OF ANY SOIL WILL BE NEEDED, TAKING INTO ACCOUNT THE ROUGH GRADE PROVIDED, THE AMOUNT OF SOIL AMENDMENTS TO BE ADDED (BASED ON A SOIL TEST, PER SPECIFICATIONS), AND THE FINISH GRADES TO BE ESTABLISHED.
 - ENSURE THAT THE FINISH GRADE IN SHRUB AREAS IMMEDIATELY ADJACENT TO WALKS AND OTHER WALKING SURFACES, AFTER INSTALLING SOIL AMENDMENTS, IS 3" BELOW THE ADJACENT FINISH SURFACE, IN ORDER TO ALLOW FOR PROPER MULCH DEPTH. TAPER THE SOIL SURFACE TO MEET FINISH GRADE, AS SPECIFIED ON THE GRADING PLANS, AT APPROXIMATELY 18" AWAY FROM THE WALKS.
 - ENSURE THAT THE FINISH GRADE IN TURF AREAS IMMEDIATELY ADJACENT TO WALKS AND OTHER WALKING SURFACES, AFTER INSTALLING SOIL AMENDMENTS, IS 1" BELOW THE FINISH SURFACE OF THE WALKS. TAPER THE SOIL SURFACE TO MEET FINISH GRADE, AS SPECIFIED ON THE GRADING PLANS, AT APPROXIMATELY 18" AWAY FROM THE WALKS.
 - SHOULD ANY CONFLICTS AND/OR DISCREPANCIES ARISE BETWEEN THE GRADING PLANS, GEOTECHNICAL REPORT, THESE NOTES AND PLANS, AND ACTUAL CONDITIONS, THE CONTRACTOR SHALL IMMEDIATELY BRING SUCH ITEMS TO THE ATTENTION OF THE LANDSCAPE ARCHITECT, GENERAL CONTRACTOR, AND OWNER.
- ALL PLANT LOCATIONS ARE DIAGRAMMATIC. ACTUAL LOCATIONS SHALL BE VERIFIED WITH THE LANDSCAPE ARCHITECT OR DESIGNER PRIOR TO PLANTING. THE LANDSCAPE CONTRACTOR SHALL ENSURE THAT ALL REQUIREMENTS OF THE PERMITTING AUTHORITY ARE MET (I.E., MINIMUM PLANT QUANTITIES, PLANTING METHODS, TREE PROTECTION METHODS, ETC.).
 - THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR DETERMINING PLANT QUANTITIES, PLANT QUANTITIES SHOWN ON LEGENDS AND CALLOUTS ARE FOR GENERAL INFORMATION ONLY. IN THE EVENT OF A DISCREPANCY BETWEEN THE PLAN AND THE PLANT LEGEND, THE PLANT QUANTITY AS SHOWN ON THE PLAN (FOR INDIVIDUAL SYMBOLS) OR CALLOUT (FOR GROUNDCOVER PATTERNS) SHALL TAKE PRECEDENCE.
 - NO SUBSTITUTIONS OF PLANT MATERIALS SHALL BE ALLOWED WITHOUT THE WRITTEN PERMISSION OF THE LANDSCAPE ARCHITECT. IF SOME OF THE PLANTS ARE NOT AVAILABLE, THE LANDSCAPE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT IN WRITING (VIA PROPER CHANNELS).
 - THE CONTRACTOR SHALL, AT A MINIMUM, PROVIDE REPRESENTATIVE PHOTOS OF ALL PLANTS PROPOSED FOR THE PROJECT. THE CONTRACTOR SHALL ALLOW THE LANDSCAPE ARCHITECT AND THE OWNER/OWNER'S REPRESENTATIVE TO INSPECT, AND APPROVE OR REJECT, ALL PLANTS DELIVERED TO THE JOBSITE. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR SUBMITTALS.
- THE CONTRACTOR SHALL MAINTAIN THE LANDSCAPE IN A HEALTHY CONDITION FOR 90 DAYS AFTER ACCEPTANCE BY THE OWNER. REFER TO SPECIFICATIONS FOR CONDITIONS OF ACCEPTANCE FOR THE START OF THE MAINTENANCE PERIOD, AND FOR FINAL ACCEPTANCE AT THE END OF THE MAINTENANCE PERIOD.
- SEE SPECIFICATIONS AND DETAILS FOR FURTHER REQUIREMENTS.

SHEET KEY

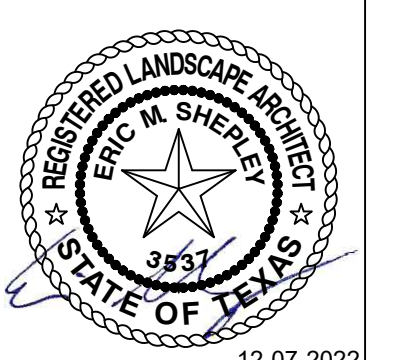


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DESTINY DALLAS - 2
 DALLAS KOA, BLOCK 1, LOT 1 & 2
 CAMPGROUND ADDITION
 5.89 ACRES
 CITY OF CORINTH
 DENTON COUNTY, TEXAS

CONCEPTUAL
 LANDSCAPE
 AND SCREENING PLAN



DRAWN: EMS
 DATE: 09/24/21
 HEI #: 21-0702

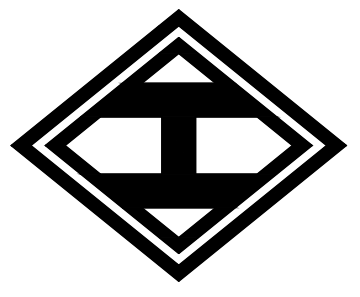
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LP-1



EXHIBIT E
 PAGE 1 OF 6



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DESTINY DALLAS - 2
 DALLAS KOA, BLOCK 1, LOT 1 & 2
 CAMPGROUND ADDITION
 5.89 ACRES
 CITY OF CORINTH
 DENTON COUNTY, TEXAS

LANDSCAPE
 PLANTING

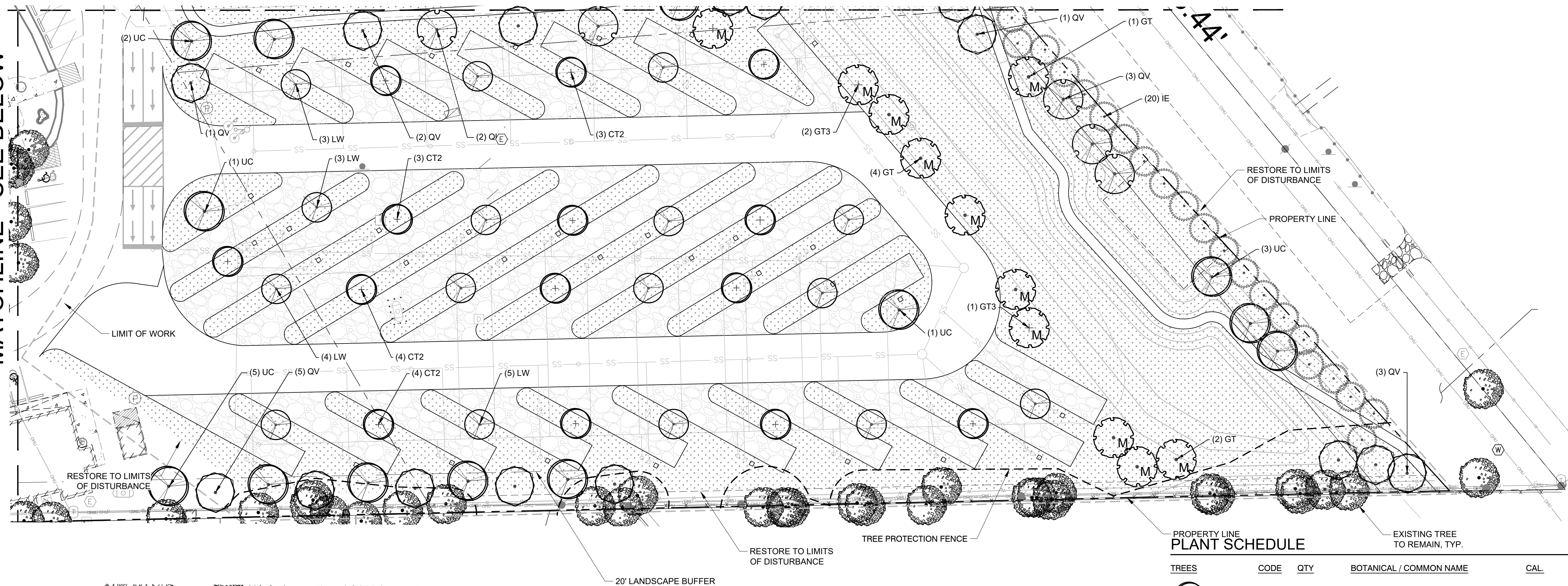


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 DATE: 09/24/21
 HEI #: 21-0702

SHEET NO:
LP-2

MATCHLINE - SEE SHEET LP-1

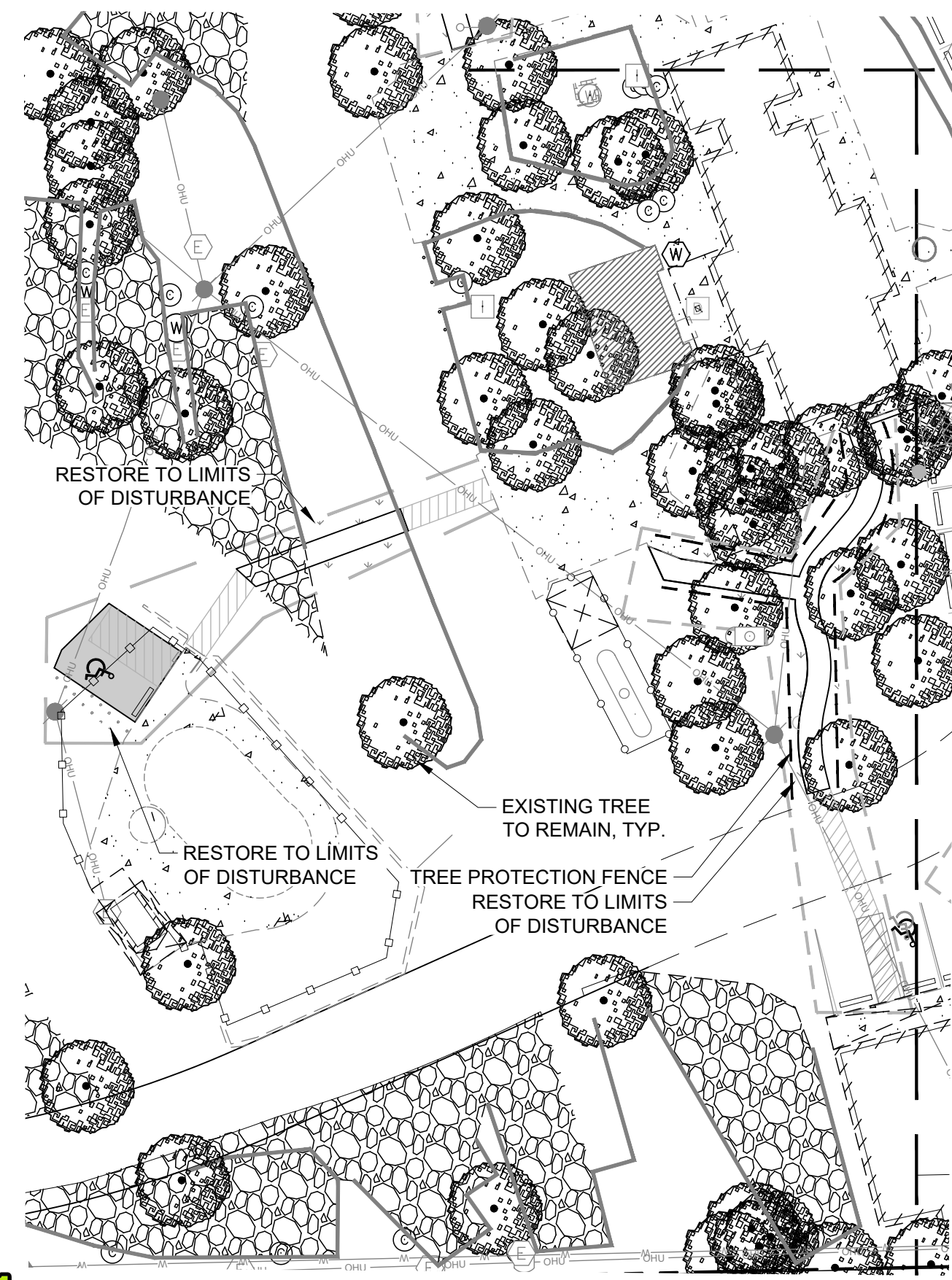
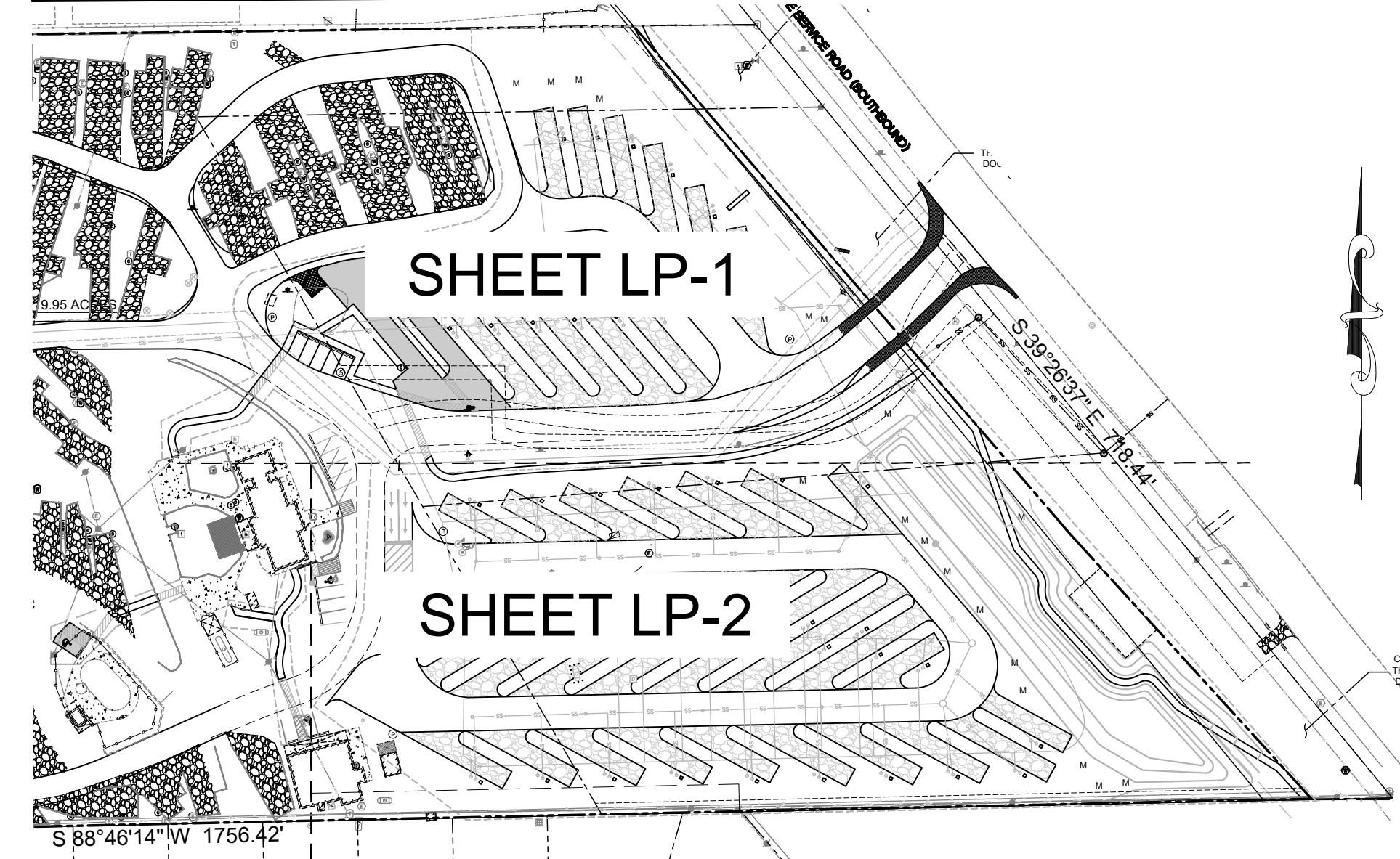
MATCHLINE - SEE BELOW



PROPERTY LINE
 PLANT SCHEDULE

TREES	CODE	QTY	BOTANICAL / COMMON NAME	CAL.	CONT.	SIZE
	CT2	21	Cercis canadensis texensis Texas Redbud	2' Cal.	Cont. or B&B	7' Min.
	GT3	3	Gleditsia triacanthos inermis 'Skycole'™ Skyline Thornless Honey Locust MITIGATION TREE	3' Cal.	Cont. or B&B	12'-14'
	GT	15	Gleditsia triacanthos inermis 'Skycole'™ Skyline Thornless Honey Locust MITIGATION TREE	4' Cal.	Cont. or B&B	14' Min.
	IE	42	Ilex x attenuata 'East Palatka' East Palatka Holly	2' Cal.	Cont.	8' HT MIN
	LW	24	Lagerstroemia indica 'Whit IV'™ Red Rocket Crape Myrtle	3-5 CANES, 2.5" OVERALL	Cont.	8' HT MIN
	QL	11	Quercus laceyi Lacey Oak	3' Cal.	Cont. or B&B	12'-14' HT
	QV	24	Quercus virginiana Southern Live Oak	3' Cal.	Cont. or B&B	12'-14' HT
	UC	18	Ulmus crassifolia Cedar Elm	3' Cal.	Cont. or B&B	12'-14' HT
GROUND COVERS	CODE	QTY	BOTANICAL / COMMON NAME	CONT.	SPACING	SIZE
	CD2	112,561 sf	Cynodon dactylon 'tif 419' Bermuda Grass	Hydromulch		
	CD	1,574 sf	Cynodon dactylon 'tif 419' Bermuda Grass	Sod		
EXISTING TREE SEE SHEET TD-1 FOR DETAILS						

SHEET KEY



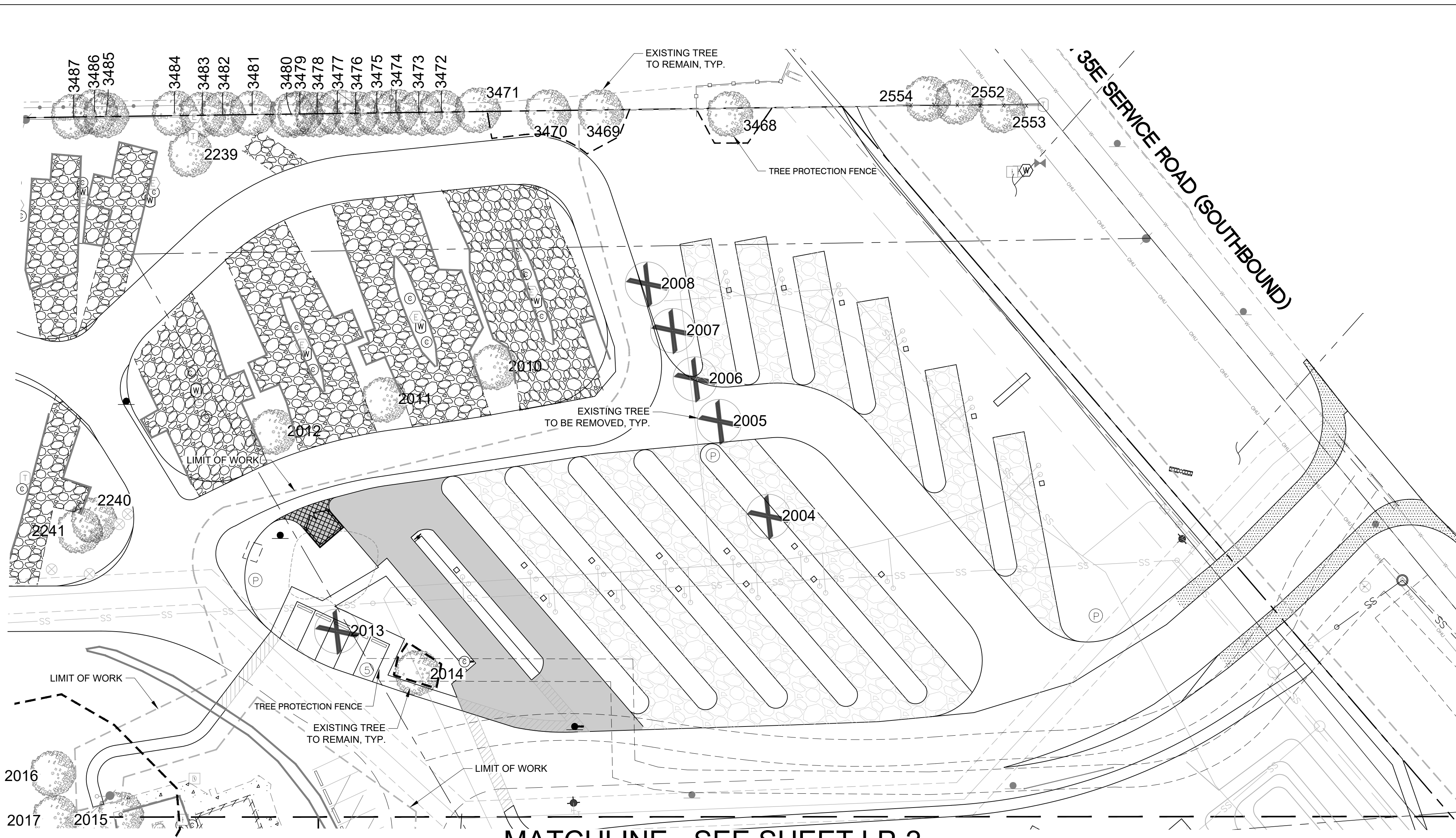
MATCHLINE - SEE ABOVE



Scale 1" = 30'

EXHIBIT E
 PAGE 2 OF 6



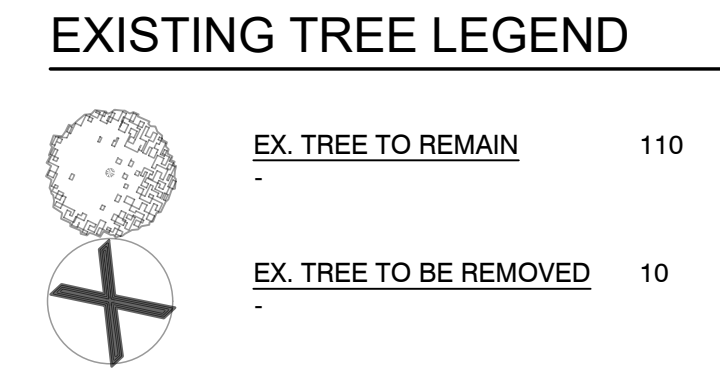


TREE INVENTORY

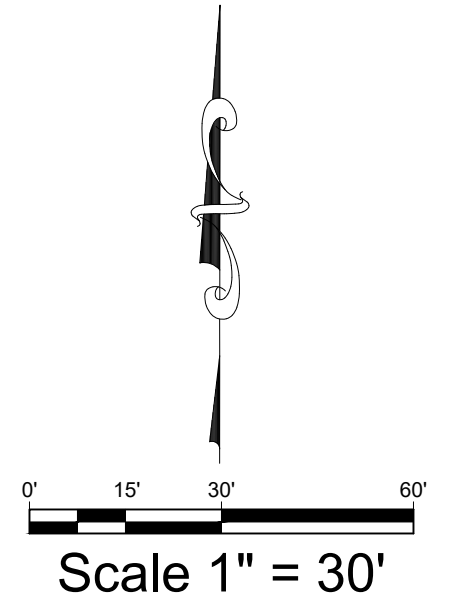
Tag #	Tree Type	Adj. DBH	Status	Tag #	Tree Type	Adj. DBH	Status
2001	Catalpa- Catalpa bignonioides	9	Remove	2046	Cedar Elm- Ulmus crassifolia	12	Remain
2002	Catalpa- Catalpa bignonioides	8	Remove	2047	Cedar Elm- Ulmus crassifolia	14	Remain
2003	Catalpa- Catalpa bignonioides	10	Remove	2048	Hackberry- Celtis occidentalis	23	Remain
2004	Mulberry- Morus alba	12	Remove	2049	Blackjack Oak- Quercus marilandica	21	Remain
2005	Mulberry- Morus alba	33	Remove	2050	Post Oak- Quercus stellata	25	Remain
2006	Mulberry- Morus alba	24	Remove	2051	Post Oak- Quercus stellata	9	Remain
2007	Mulberry- Morus alba	25	Remove	2052	Post Oak- Quercus stellata	15	Remain
2008	Maple- Acer saccharinum	28	Remove	2053	Post Oak- Quercus stellata	25	Remain
2010	Chaste tree- Vitex agnes castor	20	Remain	2054	Post Oak- Quercus stellata	16	Remain
2011	Chaste tree- Vitex agnes castor	18	Remain	2055	Post Oak- Quercus stellata	28	Remain
2012	Chaste tree- Vitex agnes castor	22	Remain	2056	Cedar Elm- Ulmus crassifolia	19	Remain
2013	Maple- Acer saccharinum	14	Remove	2057	Cedar Elm- Ulmus crassifolia	10	Remain
2014	Chinese Pistache- Pistacia chinensis	7	Remain	2058	Post Oak- Quercus stellata	25	Remain
2015	Post Oak- Quercus stellata	25	Remain	2059	Post Oak- Quercus stellata	26	Remain
2016	Post Oak- Quercus stellata	33	Remain	2239	Cedar- Juniperus virginiana	19	Remain
2017	Post Oak- Quercus stellata	18	Remain	2240	American Elm- Ulmus americana	22	Remain
2018	Post Oak- Quercus stellata	18	Remain	2241	Blackjack Oak- Quercus marilandica	23	Remain
2019	Post Oak- Quercus stellata	14	Remain	2427	Cedar Elm- Ulmus crassifolia	14	Remain
2020	Post Oak- Quercus stellata	14	Remain	2428	Cedar Elm- Ulmus crassifolia	12	Remain
2021	Post Oak- Quercus stellata	13	Remain	2429	Cedar Elm- Ulmus crassifolia	14	Remain
2022	Post Oak- Quercus stellata	20	Remain	2430	Cedar Elm- Ulmus crassifolia	24	Remain
2023	Post Oak- Quercus stellata	15	Remain	2431	Cedar Elm- Ulmus crassifolia	18	Remain
2024	Post Oak- Quercus stellata	27	Remain	2432	Cedar Elm- Ulmus crassifolia	20	Remain
2025	Post Oak- Quercus stellata	19	Remain	2433	Cedar Elm- Ulmus crassifolia	18	Remain
2027	Post Oak- Quercus stellata	12	Remain	2434	Cedar Elm- Ulmus crassifolia	12	Remain
2028	Post Oak- Quercus stellata	15	Remain	2435	Cedar Elm- Ulmus crassifolia	10	Remain
2029	Post Oak- Quercus stellata	11	Remain	2436	Cedar Elm- Ulmus crassifolia	16	Remain
2030	Post Oak- Quercus stellata	7	Remain	2437	Cedar Elm- Ulmus crassifolia	15	Remain
2031	Post Oak- Quercus stellata	16	Remain	2438	Cedar Elm- Ulmus crassifolia	12	Remain
2032	Post Oak- Quercus stellata	14	Remain	2439	Cedar Elm- Ulmus crassifolia	10	Remain
2033	Post Oak- Quercus stellata	18	Remain	2440	Cedar Elm- Ulmus crassifolia	9	Remain
2034	Post Oak- Quercus stellata	12	Remain	2441	Cedar Elm- Ulmus crassifolia	15	Remain
2035	Post Oak- Quercus stellata	18	Remain	2517	Cedar- Juniperus virginiana	8	Remain
2036	Post Oak- Quercus stellata	19	Remain	2518	Cedar- Juniperus virginiana	10	Remain
2037	Post Oak- Quercus stellata	16	Remain	2523	Cedar Elm- Ulmus crassifolia	9	Remain
2038	Post Oak- Quercus stellata	21	Remain	2524	Youpon Holly- Llex vomitoria	10	Remain
2039	Post Oak- Quercus stellata	15	Remain	2525	Hackberry- Celtis occidentalis	6	Remain
2040	Post Oak- Quercus stellata	25	Remain	2526	Cedar- Juniperus virginiana	11	Remain
2041	Post Oak- Quercus stellata	28	Remain	2527	Hackberry- Celtis occidentalis	14	Remain
2043	Post Oak- Quercus stellata	21	Remain	2528	Hackberry- Celtis occidentalis	19	Remain
2044	Post Oak- Quercus stellata	14	Remain	2529	Hackberry- Celtis occidentalis	8	Remain
2045	Bradford Pear- Pyrus calleryana	17	Remove	2530	Cedar Elm- Ulmus crassifolia	17	Remain
				2531	Cedar Elm- Ulmus crassifolia	7	Remain
				2532	Hackberry- Celtis occidentalis	13	Remain
				2533	Hackberry- Celtis occidentalis	11	Remain
				2534	Cedar- Juniperus virginiana	6	Remain
				2535	Hackberry- Celtis occidentalis	12	Remain
				2536	Chinaberry- Mia azedarach	11	Remain
				2537	Hackberry- Celtis occidentalis	7	Remain
				2538	Hackberry- Celtis occidentalis	9	Remain
				2539	Hackberry- Celtis occidentalis	11	Remain
				2540	Hackberry- Celtis occidentalis	10	Remain
				2541	Hackberry- Celtis occidentalis	8	Remain
				2542	Hackberry- Celtis occidentalis	8	Remain
				2543	Hackberry- Celtis occidentalis	9	Remain
				2544	Hackberry- Celtis occidentalis	11	Remain
				2545	Hackberry- Celtis occidentalis	15	Remain
				2546	Hackberry- Celtis occidentalis	29	Remain
				2547	Hackberry- Celtis occidentalis	7	Remain
				2548	Hackberry- Celtis occidentalis	31	Remain
				2549	Cedar- Juniperus virginiana	9	Remain
				2550	Hackberry- Celtis occidentalis	26	Remain
				2551	Bradford Pear- Pyrus calleryana	9	Remain
				2552	Hackberry- Celtis occidentalis	10	Remain
				2553	American Elm- Ulmus americana	21	Remain
				2554	American Elm- Ulmus americana	7	Remain
				3468	Hackberry- Celtis occidentalis	12	Remain
				3469	Hackberry- Celtis occidentalis	10	Remain
				3470	Hackberry- Celtis occidentalis	24	Remain
				3471	Chinese Pistache- Pistacia chinensis	9	Remain
				3472	Cedar Elm- Ulmus crassifolia	8	Remain
				3473	Hackberry- Celtis occidentalis	13	Remain
				3474	Cedar Elm- Ulmus crassifolia	6	Remain
				3475	Hackberry- Celtis occidentalis	10	Remain
				3476	Cedar Elm- Ulmus crassifolia	7	Remain
				3477	Cedar Elm- Ulmus crassifolia	9	Remain
				3478	Cedar Elm- Ulmus crassifolia	9	Remain
				3479	Hackberry- Celtis occidentalis	11	Remain
				3480	Cedar Elm- Ulmus crassifolia	11	Remain
				3481	Cedar Elm- Ulmus crassifolia	9	Remain
				3482	Cedar Elm- Ulmus crassifolia	15	Remain
				3483	Cedar Elm- Ulmus crassifolia	9	Remain
				3484	Cedar Elm- Ulmus crassifolia	17	Remain
				3485	Cedar Elm- Ulmus crassifolia	12	Remain
				3486	Cedar Elm- Ulmus crassifolia	21	Remain
				3487	Cedar- Juniperus virginiana	8	Remain
				9484	Cedar Elm- Ulmus crassifolia		

NOTE: TREE PROTECTION FOR ANY PRESERVED OR RELOCATED TREES MUST BE PROVIDED PER DETAILS AND SPECIFICATIONS ON SHEET TD-2. THESE MUST BE UP PRIOR TO THE COMMENCEMENT OF ANY WORK AND MAINTAINED THROUGHOUT CONSTRUCTION.

NOTE: ALL TREE TRIMMING MUST BE APPROVED BY THE OWNER AND LOCAL JURISDICTION PRIOR TO COMMENCEMENT OF WORK. ALL TREE TRIMMING MUST BE DONE BY AN ISA CERTIFIED ARBORIST IN ACCORDANCE WITH LOCAL TREE PRESERVATION ORDINANCE.



MITIGATION FOR REMOVAL OF EXISTING TREES
MITIGATION REQUIRED FOR REMOVAL OF 5 PROTECTED TREES: 69"
PROPOSED TREE MITIGATION PROVIDED: 69"
PLANTING OF 15 - 4" and 3 - 3" CANOPY TREES

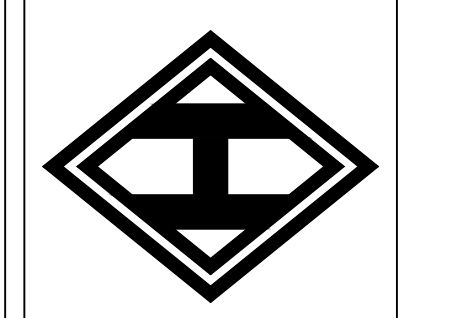


NOTE: UNPROTECTED TREES (PER CITY'S ZONING ORDINANCE) ALONG THE NORTHERN AND SOUTHERN PROPERTY BOUNDARY IN THE NEW PHASE ARE DESIRABLE AS A BUFFER AND TREE PROTECTION IS BEING PROVIDED. IF ANY UNPROTECTED TREES CANNOT BE PRESERVED DURING CONSTRUCTION THEY MAY BE REMOVED AND NO MITIGATION IS REQUIRED.

EXHIBIT E
PAGE 4 OF 6

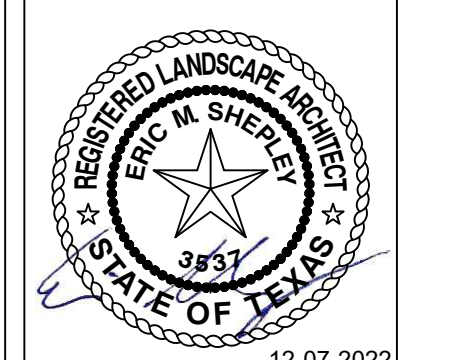


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DESTINY DALLAS - 2
DALLAS KOA, BLOCK 1, LOT 1 & 2
CAMPGROUND ADDITION
5.89 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

TREE
DISPOSITION



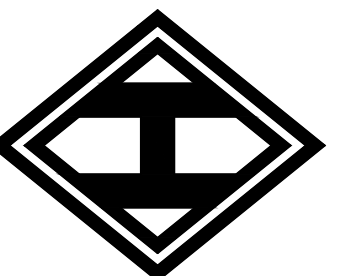
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HEI #: 21-0702

SHEET NO:
TD-1

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DESTINY DALLAS - 2
DALLAS KOA, BLOCK 1, LOT 1 & 2
CAMPGROUND ADDITION
5.89 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

TREE
DISPOSITION

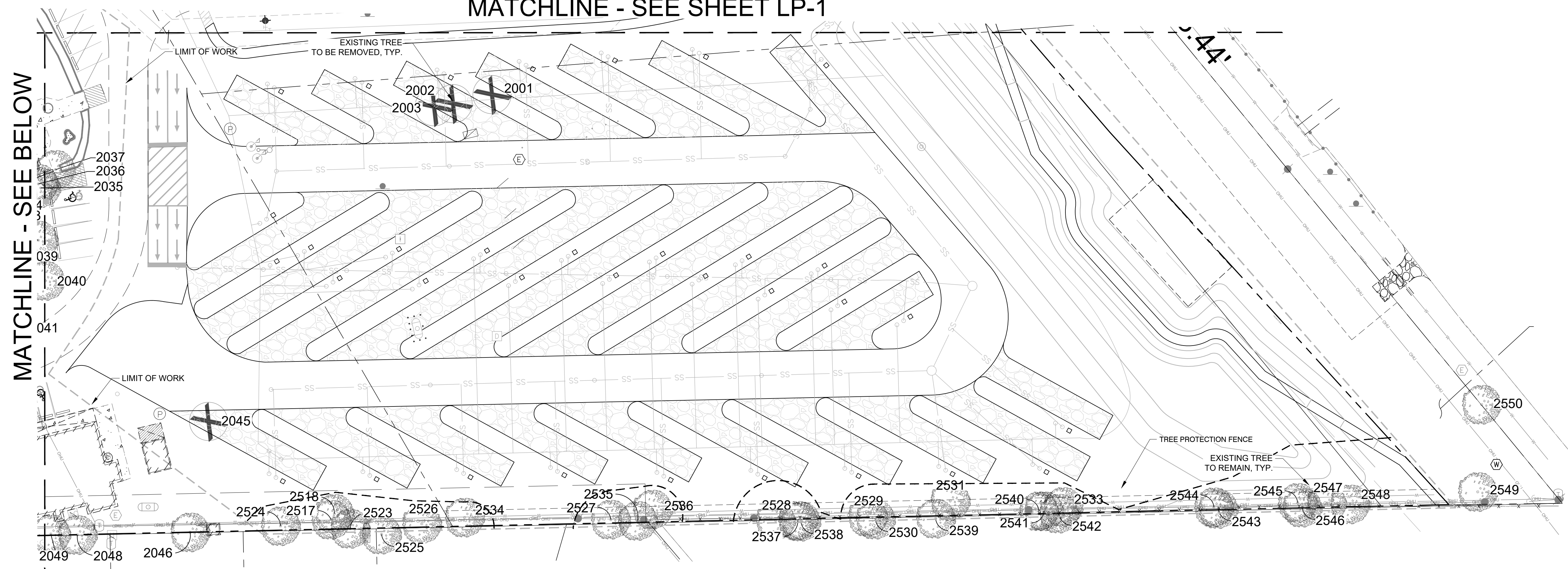


12-07-2022

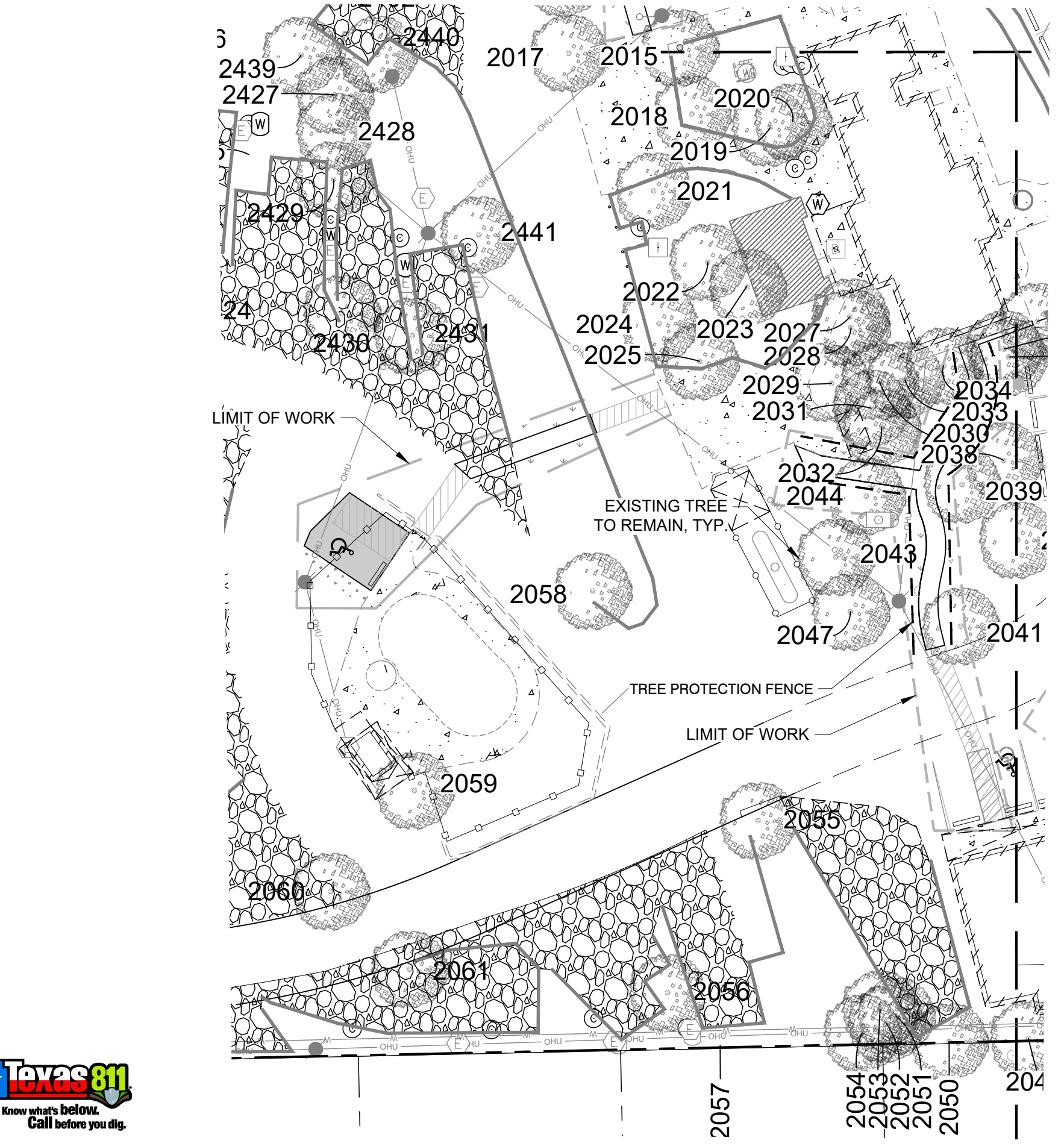
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DATE: 09/24/21
HEI #: 21-0702

SHEET NO:
TD-2

MATCHLINE - SEE SHEET LP-1

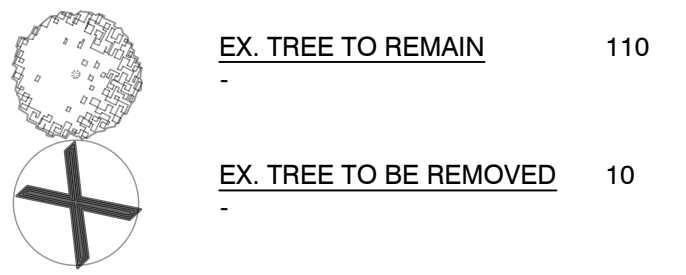


MATCHLINE - SEE BELOW



MATCHLINE - SEE ABOVE

EXISTING TREE LEGEND



NOTE:
UNPROTECTED TREES (PER CITY'S ZONING ORDINANCE) ALONG THE NORTHERN AND SOUTHERN PROPERTY BOUNDARY IN THE NEW PHASE ARE DESIRABLE AS A BUFFER AND TREE PROTECTION IS BEING PROVIDED. IF ANY UNPROTECTED TREES CANNOT BE PRESERVED DURING CONSTRUCTION THEY MAY BE REMOVED AND NO MITIGATION IS REQUIRED.

TREE INVENTORY

Tag #	Tree Type	Adj. DBH	Status	Tag #	Tree Type	Adj. DBH	Status	Tag #	Tree Type	Adj. DBH	Status
2001	Catalpa- Catalpa bignonioides	9	Remove	2046	Cedar Elm- Ulmus crassifolia	12	Remain	2531	Cedar Elm- Ulmus crassifolia	7	Remain
2002	Catalpa- Catalpa bignonioides	8	Remove	2047	Cedar Elm- Ulmus crassifolia	14	Remain	2532	Hackberry- Celtis occidentalis	13	Remain
2003	Catalpa- Catalpa bignonioides	10	Remove	2048	Hackberry- Celtis occidentalis	23	Remain	2533	Hackberry- Celtis occidentalis	11	Remain
2004	Mulberry- Morus alba	12	Remove	2049	Blackjack Oak- Quercus marilandica	21	Remain	2534	Cedar- Juniperus virginiana	6	Remain
2005	Mulberry- Morus alba	33	Remove	2050	Post Oak- Quercus stellata	25	Remain	2535	Hackberry- Celtis occidentalis	12	Remain
2006	Mulberry- Morus alba	24	Remove	2051	Post Oak- Quercus stellata	9	Remain	2536	Chinaberry- Mia azedarach	11	Remain
2007	Mulberry- Morus alba	25	Remove	2052	Post Oak- Quercus stellata	15	Remain	2537	Hackberry- Celtis occidentalis	7	Remain
2008	Maple- Acer saccharinum	28	Remove	2053	Post Oak- Quercus stellata	25	Remain	2538	Hackberry- Celtis occidentalis	9	Remain
2010	Chaste tree- Vitex agnes castor	20	Remain	2054	Post Oak- Quercus stellata	16	Remain	2539	Hackberry- Celtis occidentalis	11	Remain
2011	Chaste tree- Vitex agnes castor	18	Remain	2055	Post Oak- Quercus stellata	28	Remain	2540	Hackberry- Celtis occidentalis	10	Remain
2012	Chaste tree- Vitex agnes castor	22	Remain	2056	Cedar Elm- Ulmus crassifolia	19	Remain	2541	Hackberry- Celtis occidentalis	8	Remain
2013	Maple- Acer saccharinum	14	Remove	2057	Cedar Elm- Ulmus crassifolia	10	Remain	2542	Hackberry- Celtis occidentalis	8	Remain
2014	Chinese Pistache- Pistacia chinensis	7	Remain	2058	Post Oak- Quercus stellata	25	Remain	2543	Hackberry- Celtis occidentalis	9	Remain
2015	Post Oak- Quercus stellata	25	Remain	2059	Post Oak- Quercus stellata	26	Remain	2544	Hackberry- Celtis occidentalis	11	Remain
2016	Post Oak- Quercus stellata	33	Remain	2239	Cedar- Juniperus virginiana	19	Remain	2545	Hackberry- Celtis occidentalis	15	Remain
2017	Post Oak- Quercus stellata	18	Remain	2240	American Elm- Ulmus americana	22	Remain	2546	Hackberry- Celtis occidentalis	29	Remain
2018	Post Oak- Quercus stellata	18	Remain	2241	Blackjack Oak- Quercus marilandica	23	Remain	2547	Hackberry- Celtis occidentalis	7	Remain
2019	Post Oak- Quercus stellata	14	Remain	2427	Cedar Elm- Ulmus crassifolia	14	Remain	2548	Hackberry- Celtis occidentalis	31	Remain
2020	Post Oak- Quercus stellata	14	Remain	2428	Cedar Elm- Ulmus crassifolia	12	Remain	2549	Cedar- Juniperus virginiana	9	Remain
2021	Post Oak- Quercus stellata	13	Remain	2429	Cedar Elm- Ulmus crassifolia	14	Remain	2550	Hackberry- Celtis occidentalis	26	Remain
2022	Post Oak- Quercus stellata	20	Remain	2430	Cedar Elm- Ulmus crassifolia	24	Remain	2551	Bradford Pear- Pyrus calleryana	9	Remain
2023	Post Oak- Quercus stellata	15	Remain	2431	Cedar Elm- Ulmus crassifolia	18	Remain	2552	Hackberry- Celtis occidentalis	10	Remain
2024	Post Oak- Quercus stellata	27	Remain	2432	Cedar Elm- Ulmus crassifolia	20	Remain	2553	American Elm- Ulmus americana	21	Remain
2025	Post Oak- Quercus stellata	19	Remain	2433	Cedar Elm- Ulmus crassifolia	18	Remain	2554	American Elm- Ulmus americana	7	Remain
2027	Post Oak- Quercus stellata	12	Remain	2434	Cedar Elm- Ulmus crassifolia	12	Remain	3468	Hackberry- Celtis occidentalis	12	Remain
2028	Post Oak- Quercus stellata	15	Remain	2435	Cedar Elm- Ulmus crassifolia	10	Remain	3469	Hackberry- Celtis occidentalis	10	Remain
2029	Post Oak- Quercus stellata	11	Remain	2436	Cedar Elm- Ulmus crassifolia	16	Remain	3470	Hackberry- Celtis occidentalis	24	Remain
2030	Post Oak- Quercus stellata	7	Remain	2437	Cedar Elm- Ulmus crassifolia	15	Remain	3471	Chinese Pistache- Pistacia chinensis	9	Remain
2031	Post Oak- Quercus stellata	16	Remain	2438	Cedar Elm- Ulmus crassifolia	12	Remain	3472	Cedar Elm- Ulmus crassifolia	8	Remain
2032	Post Oak- Quercus stellata	14	Remain	2439	Cedar Elm- Ulmus crassifolia	10	Remain	3473	Hackberry- Celtis occidentalis	13	Remain
2033	Post Oak- Quercus stellata	18	Remain	2440	Cedar Elm- Ulmus crassifolia	9	Remain	3474	Cedar Elm- Ulmus crassifolia	6	Remain
2034	Post Oak- Quercus stellata	12	Remain	2441	Cedar Elm- Ulmus crassifolia	15	Remain	3475	Hackberry- Celtis occidentalis	10	Remain
2035	Post Oak- Quercus stellata	18	Remain	2517	Cedar- Juniperus virginiana	8	Remain	3476	Cedar Elm- Ulmus crassifolia	7	Remain
2036	Post Oak- Quercus stellata	19	Remain	2518	Cedar- Juniperus virginiana	10	Remain	3477	Cedar Elm- Ulmus crassifolia	9	Remain
2037	Post Oak- Quercus stellata	16	Remain	2523	Cedar Elm- Ulmus crassifolia	9	Remain	3478	Cedar Elm- Ulmus crassifolia	9	Remain
2038	Post Oak- Quercus stellata	21	Remain	2524	Youpon Holly- Llex vomitoria	10	Remain	3479	Hackberry- Celtis occidentalis	11	Remain
2039	Post Oak- Quercus stellata	15	Remain	2525	Hackberry- Celtis occidentalis	6	Remain	3480	Cedar Elm- Ulmus crassifolia	11	Remain
2040	Post Oak- Quercus stellata	25	Remain	2526	Cedar- Juniperus virginiana	11	Remain	3481	Cedar Elm- Ulmus crassifolia	9	Remain
2041	Post Oak- Quercus stellata	28	Remain	2527	Hackberry- Celtis occidentalis	14	Remain	3482	Cedar Elm- Ulmus crassifolia	15	Remain
2043	Post Oak- Quercus stellata	21	Remain	2528	Hackberry- Celtis occidentalis	19	Remain	3483	Cedar Elm- Ulmus crassifolia	9	Remain
2044	Post Oak- Quercus stellata	14	Remain	2529	Hackberry- Celtis occidentalis	8	Remain	3485	Cedar Elm- Ulmus crassifolia	17	Remain
2045	Bradford Pear- Pyrus calleryana	17	Remove	2530	Cedar Elm- Ulmus crassifolia	17	Remain	3486	Cedar Elm- Ulmus crassifolia	12	Remain
								3487	Cedar- Juniperus virginiana	21	Remain
								9484	Cedar Elm- Ulmus crassifolia	8	Remain



EXHIBIT E
PAGE 5 OF 6



TREE PROTECTION SPECIFICATIONS

MATERIALS

- FABRIC: 4 FOOT HIGH ORANGE PLASTIC FENCING AS SHOWN ON THE PLANS AND SHALL BE WOVEN WITH 2 INCH MESH OPENINGS SUCH THAT IN A VERTICAL DIMENSION OF 23 INCHES ALONG THE DIAGONALS OF THE OPENINGS THERE SHALL BE AT LEAST 7 MESHES.
- POSTS: POSTS SHALL BE A MINIMUM OF 72 INCHES LONG AND STEEL T' SHAPED WITH A MINIMUM WEIGHT OF 1.3 POUNDS PER LINEAR FOOT.
- TIE WIRE: WIRE FOR ATTACHING THE FABRIC TO THE T-POSTS SHALL BE NOT LESS THAN NO. 12 GAUGE GALVANIZED WIRE.
- USED MATERIALS: PREVIOUSLY-USED MATERIALS, MEETING THE ABOVE REQUIREMENTS AND WHEN APPROVED BY THE OWNER, MAY BE USED.

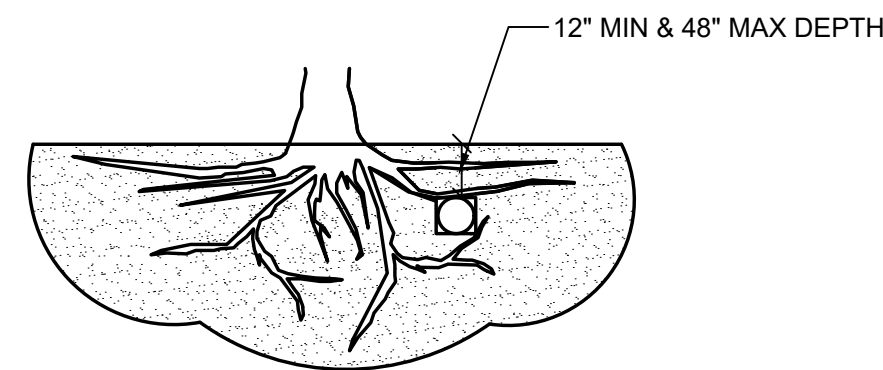
CONSTRUCTION METHODS

- ALL TREES AND SHRUBS SHOWN TO REMAIN WITHIN THE PROXIMITY OF THE CONSTRUCTION SITE SHALL BE PROTECTED PRIOR TO BEGINNING ANY DEVELOPMENT ACTIVITY.
- EMPLOY THE SERVICES OF AN ISA (INTERNATIONAL SOCIETY OF ARBORICULTURE) CERTIFIED ARBORIST AND OBTAIN ALL REQUIRED PERMITS TO PRUNE THE EXISTING TREES FOR CLEANING, RAISING AND THINNING, AS MAY BE REQUIRED.
- PROTECTIVE FENCING SHALL BE ERECTED OUTSIDE THE CRITICAL ROOT ZONE (CRZ, EQUAL TO 1' FROM THE TRUNK FOR EVERY 1" OF DBH) AT LOCATIONS SHOWN IN THE PLANS OR AS DIRECTED BY THE LANDSCAPE CONSULTANT AND/OR CITY ARBORIST, AND IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS. FENCING SHALL BE MAINTAINED AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION. TREES IN CLOSE PROXIMITY SHALL BE FENCED TOGETHER, RATHER THAN INDIVIDUALLY.
- PROTECTIVE FENCE LOCATIONS IN CLOSE PROXIMITY TO STREET INTERSECTIONS OR DRIVES SHALL ADHERE TO THE APPLICABLE JURISDICTION'S SIGHT DISTANCE CRITERIA.
- THE PROTECTIVE FENCING SHALL BE ERECTED BEFORE SITE WORK COMMENCES AND SHALL REMAIN IN PLACE DURING THE ENTIRE CONSTRUCTION PHASE.
- THE INSTALLATION POSTS SHALL BE PLACED EVERY 6 FEET ON CENTER AND EMBEDDED TO 18 INCHES DEEP. MESH FABRIC SHALL BE ATTACHED TO THE INSTALLATION POSTS BY THE USE OF SUFFICIENT WIRE TIES TO SECURELY FASTEN THE FABRIC TO THE T-POSTS TO HOLD THE FABRIC IN A STABLE AND UPRIGHT POSITION.
- WITHIN THE CRZ:
 - DO NOT CLEAR, FILL OR GRADE IN THE CRZ OF ANY TREE.
 - DO NOT STORE, STOCKPILE OR DUMP ANY JOB MATERIAL, SOIL OR RUBBISH UNDER THE SPREAD OF THE TREE BRANCHES.
 - DO NOT PARK OR STORE ANY EQUIPMENT OR SUPPLIES UNDER THE TREE CANOPY.
 - DO NOT SET UP ANY CONSTRUCTION OPERATIONS UNDER THE TREE CANOPY (SUCH AS PIPE CUTTING AND THREADING, MORTAR MIXING, PAINTING OR

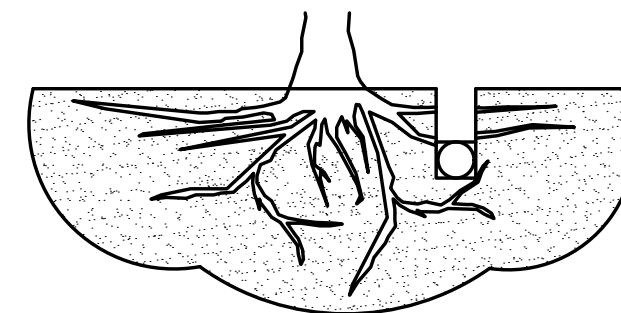
- LUMBER CUTTING). DO NOT NAIL OR ATTACH TEMPORARY SIGNS METERS, SWITCHES, WIRES, BRACING OR ANY OTHER ITEM TO THE TREES.
- DO NOT PERMIT RUNOFF FROM WASTE MATERIALS INCLUDING SOLVENTS, CONCRETE WASHOUTS, ASPHALT TACK COATS (MC-30 OIL), ETC. TO ENTER THE CRZ. BARRIERS ARE TO BE PROVIDED TO PREVENT SUCH RUNOFF SUBSTANCES FROM ENTERING THE CRZ WHENEVER POSSIBLE, INCLUDING IN AN AREA WHERE RAIN OR SURFACE WATER COULD CARRY SUCH MATERIALS TO THE ROOT SYSTEM OF THE TREE.
- ROUTE UNDERGROUND UTILITIES TO AVOID THE CRZ. IF DIGGING IS UNAVOIDABLE, BORE UNDER THE ROOTS, OR HAND DIG TO AVOID SEVERING THEM.
- WHERE EXCAVATION IN THE VICINITY OF TREES MUST OCCUR, SUCH AS FOR IRRIGATION INSTALLATION, PROCEED WITH CAUTION, AND USING HAND TOOLS ONLY.
- THE CONTRACTOR SHALL NOT CUT ROOTS LARGER THAN ONE INCH IN DIAMETER WHEN EXCAVATION OCCURS NEAR EXISTING TREES. ALL ROOTS LARGER THAN ONE INCH IN DIAMETER ARE TO BE CUT CLEANLY. FOR OAKS ONLY, ALL WOUNDS SHALL BE PAINTED WITH WOUND SEALER WITHIN 30 MINUTES
- REMOVE ALL TREES, SHRUBS OR BUSHES TO BE CLEARED FROM PROTECTED ROOT ZONE AREAS BY HAND.
- TREES DAMAGED OR KILLED DUE TO CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION SHALL BE MITIGATED AT THE CONTRACTOR'S EXPENSE AND TO THE PROJECT OWNER'S AND LOCAL JURISDICTION'S SATISFACTION.
- ANY TREE REMOVAL SHALL BE APPROVED BY THE OWNER AND LOCAL JURISDICTION PRIOR TO ITS REMOVAL, AND THE CONTRACTOR SHALL HAVE ALL REQUIRED PERMITS FOR SUCH ACTIVITIES.
- COVER EXPOSED ROOTS AT THE END OF EACH DAY WITH SOIL, MULCH OR WET BURLAP.
- IN CRITICAL ROOT ZONE AREAS THAT CANNOT BE PROTECTED DURING CONSTRUCTION AND WHERE HEAVY TRAFFIC IS ANTICIPATED, COVER THE SOIL WITH EIGHT INCHES OF ORGANIC MULCH TO MINIMIZE SOIL COMPACTION. THIS EIGHT INCH DEPTH OF MULCH SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
- WATER ALL TREES IMPACTED BY CONSTRUCTION ACTIVITIES, DEEPLY ONCE A WEEK DURING PERIODS OF HOT DRY WEATHER. SPRAY TREE CROWNS WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON THE LEAVES.
- WHEN INSTALLING CONCRETE ADJACENT TO THE ROOT ZONE OF A TREE, USE A PLASTIC VAPOR BARRIER BEHIND THE CONCRETE TO PROHIBIT LEACHING OF LIME INTO THE SOIL.
- CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL TREE PROTECTION FENCING WHEN ALL THREATS TO THE EXISTING TREES FROM CONSTRUCTION-RELATED ACTIVITIES HAVE BEEN REMOVED.

TREES THAT ARE MARKED TO BE PRESERVED ON A SITE PLAN AND FOR WHICH UTILITIES MUST PASS THROUGH THEIR ROOT PROTECTION ZONES MAY REQUIRE TUNNELING AS OPPOSED TO OPEN TRENCHES. THE DECISION TO TUNNEL WILL BE DETERMINED ON A CASE BY CASE BASIS BY THE ENGINEER.

TUNNELS SHALL BE DUG THROUGH THE ROOT PROTECTION ZONE IN ORDER TO MINIMIZE ROOT DAMAGE.



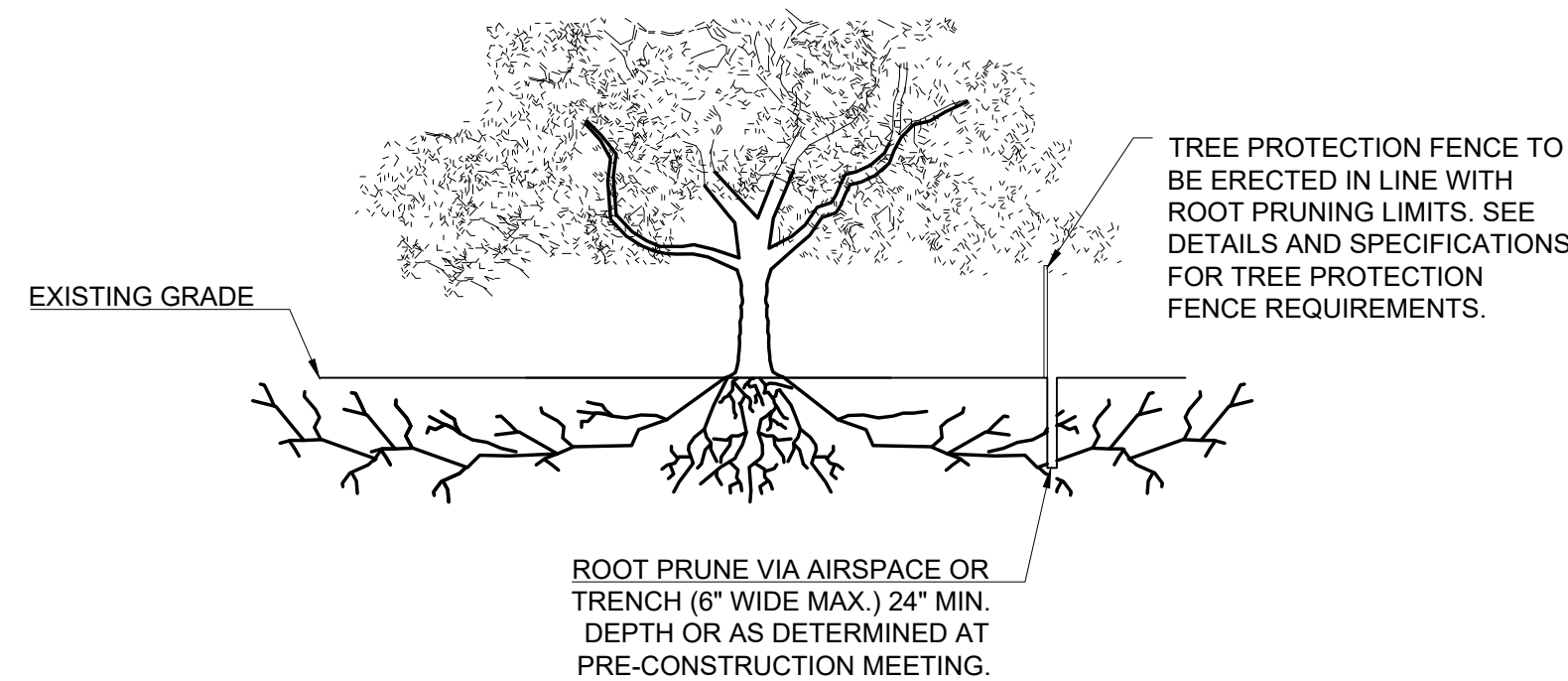
TUNNEL TO MINIMIZE ROOT DAMAGE (TOP) AS OPPOSED TO SURFACE-DUG TRENCHES IN ROOT PROTECTION ZONE WHEN THE 5' MINIMUM DISTANCE FROM TRUNK CAN NOT BE ACHIEVED.



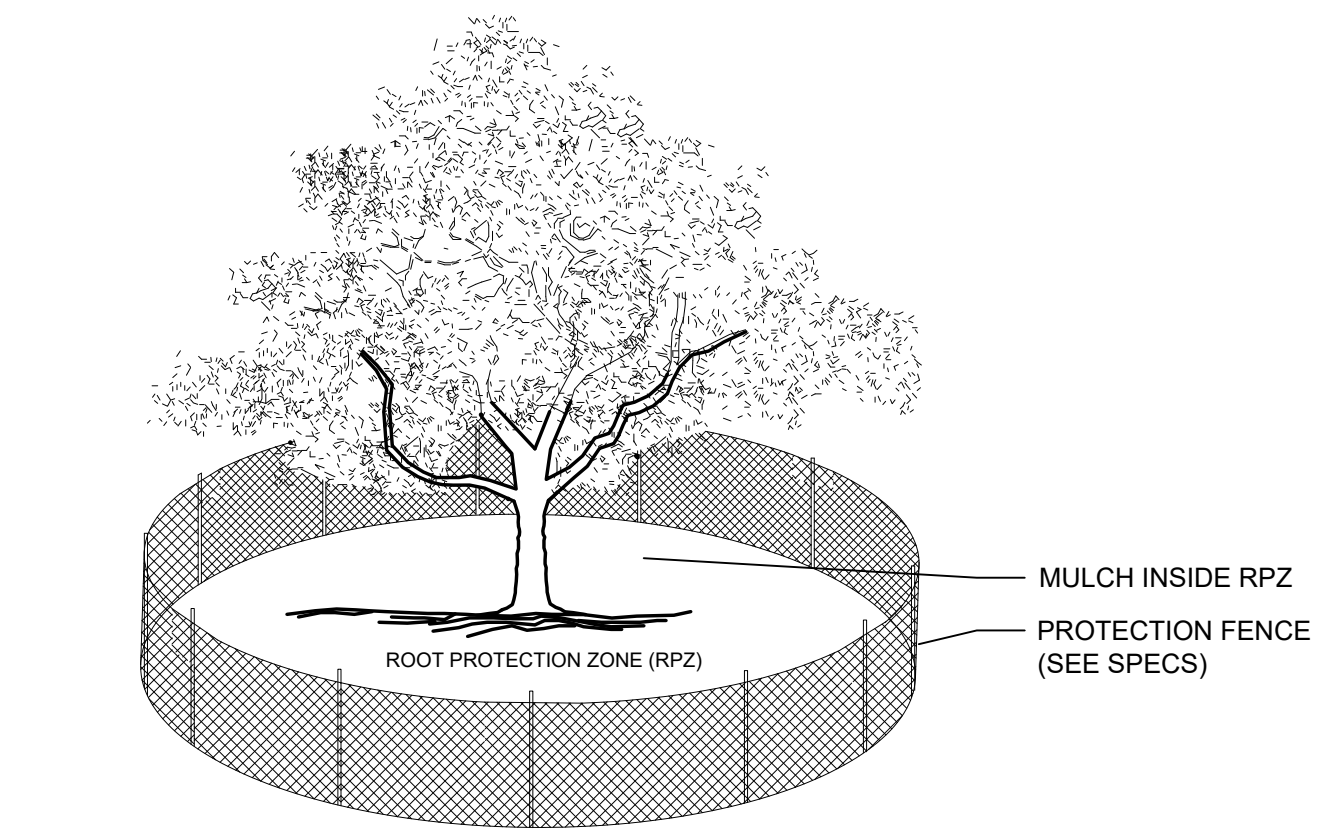
OPEN TRENCHING MAY BE USED IF EXPOSED TREE ROOTS DO NOT EXCEED 3" OR ROOTS CAN BE BENT BACK.

C BORING THROUGH ROOT PROTECTION ZONE
SCALE: NOT TO SCALE

- NOTES
- RETENTION AREAS WILL BE SET AS PART OF THE REVIEW PROCESS AND PRE-CONSTRUCTION MEETING.
 - BOUNDARIES OF RETENTION AREAS MUST BE STAKED AT THE PRE-CONSTRUCTION MEETING AND FLAGGED PRIOR TO ROOT PRUNING.
 - EXACT LOCATION OF ROOT PRUNING SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FORESTRY INSPECTOR.
 - TRENCH SHOULD BE IMMEDIATELY BACKFILLED WITH EXCAVATED SOIL OR OTHER ORGANIC SOIL AS SPECIFIED PER PLAN OR BY THE FORESTRY INSPECTOR.
 - ROOTS SHALL BE CLEANLY CUT USING VIBRATORY KNIFE OR OTHER ACCEPTABLE EQUIPMENT. ROT PRUNING METHODS AND MEANS MUST BE IN ACCORDANCE WITH ANSI STANDARD A3000.
 - ALL PRUNING MUST BE EXECUTED AT LOD SHOWN ON PLANS OR AS AUTHORIZED IN WRITING BY THE FORESTRY INSPECTOR.
 - SUPPLEMENTAL WATERING MAY BE REQUIRED FOR ROOT PRUNED TREES THROUGHOUT THE GROWING SEASON DURING CONSTRUCTION AND SUBSEQUENT WARRANTY AND MAINTENANCE PERIOD.

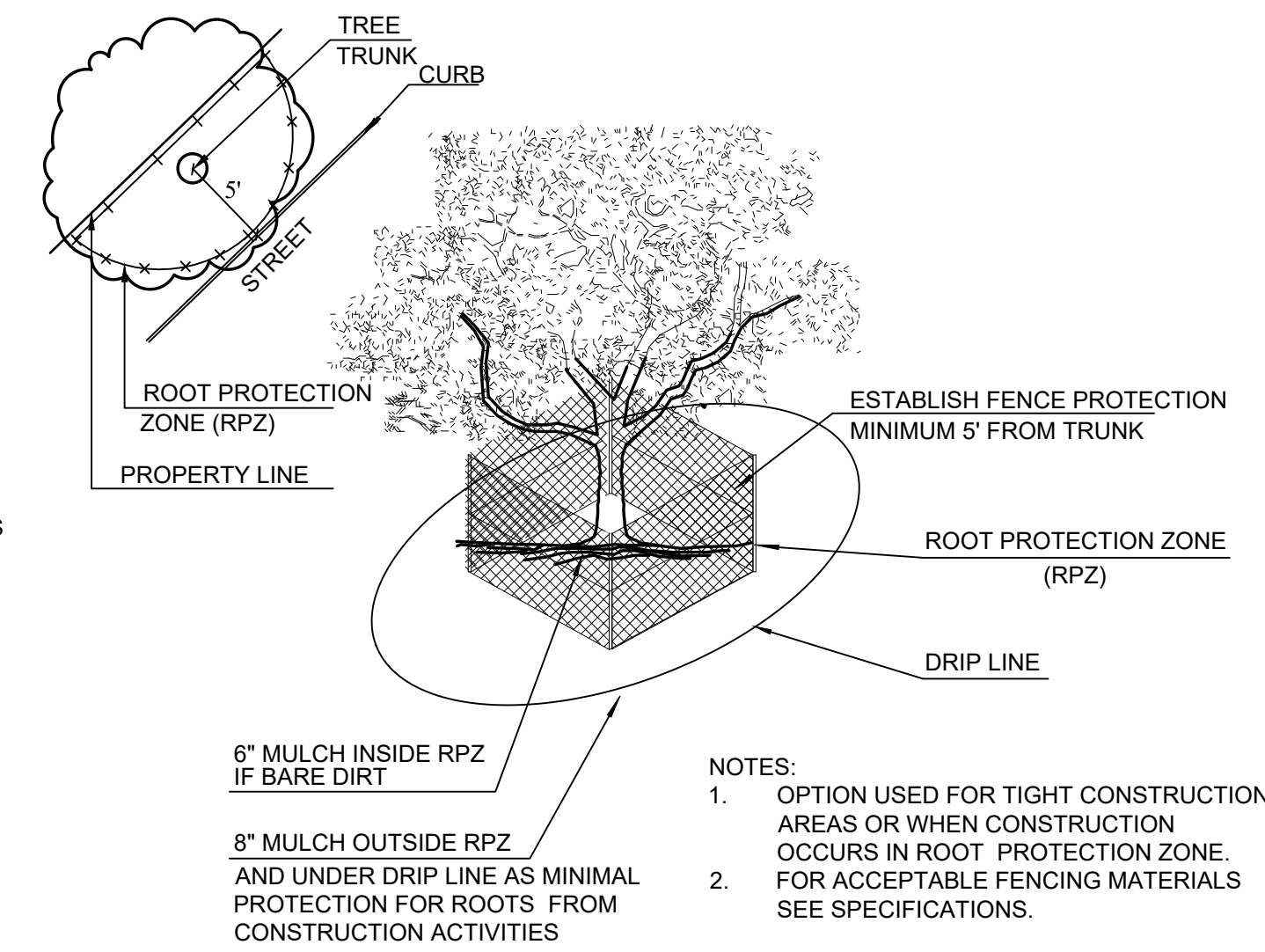


D ROOT PRUNING DETAIL
SCALE: NOT TO SCALE



- NOTES:
- THE FENCING LOCATION SHOWN ABOVE IS DIAGRAMATIC ONLY AND WILL CONFORM TO THE DRIP LINE AND BE LIMITED TO PROJECT BOUNDARY. WHERE MULTIPLE ADJACENT TREES WILL BE ENCLOSED BY FENCING, THE FENCING SHALL BE CONTINUOUS AROUND ALL TREES. FOR ACCEPTABLE FENCING MATERIALS SEE SPECIFICATIONS.
 -

A TREE PROTECTION FENCE
SCALE: NOT TO SCALE



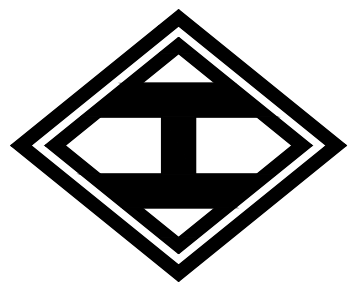
B TREE PROTECTION FENCE - TIGHT CONSTRUCTION
SCALE: NOT TO SCALE

- NOTES:
- OPTION USED FOR TIGHT CONSTRUCTION AREAS OR WHEN CONSTRUCTION OCCURS IN ROOT PROTECTION ZONE.
 - FOR ACCEPTABLE FENCING MATERIALS SEE SPECIFICATIONS.

TREE PROTECTION GENERAL NOTES

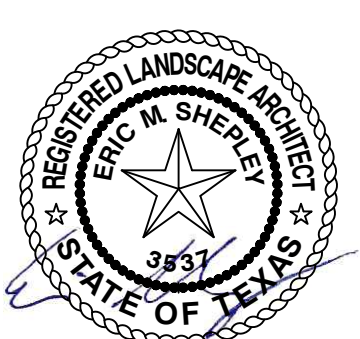
- PRIOR TO THE LAND CLEARING STAGE OF DEVELOPMENT, THE CONTRACTOR SHALL CLEARLY MARK ALL PROTECTED TREES FOR WHICH A TREE REMOVAL PERMIT HAS NOT BEEN ISSUED AND SHALL ERECT BARRIERS FOR THE PROTECTION OF THE TREES ACCORDING TO THE FOLLOWING:
 - AROUND AN AREA AT OR GREATER THAN A SIX-FOOT RADIUS OF ALL SPECIES OF MANGROVES AND PROTECTED CABBAGE PALMS;
 - AROUND AN AREA AT OR GREATER THAN THE FULL DRIPLINE OF ALL PROTECTED NATIVE PINES;
 - AROUND AN AREA AT OR GREATER THAN TWO-THIRDS OF THE DRIPLINE OF ALL OTHER PROTECTED SPECIES.
- NO PERSON SHALL ATTACH ANY SIGN, NOTICE OR OTHER OBJECT TO ANY PROTECTED TREE OR FASTEN ANY WIRES, CABLES, NAILS OR SCREWS TO ANY PROTECTED TREE IN ANY MANNER THAT COULD PROVE HARMFUL TO THE PROTECTED TREE, EXCEPT AS NECESSARY IN CONJUNCTION WITH ACTIVITIES IN THE PUBLIC INTEREST.
- DURING THE CONSTRUCTION STAGE OF DEVELOPMENT, THE CONTRACTOR SHALL NOT CAUSE OR PERMIT THE CLEANING OF EQUIPMENT OR MATERIAL WITHIN THE OUTSIDE PERIMETER OF THE CROWN (DRIPLINE) OR ON THE NEARBY GROUND OF ANY TREE OR GROUP OF TREES WHICH IS TO BE PRESERVED. WITHIN THE OUTSIDE PERIMETER OF THE CROWN (DRIPLINE) OF ANY TREE OR ON NEARBY GROUND, THE CONTRACTOR SHALL NOT CAUSE OR PERMIT STORAGE OF BUILDING MATERIAL AND/OR EQUIPMENT, OR DISPOSAL OF WASTE MATERIAL SUCH AS PAINTS, OIL, SOLVENTS, ASPHALT, CONCRETE, MORTAR OR ANY OTHER MATERIAL HARMFUL TO THE LIFE OF THE TREE.
- NO PERSON SHALL PERMIT ANY UNNECESSARY FIRE OR BURNING WITHIN 30 FEET OF THE DRIPLINE OF A PROTECTED TREE.
- ANY LANDSCAPING ACTIVITIES WITHIN THE BARRIER AREA SHALL BE ACCOMPLISHED WITH HAND LABOR.
- PRIOR TO ISSUING A CERTIFICATE OF OCCUPANCY OR COMPLIANCE FOR ANY DEVELOPMENT, BUILDING OR STRUCTURE, ALL TREES DESIGNATED TO BE PRESERVED THAT WERE DESTROYED DURING CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR WITH TREES OF EQUIVALENT DIAMETER AT BREST HEIGHT TREE CALIPER AND OF THE SAME SPECIES AS SPECIFIED BY THE CITY STAFF, BEFORE OCCUPANCY OR USE, UNLESS APPROVAL FOR THEIR REMOVAL HAS BEEN GRANTED UNDER PERMIT.
- THE CITY STAFF MAY CONDUCT PERIODIC INSPECTIONS OF THE SITE DURING LAND CLEARANCE AND CONSTRUCTION.
- IF, IN THE OPINION OF THE CITY STAFF, DEVELOPMENT ACTIVITIES WILL SO SEVERELY STRESS SLASH PINES OR ANY OTHER PROTECTED TREE SUCH THAT THEY ARE MADE SUSCEPTIBLE TO INSECT ATTACK, PREVENTATIVE SPRAYING OF THESE TREES BY THE CONTRACTOR MAY BE REQUIRED.

HOMEYER ENGINEERING, INC.
ENGINEERING, INC.
P.O. BOX 294527 • LEWISVILLE, TEXAS • 75029
972-906-9985 • PHONE • 972-906-9987 • FAX
WWW.HEI.US.COM



DESTINY DALLAS - 2
DALLAS KOA, BLOCK 1, LOT 1 & 2
CAMPGROUND ADDITION
5.89 ACRES
CITY OF CORINTH
DENTON COUNTY, TEXAS

TREE
DISPOSITION
SPECS & DETAILS



12-07-2022

DRAWN: EMS
DATE: 09/24/21
HEI #: 21-0702

SHEET NO:
TD-3

EXHIBIT E
PAGE 6 OF 6



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LEGACY SIGNS OF TEXAS

CUSTOMER APPROVAL: Note: The colors depicted on this rendering may not match actual colors used on the finished display. Note: The proportion of signs shown on building and landscape is an approximate representation. Section 1, Item 7.

PLEASE READ CAREFULLY: Before you OK this proof, please read your copy carefully and completely. Check for spelling errors and copy omissions. Any changes or alterations from the original instructions will be charged according to time and material.

FINAL PROOF APPROVAL: By signing this form I am approving the above described job and I hereby acknowledge that I have read and accept the proofing policy and Terms and Conditions of Legacy Signs of Texas. Please sign and return so that we may process your order.



**EXHIBIT F
DESTINY DALLAS PD SIGNAGE
PAGE 1 OF 4`**

CLIENT SIGNATURE: _____

DATE: _____

7923 E. McKinney St., Denton, TX 76208
O 817.431.5700 F 817.431.5799

 **UL E226292 TDLR - 18933**

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FINAL ELECTRICAL CONNECTION BY CUSTOMER

THIS SIGN IS INTENDED TO BE INSTALLED IN ACCORDANCE WITH ARTICLE 600 OF THE NATIONAL ELECTRICAL CODE AND/OR OTHER APPLICABLE LOCAL CODES. THIS INCLUDES PROPER GROUNDING & BONDING OF THE SIGN. SIGN WILL BEAR UL LABEL(S).



7923 E. McKinney St., Denton, TX 76208

O 817.431.5700 F 817.431.5799

 **UL E226292**  **TDLR 18933**

JOB DESCRIPTION	DATE	BY	REV	
D/F MONUMENT SIGN	3.23.22	MRG		
COMPANY OR JOB NAME	3.24.22	MRG	R1	
CUSTOMER CONTACT	10.19.22	JR	R2	REDUCE SIGN TO 160SQFT OVERALL & ID SIGN TO 80SQFT
ADDRESS				
PHONE				
EMAIL				
FILE NAME				
SALESMAN				

PAGE

SITE PLAN

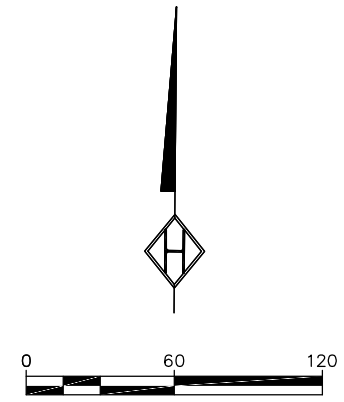
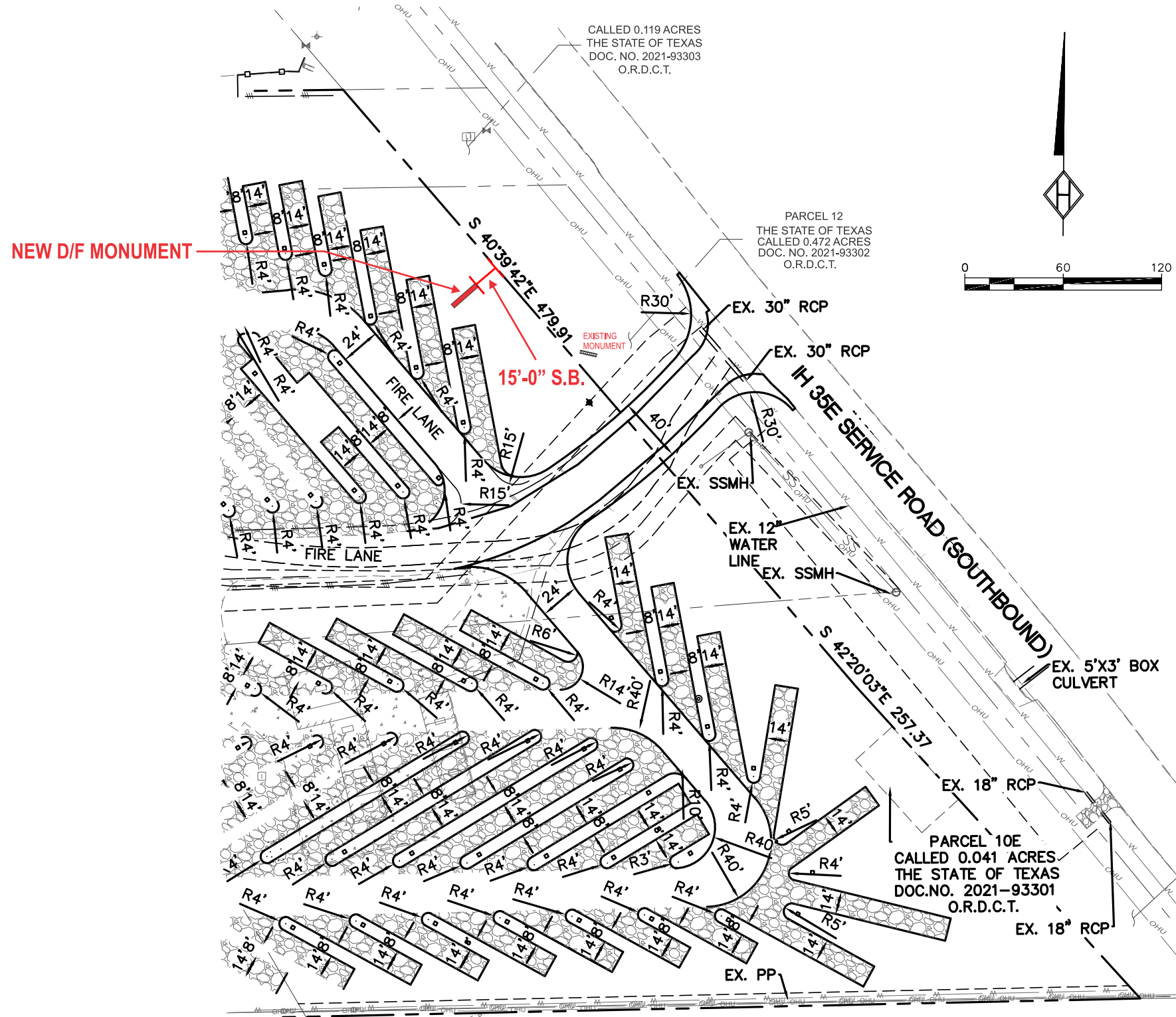


EXHIBIT F
DESTINY DALLAS PD SIGNAGE
PAGE 2 OF 4



LEGACY SIGNS
OF TEXAS

7923 E. McKinney St., Denton, TX 76208

0 817.431.5700 F 817.431.5799

UL E226292 BBB TDLR 18933

JOB DESCRIPTION	D/F MONUMENT SIGN	DATE	BY	REV	
COMPANY OR JOB NAME	DALLAS DESTINY RV RESORTS	3.23.22	MRG		
CUSTOMER CONTACT		3.24.22	MRG	R1	
ADDRESS	7100 S. 135E CORINTH, TX	10.19.22	JR	R2	REDUCE SIGN TO 160SQFT OVERALL & ID SIGN TO 80SQFT
PHONE					
EMAIL					
FILE NAME	DALLAS DESTINY RV RESORTS_CORINTH				
SALESMAN	RICK SUTTON				



A PROPOSED ELEVATION

SCALE: NTS

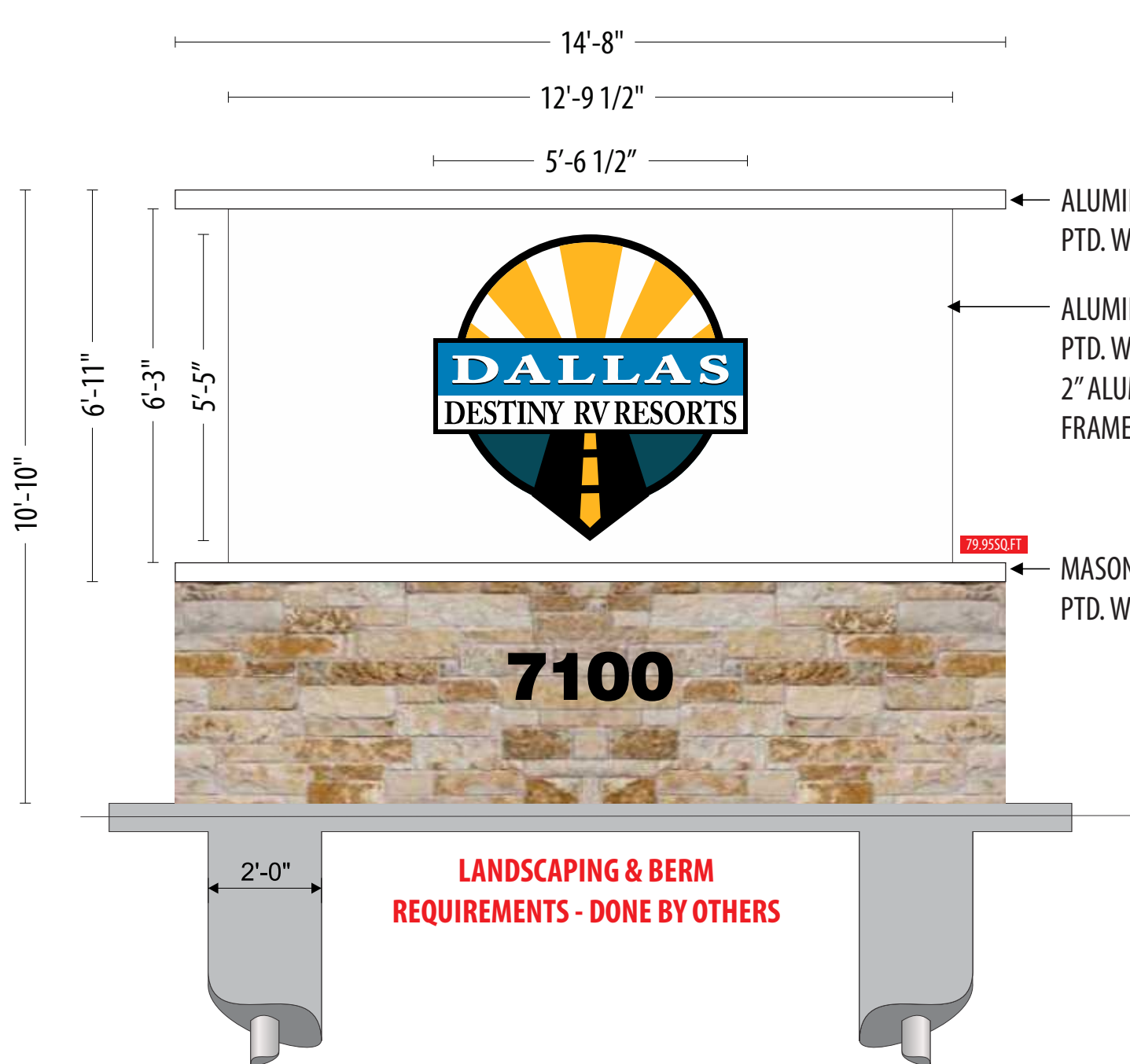
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EXHIBIT F
DESTINY DALLAS PD SIGNAGE
PAGE 3 OF 4`



7923 E. McKinney St., Denton, TX 76208
0 817.431.5700 F 817.431.5799
 UL E226292 BBB TDLR 18933

JOB DESCRIPTION	DATE	BY	REV	
D/F MONUMENT SIGN	3.23.22	MRG		
COMPANY OR JOB NAME	DALLAS DESTINY RV RESORTS			
CUSTOMER CONTACT	3.24.22	MRG	R1	
ADDRESS	7100 S. 135E CORINTH, TX	10.19.22	JR	R2
PHONE				REDUCE SIGN TO 160SQFT OVERALL & ID SIGN TO 80SQFT
EMAIL				
FILE NAME	DALLAS DESTINY RV RESORTS_CORINTH			
SALESMAN	RICK SUTTON			



79.95SQ.FT

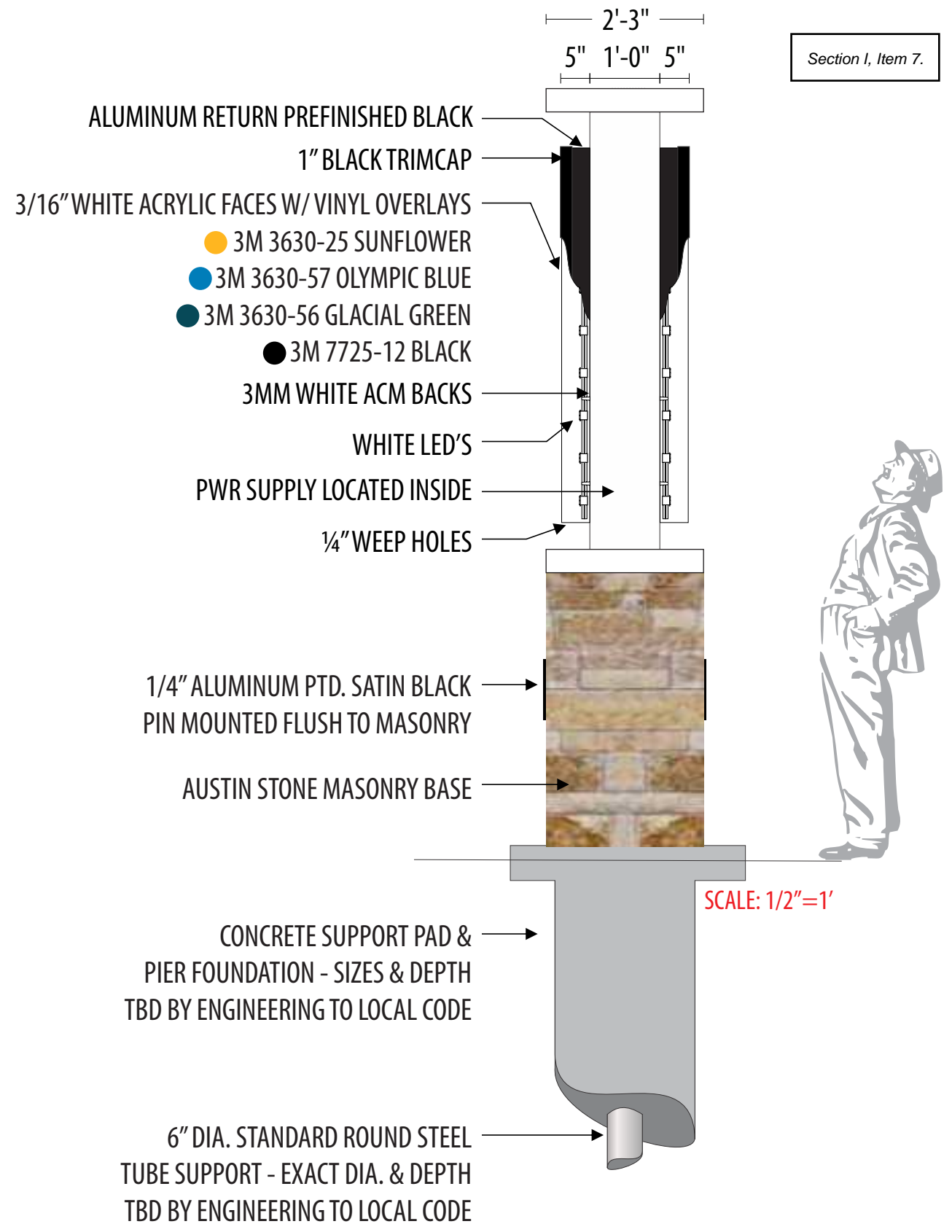
SCALE: 3/8"=1'

158.89 SQ.FT

A

D/F MONUMENT

SCOPE OF WORK:
MANUFACTURE & INSTALL (1) D/F MONUMENT SIGN



PRIMARY ELECTRICAL TO MONUMENT BY OTHERS



7923 E. McKinney St., Denton, TX 76208
 O 817.431.5700 F 817.431.5799
 UL E226292 BBB TDLR 18933

JOB DESCRIPTION	D/F MONUMENT SIGN	DATE	BY	REV
COMPANY OR JOB NAME	DALLAS DESTINY RV RESORTS	3.23.22	MRG	
CUSTOMER CONTACT		3.24.22	MRG	R1
ADDRESS	7100 S. 135E CORINTH, TX	10.19.22	JR	R2
PHONE				
EMAIL				
FILE NAME	DALLAS DESTINY RV RESORTS_CORINTH			
SALESMAN	RICK SUTTON			

REDUCE SIGN TO 160SQFT OVERALL & ID SIGN TO 80SQFT

EXHIBIT F
DESTINY DALLAS PD SIGNAGE
PAGE 4 OF 4

EXHIBIT G – VEHICLE TENTS

Section I, Item 7.



EXHIBIT H - RENT ROLL

Case No. ZAPD22-0005 - Destiny RV Resort PD

DESTINY DALLAS RV RESORT - RENT ROLL
As of 12/31/22

Site Number	Customer	Customer Type	Site Type	Deposit	Rental Rate	Arrival Date	Current Date	Last Payment Date	Length of Stay in days
001	Rapp	Monthly	Premium	50.00	725.00	4/27/2018	2/1/2023	2/6/2023	1741
002	Burke	Monthly	Premium	100.00	725.00	12/31/2022	2/1/2023	2/1/2023	32
003		Monthly	Premium					Vacant	
004	Ortega	Monthly	Premium	100.00	725.00	2/3/2023	2/1/2023	2/3/2023	-2
005	Hill	Monthly	Premium	100.00	725.00	1/27/2023	2/1/2023	1/27/2023	5
006	Garrett	Monthly	Premium	100.00	725.00	1/2/2023	2/1/2023	2/2/2023	30
007	Crownover	Monthly	Premium	100.00	725.00	8/13/2022	2/1/2023	2/11/2023	172
008	Espana	Monthly	Premium	100.00	725.00	9/3/2022	2/1/2023	2/2/2023	151
009	Cooper	Monthly	Deluxe	50.00	780.00	1/1/2019	2/1/2023	2/11/2023	1492
010	Barretts	Monthly	Deluxe	50.00	780.00	1/1/2019	2/1/2023	2/11/2023	1492
011	Walker	Monthly	Deluxe	50.00	780.00	10/26/2019	2/1/2023	2/9/2023	1194
012	Burden	Monthly	Deluxe	50.00	780.00	4/29/2020	2/1/2023	2/15/2023	1008
013	Wilcox	Monthly	Premium	50.00	780.00	9/19/2011	2/1/2023	2/1/2023	4153
014	Pelz	Monthly	Premium	100.00	725.00	7/13/2022	2/1/2023	2/10/2023	203
015	Webb	Monthly	Premium	100.00	725.00	12/30/2022	2/1/2023	2/2/2023	33
016	Bellamy	Monthly	Premium	100.00	725.00	8/7/2022	2/1/2023	2/6/2023	178
017	Paris	Monthly	Premium	50.00	725.00	5/1/2020	2/1/2023	2/17/2023	1006
018	Pierson	Monthly	Standard	50.00	705.00	6/18/2021	2/1/2023	2/10/2023	593
019	Peyrot	Monthly	Standard	50.00	705.00	6/24/2021	2/1/2023	2/16/2023	587
021	Aldrich	Monthly	Premium	50.00	725.00	6/2/2021	2/1/2023	2/2/2023	609
022	Simon	Monthly	Premium	100.00	725.00	9/26/2022	2/1/2023	2/26/2023	128
023	Avalos	Monthly	Premium	100.00	725.00	2/20/2023	2/1/2023	2/20/2023	-19
024	Mancilla	Monthly	Premium	100.00	725.00	12/13/2022	2/1/2023	2/13/2023	50
025	Smith	Monthly	Premium	50.00	725.00	6/6/2018	2/1/2023	2/15/2023	1701
026	Cohen	Monthly	Premium	50.00	725.00	6/11/2021	2/1/2023	2/2/2023	600
027	Gaudette	Monthly	Premium	50.00	725.00	8/1/2016	2/1/2023	2/1/2023	2375
028	Bargabos	Monthly	Premium	50.00	725.00	2/10/2017	2/1/2023	2/10/2023	2182
029	Calzada	Monthly	Premium	100.00	725.00	11/9/2022	2/1/2023	2/9/2023	84
030	Treadwell	Monthly	Premium	100.00	725.00	9/30/2022	2/1/2023	2/1/2023	124
031	Abrahamson	Monthly	Premium	100.00	725.00	2/12/2023	2/1/2023	2/12/2023	-11
032	Poalinelli	Monthly	Premium	50.00	725.00	10/1/2020	2/1/2023	2/1/2023	853
033		Monthly	Premium					Vacant	
034	Twomey	Monthly	Premium	100.00	725.00	12/2/2022	2/1/2023	2/2/2023	61
035	Bullard	Monthly	Premium	50.00	725.00	4/9/2022	2/1/2023	2/5/2023	298
036	Mccord	Monthly	Premium	50.00	725.00	11/19/2017	2/1/2023	2/5/2023	1900
037	Dishman	Monthly	Premium	50.00	725.00	9/11/2017	2/1/2023	2/18/2023	1969
038	Bratcher	Monthly	Premium	50.00	725.00	11/16/2017	2/1/2023	2/1/2023	1903
039	Kennedy	Monthly	Premium	50.00	725.00	6/28/2019	2/1/2023	2/9/2023	1314
040	Gomez	Monthly	Premium	50.00	725.00	6/16/2009	2/1/2023	2/3/2023	4978
041	Hazard	Monthly	Premium	50.00	725.00	9/17/2022	2/1/2023	2/16/2023	137
043	Gibbs	Monthly	Premium	50.00	725.00	4/1/2020	2/1/2023	2/1/2023	1036
044	Chongdon	Monthly	Premium	100.00	725.00	9/17/2022	2/1/2023	2/16/2023	137
045	Hartline	Monthly	Premium	100.00	705.00	7/25/2022	2/1/2023	2/22/2023	191

046 Cook	Monthly	Standard	50.00	705.00	8/21/2021	2/1/2023	2/14/2023	529
048 Schoultz	Monthly	Standard	50.00	705.00	4/11/2021	2/1/2023	2/1/2023	661
049 Collis	Monthly	Standard	50.00	705.00	2/11/2022	2/1/2023	2/8/2023	355
050 Bryan	Monthly	Standard	50.00	705.00	4/25/2020	2/1/2023	2/5/2023	1012
051 Busby	Monthly	Premium	50.00	725.00	11/28/2020	2/1/2023	2/17/2023	795
052 Mcnevin	Monthly	Premium	50.00	725.00	5/1/2018	2/1/2023	2/16/2023	1737
053 Johnson	Monthly	Premium	50.00	725.00	6/4/2022	2/1/2023	2/2/2023	242
054 Astle	Monthly	Premium	100.00	725.00	11/7/2022	2/1/2023	2/7/2023	86
055 Guha	Monthly	Standard	100.00	725.00	9/3/2022	2/1/2023	2/2/2023	151
057 Clawson	Monthly	Premium	50.00	725.00	5/7/2016	2/1/2023	2/1/2023	2461
058 McGehee	Monthly	Premium	50.00	725.00	7/1/2009	2/1/2023	2/1/2023	4963
059 Railey	Monthly	Premium	50.00	725.00	10/1/2021	2/1/2023	2/2/2023	488
060 Thompson	Monthly	Premium	100.00	725.00	1/14/2023	2/1/2023	2/14/2023	18
061 Boone	Monthly	Premium	50.00	725.00	6/13/2022	2/1/2023	2/10/2023	233
062 Falcon	Monthly	Premium	100.00	725.00	2/17/2023	2/1/2023	2/17/2023	-16
063 Heasley	Monthly	Premium	50.00	725.00	3/20/2021	2/1/2023	2/10/2023	683
064 Clarke	Monthly	Premium	50.00	725.00	5/1/2016	2/1/2023	2/5/2023	2467
065 Green	Monthly	Premium	50.00	725.00	7/1/2021	2/1/2023	2/1/2023	580
066 Phillips	Monthly	Premium	100.00	725.00	9/3/2022	2/1/2023	2/1/2023	151
068 Tays	Monthly	Premium	100.00	725.00	10/3/2022	2/1/2023	2/3/2023	121
069 Prince	Monthly	Premium	50.00	725.00	8/24/2020	2/1/2023	2/12/2023	891
070 McClain	Monthly	Premium	50.00	725.00	11/29/2021	2/1/2023	2/1/2023	429
072 Cahill	Monthly	Premium	50.00	725.00	12/30/2016	2/1/2023	2/1/2023	2224
073 Brockhoff	Monthly	Premium	50.00	725.00	5/9/2022	2/1/2023	2/5/2023	268
074 Brown	Monthly	Premium	50.00	725.00	5/11/2015	2/1/2023	2/1/2023	2823
075 Nye	Monthly	Premium	50.00	725.00	7/6/2019	2/1/2023	2/15/2023	1306
076 Martin	Monthly	Premium	100.00	725.00	7/2/2022	2/1/2023	2/1/2023	214
077 Hardin	Monthly	Premium	100.00	725.00	7/2/2022	2/1/2023	2/1/2023	214
078 Delgado	Monthly	Premium	50.00	725.00	1/3/2020	2/1/2023	2/17/2023	1125
079 Cordell	Monthly	Premium	50.00	725.00	8/21/2021	2/1/2023	2/16/2023	529
080 Garcia	Monthly	Premium	100.00	725.00	10/24/2022	2/1/2023	2/23/2023	100
081 Pruitt	Monthly	Employee	100.00	725.00	9/20/2022	2/1/2023	2/19/2023	134
082 Beres	Monthly	Premium	50.00	725.00	1/3/2016	2/1/2023	2/2/2023	2586
083 Schwerdtfeger	Monthly	Premium	50.00	725.00	10/2/2014	2/1/2023	2/1/2023	3044
084 Crowell	Monthly	Premium	50.00	725.00	10/31/2020	2/1/2023	2/1/2023	823
085 Farmer	Monthly	Standard	100.00	725.00	8/12/2022	2/1/2023	2/10/2023	173
086 Williams	Monthly	Premium	100.00	725.00	11/8/2022	2/1/2023	2/8/2023	85
087 Sierocinski	Monthly	Premium	50.00	725.00	12/18/2021	2/1/2023	2/11/2023	410
088 Blackard	Monthly	Premium	50.00	725.00	10/21/2019	2/1/2023	2/5/2023	1199
090 Ferraro	Monthly	Premium	50.00	725.00	4/5/2019	2/1/2023	2/1/2023	1398
091 Fliescher	Monthly	Premium	100.00	725.00	8/13/2022	2/1/2023	2/12/2023	172
092 Wilson	Monthly	Premium	50.00	725.00	9/29/2017	2/1/2023	2/2/2023	1951
093 Wyatt	Monthly	Premium	50.00	725.00	5/13/2019	2/1/2023	2/1/2023	1360
095 Ashford	Monthly	Premium	100.00	725.00	1/1/2023	2/1/2023	2/1/2023	31
096 Estes	Monthly	Premium	50.00	725.00	11/1/2021	2/1/2023	2/1/2023	457
097 Clarke	Monthly	Premium	50.00	725.00	8/1/2020	2/1/2023	2/1/2023	914
098 Lormand	Monthly	Premium	50.00	725.00	2/10/2018	2/1/2023	2/15/2023	1817

099 Andel	Monthly	Standard	50.00	705.00	6/8/2021	2/1/2023	2/5/2023	603
100 Burden	Monthly	Premium	50.00	725.00	11/25/2020	2/1/2023	2/15/2023	798
101 Goodin	Monthly	Premium	50.00	725.00	7/24/2016	2/1/2023	2/1/2023	2383
102 Covey	Monthly	Premium	50.00	725.00	1/21/2018	2/1/2023	2/1/2023	1837
103 Pistokache	Monthly	Premium	50.00	725.00	2/29/2020	2/1/2023	2/15/2023	1068
104 Young	Monthly	Premium	50.00	725.00	5/21/2019	2/1/2023	2/12/2023	1352
105 Usher	Monthly	Premium	100.00	725.00	9/10/2022	2/1/2023	2/19/2023	144
106 Kachman	Monthly	Standard	100.00	705.00	1/2/2023	2/1/2023	2/1/2023	30
107 Owings	Monthly	Premium	50.00	725.00	9/1/2019	2/1/2023	2/14/2023	1249
108 Holder	Monthly	Premium	50.00	725.00	5/19/2022	2/1/2023	2/19/2023	258
109 Mcphearson	Monthly	Premium	50.00	725.00	1/11/2019	2/1/2023	2/1/2023	1482
110 Yancey	Monthly	Premium	50.00	725.00	7/15/2020	2/1/2023	2/1/2023	931
112 Faught	Monthly	Premium	100.00	725.00	2/13/2023	2/1/2023	2/13/2023	-12
113 Connelley	Monthly	Premium	50.00	725.00	10/26/2019	2/1/2023	2/9/2023	1194
114 Olson	Monthly	Premium	50.00	725.00	1/30/2016	2/1/2023	2/1/2023	2559
115 Valesky	Monthly	Standard	100.00	725.00	2/25/2023	2/1/2023	2/25/2023	-24
116 Johnston	Monthly	Premium	50.00	725.00	7/27/2013	2/1/2023	2/6/2023	3476
117 Ellis	Monthly	Standard	50.00	705.00	8/28/2021	2/1/2023	2/1/2023	522
118 Porter	Monthly	Standard	50.00	705.00	12/6/2021	2/1/2023	2/1/2023	422
119 Crumpton	Monthly	Premium	50.00	725.00	12/19/2020	2/1/2023	2/9/2023	774
120		Standard				vacant		
121 Garcia	Monthly	Standard	50.00	705.00	10/13/2021	2/1/2023	2/1/2023	476
122 Jones	Monthly	Standard	50.00	705.00	4/28/2021	2/1/2023	2/1/2023	644
123 Tienter	Monthly	Standard	50.00	705.00	2/7/2019	2/1/2023	2/18/2023	1455
124 Trejo	Monthly	Standard	50.00	705.00	2/22/2022	2/1/2023	2/19/2023	344
125 Lancour	Monthly	Premium	50.00	725.00	5/13/2022	2/1/2023	2/9/2023	264
126 Scarbrough	Monthly	Standard	50.00	705.00	6/13/2016	2/1/2023	2/9/2023	2424
127 Mills	Monthly	Premium	50.00	725.00	10/19/2015	2/1/2023	2/9/2023	2662
128 Taylor	Monthly	Premium	50.00	725.00	7/6/2020	2/1/2023	2/1/2023	940
129 Atkinson	Monthly	Premium	50.00	725.00	6/4/2021	2/1/2023	2/1/2023	607
130 Mayo	Monthly	Standard	100.00	705.00	7/22/2022	2/1/2023	2/19/2023	194
131 Garza	Monthly	Standard	50.00	705.00	4/4/2022	2/1/2023	2/5/2023	303
132	Weekly	Standard				vacant		
133 Roberts	Monthly	Premium	100.00	725.00	1/15/2023	2/1/2023	2/15/2023	17
134 Sebald	Monthly	Standard	100.00	705.00	1/14/2023	2/1/2023	2/14/2023	18
135 LaFrance	Monthly	Premium	50.00	725.00	1/23/2017	2/1/2023	2/1/2023	2200
136 Harding	Monthly	Premium	100.00	725.00	9/1/2022	2/1/2023	2/1/2023	153
137 Hill	Monthly	Premium	100.00	725.00	11/25/2022	2/1/2023	2/25/2023	68
138 Benson	Monthly	Standard	50.00	705.00	5/30/2018	2/1/2023	2/1/2023	1708
139 Grasso	Monthly	Premium	50.00	725.00	4/9/2018	2/1/2023	2/17/2023	1759
140 Watson	Monthly	Premium	50.00	725.00	2/8/2022	2/1/2023	2/4/2023	358
141 Wilson	Monthly	Premium	50.00	725.00	10/29/2017	2/1/2023	2/10/2023	1921
142 Nelsson	Monthly	Premium	100.00	725.00	1/16/2023	2/1/2023	2/16/2023	16
143 Golightly	Monthly	Premium	50.00	725.00	3/5/2022	2/1/2023	2/2/2023	333
144 Cox	Monthly	Standard	100.00	705.00	8/27/2022	2/1/2023	2/1/2023	158
145 Vega	Monthly	Premium	50.00	725.00	6/2/2021	2/1/2023	2/1/2023	609
146 Tischler	Monthly	Premium	50.00	725.00	2/29/2020	2/1/2023	2/2/2023	1068

	147 Lane	Monthly	Standard	50.00	705.00	9/16/2014	2/1/2023	2/3/2023	3060
	149 Sprayberry	Monthly	Standard	50.00	705.00	5/4/2022	2/1/2023	2/2/2023	273
	150 Larsen	Monthly	Premium	100.00	725.00	10/22/2022	2/1/2023	2/22/2023	102
	151 Allison	Monthly	Standard	50.00	705.00	7/22/2017	2/1/2023	2/1/2023	2020
	152 Penaluna	Monthly	Standard	100.00	705.00	9/3/2022	2/1/2023	2/1/2023	151
	153 Vermillion	Monthly	Standard	100.00	705.00	11/26/2022	2/1/2023	2/26/2023	67
	154 Coad	Monthly	Standard	50.00	705.00	7/4/2020	2/1/2023	2/1/2023	942
	155 Camizzi	Monthly	Standard	50.00	705.00	8/2/2017	2/1/2023	2/6/2023	2009
	156 McWilliams	Monthly	Premium	100.00	725.00	1/13/2023	2/1/2023	2/13/2023	19
	157 Crowder	Monthly	Premium	100.00	725.00	11/12/2022	2/1/2023	2/12/2023	81
	158 Robillard	Monthly	Standard	100.00	705.00	2/1/2023	2/1/2023	2/1/2023	0
	159 Howe	Monthly	Premium	100.00	725.00	2/1/2023	2/1/2023	2/1/2023	0
	162 Goff	Monthly	Standard	50.00	705.00	12/28/2020	2/1/2023	2/1/2023	765
	163 Powell	Monthly	Standard	100.00	705.00	12/30/2022	2/1/2023	2/1/2023	33
	164 Francis	Monthly	Standard	50.00	705.00	2/28/2022	2/1/2023	2/1/2023	338
	165 Harris	Monthly	Standard	50.00	705.00	11/7/2020	2/1/2023	2/1/2023	816
	166 Willis	Monthly	Standard	50.00	705.00	5/25/2021	2/1/2023	2/1/2023	617
	167 Hanbright	Monthly	Standard	50.00	705.00	6/20/2020	2/1/2023	2/8/2023	956
	168 Stahl	Monthly	Standard	50.00	705.00	7/13/2021	2/1/2023	2/2/2023	568
	169 Baker	Monthly	Standard	100.00	705.00	9/10/2022	2/1/2023	2/7/2023	144
	171 Hurley	Monthly	Standard	100.00	705.00	7/9/2022	2/1/2023	2/6/2023	207
	173 Stanglin	Monthly	Standard	50.00	705.00	1/30/2021	2/1/2023	2/1/2023	732
	174 Plummer	Monthly	Premium	50.00	725.00	12/10/2022	2/1/2023	2/10/2023	53
	175 Lyons	Monthly	Premium	50.00	725.00	6/1/2019	2/1/2023	2/11/2023	1341
	176 Gallagher	Monthly	Premium	100.00	725.00	9/12/2022	2/1/2023	022/11/23	142
Ranch	Delosantos	Monthly	Apartment	500.00	1050.00	8/21/2020	2/1/2023	2/22/2023	894
			TOTAL	10,950.00	117,250.00	\$128,180.00		2/15/2023	
									580 Median



**ATTACHMENT 2:
LETTERS RECEIVED FROM PROPERTY OWNERS WITHIN
200 FEET OF SUBJECT PROPERTY**



Planning and Zoning Commission Meeting
Date: **MONDAY, December 12, 2022 at 6:30 P.M.**

City Council Regular Meeting
Date: **THURSDAY, January 19, 2023 at 6:30 P.M.**

Section 1, Item 7.
DEC 05 2022
BY: *ml*

Hearings Location: City Hall, 3300 Corinth Parkway, Corinth, TX 76208. The meetings will be broadcast live at <https://www.cityofcorinth.com/remotesession>.

PUBLIC HEARING NOTICE

Dear Property Owner:

On Monday, December 12, 2022, at 6:30 PM, the City of Corinth Planning and Zoning Commission will conduct a public hearing on the item listed below. Should the Planning & Zoning Commission make a recommendation, the Corinth City Council will conduct a public hearing on Thursday, January 19, 2023, at 6:30 PM and will consider acting on the item listed below. The meetings will be held at the Corinth City Hall, 3300 Corinth Pkwy, Corinth, Texas 76208.

- A request to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, from MX-C Mixed-Use Commercial to a Planned Development with a base zoning district of MX-C Mixed-Use Commercial, to accommodate a proposed expansion of the Destiny RV Resort, on approximately ±18.96 acres located at 7100 S I-35E. Case No. ZAPD22-0005.

Additional information regarding this request can be found on the Upcoming Public Hearings page of the City of Corinth website at: <https://www.cityofcorinth.com/planning-development/page/upcoming-public-hearings>

As a property owner within two hundred (200) feet of this property, you are invited to attend this meeting in-person and voice your opinion at the public hearing (please note you are not required to attend).

Additionally, your opinion regarding the request on the property described above may be expressed by notation on this form or by letter. You may support or oppose this request; your opposition will be considered a protest. Signed written comments must be received by the City of Corinth Planning and Development Department at 3300 Corinth Parkway, Corinth, Texas 76208 (3 days prior to public hearing). Signed comments may be scanned and sent by email to Michelle Mixell, Planning Manager, at planning@cityofcorinth.com. Additionally, if you have any questions regarding this request, you may call 940-498-3262 for assistance.

I am writing in (Check as applicable) Support: Opposition: of the proposal.

I have reached out to Dallas R.V. several times over the last few years - can't get a call back - they have not seen good neighbors - I am against allowing them to expand their foot print

Name/Address/City: **(REQUIRED)**

Signature: **(REQUIRED)**

Thomas Mike Mason
(Please Print)

Thomas Mike Mason
(Signature)



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I am writing in (Check as applicable) Support: Opposition: of the proposal.

IF just expanding toward the frontage road,
then this looks good.

Name/Address/City: (REQUIRED)

DAVID Imy [Redacted]

Signature: (REQUIRED)

David Imy
(Signature)



**ATTACHMENT 3:
PLANNING & ZONING COMMISSION MINUTES**

December 12, 2022

January 23, 2023

February 27, 2023



MINUTES
PLANNING & ZONING COMMISSION
REGULAR SESSION

Monday, January 23, 2023, at 6:30 PM

City Hall | 3300 Corinth Parkway

On this, the 23rd day of January, the Planning & Zoning Commission of the City of Corinth, Texas, met in Regular Session at the Corinth City Hall at 6:30 P.M., located at 3300 Corinth Parkway, Corinth, Texas.

Commissioners Present:
Chair Alan Nelson
Vice Chair Mark Klingele
Rebecca Rhule
Adam Guck
Bradford Harrold

Commissioners Absent:
KatieBeth Bruxvoort

Staff Members Present:
John Webb, Director of Development Services
Michelle Mixell, Planning Manager
Miguel Inclan, Planner
Matthew Lilly, Development Services Coordinator

A. CALL TO ORDER AND ANNOUNCE A QUORUM PRESENT

Chair Alan Nelson called the meeting to order at 6:31 PM.

B. ESTABLISH VOTING MEMBERS AND DESIGNATE ALTERNATES

Commissioners Guck and Harrold were designated as voting members.

C. PLEDGE OF ALLEGIANCE

D. CONSENT AGENDA

1. Consider the approval of minutes for the Planning & Zoning Commission Special Session held on December 12, 2022.

Motion to approve consent agenda by Commissioner Guck, seconded by Commissioner Bruxvoort.

Motion passed unanimously: 5-for, 0-against.

Minutes
Planning and Zoning Commission
January 23, 2023

E. BUSINESS AGENDA

2. Consider and act on a Site Plan for the redevelopment of ±5.363 acres to permit the construction of a ±13,290 square foot, one-story automotive service building, located within the boundaries of both the City of Corinth and the City of Denton at 5000 S I-35E. Case No. SPC22-0008: Classic CDJR Service Building.

Miguel Inclan, Planner, provided Staff's presentation to the Commission and gave the recommendation that the proposal be approved as presented with the added stipulations.

Chair Nelson asked how building inspections would be coordinated with the City of Denton.

Inclan replied that the City of Corinth will defer to the City of Denton on building and construction inspections due to the majority of the site being located within the limits of the City of Denton, but that the utility and fire line relocations in the City of Corinth were reviewed by the City Engineer and Fire Marshall.

Birk Ayer, Ayer Design, gave a presentation on behalf of the Applicant.

Chair Nelson asked what setbacks and screening are being required in the landscape buffer along the southern boundary line adjacent to the residential properties.

Ayer explained that there is an existing 6-foot masonry wall and evergreen screening along the entirety of the fence line that will be preserved. Additionally, a new 6-foot concrete wall between the proposed service building and existing residences with additional deciduous and evergreen trees being planted in the buffer. He stated that there will not be an outdoor speaker system or outdoor music and he elaborated on the services that will be provided in the building along with the building layout.

Chair Nelson asked if the elevation change represented in the renderings was accurate and if so, would the proposal require cutting into the hill on the southwest side.

Ayer confirmed that the renderings are accurate and some additional grading will need to take place to accommodate the project.

Chair Nelson asked if more right-of-way would be ceded to TX-DOT in front of the Mazda Dealership.

Ayer confirmed that TX-DOT will be acquiring additional right-of-way in this location.

Vice-Chair Klingele asked if there will be any light standards for the buildings, specifically on the backs of buildings, in addition to the tall-light standards provided.

Ayer explained that they did perform a photometric study to ensure that no lighting spilled across the property line.

Commissioner Guck asked if the Applicant had an estimate on how the volume will increase with the proposed expansion.

Ayer replied that he did not have this information but that the proposed improvements should enhance circulation within the site.

Minutes
Planning and Zoning Commission
January 23, 2023

Chair Nelson stated that this item did not require a public hearing but asked if any residents would like to speak.

Melvin Locklear, 1602 Oakhollow Dr, expressed concerns with additional car dealership expansions in the City and asked what direction the City would be moving in going forward in terms of automotive uses.

Chair Nelson asked if the land along I-35E from the subject property to Corinth Pkwy was zoned to permit automotive uses.

Inclan explained that the existing zoning for the subject site is for automotive use but that no additional land along the interstate was specifically zoned or intended for automotive uses.

Commissioner Rhule made a motion to recommend approval of Case No. SPC22-0008 Classic CDJR Service Building subject to the approval of the site plan by the City of Denton and the approval of the plat by the City of Corinth. Seconded by Commissioner Harrold.

Motion approved unanimously: 5-for, 0-against

3. Conduct a Public Hearing to consider testimony and make a recommendation to the City Council on a rezoning request by the Applicant, Homeyer Engineering, Inc., to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, from MX-C Mixed-Use Commercial to a Planned Development with a base zoning district of MX-C Mixed-Use Commercial, to accommodate a proposed expansion of the Destiny RV Resort, on approximately ±18.96 acres located at 7100 S I-35E. Case No. ZAPD22-0005 – Destiny RV.

Inclan provided Staff's presentation and gave a brief recap of the zoning change request since the item was tabled at the previous meeting. He pointed out how the Applicant has addressed the Commission's concerns and recommended that the item be approved as presented subject to the RV Park definition being amended.

Chair Nelson asked if the PD Design Statement would be reverting back to the RV Park definition as shown in the UDC.

Inclan confirmed this.

Helen-Eve Beadle, HE Planning & Design, gave a presentation on behalf of the Applicant. She explained that the RV park would be adding a 3-year maximum stay and would be requiring customers to vacate the park for 30 days following the maximum stay period. Additionally, the 30-day minimum stay was removed to allow for shorter stays on rare occasions. She stated that they had removed the 12-year maximum age for RVs and would instead be monitoring vehicles based on their age and condition going forward. She stated that the applicant had provided the requested census of current licensees at the park and that the number of service calls performed during 2022 in the park was comparable to surrounding residential subdivisions. She explained the Applicant's stance that they did not feel it was their responsibility to replace the residential fencing along the southern property boundary and that they felt preserving the existing tree buffer between the park and the school was preferable to removing trees and installing a wooden fence.

Chair Nelson asked for the Applicant to explain why the 30-day minimum stay was removed and why there was not a maximum stay.

Minutes
Planning and Zoning Commission
January 23, 2023

Beadle explained that a maximum length of stay was provided, and it is 3 years. She further explained that often customers leave before their 30-day lease is up and that they would like to accommodate customers for one or two weeks in these instances.

Commissioner Rhule asked what the average length of stay in days at the park was.

Beadle replied that she did not have that information at the time but that they had provided the census of licensees as requested.

Commissioner Rhule asked how the Applicant is verifying that lots are being occupied and not simply used as RV storage.

Beadle stated that park management will be regulating the RV stalls and see that park rules are followed.

Commissioner Rhule asked how many clients would be grandfathered into the existing regulations with no maximum stay.

Beadle replied that everyone currently at the park would be grandfathered into the proposed agreement.

Commissioner Rhule asked if the RV park performed criminal background checks.

Beadle replied that given the park is a lodging use, they do not perform background checks.

Commissioner Rhule asked what the Applicant is doing to be a good neighbor to the surrounding properties.

Beadle replied that they work with surrounding property owners to meet their needs and requests.

Commissioner Rhule asked what the Applicant is doing proactively to be a good neighbor.

Beadle stated that the park is a good community and aside from the proposed improvements, management seeks to ensure that rules are followed, and proper conduct is maintained.

Commissioner Rhule asked if the Applicant would reconsider replacing the fence along the southern border, particularly along the school boundary, given that they have agreed to replace the fence on Tower Ridge.

Beadle explained that the fence along Tower Ridge would only be replaced if a majority of the fence is determined to need repair, and that the fences along the southern property line are owned and maintained by the Fairview residents. She stated that the fence between the school and the park was determined to be unnecessary due to the existing tree line and was not required by zoning.

Commissioner Rhule asked what the policy in the park was toward crime.

Beadle replied that it was her understanding that there was a zero-tolerance policy towards crime in the park and any offenders would be asked to leave.

Commissioner Harrold asked if the 12-year or newer policy for RVs would be self-managed.

Beadle confirmed that this would be self-managed.

Minutes
Planning and Zoning Commission
January 23, 2023

Commissioner Harrold asked if the Applicant knew what percentage of the licensees have a 12-year or older vehicle.

Beadle stated that she did not have this information.

Chair Nelson stated that he felt that the 3-year maximum stay was lengthy for a lodging use and that it was his understanding that additional discussion or language added to ensure that the park operates uniformly, with the proposed regulations applying to both the new and existing portions of the park. He expressed that the video of the southern fence line was helpful visually and that many of the fences appeared to be in good condition. Given that only a few of the fences appeared to be in poor condition, he asked if the Applicant would be splitting the costs of any new fences with the adjoining property owners.

Beadle explained that the fencing along the southern property line was solely within the property of the Fairview residents and would not be replaced by the Applicant.

Chair Nelson asked if there was any consideration for excluding the grandfathered clause.

Beadle explained that in the previous year the park had 37% of its lots overturn with only 17% of licensees having been at the park over 4 years.

Chair Nelson clarified that he did not necessarily want to see the park turnover all at one time but felt that the community would benefit most by applying the maximum length of stay to the whole park and creating more opportunity for turnover.

Beadle stated that she understood the Commissions concern but that the Park has been operating without the proposed regulations for several decades and that turnover has not been a problem.

Vice-Chair Klingele stated that he was confused with the phrasing of the community and wanted clarity on whether the park was lodging or for residence. He explained that it was understanding, as the Chair had stated before, that they had determined at the previous meeting that any new regulations would apply to the entirety of the park.

Beadle stated that the park is lodging in that it is a campground and that she apologized if anything had been misunderstood at the previous meeting, but that no decisions had been made at that time. She explained that they had been asked to investigate and look into several things and that the current proposal is what the Applicant had decided on.

Vice-Chair Klingele clarified that he understood that the park has been operating as is for several decades, but that he felt the definition being proposed was unable to properly apply to the park, which he sees as having both lodging and residential uses.

Brett Fugman, Destiny, stated that the park will be improving the area along the frontage road, adding detention, and installing sidewalks along the I-35E service road and Tower Ridge Dr. He explained that the annual turnover in the park is 37%, with 17% of licensees having been there over 4 years and only 3 people have been there since 2009, two of them being staff. He reiterated that the park is a close-knit community and that he is willing to put in the necessary investment to improve the site. He stated that the proposed development will be positive for licensees, for the City, and for surrounding residents.

Minutes
Planning and Zoning Commission
January 23, 2023

Chair Nelson asked if the Applicant would be willing to add minimum or maximum permitted sizes for RVs, restricting to Class A and Class C vehicles and allowing only 26-foot or larger fifth wheels and trailers.

Fugman stated that self-management on the maintenance of vehicles has worked well for the park in the past, and that he would like to discuss this further with his manager before committing to anything, but that the proposed 52 new stalls are designed and intended for 45-foot Class A RVs.

Chair Nelson stated that he believed by bringing in higher-end RVs to the park would ensure that the overall quality of the park was increased.

Fugman explained that this was potentially true but that less expensive vehicles would not reduce the quality. He stated that he was willing to adhere to new business regulations set by the City, but that his main goal was to see that his proposal of 52 new stalls be achieved.

Commissioner Harrold asked how the regulations enumerated in the planned development standards would be enforced down the line.

Fugman stated that he was not trying to skirt any of the regulations and that he was more than happy to provide any information, such as a rent roll, to the City in the future.

Inclan clarified that the requirement of a minimum RV age in the park was removed to accommodate renovated older models.

Commissioner Rhule asked if there had been any communication with the school and if so if they had any input.

Incan stated that the school would have been notified as a property owner within 200 feet.

Chair Nelson opened the Public Hearing.

Melvin Locklear, 1602 Oakhollow Dr, stated that he was not for or against the rezoning request but felt that this proposal was not following the 2040 Comprehensive Plan and was further expanding automotive uses in the City. He asked if there was an occupancy tax for those staying in the park and stated that the total amount of taxes collected by the City in 2022 was \$4,000. He stated that if nothing else, they should hold off on the proposal until the I-35 E service road is improved.

Don Wilson, RV Park licensee, explained that he considers the Destiny RV Park as his home base so that he can visit his grandchildren. He stated that licensees pour a lot of money into the community and that he considers everyone in the park as residents rather than licensees. He explained that it is a zero-tolerance community for breaking park rules and that the park is a great community.

Judy Ragland, RV Park resident, explained she works at the park part-time and that they verify RVs visiting the park are the correct age. She stated that anyone who is bad for the community is asked to leave and that this is a problem that comes up in any community.

Greg Shappa, 2713 Skyview Dr, stated that many other RV parks in the area are poorly kept, but that he has never had any problems with Destiny RV Park. He felt that the deceleration lane is a great idea and that the overall proposal is a great improvement for Corinth. He stated that his only problem with the park is that the licensees don't pay property taxes for staying at the park.

Minutes
 Planning and Zoning Commission
 January 23, 2023

Chair Nelson closed the Public Hearing.

Chair Nelson stated that he had concerns with the lack of guidelines regulating the park moving forward, particularly regarding the length of stay, and that he was not comfortable at the present time to put forward a motion for approval and instead suggested that the item again be tabled.

Commissioner Guck that he felt that they had made some progress since the previous meeting, but that additional language needed to be added to differentiate between short-term and long-term stays.

Commissioner Harrold agreed with the previous statements and that he would like to see background checks conducted at the park.

Director Webb informed the commission, if they were going to table the item, to make a motion to continue the public hearing and table the item to the next meeting so that the item would not have to be readvertised.

Vice-Chair Klingele asked if it would be possible to conduct a Workshop Session prior to the next Regular Session.

Webb stated that they could hold a Workshop Session but that the Commission needed to provide specific direction to the Applicant on what they wanted to see addressed, as it is uncommon to continue to table an item.

Commissioner Guck made a motion to continue the public hearing and table the item to the February 27th meeting. Seconded by Commissioner Rhule

Motion passed unanimously; 5-for, 0-against.

4. Conduct a Public Hearing to consider testimony and make a recommendation to the City Council on a rezoning request to amend the boundary of PD-51, as adopted by Ordinance No. 20-12-17-41, by removing approximately ±13.577 acres referred to as Tract 2 from PD-51, generally located on the north side of Walton Drive, west of Victory Way, and south of Orion Place. Case No. ZAPD22-0011 – PD-51 Boundary Amendment.

Michell Mixell, Planning Manager, gave a presentation on behalf of Staff and explained that this item is a companion piece to the Village Square Multi-Family Planned Development rezoning request. She explained that Tract 2 of PD-51 was created as a place holder until such time that a detailed concept was proposed.

5. Conduct a Public Hearing to consider testimony and make a recommendation to the City Council on a rezoning request by the Applicant, Carleton Companies, to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, from PD-51 (Tract 2 of current PD-51) – Planned Development with a base zoning district of MF-3 Multifamily Residential, to a new Planned Development with a base zoning district of MF-3 Multifamily Residential, to accommodate a proposed multifamily development, on approximately ±13.577 acres located on the north side of Walton Drive, west of Victory Way, and south of Orion Place. Case No. ZAPD22-0007 – Village Square at Corinth.

Mixell continued her presentation for the companion rezoning request and explained the proposed multi-family project. She pointed out the proposed changes from the existing multi-family zoning and gave the recommendation that the proposal be approved as presented.

Minutes
Planning and Zoning Commission
January 23, 2023

Chair Nelson asked if the proposal would contain a mixed-use element.

Mixell stated that the Applicant had included language at the recommendation of Staff to permit 1,500 square feet of retail space along Walton Drive or Street A that could accommodate a café or small shop.

Chris Martino, HEDK Architects, gave a presentation on behalf of the Applicant and broke down the specifics of the proposed planned development. He stated that the proposed amenities included a pool, dog park, and a landscaped trail running around the exterior of the development. He stated that the facades would consist of quality materials and their goal was for the development to maintain its appearance for a number of years.

Chair Nelson asked how the courtyards in Phase 2 were going to be landscaped.

Martino stated that the courtyards had not yet been fully designed, but that he imagined one of the courtyards would be utilized as a pool area.

Chair Nelson asked where the retail area would be located.

Martino stated that it was his understanding this would be in Phase 2, likely adjacent to the club.

Chair Nelson asked if there would be any public parking for the retail area.

Martino stated that parallel parking will be provided along Walton Dr and head-in parking along the private street.

Commissioner Guck asked if recess materials were being counted towards the façade percentages.

Martino explained that these recesses did not count toward the façade percentages and consisted of cementitious siding resembling wood. He stated that these balconies would be recessed behind walls and not visible from the street view aside from the front face.

Commissioner Guck stated that facing Agora Dr., he would prefer for the recessed cementitious siding to be replaced by masonry materials.

Chair Nelson asked what section of the development the colored rendering was depicting.

Martino explained that this rendering represented the main entrance off of Walton Dr into Phase 1.

Commissioner Guck asked if the Applicant had considered any other recess materials, specifically on the corners of buildings along Walton Dr.

Martino stated that he does not believe the siding in the recesses would be overly visible from the Agora Park given that there was another property between the development and the park.

Commissioner Rhule asked if the parking garage would be visible from any side of the development.

Martino stated that the garage would be fully enclosed, and the top level would not be visible from the surrounding area.

Chair Nelson asked if the entrance to the parking garage was on the north side.

Minutes
Planning and Zoning Commission
January 23, 2023

Martino stated that the garage would have two entrances with one on the north side off of Orion Place and one on the east side off of the private street.

Chair Nelson asked if the garage would be open to visitor parking in addition to residents.

Martino explained that the lockable gate would be set back further into the garage to allow for visitor parking but that they had yet to determine how much visitor parking would be provided.

Chair Nelson opened the public hearing for items 4 and 5.

Melvin Locklear, 1602 Oakhollow Dr, stated that he is against the proposal, he does not want more apartments in the City, and that he feels the proposal does not meet the 2040 Comprehensive Plan.

Greg Shappa, 2713 Skyview Dr, stated that he feels there are currently enough apartments in the City, he believes the frontage road going southbound on I-35 will not be able to accommodate this many new residents, and that any proposal should be held off until after the TX-DOT improvements are completed.

Mike King, 2610 Zachary Dr., stated that he was unhappy with the amount of new multi-family developments being approved in the City, that he was looking into the legality of the land the City of Corinth had recently sold, and he read off a list of the recently approved multi-family units.

Mark Clyburn, 3325 Ithaca St., explained that he is buying a house in Walton Ridge and was unaware of the proposed multi-family development until recently. He stated that he believes that this project will damage his property value, that the development will have parking issues, and that he feels there needs to be a boundary between the apartments and the single-family houses.

Kelly Clyburn, 3325 Ithaca St., stated that she has an issue with this proposed development being so close to her house, they had not received a notice of the zoning change as the future property owners, and raised concerns with parking and screening.

Chair Nelson closed the Public Hearings.

Commissioner Rhule asked what the options were if the Commission was to not approve the rezoning request.

Mixell explained that if the request was not approved, both the boundaries of PD-51 and the existing zoning would remain unchanged but reiterated that when PD-51 was approved in 2020, Tract 2 had been zoned for multi-family use.

Chair Nelson pointed out that the proposed parking ratio is greater than the approved parking ratio for PD-51 Tract 2.

Mixell confirmed this was the case and explained that the city center was envisioned as a transit-oriented district that would hopefully in the future be served by a DCTA transit stop.

Commissioner Rhule asked if Staff could explain what was envisioned for the future city center district.

Mixell pointed out the development and improvements that had been envisioned for the city center in the 2040 Comprehensive Plan.

Minutes
Planning and Zoning Commission
January 23, 2023

Commissioner Rhule stated that she sympathized with the issue of the openness between the single-family homes and the multi-family development and was trying to reconcile the issue or come up with a solution.

Commissioner Guck asked what the current proposed boundary was between the development and the single-family homes.

Mixell explained that the Applicant will be providing vegetative screening along the eastern property boundary and that Buildings 3 and 4 of Phase 1 were setback 50 feet from this boundary. Along the northern boundary where there is a shorter setback, the Applicant will be providing shade trees.

Commissioner Rhule stated that she could see multi-family tenants parking along Victory Way in the single-family development.

Chair Nelson asked if Phase 1 would only be served by surface parking.

Mixell stated that the majority of parking in Phase 1 would be surface parking with some tuck-under parking.

Chair Nelson asked how many units were proposed for Phase 1.

Mixell stated that 236 units were proposed.

Chair Nelson asked if the proposal met the Comprehensive Plan.

Mixell confirmed that the proposal met the Comprehensive Plan.

Commissioner Rhule made a motion to recommend approval of the rezoning request to amend the boundary of PD-51, as adopted by Ordinance No. 20-12-17-41, by removing approximately ±13.577 acres referred to as Tract 2 from PD-51, generally located on the north side of Walton Drive, west of Victory Way, and south of Orion Place. Case No. ZAPD22-0011 – PD-51 Boundary Amendment. Commissioner Guck seconded the motion.

Commissioner Harrold stated that he was concerned with amount of traffic the development would generate and that it may become problematic without the proper infrastructure in place.

Commissioner Guck stated that the proposal would increase the parking ratio from what was previously approved.

Motion passed unanimously; 5-for, 0-against.

Commissioner Rhule stated that she had concerns with the proposed number of parking spaces and the boundary between the proposed development and single-family houses.

Chair Nelson agreed with Commissioner Rhule's concerns. He stated that he felt that the amount of new multi-family developments in the City was very rapid, but that all of this conformed with what was envisioned in the 2040 Comprehensive Plan. He stated that he felt the current proposal for the subject property was a good offer.

Commissioner Harrold reiterated his concerns with traffic congestion and infrastructure.

Commissioner Guck stated that he would like to have more information regarding the proposed public street along the west side of the development and estimates on the increases in traffic.

Director Webb explained that the Applicant will be constructing Street A which will then become a public street, and the City would oversee the improvements on Walton Dr, the construction of Main St., and the expansion of North Corinth St. to Corinth Pkwy. He stated that Staff believed traffic would be fine along these and surrounding roads and that TX-DOT improvements to the service roads and the underpass at Lake Sharon Dr will ease traffic at these locations.

Commissioner Guck asked if on-street parking along these streets would pose additional traffic problems.

Webb explained that based on research of parking in other cities, the ratio of 1.7 parking spaces per dwelling unit has been sufficient. He stated that he feels the vast majority of multi-family residents will park in the surface parking and garages within the development for convenience and safety.

Chair Nelson asked what the Applicant's target market was for the apartments.

Kim McCaslin, MR Development, explained that they will be providing 1- and 2-bedroom apartments targeted primarily at singles and married couples.

Commissioner Guck asked to see further clarification on what the nature of the development would look like.

Webb stated that the proposal was a multi-story multi-family development but was unsure what specific information Commissioner Guck was asking for.

Commissioner Guck asked if the proposal were approved if the development would be constructed as depicted in the provided concepts.

Webb confirmed that the concepts and design standards would become part of the PD ordinance and would bind the development to adhere to these standards.

Commissioner Guck asked for clarity on the retail element of the proposal.

Webb stated that any retail use would be very minor, as it is restricted to a maximum of 1,500 square feet, and it was at the Applicant's discretion as to whether the retail use would even be part of the development.

Chair Nelson made a motion to make a recommendation to City Council to approve Case No. ZAPD22-0007 Village Square PD as presented. Commissioner Rhule seconded the motion.

Chair Nelson, Vice-Chair Klingele, Commissioner Rhule, and Commissioner Guck voted in favor of the motion. Commissioner Harrold voted in opposition of the motion.

Motion Passed: 4-for, 1-against.

F. DIRECTORS REPORT

Webb commended Chair Nelson on his presentation to the City Council the previous Thursday regarding the Planning and Zoning Commission. He stated that Staff would be working to schedule a Workshop Session for Destiny RV prior to February 27th and that the February meeting would have one new public hearing item in

Minutes
Planning and Zoning Commission
January 23, 2023

addition to the item tabled that night. Lastly, he informed the Commission that Commissioner Thornton had tendered his resignation from the Planning and Zoning Commission earlier that day due to work conflicts and that the City Council would be working to fill the empty seat.

Commissioner Guck asked if it would be possible for an alternate to move up to a voting member.

Webb explained that this was at the City Council’s discretion but that historically the Council would elevate an alternate to a voting member and then bring in a new member as an alternate.

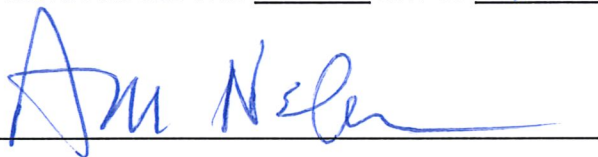
G. ADJOURN REGULAR SESSION

The regular session was adjourned at 9:12 PM.

H. ADJOURNMENT

There being no further business before the Commission, the meeting was adjourned at 9:12 PM.

MINUTES APPROVED THIS 27 DAY OF FEB, 2023.



Alan Nelson, Planning and Zoning Commission Chairman



MINUTES
PLANNING & ZONING COMMISSION
REGULAR SESSION

Monday, December 12, 2022, at 6:30 PM

City Hall | 3300 Corinth Parkway

On this, the 12th day of December, the Planning & Zoning Commission of the City of Corinth, Texas, met in Regular Session at the Corinth City Hall at 6:30 P.M., located at 3300 Corinth Parkway, Corinth, Texas.

Commissioners Present:

Chair Alan Nelson
Vice Chair Mark Klingele
KatieBeth Bruxvoort
Rebecca Rhule
Adam Guck
Bradford Harrold

Commissioners Absent:

Rodney Thornton

Staff Members Present:

John Webb, Director of Development Services
Michelle Mixell, Planning Manager
Miguel Inclan, Planner
Matthew Lilly, Development Services Coordinator

A. CALL TO ORDER AND ANNOUNCE A QUORUM PRESENT

Chair Alan Nelson called the meeting to order at 6:31 PM.

B. ESTABLISH VOTING MEMBERS AND DESIGNATE ALTERNATES

Commissioner Guck was designated as a voting member.

C. PLEDGE OF ALLEGIANCE

D. CONSENT AGENDA

All matters listed under the Consent Agenda are considered to be routine and will be enacted in one motion. Should the Chair, a Commission Member, or any citizen desire discussion of any item, that item will be removed from the Consent Agenda and will be considered separately.

1. Consider the approval of minutes for the Planning & Zoning Commission Special Session held on November 28, 2022.

Motion to approve consent agenda by Commissioner Guck, seconded by Commissioner Bruxvoort.

Motion passed unanimously: 5-for, 0-against.

E. BUSINESS AGENDA

2. Conduct a Public Hearing to consider testimony and make a recommendation to the City Council on a rezoning request by the Applicant, Homeyer Engineering, Inc., to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, from MX-C Mixed-Use Commercial to a Planned Development with a base zoning district of MX-C Mixed-Use Commercial, to accommodate a proposed expansion of the Destiny RV Resort, on approximately ±18.96 acres located at 7100 S I-35E. Case No. ZAPD22-0005 – Destiny RV.

Miguel Inclan, Planner, provided Staff's presentation to the Commission and recommended that the proposal be approved as presented.

Chair Nelson opened the Public Hearing at 6:48 PM.

Brett Fugman, Shorebreak Holdings, gave a presentation on the proposed development. He explained that they have owned the RV park approximately 18 months, updating many of the onsite amenities in this time, and have been working with staff on this expansion for approximately 20 months. The proposed expansion will allow for more capacity, as the site has been 100% full the last four years, and new stalls will be able to accommodate larger RVs.

Helen-Eve Beadle, HE Planning and Design, continued the Applicant's presentation. She stated that the proposed expansion will provide an additional 52 RV spaces, the existing public car wash will be demolished, water lines will be reconfigured to provide fire hydrants, fire lanes will be widened to 20 feet, and an emergency access point off Tower Ridge will be installed. Additionally, a deceleration lane will be constructed at the entrance of the park and a landscape buffer along I-35E will be installed.

Commissioner Rhule asked what the current UDC definition of RV park is.

Inclan stated the definition of RV Park as stated in the UDC.

Commissioner Rhule asked for the difference between the current and proposed definition.

Inclan explained that the new definition provides for a minimum term of stay and a minimum age of RVs.

Chair Nelson asked if the new standards will be applicable to the existing site.

Inclan replied that the standards would apply to the entire park including the existing park.

Chair Nelson asked for clarification if the RV Park definition in the UDC defines short-term and long-term stays and standards for the permitted age of equipment or vehicles.

Inclan replied that the current UDC definition does not include this information.

Commissioner Rhule stated that the new definition does not specifically define the difference between short-term and long-term stay.

Inclan explained that the new definition provides requirements for a minimum stay but not a maximum stay.

Chair Nelson asked for the reasoning on why a minimum stay is being asked for.

Inclan replied that this could be addressed by Applicant.

Commissioner Rhule asked if the proposed RV Park definition would only apply to this development.

Inclan stated that this definition would only apply to this planned development.

Chair Nelson stated that he would expect that a similarly sized residential development would require more fire protection and asked what fire protection standards are being utilized for this site.

Inclan responded that the expansion area will meet all of the current fire codes and that for the existing site, the Fire Marshal has requested that the fire lanes be provided and be a minimum of 20 feet in width and for water lines and fire hydrants to be added.

Vice-Chair Klingele asked about the rated capacity of some of the proposed pavers.

Inclan replied that he did not know the answer.

Vice-Chair Klingele asked if the fire lanes would be painted on both sides to prevent parking.

Inclan explained that the property will be replatted and fire lane easements can be required to be included as part of the replat.

Commissioner Guck asked if the increased electrical demands of the proposal had been given consideration and if additional capacity will be needed.

Inclan replied that this could be addressed by the Applicant's engineer but that to his knowledge, the capacity would not have to be increased.

Chair Nelson asked why there is a 30-day minimum stay.

Fugman replied that this prevents more transient customers and that the average stay is 90 days, but they occasionally allow one and two week stays if there are empty spots. He explained that there are currently 3 contractors at the park who have been there 9 months, but that the intention is for the park to function as lodging and not as a permanent residence. He further explained that the proposed restrictions on permanent and semi-permanent structures will prevent longer stays and that the new regulations will give more control to the city and bring the park into better conformance.

Commissioner Guck asked if there had been any thought to establish a maximum length of stay.

Fugman stated that they license month to month but if a problem arises with a customer, they are asked to leave.

Commissioner Rhule stated that someone could in theory renew their license indefinitely.

Fugman replied that the way the system is currently set up that this is possible.

Commissioner Rhule asked what the monthly turnover rate was.

Fugman estimated that 5-10 lots rotate per month, but that the park typically stays at 95-100% occupancy.

Commissioner Rhule asked if there were any people that used the site as a permanent residence.

Fugman replied that other than their caretakers onsite, people were not using the park as a permanent residence.

Chair Nelson asked what the longest current stay is.

Fugman replied that the contractors who have been there 9 months have currently been there the longest

Chair Nelson pointed out that several of the RVs currently at the park appear to be older than 12 years.

Fugman stated that management is aware of this and have begun to notify the customers with older equipment that they will not be allowed to return the park with these vehicles.

Commissioner Harrold asked the intent of the 12-year-old RV policy.

Fugman replied that this is to keep the park looking cleaner.

Commissioner Harrold asked if the purpose of their fee structure was to target was long-term clients.

Fugman replied that this is not necessarily true and that their current rates are below market values.

Commissioner Bruxvoort asked if contract workers make up a large portion of their clients and if there were any guest restrictions such as noise limits due to the site's adjacency to single-family housing.

Fugman replied that he only knows of the three contract workers on site, but he was not sure if there were any more. He explained that they do not have any noise restriction rules but that the people who reside in the park police the site and ask disruptive people to leave.

Commissioner Bruxvoort asked for clarification regarding if only gravel will be used in the expansion area.

Fugman explained that all of the new roads will be constructed out of asphalt with two handicap sites that will be concrete, but that the remainder of the sites will be a gravel material.

Commissioner Bruxvoort asked why the sites are going to be gravel.

Fugman stated that RVs sit better on gravel than on concrete.

Vice-Chair Klingele asked how a transient community has remained 100% full over the last 4 years as the Applicant claimed.

Fugman replied that every now and then they may be at 96% but that they are generally at full capacity.

Vice-Chair Klingele explained that he used to work for the Census Bureau and at the time he had interviewed several families who claimed that the site was their permanent residence. He stated that he visited the site again that day and saw many of the same RVs that he has observed previously and saw a school bus go through the site and drop off several kids.

Fugman replied that he knows of two children who use the bus system. He noted that they have owned the RV park for 18 months and are still working through some of the problems at the park. He stated they are willing to put in place any other restrictions that the Commissioners feel comfortable with and want to create something that Corinth can be proud of.

Vice-Chair Klingele replied that his concerns are not about the proposed expansion but that he believes there are many more permanent residents at the site than what the Applicant may know about.

Fugman asked if the Commission would be comfortable with adding a maximum stay.

Commissioner Guck asked that the Applicant clarify the definition of a temporary stay.

Fugman stated that he is open to establishing a maximum stay and does not want to create permanent residency. He agreed that the definition being proposed does lack some clarity regarding the length of stay and that he was willing to adjust the maximum stay to whatever made everyone comfortable.

Commissioner Rhule stated that it is up to the Applicant to establish what temporary means and what an appropriate maximum length of stay should be.

Commissioner Guck stated that he wants some clarity on the amount of people actually using the site as a permanent residence and that the maximum length of stay should be determined by the Applicant so that it will be conducive to their financial model.

Fugman explained that there are the contract workers who have been at site for nine months but that they are not advertising the park to serve as a permanent residence.

Vice-Chair Klingele stated that he believes that they do not intend for the site to be used for permanent residence but that the Applicant may have inherited more than they had known when they purchased the RV park.

Commissioner Harrold asked for some more data in regard to average stay and turnover rate.

Fugman stated that they do not typically track this information but that they could find it.

Commissioner Guck asked what the reasoning was behind the increase in monument sign size.

Fugman stated that the sign size was based off the sign at Huffines and that he wants it to be visible to customers as they are driving on the service road.

Vice-Chair Klingele asked how they would regulate the building of semi-permanent structures in the old and new areas.

Fugman replied that he would defer to the City's judgement if they were willing to issue a permit for these structures or not.

Chair Nelson asked if old semi-permanent structures would be removed by customers as they leave the park.

Fugman confirmed that the new regulations would have the structures taken down and new customers would not be able to put up new structures.

Fugman stated that if this proposal was denied or become not viable financially, the RV park would continue to operate as is and that he wants to do what is right to satisfy all parties.

Commissioner Bruxvoort stated that she appreciated this comment and that the goal of the Commission was to recommend something to City Council that they were sure they wanted in the city.

Joe Medina, 3306 Fairview Drive, is in favor of the RV Park being improved but wants the security in the park to be improved. He explained that he would like the trees along his fence line to be removed, for a masonry fence to be installed along the south side of the park, and that he does not want a path going behind his house.

Chair Nelson asked Staff if the path along the south side of the RV park was going to be constructed.

Inclan clarified that the Applicant will not be required to construct the path.

Chair Nelson asked if there was an easement between the RV park and the single-family development to the south.

Inclan replied that there was not an easement to his knowledge and that there was not a common fence built by the developer along this property line.

Chair Nelson asked if the majority of the trees along the southern property line were on the RV park's property.

Inclan replied that this was correct.

Juana Medina, 3306 Fairview Drive, stated that she had all the same issues raised before and that she doesn't let her children go in the backyard by themselves because she does not feel comfortable. She raised concerns with the park's proximity to the school, privacy, safety, noise during construction, and prefers that a barrier wall be constructed along the entire southern property line.

Chair Nelson closed the public hearing at 7:37 PM.

Commissioner Bruxvoort asked Staff if the Commission could move into executive session to further discuss the proposal.

Director Webb explained that the Commission can only move into executive session for legal advice from an attorney.

Vice-Chair Klingele made a motion to table the item until the January 23, 2023 Planning and Zoning Commission meeting for clarification regarding the fence in lieu of a walkway along the southern property line and the maximum length of stay. Commissioner Rhule seconded the motion.

Motion passed unanimously. 5-for, 0-against.

Fugman asked for clarification on what was being asked for the next meeting.

Chair Nelson clarified that the Commission would like a better definition of the temporary stay with an end-date and regarding the southern fence.

Fugman explained that a masonry fence along the southern property line would make the project not feasible. He further stated that they had held a neighborhood meeting in March that one person attended but that he is willing to continue to work with surrounding property owners to address their concerns.

Commissioner Guck asked that the Applicant better establish the boundary between the RV park and both the school and single-family homes to the south.

Fugman confirmed that they will be installing a wood fence between the RV park and the school.

Vice-Chair Klingele stated that the boundary does not have to be a masonry fence and suggested that the Applicant could install a secondary fence on the southern property line to act as a buffer.

Fugman replied that any additional fencing would likely result in the loss of several protected trees.

Chair Nelson stated that he understood the Applicant's concerns and asked that they look at the Commission's two concerns and come back with solutions in January.

Commissioner Bruxvoort explained that she is not necessarily in favor of a masonry fence due to their impact on trees and drainage issues and that higher wood fencing would be ideal in this situation.

Fugman stated that they would look into the fencing concerns further.

F. DIRECTORS REPORT

Webb stated that the January Planning and Zoning Commission meeting will have 3 public hearings.

Vice-Chair Klingele asked how the Commissioners' concerns have been addressed since the previous public hearing regarding the Corinth Groves Planned Development.

Michelle Mixell explained that the Applicant's response has been uploaded to the city website.

G. ADJOURN REGULAR SESSION

The regular session was adjourned at 7:48 PM.

H. ADJOURNMENT

There being no further business before the Commission, the meeting was adjourned at 7:48 PM.

MINUTES APPROVED THIS 23 DAY OF January, 2023.



Alan Nelson, Planning and Zoning Commission Chairman



MINUTES
PLANNING & ZONING COMMISSION
REGULAR SESSION

Monday, February 27, 2023, at 6:30 PM

City Hall | 3300 Corinth Parkway

On this, the 27th day of February, the Planning & Zoning Commission of the City of Corinth, Texas, met in Regular Session at the Corinth City Hall at 6:30 P.M., located at 3300 Corinth Parkway, Corinth, Texas.

Commissioners Present:

Chair Alan Nelson
 Vice Chair Mark Klingele
 KatieBeth Bruxvoort
 Rebecca Rhule
 Adam Guck
 Crystin Jones

Commissioners Absent:

Bradford Harrold

Staff Members Present:

John Webb, Director of Development Services
 Michelle Mixell, Planning Manager
 Miguel Inclan, Planner
 Matthew Lilly, Development Services Coordinator

A. CALL TO ORDER AND ANNOUNCE A QUORUM PRESENT

Chair Alan Nelson called the meeting to order at 6:30 PM.

B. ESTABLISH VOTING MEMBERS AND DESIGNATE ALTERNATES

Chair Nelson introduced Commissioner Jones as a new alternate voting member and stated that Commissioner Guck had been promoted to a regular voting member.

C. PLEDGE OF ALLEGIANCE

D. CONSENT AGENDA

1. Consider the approval of minutes for the Planning & Zoning Commission Special Session held on January 11, 2023.
2. Consider the approval of minutes for the Planning & Zoning Commission Regular Session held on January 23, 2023.
3. Consider the approval of minutes for the Planning & Zoning Commission Special Workshop Session held on February 6, 2023.

4. Consider and act upon a Conveyance Plat for Greenway Trails, consisting of one (1) lot and right-of-way dedication, being ± 14.168 acres of land generally located east of North Corinth Street, south of Shady Shores Road, and north of North Central Texas College. (Case No. CONV23-0001)

Motion to approve consent agenda by Commissioner Klingele, seconded by Commissioner Rhule.

Motion passed unanimously: 5-for, 0-against.

E. BUSINESS AGENDA

5. Conduct a Public Hearing to consider testimony and make a recommendation to the City Council on a rezoning request by the Applicant, Homeyer Engineering, Inc., to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, from MX-C Mixed-Use Commercial to a Planned Development with a base zoning district of MX-C Mixed-Use Commercial, to accommodate a proposed expansion of the Destiny RV Resort, on approximately ± 18.96 acres located at 7100 S I-35E. Case No. ZAPD22-0005 – Destiny RV.

Miguel Inclan, Planner, provided Staff's presentation to the Commission and gave the recommendation that the proposal be approved as presented.

Chair Nelson asked how the cutoff date for those exempted from the 24-month maximum stay had changed since the prior meeting.

Inclan stated that the cutoff date had been changed by the Applicant from January 1, 2019, to July 1, 2021, increasing the amount of people that would be exempted from the maximum stay requirements. He clarified that the 24-month maximum stay would begin to apply upon the approval of the PD.

Helen-Eve Beadle, Beadle Planning & Design, gave a presentation on behalf of the Applicant and provided a brief summary of the proposal. She stated that the Applicant had decided to reduce the maximum stay from 36 to 24 months and exempted licensees from the maximum stay requirement who had been at the park since before July 1, 2021, when the Applicant purchased the property. She explained that though the RV park does not necessarily resemble what was envisioned in the Comprehensive Plan, it did still meet some of the described design priorities as a lodging use and through the proposed improvements. She concluded by alluding to the fact that notification letters had been sent to surrounding property owners several times and no letters of opposition had been received.

Vice-Chair Klingele asked how many more pads would be exempted from the maximum stay requirements as a result of the date change.

Beadle replied that 75 pads in total would be exempted.

Chair Nelson asked how many pads were exempted with the January 1, 2019, cutoff date.

Beadle replied that 35 pads would have been exempted under that date, so an additional 40 pads would be included under the July 1, 2021, cutoff date.

Commissioner Guck asked if the Applicant felt confident in being able to provide yearly enrollment data to the City.

Beadle confirmed that this data would be provided on a yearly basis.

Commissioner Rhule asked if the fenced area for pets referenced in the PD Design Statement would be in one location or per pad.

Beadle stated that each pad would be permitted to have a fenced in area for pets.

Commissioner Rhule asked how the Applicant would be monitoring concerns from residents of the Fairview Subdivision, such as licensees hanging clothing or items on that fence line.

Beadle stated that management had reached out to licensees to ensure that clothing would not be hung on this fence line and that this issue would be heavily monitored moving forward.

Commissioner Bruxvoort made a motion to recommend approval as presented. Seconded by Vice-Chair Klingele.

Vice-Chair Klingele thanked the Applicant for including improvements for public safety within the existing RV park in their proposal.

Motion passed unanimously: 5-for, 0-against.

6. Conduct a Public Hearing to consider testimony and make a recommendation to the City Council on a rezoning request by the Applicant, Rockbrook Development, to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, from SF-2 Single Family Residential to a Planned Development with a base zoning district of MF-1 Multi-Family Residential, on approximately ±9.007 acres generally located on the west side of Parkridge Drive, between Meadowview Drive and FM 2181. Case No. ZAPD21-0002 – Quarry Multi-Family.

Michelle Mixell, Planning Manager, provided Staff's presentation and gave the recommendation that the proposal be approved as presented.

Commissioner Rhule asked if trails as defined in the Comprehensive Plan were essentially the same as a sidewalk.

Mixell explained that a trail was defined as a 6- to 10-foot-wide side path. She stated that the Applicant would be providing 8-foot wide trails along the southside of Quarry Drive and along the westside of Parkridge Drive.

Commissioner Rhule asked if both of these trails would be running alongside a street.

Mixell confirmed this.

Jason Rose, J Rose Architects & Builders, stated that the proposal was for a 90-unit multi-family development with a mix of duplex-style and townhouse-style units. He explained that his company would be the developer and the builder for this proposal and provided a background on his company and previous developments. He stated that the target demographic was singles and young couples looking for a product that acted as a step between an apartment and a house. He explained that he spoke with the Lake Dallas School District who stated they were at the plateau of their student population and explained that this product does not typically attract families with children. He stated that they performed a TIA when the unit count was anticipated to be 127 units and found that there was a very minimal impact on the existing traffic. He stated that he reached out to many

of the surrounding property owners, including the Acme Quarry, to inform them of his proposed development and collected several letters of support for the proposal. He concluded by explaining that his development could help attract new commercial development along FM 2181 and would also act as a buffer between the commercial uses and the existing single-family neighborhoods.

Chair Nelson asked if there would be a stop sign at the intersection of Quarry Drive and Parkridge Drive.

Rose confirmed that this intersection would have a stop sign but that this may change in the future when Quarry Drive expands further west.

Chair Nelson asked if there would be a median along Quarry Drive.

Rose stated that there would not be a median. Rose stated that he included 4 pocket parks along the frontage of Parkway Drive which would include benches and vegetation.

Chair Nelson asked if there would be a secondary entrance for each unit in addition to the front door.

Rose stated that there would be a front door and a secondary exit through the garage.

Commissioner Rhule asked how the decision was made to incorporate the entirety of the pond into the proposal.

Rose explained that this decision was made on the recommendation of the City Engineer to prevent the property line running through the pond and to allow for the construction of a controlled outflow.

Commissioner Rhule asked what recreational activities, amenities, and nodes would be provided and what the difference was between the three.

Rose explained that this language was based off of the Comprehensive Plan and that he would be providing trails to the pond and docks, a dog park, an amenitized dry detention pond, and pocket parks. He stated that all three terms essentially referred to the same thing, which are the amenities for the residents.

Commissioner Rhule asked if the trails around the pond and throughout the development would be ADA accessible and available to any visitor.

Rose stated that he intends for all amenities to be ADA accessible but that due to the grading challenges around the pond, his desire to preserve the natural beauty, and the increase in liability, he would not be providing a trail around the pond.

Commissioner Rhule asked if the Applicant would be discouraging people from walking around the pond.

Rose stated that it was his intention to provide enough areas for people to walk and gather that there would not be a desire to walk around the pond. He explained that he wanted to preserve the pond as a natural feature and that he also wanted to protect the privacy of the property owner to the south.

Commissioner Rhule asked if there was a fence along the southern boundary line.

Rose stated that there was an existing fence that runs through the pond but that it would be moved and replaced to reflect the new property line.

Vice-Chair Klingele asked where the AC units would be located.

Rose stated that the AC units would be located in the rear portion of the side yards next to the garages on the duplex units and along the sides of the townhouse-style units.

Vice-Chair Klingele asked if the units would be sprinklered and include riser rooms and fire department connections.

Rose stated that the townhouse-style units would be sprinklered but that the duplexes did not require sprinklers by the current fire code. He explained that by not sprinkling the duplex units, there would be significant cost savings and would make the units more affordable for potential buyers. He further explained that he did not believe this was a life safety issue as there were a number of egress points from these units.

Commissioner Jones asked how tall the private yard fences would be.

Rose stated that these would be 4' tall wrought iron fences with two gates.

Commissioner Jones raised concerns with the possibility of pets escaping from these yards and causing disputes between neighbors.

Rose stated that his management would handle any disputes between neighbors but that this was not a problem he had dealt with in the past.

Dan Derton, 2716 Meadowview Drive, stated that he had signed a letter of support in 2021 because he believed the proposal was for fewer units than what was being presented. He raised concerns with traffic along Parkridge Drive, noise from the dog park, and light pollution. He concluded by asking if the units would be owned or rented.

Mixell explained that it was Staff's understanding that the units would be condominiums owned by the residents and that the development would have an HOA.

Sarah Gesell, 2818 Goodnight Trail, raised concerns with traffic at the intersection of Meadowview Drive and Parkridge Drive and with the density of the proposed development. She stated that there was a lot of pedestrian traffic around the high school and from the single-family development to the north. She stated that she was not against development but felt this was the wrong location for the proposed use.

Jared Dale, 2807 Goodnight Trail, stated that he was for development in the community, but that it needed to be the right type of development. He specified that he was against high-density developments in this location and felt that the proposed development would not be cohesive with the existing community. He asked for clarification on the style of housing that would be in the development and felt that the area would not support high-density use.

Greg Shappa, 2713 Skyview Drive, raised concerns with additional traffic on Parkridge Drive and Meadowview Drive. He stated that he liked the appearance of the proposal and supported the existence of an HOA, but felt the density was too high.

Brenda Western, 2804 Cochise Court, raised concerns with traffic and water drainage from the proposed development. She expressed that she felt this type of development was not in demand at the proposed price point and was unsure if it would remain a viable product into the future.

Orlin Chotev, 2015 Yellowstone Lane, stated that he disliked the density of the proposal and was against the deforestation of the property. He stated that he felt there was a large discrepancy between the vision of the Council and City and the community on the type of development that was desired in Corinth.

Chair Nelson asked what the net impact of traffic from the proposed development would be as determined by the TIA.

Mixell stated that she did not know this information, but the City Engineer had reviewed the TIA and determined that no further improvements were required.

Chair Nelson asked if there had been any conversation to include a traffic signal at the intersection of Parkridge Drive and Quarry Drive.

Mixell stated that this had not been discussed.

Inclan provided the information from the TIA and clarified that the assessment had been completed under the assumption of 127 units rather than the currently proposed 90 units.

Commissioner Rhule asked what the threshold was for requiring improvements and how close the assessed number was to the threshold.

Inclan stated that the threshold was 60 trips per hour and that the TIA showed 47 trips per hour under the assumption of 127 units.

Commissioner Rhule asked if an HOA could prohibit rentals in the development.

The City Attorney replied that an HOA would probably not be able to prohibit rentals lawfully.

Commissioner Rhule asked if a survey had been issued to gauge interest in amending the Comprehensive Plan.

Inclan stated that no such survey had been completed.

Commissioner Rhule stated that she had seen surveys in the past related to updating certain ordinances.

Inclan confirmed that surveys have been issued in the past when certain ordinances were updated.

Commissioner Rhule clarified that all of the Commissioners and City Councilors were residents of the city.

Commissioner Guck asked what correspondences could be considered as on the record or off the record.

Inclan stated that only written statements to the city or spoken words at public hearings are included in the public record.

Commissioner Rhule asked if that meant that people need to attend meetings or submit their opinions in writing for their opinions to be recorded and considered.

Inclan confirmed this and stated that people outside of the 200' buffer in which notifications of public hearings are sent can still submit a letter or email stating their opinion or speak on the record during public hearings.

Minutes
Planning and Zoning Commission
February 27, 2023

Chair Nelson asked if there would be any language in the CCRs to restrict long-term or short-term rentals within the development.

Rose stated that this language would not be included in the CCRs due to legal constraints but that there would be language to prevent the posting of rental signs in yards. He stated that it was his intention for the units to be for-sale but that he was unaware of a way to prevent rentals in any neighborhood.

Chair Nelson asked if there would be language in the CCRs regarding the number of unrelated residents within a household.

Rose confirmed that this language would be included.

Rose stated that the dog park had been located as far away from the surrounding residents as was possible within the current design. He stated that he did not believe the majority of traffic in and out of the site would be going through the single-family neighborhoods.

Commissioner Guck stated that most current traffic along Parkridge Drive came from FM 2181 and that most of the traffic from the proposed development would be flowing in the opposite direction.

Commissioner Rhule asked how traffic along Parkridge Drive would be addressed during the construction phase.

Rose stated that there would always be some conflict during construction, but that overall construction would be low intensity with the site being developed in small pieces at a time.

Commissioner Guck asked what the expected timelines for Phase 1 and Phase 2 were.

Rose stated that he envisioned Phase 1 beginning construction in about a year and would stretch over 4 or 5 years but that the timeline was dependent on the economy.

Commissioner Bruxvoort asked if the Applicant would go over the style of housing being envisioned in the development.

Rose stated that he liked unique styles with different colors, textures, and materials. He explained that the facades would be composed of cementitious board, brick, and stone but that materials would vary from building to building.

Inclan described the duplex-style and townhouse-style elevations and indicated that each building would be composed of a minimum of 40% masonry.

Commissioner Bruxvoort asked how drainage from the site would be mitigated both during and after construction.

Rose stated that their goal was to direct all of the drainage from the site into the existing pond, with the dry detention pond accumulating water from Phase 2 and then draining into the larger pond. He clarified that no drainage would flow into the surrounding residential areas.

Commissioner Bruxvoort asked if drainage would be one of the main priorities during the design and construction phase.

Rose stated that drainage was a major priority and explained that there are ordinances and devices in place that would be utilized to mitigate storm water during construction.

Commissioner Bruxvoort asked why one of the residents who had previously spoken with the Applicant had been under the impression that the development would be smaller than what was being presented.

Rose stated that he believed that the resident may have met with a different developer but that the original design that he had shared with residents had actually had a higher unit count than what was currently being proposed. He stated that he would do whatever was within his power to mitigate impacts on neighboring properties.

Commissioner Bruxvoort asked if he had dealt with disputes with neighboring property owners in the past or experienced any issues related to drainage during construction, and if so, how he had handled these situations.

Rose stated that his largest priority was communication and that he wanted everyone around the development to be aware of what was being proposed.

Commissioner Jones asked if the existing pond would be stocked for fishing and accessible to the public.

Rose stated that due to liability, the pond would only be available to residents and that the pond was stocked naturally.

Commissioner Jones stated that she appreciated the Applicant preserving the natural feel of the pond but asked if the area surrounding the pond would be cleared of vegetation.

Rose stated that they would be removing some vegetation around the areas where people would walk but that he intended to keep the pond as natural as possible.

Vice-Chair Klingele made a motion to approve the proposal as presented. Seconded by Commissioner Rhule.

Motion passed unanimously; 5-for, 0-against.

Chair Nelson called the meeting to recess at 8:17 PM.

Chair Nelson resumed the meeting at 8:27 PM.

7. Conduct a Public Hearing to consider testimony and make a recommendation to the City Council on a zoning request by the Applicant, William Sullivan, Jr., to amend the Zoning Ordinance and Zoning Map of the City of Corinth, each being a part of the Unified Development Code of the City, by amending Planned Development No. 26 (PD-26) and incorporating an additional ± 3.5 acres into PD-26 with a base zoning district of C-2 Commercial for the expansion of parking and the redesign and addition of multiple buildings and structures on approximately ± 12.5 acres generally located at 5920 S I-35E and the northwest corner of S I-35E and Church Drive. Case No. ZAPD22-0006 – American Eagle Harley Davidson & Wheeler Yard.

Michelle Mixell, Planning Manager, provided Staff's presentation. She referenced the comparison chart included in the Staff report which enumerated the requested deviations by the Applicant as well as the differences from the PD approved in 2020. She stated that given the unique nature of the proposal and the large number of deviations being requested by the Applicant, staff would not be providing a formal recommendation and would instead leave final discretion to the Commission.

Minutes
Planning and Zoning Commission
February 27, 2023

Chair Nelson asked how tall the proposed covered riding academy would be.

Mixell stated that this would be a 40-foot-tall open-air structure with a metal roof and solar farm.

Chair Nelson asked if the eave height or the ridge height would be 40 feet.

Mixell stated that she had previously misspoke and clarified that the ridge height would be 30 feet with the eave height being 20 feet and that this structure would cover the majority of the existing rear parking lot.

Chair Nelson asked if Staff was recommending moving the sidewalk along the service road inside the landscape buffer.

Mixell confirmed this.

Chair Nelson asked if the sidewalk would be continued around the perimeter of the off-site parking lot.

Mixell stated that there would be a sidewalk around this parking lot but that a definitive crossing point across Church Drive had yet to be determined.

Chair Nelson asked for confirmation on the location of the off-site parking lot.

Mixell pointed out this area on the concept plan.

Chair Nelson asked if the Fire Department had any concerns with deeding back the right-of-way for the hammerhead on Chapel Place.

Mixell stated that this was not a concern from the Fire Department, but that residents had indicated that drivers used the hammerhead to turn around several times a week.

Chair Nelson asked how existing traffic on Chapel Place would be affected if the hammerhead was eliminated.

Mixell explained that this would likely result in drivers using resident's driveways to turn around instead.

Chair Nelson asked what the building setback was on the proposed addition to the collision center.

Mixell stated that the concept plan showed a 15-foot setback at this location but that a 10-foot minimum rear setback was being proposed in the PD Design Statement and that the language in the PD Design Statement would govern over what was portrayed in the exhibit. She stated that Staff was asking if the 10-foot minimum rear setback were to be approved, that it only be permitted in this one location with the existing 28-foot minimum rear setback being maintained everywhere else.

Chair Nelson asked for the locations where Staff was recommending a vegetative screen.

Mixell stated that Staff was recommending that an opaque vegetative screen around the site where adjacent to residential lots.

Commissioner Rhule asked how the "multi-use" term applied to the riding academy.

Mixell stated that would be a question for the Applicant but that the term was currently undefined in the PD Design Statement.

Commissioner Rhule asked if the Applicant was asking for a 10-foot or 15-foot minimum rear setback behind the collision center addition.

Mixell reiterated that the PD Design Statement defined a 10-foot minimum rear setback, and the concept plan depicted a 15-foot minimum rear setback, but that the language in the PD Design Statement would govern as the actual standard.

Commissioner Rhule asked if a 28-foot building setback was being maintained for the riding academy as depicted on the concept plan.

Inclan displayed the setbacks as shown on the concept plan which represented the 28-foot setback being maintained.

Commissioner Rhule asked if a crosswalk or other traffic calming devices would be utilized to accommodate a singular, safe pedestrian crossing at Church Drive.

Mixell stated that they had worked with the Applicant to reduce the number of curb cuts to help with vehicular traffic and circulation. She explained that typical driver expectation was for pedestrian crossings at intersections rather than mid-block and that Staff would need to work further with the Applicant to define a safe crossing point.

Commissioner Rhule asked if the Police Department had provided any information regarding noise complaints.

Mixell explained that Staff had yet to receive any information from the Police Department but had reached out to the Code Enforcement Officer who had no knowledge of noise complaints in the area.

Willy Sullivan, American Eagle Harley Davidson, pointed out the existing and improved facilities on the site and explained that this proposal had been in the works since 2015. He stated that traffic from past uses on the site, including a day care and wedding venue, was able to be accommodated by the existing street infrastructure. He pointed out what was approved under the 2020 PD and explained that in the ensuing period he had made the decision to expand the restaurant use, include additional parking to accommodate the anticipated 2,000 customers per day on weekends, and incorporate several other changes based off observations from existing Harley Dealerships that had implemented the model in Florida. He explained that the extension in operating hours for the riding academy was to provide more flexibility and stated that the multi-use purpose for this area was not to hold concerts but to have events such as a farmers' market. He stated that they had enclosed the entire stage and incorporated sound absorbing materials for further noise control. He stated that they had performed noise measurements at prior events and determined that they were well under the decibel limit dictated by the noise ordinance.

Chair Nelson asked if it was the Applicant's intention to completely enclose the pavilion area.

Sullivan stated that the pavilion would be open air with fans and heaters throughout the area.

Chair Nelson asked if sound from the stage would be directed primarily towards the interstate given the proposed screening on the north, west, and south sides of the pavilion.

Sullivan stated that this was correct.

Chair Nelson asked if there was only one open area from the pavilion facing the neighborhood.

Minutes
Planning and Zoning Commission
February 27, 2023

Sullivan confirmed that the entrance into the pavilion was the only open portion of the pavilion facing the residences.

Chair Nelson asked if the restaurant venue would be utilizing the dealership parking lot for spill over parking when they hold larger events.

Sullivan stated that the site would be split into two separate lots with the dealership and Wheeler Yard operating independently of each other and utilizing separate parking. He explained that an agreement could be reached between the two businesses which would allow for the sharing of parking or maintenance companies but that this would be determined at a later date.

Sullivan stated that he would have liked to include the 20-foot landscape buffer adjacent to the residential lots but that he had to reduce it in size to accommodate the necessary parking for the site.

Commissioner Bruxvoort asked if a portion of the parking near the Harley Dealership would be for motorcycles only.

Sullivan explained that the parking spaces would be standard 10-foot by 20-foot spaces that could be used by motorcycles or automobiles.

Commissioner Guck asked if the covered riding area would be utilized for different uses such as live music events. He asked if it would be possible to include an exemption in the PD Design Statement which would prohibit live music in this area.

Sullivan stated that they had no intention of live music events being held in the covered parking area and that the infrastructure was not in place to support that kind of use. He explained that the main use of this structure would be to provide shade for the riding academy but would occasionally be used for additional parking and events such as farmers markets which would not create a lot of noise pollution.

Chair Nelson asked if the covered riding academy would include fire protection.

Sullivan stated that he was unsure if additional fire protection would be required.

Chair Nelson asked that Staff confirm with the Fire Marshall and Building Official to determine if additional fire protection will be needed.

Commissioner Rhule asked that a definitive definition of the multi-use area be included. She pointed out that the Florida dealerships which the Applicant had used as examples were not located near residential areas. She stated that she had concerns with the amount of traffic and noise being produced from both past events and proposed future events and that she would like to see more real-world examples of effective noise mitigation methods and materials.

Commissioner Rhule asked if the Applicant had an estimate of the decibel levels that would be produced once noise mitigation measures were in place.

Sullivan provided the example of Marty B's which had a new single-family development under construction directly behind it. He also stated that one of the Harley Dealerships shown as an example had a new residential development under construction nearby and gave examples of other areas in the metroplex which had event

venues adjacent to residential areas. He stated that he would do everything in his power to mitigate sound, including enclosing the stage.

Commissioner Rhule stated that she understood and appreciated the Applicant's points but clarified that the examples he provided had developed in the opposite manner as to what was being proposed, in that the event venues were already existing with residential developments then being built around them.

Commissioner Rhule asked if the Applicant would consider limiting activities to certain days and times during the week in order to provide breaks for surrounding residences. Additionally, she asked how many jobs the dealership currently generated and how many would be generated by the proposed venue.

Sullivan explained that the venue would generate approximately 100 additional jobs.

Commissioner Rhule asked if the Applicant would consider having employees park in the off-site parking lot and allowing customers to utilize the parking spaces that are on-site in order to improve pedestrian safety. She stated that her main concerns were for the amount of noise and traffic that would be generated and asked if a TIA had been performed.

Sullivan stated that he did not necessarily know how to address the concerns but explained that the site was already zoned for the proposed use. He pointed out other nearby developments in the city which included multi-family and retail uses which would be adjacent to existing residential neighborhoods and stated that there would always be problems when residential and retail areas met. He stated that he believed the proposed venue would be unbelievable, but that he was unsure if this was the appropriate location for such a use.

Commissioner Rhule asked what kind of lighting fixtures would be required and utilized at the site and what kind of art approval would be required.

Sullivan stated that they did not have specifics for the lighting at that time but would be adhering to what the code required.

Commissioner Rhule asked if there would be any times when people would be gathering or tailgating in the parking lots near the residential fences.

Sullivan stated that he had not considered this but that he did not foresee this being an issue.

Chair Nelson asked how many total parking spaces were being proposed.

Sullivan stated they were proposing approximately 500 parking spaces.

Chair Nelson stated that he was not overly concerned with noise affecting the surrounding residences given that the stage would be enclosed and if an evergreen landscape buffer is installed.

Sullivan stated that he did not think conditions for the neighbors would be any different than they were currently but that they would be holding events or hosting live music most days of the week. He brought up the point that the highway currently generates a large amount of noise and that he would most likely not be proposing this project if not for this fact.

Commissioner Rhule stated that she lived about a mile away from the site and was unable to hear the highway but could clearly hear music from the dealership. She asked that definitive data be provided demonstrating that the proposed noise mitigation measures would effectively reduce the noise.

Sullivan stated that several variables affect the amount of noise spilling onto neighboring properties including landscaping, buildings and building materials, wind, and weather. He stated that they were trying to take all of these factors into consideration but that the noise from bands currently being generated was well within code requirements. He stated that it boiled down to the question of whether the proposal was simply a bad project for that location.

Commissioner Jones asked if the applicant could compile a list of proposed materials to be used at the location for noise mitigation.

Sullivan stated that he would try to provide this information.

Chair Nelson asked if the Applicant's architect would be utilizing an AVL consultant.

Sullivan stated that the Wheeler Yard owner would be hiring an AVL consultant.

Chair Nelson asked if it would be possible for the Applicant to have an AVL consultant speak to the design of the project in order to help satisfy some of the concerns revolving around noise mitigation.

Commissioner Rhule stated that she was appreciative of the Applicant including green initiatives in their proposal.

Chair Nelson asked what the diameter of the 100-foot flag poles would be and how large the flags would be.

Sullivan replied that the diameter of the flag poles would be around 3 feet and that the flags themselves would be 50 feet by 30 feet.

Chair Nelson asked if the Applicant had concerns with the flagpoles being too close to each other.

Sullivan stated that he believed this would not be a problem and that he had worked with his architect to ensure that there would be enough room between the flags.

Marina Mata, 2803 Chapel Place, stated that she shared two fence lines with the Harley Dealership and pointed out that the Harley Dealerships in Florida provided as examples were not near residential areas. She explained that she was opposed to eliminating the hammerhead at the end of Chapel Place due to the number of cars that utilize it on a weekly basis. She asked that the existing wooden fence be replaced by an 8-foot cinderblock wall to aid in noise mitigation and as a safety precaution. She explained that she had witnessed several crimes in the existing parking lot and had concerns that people leaving the brewery would possibly be inebriated. She stated that she was not against development but that she did not feel that development should negatively impact the surrounding properties. She requested that the proposal be denied or modified at that time.

Kent Kneading, 2711 Church Drive, stated that he could clearly hear the music from the Harley Dealership in his home but only occasionally hears noise from the interstate. He explained that he would not have purchased his property if he had known about what was being proposed and felt that the proposed development would decrease his property value. He stated that he was in favor of a restaurant being at this location but was concerned about excessive noise and partying. He also raised concerns with the traffic that would be flowing

through his neighborhood due to the proposed venue and felt that additional modifications were needed for the proposal.

Michael Atteberry, 1709 Wildwood Street, stated that his property was directly behind the proposed shade structure for the riding academy and that he was concerned the structure would cast a large shadow on his yard. He stated that he would like for a taller fence to be installed, expressed concerns with the noise generated from the dealership, and stated that he felt that the Harley Dealership was not a good neighbor.

Brent Ashley, 1603 North Haven Drive, stated that his parents own several other properties along North Haven and that he and his parents were opposed to the proposed development. He stated that he felt that additional measures needed to be taken for noise mitigation, asked how the utility right-of-way would be addressed in the setback encroachment, and expressed concerns with existing sewer problems in the area and parking spilling over into the neighborhood.

Tim Miller, 1701 North Haven Drive, stated that he believed the sound could be properly mitigated, but that his main concern was with traffic going through the neighborhood.

Vice-Chair Klingele made a motion to continue the public hearing and table the proposal to the March 27, 2023 meeting. Seconded by Commissioner Bruxvoort.

Commissioner Bruxvoort stated that she was appreciative of the residents staying as late as they did to voice their opinions.

Commissioner Guck stated that he appreciated everyone's stamina and keeping all of their comments civil.

Motion passed unanimously; 5-for, 0-against.

F. DIRECTORS REPORT

Webb gave his report and informed the Commission that the City Council had approved the Village Square planned development. He added that the only public hearing scheduled for the March 27th Planning & Zoning Commission meeting was for Harley-Davidson.

G. ADJOURN REGULAR SESSION

The regular session was adjourned at 10:41 PM.

H. ADJOURNMENT

There being no further business before the Commission, the meeting was adjourned at 10:41 PM.

MINUTES APPROVED THIS _____ DAY OF _____, 2023.

Alan Nelson, Planning and Zoning Commission Chairman



**ATTACHMENT 4:
CORRESPONDENCE WITH APPLICANT REGARDING
NEIGHBORING PROPERTY OWNER CONCERNS**

From: Matthew Lilly
Sent: Friday, February 24, 2023 9:08 AM
To: Matthew Lilly
Subject: FW: Property Owner Concern -Destiny RV

From: Helen-Eve Beadle <heleneve@heplanningdesign.com>
Sent: Thursday, February 23, 2023 5:45 AM
To: John Webb <John.Webb@cityofcorinth.com>
Cc: Michelle Mixell <Michelle.Mixell@cityofcorinth.com>; Miguel Inclan <Miguel.Inclan@cityofcorinth.com>
Subject: RE: Property Owner Concern -Destiny RV

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

John, Michelle, and Miguel.

Upon receipt of your email from Mr. Patlan, the Destiny RV Owners immediately contacted their office to ensure nothing is to be attached to the fence along the southern property boundary.

The Park Rules do not allow clotheslines or any other attachment of ropes, etc. to RV's, trees, or fences. The Park has reminded all park visitors that the Fairview fence is not to be used for anything.

Again, the fence along the southern property boundary was erected after Destiny RV had been in existence for many years. The RV park was there first and the fence is not the property of Destiny RV. We have reviewed, to the best of our knowledge, property documents for Destiny RV and have not found any reference or image related to an easement along the southern boundary of the unplatted portion of the property.

I would speculate the easement on the platted lots are representative of the Subdivision Regulations, Section 3.05.07 A.4. Easements and Dedications where an eight (8) foot utility easement is required on each side of all rear lot lines and alongside lot lines to provide for utilities. Adding the easements is a platting requirement.

We checked earlier in the review process and did note there is an 8" City waterline in the 10 foot utility easement along the north side of the Fairview Subdivision lots adjacent to the property boundary.

Additionally, there are no proposed permanent structures planned along the eight (8) foot wide area along the southern property boundary.

The current Owners of Destiny RV never had intentions of building cabins along the southern property line or within a utility easement.

Please let us know if you need anything else.

Thank you.

Helen-Eve



Helen-Eve Beadle, AICP

469.360.6618
heplanningdesign.com
heleneve@heplanningdesign.com

From: John Webb <John.Webb@cityofcorinth.com>
Sent: Monday, February 20, 2023 11:54 AM
To: Helen-Eve Beadle <heleneve@heplanningdesign.com>
Cc: Michelle Mixell <Michelle.Mixell@cityofcorinth.com>
Subject: Property Owner Concern -Destiny RV

Helen-Eve,

FYI – see below. Mr. Patlan’s property is 3210 Fairview. There is a 10-foot utility on the Fairview side, and an 8-foot utility easement along the southern property line on the KOA platted lot – vacant eastern lot. Do you know of any utility easements along the southern property line of the unplatted portion of Destiny?

If you have any questions, please reach out to Michelle as Miguel is out of the office the first part of this week.

Thanks,
John

From: Pat Patlan
Sent: Saturday, February 18, 2023 7:34 PM
To: Michelle Mixell <Michelle.Mixell@cityofcorinth.com>; Miguel Inclan <Miguel.Inclan@cityofcorinth.com>
Cc: Matthew Lilly <Matthew.Lilly@cityofcorinth.com>; John Webb <John.Webb@cityofcorinth.com>
Subject: Re: Case No. ZAPD22-0005-Destiny RV

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Hi Miguel,

Thank you for getting back to me on this matter. I find it disappointing that the applicant plans to keep those spots considering they haven't done anything for the home owners next to them. They currently maintain and have a fence line around the other 3 sides of their property but are relying on us home owners to provide a fence line on this side for them, which is in a utility easement. I had to put up my own 8 ft. fence when they started parking RV's along my fence line. Nothing stops their residents from using our fences to hang or lean their items on my fence and my neighbors fences. I am going to have to put up another 8 ft. fence on the right side of my rear property to have privacy from their RV's in the spots along the fence line. I don't understand how they can have permanent spots in a utility easement. I'm not sure the utility company is even aware of this. The former owners tried building permanent cabins along the

fence line but were shut down by either the city or the utility company. I don't understand what the difference is. As a long time resident of the City of Corinth do I have any recourse in this matter?

Thank you again for reaching back out to me.

Sincerely,
Concerned Corinth Citizen
Patrick Patlan



CITY OF CORINTH
Staff Report

Meeting Date:	4/6/2023	Title:	BI – Change Order – Agora TOD Streets – DDM Construction
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development		
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission Click to enter recommendation/decision of supporting group.		

Item/Caption

Consider approval of change order number 1 to DDM Construction for the Agora/TOD Streets project in the amount of \$247,937.76 for a total project award of \$7,981,710.76 and authorize the City Manager to execute any necessary documents.

Item Summary/Background/Prior Action

On July 7, 2022, City Council approved the award of the Agora Transit Oriented Development Streets project for construction of the streets and park civil infrastructure in an amount of \$7,733,773.00 to DDM Construction.

DDM has worked diligently since the notice to proceed of October 5, 2022, and have made every effort to remain on schedule. Many issues have arisen due to the coordination with the City of Denton as well as coordination with Byrne Construction working on the Agora Park improvements.

As previously reported, the roadway plan was amended to shift N. Corinth St. about 30 feet to the east to avoid the 30' water/utility easement owned by the City of Denton. This easement has 2 main raw water supply lines running parallel to the DCTA/DART rail line. While the easement does not specifically exclude the planned improvements, the City of Denton denied our request to pave over sections of their water mains which resulted in the necessary road realignment.

To mitigate delays associated with the road redesign, DDM construction began work outside the Denton easement to include large box culverts and water lines. This led to issues with the revised plan and the designers (Quiddity) adjusted plans to minimize impacts to the improvements in the ground. However, some issues could not be avoided.

The following issues are directly related to the N. Corinth St. shift:

- 1) Inlet Vertical Foot Adjustment - \$8,800
- 2) Core & Plug existing box culvert - \$27,159.25
- 3) Water Main adjustments - \$32,520
- 4) Additional water valves - \$7,400

Other impacts due to the field conditions that were unavoidable were the following:

- 1) Additional grading due to conflicts with the park (Moving dirt twice for Byrne)
- 2) Conflict with elevations of existing water main on Walton Drive.
- 3) Oncor requiring additional spare conduit that Oncor did not identify during the design phase.

After the project was awarded, it was determined that there were significant issues with the bid quantities for the large box culverts. In this instance, it was an overall net reduction of about \$120,000 in the City’s favor.

After reviewing the traffic control for the construction of the roundabout & realignment of N. Corinth St. DDM & City Staff have come to a resolution to limit the overall road closure of N. Corinth St. to no more than 45 days without penalty but providing a bonus of \$3,000 per day if the intersection is opened after that point. (i.e., 46 days = (\$3,000), 47 days = (\$6,000) with a maximum bonus of \$45,000). This is a suggested alternative as the original road closure was estimated at 6-9 months, which would certainly have a negative effect on the businesses at Pinnel Square and NCTC.

Due to the challenges on this project, it is reasonable to provide DDM with an overall project extension of 93 days, extending the contract time to 393 days. This would put their completion time November 2, 2023. DDM has performed their work in such a manner that they feel they are still able to meet the original August deadline, but it is necessary to go ahead and provide them with this buffer. The penalty for going beyond the original time frame is \$240 per day.

The last part of this change order is to provide a contingency not to exceed \$80,000 for potential future change orders. Future change orders utilizing these funds would require City Manager approval. The proposed change order is \$247,937.76 (including this contingency) is only 3.2% of the original contract.

Financial Impact

The change order of \$247,937.76 is within the original budget amount for TOD streets in the 2020 Certificate of Obligation Bond Fund.

Staff Recommendation/Motion

Approve of change order number 1 to DDM Construction for the Agora/TOD Streets project in the amount of \$247,937.76 for a total project award of \$7,981,710.76 and authorize the City Manager to execute any necessary documents.

Agora/TOD Streets - DDM

Change Order #1

Project: TOD 1002 Streets Agora				Original Contract Amount:		\$7,733,773.00		
Owner: City of Corinth				Change Order Amount:		\$247,937.76		
Contractor: DDM				Previous Change Orders:		\$0.00		
Date:		4/6/2023		New Contract Amount:		\$7,981,710.76		
				Contract Time:		300		
				Total Days Added to CO:		93		
				New Contract Time:		393		
				Change Order Amount			Proposed Contract Changes	
Bid Item	Change in Contract	Contract Price	Quantity	Unit	Unit Price	Total	Change in Time	Change in Cost
320	Reinforced Concrete Box (5'X4') (Single Barrel)	\$ 590.00	-642	LF	\$ 590.00	\$ (378,780.00)		\$ (378,780.00)
	Reinforced Concrete Box (5'X4') (Single Barrel)		304	LF	\$ 650.00	\$ 197,600.00		\$ 197,600.00
322	Reinforced Concrete Box (6'X4') (Single Barrel)	\$ 600.00	-598	LF	\$ 600.00	\$ (358,800.00)		\$ (358,800.00)
	Reinforced Concrete Box (6'X4') (Single Barrel)		313	LF	\$ 700.00	\$ 219,100.00		\$ 219,100.00
	Reinforced Concrete Box (6'X5') (Single Barrel)		400	LF	\$ 800.00	\$ 320,000.00		\$ 320,000.00
324	Reinforced Concrete Box (7'X5') (Single Barrel)	\$ 850.00	-115	LF	\$ 850.00	\$ (97,750.00)		\$ (97,750.00)
	Inlet Vertical Foot Adjustment		16	VF	\$ 550.00	\$ 8,800.00		\$ 8,800.00
	24" TxDOT PW Headwall		1	EA	\$ 3,250.00	\$ 3,250.00		\$ 3,250.00
	Reinforced Concrete Box Access Riser		1	LS	\$ 7,500.00	\$ 7,500.00		\$ 7,500.00
	Incentive to complete N. Corinth St closure within 45 days. 45 Days = \$45000 bonus, 46 Days = -\$3000		15	Day	\$ 3,000.00	\$ 45,000.00		\$ 45,000.00

703	Additional grading due to conflicts with Park (Byrne Construction)	\$ 25.00	2800	CY	\$ 25.00	\$ 70,000.00		\$ 70,000.00
402	Water Main Pipe (8" PVC C-900, DR-18)	\$ 75.00	220	LF	\$ 75.00	\$ 16,500.00		\$ 16,500.00
410	Trench Safety System for Water Main	\$ 1.00	220	LF	\$ 1.00	\$ 220.00		\$ 220.00
407	Gate Valve (8")	\$ 3,700.00	2	EA	\$ 3,700.00	\$ 7,400.00		\$ 7,400.00
413	Water line Lowering	\$ 7,900.00	2	LS	\$ 7,900.00	\$ 15,800.00		\$ 15,800.00
	Core & Plug box		1	LS	\$ 27,159.25	\$ 27,159.25	3	\$ 27,159.25
	MH mod		1	LS	\$ 23,825.03	\$ 23,825.03		\$ 23,825.03
	(-) 24" RCP	\$ 120.00	-213	LF	\$ 120.00	\$ (25,560.00)		\$ (25,560.00)
	Driveway culvert		1	LS	\$ 9,079.93	\$ 9,079.93		\$ 9,079.93
	Electrical Conduit		1	LS	\$ 25,912.30	\$ 25,912.30		\$ 25,912.30
	Inlet Modifications		1	LS	\$ 29,181.25	\$ 29,181.25		\$ 29,181.25
	Pipe Collars on 12"		2	EA	\$ 1,250.00	\$ 2,500.00		\$ 2,500.00
	Contingency							\$ 80,000.00
	Additional Days due to Denton Coordination						90	
Total:							93	\$ 247,937.76

Reviewed: 3.2%

By: _____
 City Engineer George S. Marshall P.E., CFM Date

Approved: City of Corinth

By: _____
 City Manager Scott Campbell Date

Approved: DDM

By: Blanton Pason 3/28/2013
Date



CITY OF CORINTH
Staff Report

Meeting Date:	4/6/2023	Title: CA – Denton County HMAP Resolution
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input checked="" type="checkbox"/> Health & Safety <input checked="" type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development	
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission Click to enter recommendation/decision of supporting group.	

Item/Caption

Consider a resolution adopting the Denton County Hazard Mitigation Plan and authorize the Mayor to execute any necessary documents.

Item Summary/Background/Prior Action

The City of Corinth has been working with Denton County for approximately a year providing data and information for the County to update the Hazard Mitigation Plan (HMAP). With this plan the City will be eligible to pursue a full range of pre-disaster and post-disaster federal funding opportunities through the Federal Emergency Management Agency (FEMA) and the Texas Division of Emergency Management (TDEM).

The plan covers the following various potential hazards:

- Extreme Heat
- Hail
- Lightening
- Thunderstorm Wind
- Tornado
- Winter Storm
- Drought
- Expansive Soil
- Flood
- Earthquake
- Wildfire
- Dam and Levee Failure

The detailed information regarding each hazard and how it applies to our region is provided for in the public copy of the plan, included as an attachment.

Financial Impact

The adoption of this resolution has no effect on the current fiscal budget or future budgets. It however does allow the City to pursue future grant opportunities.

Staff Recommendation/Motion

Approve a resolution adopting the Denton County Hazard Mitigation Plan and authorize the Mayor to execute any necessary documents.

**RESOLUTION FOR CITY OF CORINTH
APPROVAL OF HAZARD MITIGATION PLAN**

WHEREAS, natural hazards in the City of Corinth area historically have caused significant disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires that communities update hazard mitigation action plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Corinth has assessed the community’s potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Denton County Hazard Mitigation Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards that threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Denton County Hazard Mitigation Plan is approved in its entirety;
2. The City of Corinth will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Corinth vests with the Mayor the responsibility, authority, and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the City Council for consideration; and
4. The City of Corinth to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this ____ day of____, 2023.

Mayor, Bill Heidemann

City Secretary, Lana Wylie

DENTON COUNTY HAZARD MITIGATION ACTION PLAN



UPDATE 2023

Maintaining a Safe, Secure, and Sustainable Community



For more information, visit our website at:

www.dentoncounty.gov

Written comments should be forwarded to:

H2O Partners, Inc.

P. O. Box 160130

Austin, Texas 78716

info@h2opartnersusa.com

www.h2opartnersusa.com

SECTION 1 – INTRODUCTION

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

SECTION 2 – PLANNING PROCESS

Plan Preparation and Development.....2-1
Review and Incorporation of Existing Plans.....2-9
Timeline for Implementing Mitigation Actions.....2-12
Public and Stakeholder Involvement.....2-13

SECTION 3 – COUNTY PROFILE

Overview.....3-1
Population and Demographics.....3-4
Future Development.....3-7
Economic Impact.....3-8
Existing and Future Land Use and Development Trends.....3-11

SECTION 4 – RISK OVERVIEW

Hazard Description.....4-1
Natural Hazards and Climate Change.....4-4
Overview of Hazard Analysis.....4-4

SECTION 5 – FLOOD

Hazard Description.....5-1
Location.....5-1
Extent.....5-33
Historical Occurrences.....5-36
Probability of Future Events.....5-40
Vulnerability and Impact.....5-41
NFIP Participation.....5-51
NFIP Compliance and Maintenance.....5-53
Repetitive Loss.....5-54

SECTION 6 – THUNDERSTORM WIND

Hazard Description6-1
Location6-1
Extent6-2
Historical Occurrences6-3
Probability of Future Events6-15
Vulnerability and Impact6-15

SECTION 7 – TORNADO

Hazard Description7-1
Location7-1
Extent7-2
Historical Occurrences7-5
Probability of Future Events7-10
Vulnerability and Impact7-11

SECTION 8 – LIGHTNING

Hazard Description8-1
Location8-1
Extent8-1
Historical Occurrences8-3
Probability of Future Events8-6
Vulnerability and Impact8-6

SECTION 9 – HAIL

Hazard Description9-1
Location9-1
Extent9-1
Historical Occurrences9-3
Probability of Future Events9-10
Vulnerability and Impact9-11

SECTION 10 – WINTER STORM

Hazard Description10-1
Location10-3
Extent10-3

Historical Occurrences10-4
Probability of Future Events10-6
Vulnerability and Impact10-6

SECTION 11 – EXTREME HEAT

Hazard Description11-1
Location11-1
Extent11-1
Historical Occurrences11-4
Probability of Future Events11-6
Vulnerability and Impact11-6

SECTION 12 – DROUGHT

Hazard Description12-1
Location12-2
Extent12-3
Historical Occurrences12-5
Probability of Future Events12-8
Vulnerability and Impact12-8

SECTION 13 – WILDFIRE

Hazard Description13-1
Location13-1
Extent13-33
Historical Occurrences13-67
Probability of Future Events13-71
Vulnerability and Impact13-71

SECTION 14 – DAM AND LEVEE FAILURE

Hazard Description14-1
Location14-3
Extent14-4
Historical Occurrences14-7
Probability of Future Events14-7
Vulnerability and Impact14-7

SECTION 15 – EARTHQUAKE

Hazard Description15-1
Location15-2
Extent15-4
Historical Occurrences15-7
Probability of Future Events15-7
Vulnerability and Impact15-7

SECTION 16 – EXPANSIVE SOILS

Hazard Description16-1
Location16-1
Extent16-2
Historical Occurrences16-3
Probability of Future Events16-3
Vulnerability and Impact16-4

SECTION 17 – MITIGATION STRATEGY

Mitigation Goals17-1
Goal 117-1
Goal 217-1
Goal 317-2
Goal 417-2
Goal 517-2
Goal 617-2

SECTION 18 – PREVIOUS ACTIONS

Summary18-1
Denton County18-2
Town of Arygle18-15
City of Aubrey18-24
City of Corinth18-33
Town of Cross Roads18-45
City of Denton18-54
Town of Double Oak18-63
Town of Flower Mound18-72
Town of Hickory Creek18-80

City of Highland Village 18-92

City of Justin 18-103

City of Krugerville 18-110

City of Krum 18-120

City of Lake Dallas 18-131

City of Lewisville 18-146

Town of Little Elm 18-165

City of Pilot Point 18-181

Town of Ponder 18-190

City of Roanoke 18-197

City of Sanger 18-205

Town of Shady Shores 18-214

City of The Colony 18-227

SECTION 19 – MITIGATION ACTIONS

Summary 19-2

Denton County – County-Wide Actions 19-5

Denton County 19-11

Town of Arygle 19-67

City of Aubrey 19-73

Town of Bartonville 19-88

Town of Copper Canyon 19-91

City of Corinth 19-94

Town of Cross Roads 19-115

City of Denton 19-134

Town of DISH..... 19-175

Town of Double Oak 19-182

Town of Flower Mound 19-233

City of Hackberry 19-242

Town of Hebron 19-247

Town of Hickory Creek 19-250

City of Highland Village 19-264

City of Justin 19-272

City of Krugerville 19-278

City of Krum 19-296

City of Lake Dallas19-305

Town of Lakewood Village19-326

City of Lewisville19-331

Town of Little Elm19-369

Town of Northlake19-384

City of Oak Point19-391

City of Pilot Point19-405

Town of Ponder19-416

Town of Providence Village19-422

City of Roanoke19-432

City of Sanger19-440

Town of Shady Shores19-457

City of The Colony19-467

Town of Trophy Club19-497

SECTION 20 – PLAN MAINTENANCE

Plan Maintenance Procedures20-1

Incorporation20-1

Monitoring and Evaluation20-11

Updating20-13

Continued Public Involvement20-14

APPENDIX A – PLANNING TEAM

APPENDIX B – PUBLIC SURVEY RESULTS

APPENDIX C – CRITICAL FACILITIES

APPENDIX D – DAM LOCATIONS

APPENDIX E – MEETING DOCUMENTATION

APPENDIX F – CAPABILITY ASSESSMENT

APPENDIX G – UPPER TRINITY REGIONAL WATER DISTRICT - DC GREENBELT PLAN

APPENDIX H – INCORPORATING GREEN INFRASTRUCTURE INTO THE DENTON COUNTY HMAP

APPENDIX I – MAN-MADE HAZARDS

SECTION 1: INTRODUCTION

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

BACKGROUND

Denton County is located in north Texas, nestled within the northern part of the Dallas-Fort Worth metroplex. The western half of the county is covered in the black soil of the Grand Prairie. The eastern portion of the county lies within the Blackland Prairie featuring rich black soils, while central Denton County lies within the Eastern Cross Timbers prairie. The county’s seat is the City of Denton, which is the 27th most populous city in the state. Denton County is surrounded by Cooke and Grayson County to the north and Dallas and Tarrant County to the south and is one county south of the state of Oklahoma.

Texas is prone to extremely heavy rains and flooding with half of the world’s record rainfall rates (48 hours or less).¹ While flooding is a well-known risk, Denton County is susceptible to a wide range of natural hazards, including but not limited to winter storm, tornado, and thunderstorm winds. These life-threatening hazards can destroy property, disrupt the economy, and lower the overall quality of life for individuals.

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

In 2014, Denton County and the participating jurisdictions prepared the Denton County, Texas Multi-Hazard Mitigation Action Plan. That plan was to update the previous hazard mitigation action plan that was adopted by Denton County and participating municipalities in 2011.

The Disaster Mitigation Act requires that hazard mitigation plans be reviewed and revised every five years to maintain eligibility for Hazard Mitigation Assistance (HMA) grant funding. FEMA approved the Denton County Hazard Mitigation Action Plan HMAP in 2016. The County began the process of updating the plan prior to its expiration. Denton County, in coordination with all participating jurisdictions, contracted with H2O Partners, Inc. to write and develop the 2023 HMAP Update in order to reestablish eligibility for HMA grant funding.

¹ <http://www.floodsafety.com/texas/regional-info/san-antonio-flooding/>
² <http://www.fema.gov/hazard-mitigation-planning-resources>

SECTION 1: INTRODUCTION

The HMAP Update planning process provided an opportunity for Denton County to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss. The 2023 HMAP Update, hereinafter titled: “Denton County Hazard Mitigation Action Plan Update 2023: Maintaining a Safe, Secure, and Sustainable Community” is a multi-jurisdictional plan. The participating jurisdictions include: Denton County and the Town of Argyle, the City of Aubrey, the City of Corinth, the Town of Bartonville, the Town of Copper Canyon, the Town of Cross Roads, the City of Denton, the Town of DISH, the Town of Double Oak, the Town of Flower Mound, the Town of Hackberry, the Town of Hebron, the Town of Hickory Creek, the City of Highland Village, the City of Justin, the City of Krugerville, the City of Krum, the City of Lake Dallas, the City of Lakewood Village, the City of Lewisville, the Town of Little Elm, the Town of Northlake, the City of Oak Point, the City of Pilot Point, the Town of Ponder, the Town of Providence Village, the City of Roanoke, the City of Sanger, the Town of Shady Shores, the City of The Colony, and the Town of Trophy Club.

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

SCOPE

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

PURPOSE

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

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

Participating jurisdictions within Denton County, and planning participants identified twelve natural hazards to be addressed by the Plan Update. Additional man-made hazards are included in Appendix I. The specific goals of the Plan Update are to:

- Provide a comprehensive update to the 2016 HMAP;

SECTION 1: INTRODUCTION

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

AUTHORITY



The Plan is tailored specifically for participating jurisdictions within Denton County and plan participants including Planning Team members, and stakeholders the general public who participated in the Plan Update development process. The Planning Team also considers input from the public in developing mitigation priorities. The Plan complies with all requirements promulgated by the Texas Division of Emergency Management (TDEM) and all applicable provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390), and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Additionally, the Plan complies with the Interim Final Rules for the Hazard Mitigation Planning and Hazard Mitigation Grant Program (44 CFR, Part 201), which specify the criteria for approval of mitigation plans required in Section 322 of the DMA 2000 and standards found in FEMA’s “Local Mitigation Plan Review Guide” (October 2011), and the “Local Mitigation Planning Handbook” (March 2013). The Plan was developed in accordance with FEMA’s Community Rating System (CRS) Floodplain Management Plan standards and policies.

SUMMARY OF SECTIONS

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

Sections 4 through 16 present a hazard overview and information on individual natural hazards in the planning area. The hazards generally appear in order of priority based on potential losses to life and property and other community concerns. For each hazard, the Plan Update presents a description of the hazard, a list of historical hazard events, and the results of the vulnerability and risk assessment process.

Section 17 presents hazard mitigation goals and objectives. Section 18 gives an analysis for the previous actions and Section 19 presents hazard mitigation actions for Denton County and the participating jurisdictions. Section 20 identifies Plan maintenance mechanisms.

Appendix A is the list of planning team members and stakeholders. Public survey results are analyzed and presented in Appendix B. Appendix C contains a detailed list of critical facilities for the area. Appendix D contains information regarding Dam locations within Denton County.

SECTION 1: INTRODUCTION

Appendix E contains workshops and meeting documentation. Capability Assessment results for participating jurisdictions within Denton County are in Appendix F. Appendix G and H contains information on incorporating green infrastructure. Appendix I profiles man-made hazards.³

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

SECTION 2: PLANNING PROCESS

- Plan Preparation and Development 1
 - Overview of the Plan 1
 - Planning Team 2
 - Planning Process 7
 - Kickoff Workshop 7
 - Hazard Identification..... 7
 - Risk Assessment 8
 - Mitigation Review and Development 8
- Review and Incorporation of Existing Plans 9
 - Review 9
 - Incorporation of Existing Plans into the HMAP Process..... 9
 - Incorporation of the HMAP into Other Planning Mechanisms 10
 - Plan Review and Plan Update..... 12
- Timeline for Implementing Mitigation Actions 12
- Public and Stakeholder Involvement..... 13
 - Stakeholder Involvement..... 13
 - Public Meetings 16
 - Public Participation Survey 17

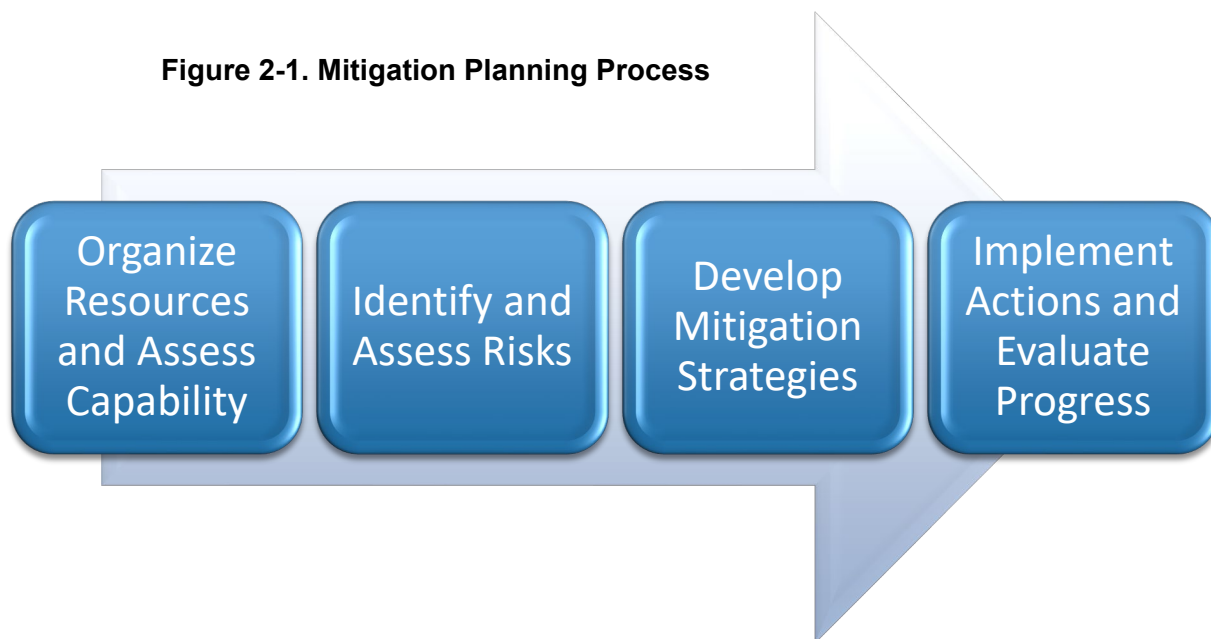
PLAN PREPARATION AND DEVELOPMENT

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

OVERVIEW OF THE PLAN

Denton County and the participating jurisdictions hired H2O Partners, Inc. (Consultant Team), to provide technical support and oversee the development of the Denton County Hazard Mitigation Action Plan Update 2023. The Consultant Team used the FEMA “Local Mitigation Plan Review Guide” (October 1, 2011), and the “Local Mitigation Planning Handbook” (March 2013) to develop the Plan Update. The overall planning process is shown in Figure 2-1 below.

Figure 2-1. Mitigation Planning Process



Denton County, participating jurisdictions, and the Consultant Team met in April 2022 to begin organizing resources, identify Planning Team members, and conduct a Capability Assessment.

PLANNING TEAM

Key members of H2O Partners, Inc. developed the Plan Update in conjunction with the Planning Team. The Planning Team was established using a direct representation model. Some of the responsibilities of the Planning Team included: completing Capability Assessment surveys, providing input regarding the identification of hazards, identifying mitigation goals, and developing mitigation strategies. An Executive Planning Team consisting of key personnel from each of the participating jurisdictions within Denton County, shown in Table 2-1, was formed to coordinate planning efforts and request input and participation in the planning process. Table 2-2 reflects the Advisory Planning Team, consisting of additional representatives from area organizations and departments from the participating jurisdictions within Denton County that participated throughout the planning process.

Table 2-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Denton County	Director of Emergency Management
Denton County	Emergency Management Officer II
Town of Argyle	Town Administrator
City of Aubrey	Assistant Fire Chief
Town of Bartonville	Town Administrator
Town of Copper Canyon	Town Administrator

SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
City of Corinth	Assistant to City Manager
Town of Cross Roads	Chief of Police
City of Denton	Emergency Management Coordinator
Town of DISH	Mayor
Town of Double Oak	Mayor
Town of Flower Mound	Emergency Management Coordinator / Fire Chief
City of Hackberry	Mayor
Town of Hebron	Mayor
Town of Hickory Creek	Town Administrator
City of Highland Village	Deputy Director of Public Works
City of Justin	City Manager
City of Krugerville	Assistant City Administrator and City Secretary
City of Krum	Emergency Management Coordinator / Fire Chief
City of Lake Dallas	City Manager
Town of Lakewood Village	Town Administrator
City of Lewisville	Emergency Management Coordinator
Town of Little Elm	Emergency Management Coordinator
Town of Northlake	Public Works Management Analyst
City of Oak Point	City Manager
City of Pilot Point	City Manager
Town of Ponder	Fire Chief
Town of Providence Village	Town Manager
City of Roanoke	Fire Chief
City of Sanger	Fire Marshal
Town of Shady Shores	Town Administrator
City of The Colony	Emergency Management Coordinator
Town of Trophy Club	Senior Community Development Specialist

Table 2-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Denton County	PHEP Program Coordinator
Denton County	Senior Development Coordinator
Town of Argyle	Chief of Police
Town of Argyle	Community Development Director
Town of Argyle	Public Works Director
City of Aubrey	Fire Chief
City of Aubrey	Mayor
City of Aubrey	Police Lieutenant
Town of Bartonville	Mayor
Town of Copper Canyon	Emergency Management Coordinator / Council Member
City of Corinth	City Engineer
City of Corinth	City Manager
City of Corinth	City Marshal
City of Corinth	Director of Public Works
City of Corinth	Emergency Management Intern
City of Corinth	Fire Chief
City of Corinth	City Engineer
City of Corinth	Streets and Stormwater Manager
Town of the Cross Roads	Town Administrator
City of Denton	City Engineer
City of Denton	Deputy City Engineer
City of Denton	Deputy Director of Operations
City of Denton	Public Information Officer
Town of DISH	Town Secretary
Town of Double Oak	Director of Public Works
Town of Flower Mound	Emergency Management Specialist

SECTION 2: PLANNING PROCESS

ORGANIZATION / DEPARTMENT	TITLE
Town of Flower Mound	Floodplain Manager
City of Hackberry	Town Secretary
City of Highland Village	Assistant Fire Chief
City of Justin	City Secretary
City of Krugerville	Mayor
City of Krum	Deputy Fire Chief
City of Krum	Fire Captain
City of Krum	Fire Deputy
City of Krum	Fire Deputy - Intern
City of Lake Dallas	Public Works Superintendent
Town of Lakewood Village	Mayor
City of Lewisville	Administrative Intern for OEM
City of Lewisville	Assistant City Manager
City of Lewisville	Emergency Management Specialist
City of Lewisville	Fire Marshal
City of Lewisville	GIS Administrator
City of Lewisville	Internal Services Manager
City of Lewisville	NRO Sergeant
City of Lewisville	Public Works Manager
Town of Northlake	Director of Public Works
Town of Northlake	Town Secretary
City of Oak Point	Support Services Coordinator
City of Pilot Point	Director of Public Works
City of Pilot Point	Fire Chief
City of Pilot Point	Mayor
City of Pilot Point	Police Chief
Town of Ponder	Chief of Police

ORGANIZATION / DEPARTMENT	TITLE
Town of Providence Village	EM Specialist
City of Roanoke	Assistant Fire Chief
City of Roanoke	Captain of Field Operations
City of Sanger	Director of Development Services
Town of Shady Shores	Communication Relations Manager
City of The Colony	Emergency Management Specialist
City of The Colony	Senior Engineer
Town of Trophy Club	Administrative Assistant to Fire Department
Town of Trophy Club	Director of Community Development
Town of Trophy Club	Fire Chief
Town of Trophy Club	Streets / Drainage Superintendent

Additionally, a Stakeholder Group was invited to participate in the planning process via e-mail. The Consultant Team, Planning Teams, and Stakeholder Group coordinated to identify mitigation goals, and develop mitigation strategies and actions for the Plan. Appendix A provides a complete listing of all participating Planning Team members and stakeholders from participating jurisdictions within Denton County by organization and title.

Based on the results of the completed Capability Assessment, participating jurisdictions within Denton County described methods for achieving future hazard mitigation measures by expanding existing capabilities. For example, several participating jurisdictions do not have a Comprehensive Master Plan in place. Other options for improving capabilities include the following:

- Establishing Planning Team members with the authority to monitor the Plan and identify grant funding opportunities for expanding staff.
- Identifying opportunities for cross-training or increasing the technical expertise of staff by attending free training available through FEMA and the Texas Division of Emergency Management (TDEM) by monitoring classes and availability through preparingtexas.org.
- Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes.
- Developing ordinances that will require all new developments to conform to the highest mitigation standards.

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

The Planning Team developed hazard mitigation actions for mitigating risk from all of the hazards including potential flood, tornado, and winter storm. These actions include but are not limited to

SECTION 2: PLANNING PROCESS

implementing an education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens on hazards and mitigation measures.

PLANNING PROCESS

The process used to prepare the Plan Update followed the four major steps included at Figure 2-1. After the Planning Team was organized, a capability assessment was developed and distributed at the Kick-Off Workshop. Hazards were identified and assessed, and results associated with each of the hazards were provided at the Risk Assessment Workshop. Based on Denton County’s identified vulnerabilities, specific mitigation strategies were discussed and developed at the Mitigation Strategy Workshop. Finally, Plan maintenance and implementation procedures were developed and are included in Section 20. Participation of Planning Team members, stakeholders, and the public at each of the workshops is documented in Appendix E.

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

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

KICKOFF WORKSHOP

The Kickoff Workshop was held on April 26, 2022, at the Denton County Courthouse. The initial workshop informed participating officials and key department personnel about how the planning process pertained to their distinct roles and responsibilities and engaged stakeholder groups including, but not limited to local emergency service districts (ESDs), local independent school districts and surrounding counties. In addition to the kickoff presentation, participants received the following information:

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

A risk ranking exercise was conducted at the Kickoff Workshop to get input from the Planning Team and stakeholders pertaining to various risks from a list of natural hazards affecting the planning area. Participants ranked hazards high to low in terms of perceived level of risk, frequency of occurrence, and potential impact.

HAZARD IDENTIFICATION

At the Kickoff Workshop, and through e-mail and phone correspondence, the Planning Team conducted preliminary hazard identification. The Planning Team in coordination with the Consultant Team reviewed and considered a full range of natural hazards. Once identified, the teams narrowed the list to significant hazards by reviewing hazards affecting the area, the 2018 State of Texas Hazard Mitigation Plan, and initial study results from reputable sources such as

SECTION 2: PLANNING PROCESS

federal and state agencies. Based on this initial analysis, the teams identified a total of twelve natural hazards which pose a significant threat to the planning area.

RISK ASSESSMENT

An initial risk assessment for participating jurisdictions within Denton County was completed in June 2022 and results were presented to Planning Team members at the Risk Assessment Workshop held on June 21, 2022, at the Denton County Courthouse. At the workshop, the characteristics and consequences of each hazard were evaluated to determine the extent to which the planning area would be affected in terms of potential danger to property and citizens.

Property and crop damages were estimated by gathering data from the National Centers for Environmental Information (NCEI) and National Oceanic and Atmospheric Administration (NOAA). The assessment also examined the impact of various hazards on the built environment, including general building stock, critical facilities, lifelines, and infrastructure. The resulting risk assessment profiled hazard events provided information on previous occurrences, estimated probability of future events, and detailed the spatial extent and magnitude of impact on people and property. Each participant at the Risk Assessment Workshop was provided a risk ranking sheet that asked participants to rank hazards in terms of the probability or frequency of occurrence, extent of spatial impact, and the magnitude of impact. The results of the ranking sheets identified unique perspectives on varied risks throughout the planning area.

The assessments were also used to set priorities for hazard mitigation actions based on potential loss of lives and dollar losses. A hazard profile and vulnerability analysis for each of the hazards can be found in Sections 4 through 16.

MITIGATION REVIEW AND DEVELOPMENT

Developing the Mitigation Strategy for the Plan involved identifying mitigation goals and new mitigation actions. A Mitigation Workshop was held on August 23, 2022, at the Denton Office of Emergency Management. In addition to the Planning Team, stakeholder groups were invited to attend the workshop. Regarding hazard mitigation actions, workshop participants emphasized the desire for flood and high wind projects. Additionally, the participating jurisdictions were proactive in identifying mitigation actions to lessen the risk of all the identified hazards included in the Plan Update.

An inclusive and structured process was used to develop and prioritize new hazard mitigation actions for the Plan Update. The prioritization method was based on FEMA’s STAPLE+E criteria and included social, technical, administrative, political, legal, economic, and environmental considerations. As a result, each Planning Team Member assigned an overall priority to each hazard mitigation action. The overall priority of each action is reflected in the hazard mitigation actions found in Section 19.

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

Specifically, the process involved:

- Listing optional hazard mitigation actions based on information collected from previous plan reviews, studies, and interviews with federal, state, and local officials. Workshop participants reviewed the optional mitigation actions and selected actions that were most

SECTION 2: PLANNING PROCESS

applicable to their area of responsibility, cost-effective in reducing risk, easily implemented, and likely to receive institutional and community support.

- Workshop participants inventoried federal and state funding sources that could assist in implementing the proposed hazard mitigation actions. Information was collected, including the program name, authority, purpose of the program, types of assistance and eligible projects, conditions on funding, types of hazards covered, matching requirements, application deadlines, and a point of contact.
- Planning Team Members considered the benefits that would result from implementing the hazard mitigation actions compared to the cost of those projects. Although detailed cost-benefit analyses were beyond the scope of the Plan Update, Planning Team Members utilized economic evaluation as a determining factor between hazard mitigation actions.
- Planning Team Members then selected and prioritized mitigation actions.

Hazard mitigation actions identified in the process were made available to the Planning Team for review. The draft Plan Update was maintained on file by the Denton County Office of Emergency Management and participating jurisdictions and was made available to the general public for review.

REVIEW AND INCORPORATION OF EXISTING PLANS

REVIEW

Background information utilized during the planning process included various studies, plans, reports, and technical information from sources such as FEMA, the United States Army Corps of Engineers (USACE), the U.S. Fire Administration, National Oceanic and Atmospheric Administration (NOAA), the Texas Water Development Board (TWDB), the Texas Commission on Environmental Quality (TCEQ), the Texas State Data Center, Texas Forest Service, the Texas Division of Emergency Management (TDEM), and local hazard assessments and plans. Section 4 and the hazard-specific sections of the Plan (Sections 5-16) summarize the relevant background information.

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

INCORPORATION OF EXISTING PLANS INTO THE HMAP PROCESS

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

SECTION 2: PLANNING PROCESS

Existing projects and studies were utilized as a starting point for discussing hazard mitigation actions among Planning and Consultant Team members. For example, Denton County developed the SWIFT 911 program, allowing constituents to be contacted with important information and announcements by the Office of Emergency Management.

Additionally, policies and ordinances were reviewed by several of the participating jurisdictions. These jurisdictions have included actions to develop and adopt higher building code standards. Other plans were reviewed, such as Emergency Operations Plan, to identify any additional mitigation actions. Finally, the 2018 State of Texas Hazard Mitigation Plan, developed by TDEM, was discussed in the initial planning meeting in order to develop a specific group of hazards to address in the planning effort. The 2018 State Plan was also used as a guidance document, along with FEMA materials, in the development of the Denton County Hazard Mitigation Action Plan Update 2023.

INCORPORATION OF THE HMAP INTO OTHER PLANNING MECHANISMS

Planning Team members will integrate implementation of the Plan Update with other planning mechanisms for Denton County, such as the Emergency Operations Plan. Existing plans for participating jurisdictions will be reviewed and incorporated into the Plan Update, as appropriate. This section discusses how the Plan will be implemented by the participating jurisdictions within Denton County. It also addresses how the Plan will be evaluated and improved over time, and how the public will continue to be involved in the hazard mitigation planning process.

Participating jurisdictions within Denton County will be responsible for implementing hazard mitigation actions contained in Section 19. Each hazard mitigation action has been assigned to a specific County, City or Town department that is responsible for tracking and implementing the action.

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

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

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

from moderate and high-risk hazards. Within one year of formal adoption of the Plan, existing planning mechanisms will be reviewed and analyzed as they pertain to the Plan Update.

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

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

Table 2-3 identifies types of planning mechanisms and examples of methods for incorporating the Plan into other planning efforts.

Table 2-3. Examples of Methods of Incorporation

Planning Mechanism	Incorporation of Plan
Annual Budget Review	Various departments and key personnel that participated in the planning process for participating jurisdictions within Denton County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.
Capital Improvement Plans	Some participating jurisdictions within Denton County have a Capital Improvement Plan (CIP) in place. Prior to any revisions to the CIP, County, Town, and City departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Floodplain Management Plans	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 5 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when some participating jurisdictions within Denton County update their management plans or develops new plans.
Grant Applications	The Plan will be evaluated by participating jurisdictions within Denton County when grant funding is sought for mitigation projects. If a project is not in the Plan Update, a Plan Revision may be necessary to include the action in the Plan.
Regulatory Plans	Currently, some participating jurisdictions within Denton County have regulatory plans in place, such as Emergency Management Plans, Continuity of

Planning Mechanism	Incorporation of Plan
	Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when County, Town, and City departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.

Appendix F provides an overview of Planning Team members’ existing planning and regulatory capabilities to support implementation of mitigation strategy objectives. Appendix G identifies the Upper Trinity Region Water District Denton County Greenbelt Plan. The appendix identifies the mitigation activities that are conducted by stakeholders in the community.

It should be noted for the purposes of the Plan Update that the HMAP has been used as a reference when reviewing and updating all plans and ordinances for the entire planning area, including all participating jurisdictions. The Emergency Management Plans developed for Denton County, Town of Argyle, City of Corinth, City of Denton, Town of Double Oak, Town of Flower Mound, Town of Hickory Creek, City of Highland Village, City of Justin, City of Krum, City of Lewisville, Town of Little Elm, Town of Northlake, City of Oak Point, City of Pilot Point, Town of Ponder, Town of Providence Village, City of Roanoke, City of Sanger, Town of Shady Shores, City of The Colony, and Town of Trophy Club are updated every 5 years and incorporate goals, objectives and actions identified in the mitigation plan.

PLAN REVIEW AND PLAN UPDATE

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

TIMELINE FOR IMPLEMENTING MITIGATION ACTIONS

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

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

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

PUBLIC AND STAKEHOLDER INVOLVEMENT

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

The public was involved in the development of the Denton County Hazard Mitigation Action Plan Update 2023 at different stages prior to official Plan approval and adoption. Public input was sought using three methods: (1) open public meetings; (2) survey instruments; and (3) making the draft Plan Update available for public review on participating jurisdictions’ websites.

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

The Plan Update will be advertised and posted on Denton County and participating jurisdictions’ websites upon approval from FEMA, and a copy will be kept at the Denton County Courthouse.

STAKEHOLDER INVOLVEMENT

Stakeholder involvement is essential to hazard mitigation planning since a wide range of stakeholders can provide input on specific topics and from various points of view. Throughout the planning process, members of community groups, local businesses, neighboring jurisdictions, schools, and hospitals were invited to participate in development of the Plan Update. The Stakeholder Group (Table A-3 in Appendix A, and Table 2-4, below), included a broad range of representatives from both the public and private sector and served as a key component in Denton County’s outreach efforts for development of the Plan Update. Documentation of stakeholder meetings is found in Appendix E. A list of organizations invited to attend via e-mail is found in Table 2-4.

Table 2-4. Stakeholder Working Group

AGENCY	TITLE	PARTICIPATED
American Red Cross	Program Manager	x
American Red Cross	Volunteer	x
Argyle Independent School District	Chief of Police	

SECTION 2: PLANNING PROCESS

AGENCY	TITLE	PARTICIPATED
Argyle Independent School District	Director of Communications	
Argyle Independent School District	Superintendent	
Aubrey Independent School District	Chief of Police	
City of Denton	Director of Public Utilities involved in Incorporating Green Infrastructure into Denton County	
City of Denton	Watershed Protection Manager involved in Incorporating Green Infrastructure into Denton County	
Collin County	Assistant Emergency Management Coordinator	
Cooke County	Emergency Management Coordinator / Fire Marshal	
Conserv	Utility Representative	
Dallas County	Chief of Emergency Services	
Denton County ESD #1	Board Member	
Denton County Fresh Water Supply District 10	District Representative	
Denton Creek Wastewater Facility	Facility Representative	
Denton Chronicle	News Editor	
Denton Independent School District	Director of Operations	
Denton Independent School District	Superintendent	
Denton Municipal Electric	Utility Representative	
Department of Homeland Security	Media and Communications Office	
Devon Energy Water Treatment Facility	Facility Representative	
Doe Branch / Riverbend Wastewater Facility	Facility Representative	
Environmental Protection Agency	Region 6 Representative involved in Incorporating Green Infrastructure into Denton County	
Frisco Fire Department	Emergency Management Analyst	
Grayson County	Emergency Management Coordinator	
Krum Independent School District	Chief of Police	

SECTION 2: PLANNING PROCESS

AGENCY	TITLE	PARTICIPATED
Krum Independent School District	Director of Operations	
Krum Independent School District	Interim Superintendent	
Lake Dallas Independent School District	Director of Operations	
Lake Dallas Independent School District	Superintendent	
Lewisville Independent School District	Director of Safety and Security	
Lewisville Independent School District	Superintendent	
Lewisville Sewage Plant	Plant Representative	
Lewisville Water Treatment Plant	Plant Representative	
Little Elm Independent School District	Executive Director of Construction / Operations	
Little Elm Independent School District	Superintendent	
Northwest Independent School District	Director of Facilities	
Northwest Independent School District	Director of Safety and Security	
OnCor	Utility Representative	
Pilot Point Independent School District	Director of Operations	
Pilot Point Independent School District	Superintendent	
Ponder Independent School District	Superintendent	
Sanger Independent School District	Superintendent	
NOAA	Regional Representative	
North Central Texas Council of Governments	Mitigation Strategies Representative	
North Central Texas Council of Governments	Regional Emergency Preparedness Representative	
Tarrant County	Emergency Management Coordinator	
Texas A&M Agrilife Extension	District Representative	
Texas A&M Agrilife Extension	Water Resource Specialist / Researcher involved in Incorporating Green Infrastructure into Denton County	

AGENCY	TITLE	PARTICIPATED
Texas A&M Forest Service	District Representative / Staff Forester	
Texas Commission of Environmental Quality	Regional Director	
Texas Department of Emergency Management	District Coordinator	
Texas Department of Transportation	Area Engineer	
Texas Parks and Wildlife	District Leader	
Texas Water Board	Deputy Executive Administrator	
Texas Women’s University	Director of Risk Management	x
The Colony WWTP	City Representative	
TNMP Power	Utility Representative	
Trinity River Authority	Director of Operations	
University of North Texas	Director of Emergency Management and Safety Services	
University of North Texas	Emergency Preparedness and Business Continuity Manager	
University of North Texas	Emergency Management Specialist	
USACE	Research Biologist involved in Incorporating Green Infrastructure into Denton County	
USACE	Southwest Division Representative	
U.S Fish and Wildlife	Southwest Regional Director	
Upper Trinity Regional Water District	Region Representative	
Upper Trinity Regional Water District	Water Education Coordinator involved in Incorporating Green Infrastructure into Denton County	
Wise County	Emergency Management Coordinator	

Stakeholders and participants from neighboring communities that attended the Planning Team and public meetings played a key role in the planning process. For example, high winds were one of the concerns to stakeholders, so participating jurisdictions included actions to adopt and implement a routine tree trimming program that clears tree limbs near power lines.

PUBLIC MEETINGS

A series of public meetings were held throughout the planning area to collect public and stakeholder input. Topics of discussion included the purpose of hazard mitigation, discussion of the planning process, and types of natural hazards. Each participating jurisdiction within Denton County released information regarding the public meetings in their area to increase public

SECTION 2: PLANNING PROCESS

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

Public meetings were held on the following dates and locations:

- April 26, 2022, Denton County Courthouse
- June 21, 2022, Denton County Courthouse
- August 23, 2022, Denton County Courthouse

PUBLIC PARTICIPATION SURVEY

In addition to public meetings, the Planning and Consultant Teams developed a public survey designed to solicit public input during the planning process from citizens and stakeholders and to obtain data regarding the identification of any potential hazard mitigation actions or problem areas. The survey was promoted by local officials and a link to the survey was posted on participating jurisdictions' websites. A total of 354 surveys were completed online. The survey results are analyzed in Appendix B. Participating jurisdictions within Denton County reviewed the input from the surveys and decided which information to incorporate into the Plan as hazard mitigation actions. For example, many citizens mentioned concerns about tornados, and suggested additional education and awareness. In response, several actions were added to the Plan to implement education and awareness programs utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards, including tornado, and mitigation measures to reduce injuries, fatalities, and property damages.

SECTION 3: COUNTY PROFILE

- Overview 1
- Population and Demographics 4
 - Population Growth 6
- Future Development 8
- Economic Impact 8
- Existing and Future Land Use and Development Trends 11

OVERVIEW

In 1846 the Texas State Legislature pulled land from Fannin County to create Denton County, named for a Methodist preacher and lawyer, John Bunyan Denton. The county seat was moved twice before finally being set in its modern location of the City of Denton in 1856, however, Denton was not incorporated as a city until 1866.

Denton County grew slowly until the 1870s when the population more than doubled in size. Many of these newcomers created farms and by the 1880s, 50% of the county was involved in agriculture production. Due to the Grand Prairie, wheat culture consisted of more than 80,000 acres, ranking it the second producer of wheat in the state. The then Village of Krum received the reputation of being the largest inland wheat market in the U.S. in 1900.

After 1900 the population growth of Denton County slowed until the establishment of two state universities, the University of North Texas and Texas Women’s University. These universities, originally established as Texas Normal College and Girl’s Industrial College respectively. Currently the universities have a combined enrollment of more than 60,000 students.

The completion of HI-35 in the 1950s and interstate highways 35E and 35W forked in Denton, allowed for an increase in commuting which grew the county’s population substantially. Areas of the county including but not limited to Lewisville and The Colony all began to serve as suburbs of the Dallas-Fort Worth metropolitan area. Large horse ranches were established across the county and much of Denton’s rich agricultural land turned to pasture.

Denton County has a total area of 953 square miles, of which 878 square miles is land and 75 square miles is water. The western portion of the county consists of the Grand Prairie with rich black soils juxtaposing with the sandy Eastern Cross Timbers. Major rivers and waterways include the Elm Fork of the Trinity River, Lewisville Lake, Clear Creek, Hickory Creek, Denton Creek, and Grapevine Lake.

Figure 3-1 shows the general location of Denton County along with the Cities and Towns that are located within the County.

Figure 3-1. Location of Denton County

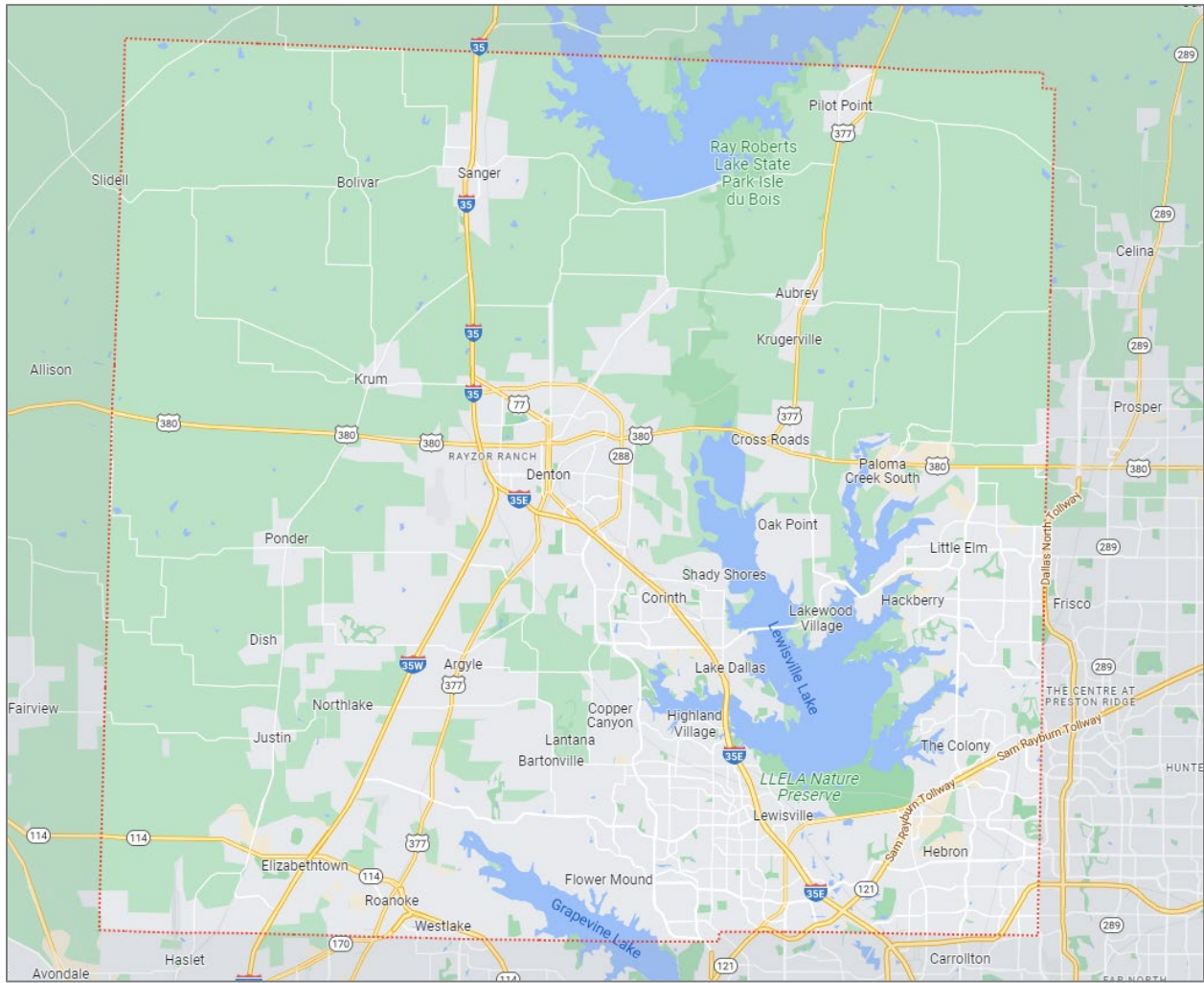
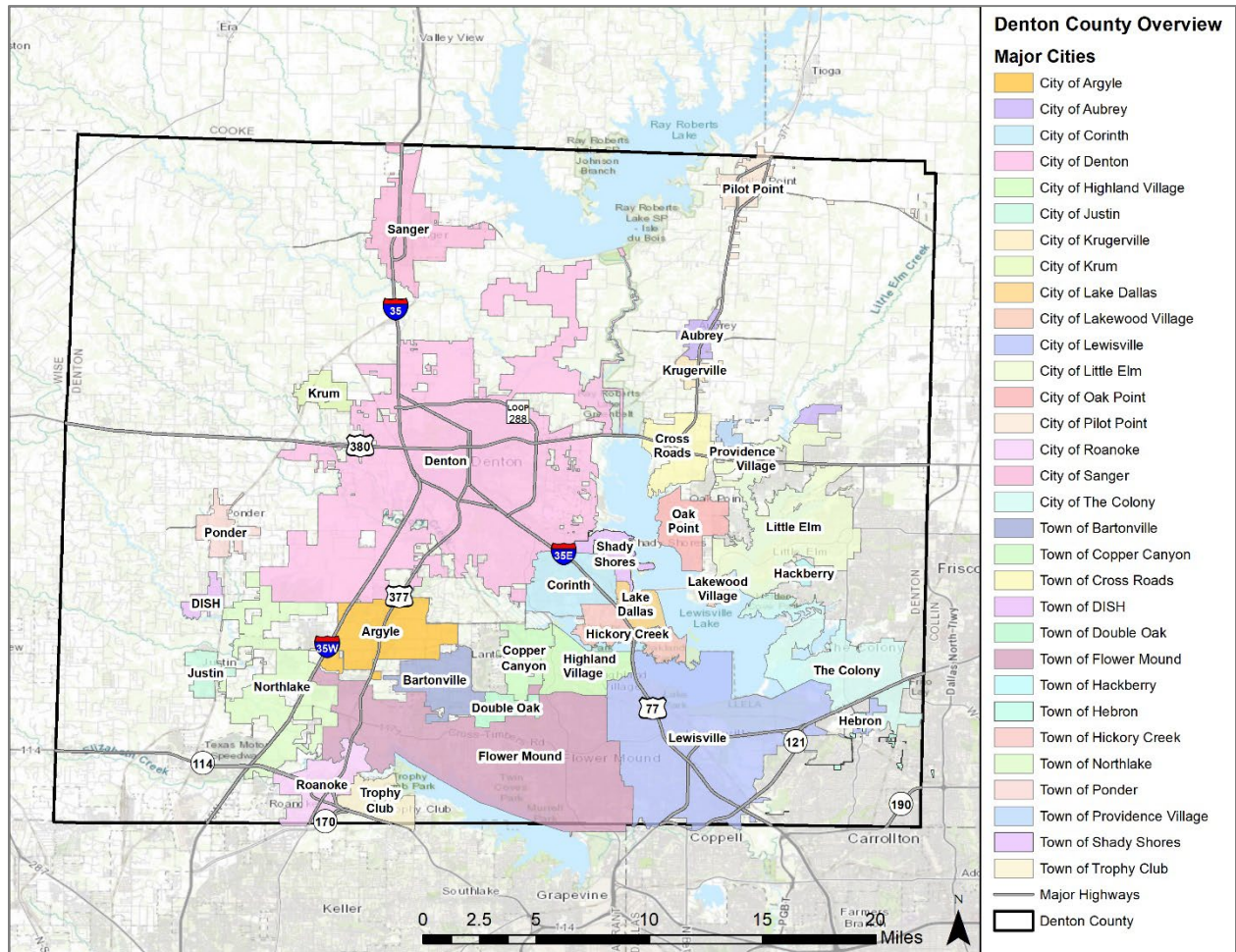


Figure 3-2 shows the participating jurisdictions within Denton County that are covered in the risk assessment analysis of the Plan Update.

Figure 3-2. Denton County Planning Area



Provided in Table 3-1 below is a listing of the jurisdictions in Denton County that participated in the Denton County Hazard Mitigation Action Plan Update 2023.

Table 3-1. Participating Jurisdictions

PARTICIPATING JURISDICTIONS		
Denton County	Town of Hackberry	Town of Northlake
Town of Argyle	Town of Hebron	City of Oak Point
City of Aubrey	Town of Hickory Creek	City of Pilot Point
Town of Bartonville	City of Highland Village	Town of Ponder
Town of Copper Canyon	City of Justin	Town of Providence Village
City of Corinth	City of Krugerville	City of Roanoke
Town of Cross Roads	City of Krum	City of Sanger
City of Denton	City of Lake Dallas	Town of Shady Shores
Town of DISH	City of Lakewood Village	City of The Colony
Town of Double Oak	City of Lewisville	Town of Trophy Club
Town of Flower Mound	City of Little Elm	

POPULATION AND DEMOGRAPHICS

In the official Census population count, as of April 1, 2020, Denton County has a population of 906,422 residents. Table 3-2 provides the population distribution by jurisdiction within Denton County based on the 2010 and 2020 Census information.¹

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

Table 3-2. Population Distribution by Jurisdiction

JURISDICTION	TOTAL 2010 POPULATION	TOTAL 2020 POPULATION	PERCENTAGE (based on 2020 Population)	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS ²		
				Youth (Under 5)	Elderly (Over 65)	Below Poverty Level
Town of Argyle	3,282	4,403	0.49%	51	839	0
City of Aubrey	2,595	5,006	0.55%	435	499	746

¹ Source: <https://demographics.texas.gov/Data/Decennial/2010/>; <https://www.census.gov/>; and <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2020/>

² The Estimated Vulnerable or Sensitive Populations are based off the 2021 American Community Survey 5-Year Estimates Data Profiles. 2020 Census data was utilized where 2021 estimates were not available for Corinth, Hackberry, Hickory Creek, Justin, Lake Dallas, and Lewisville, throughout the plan.

SECTION 3: COUNTY PROFILE

JURISDICTION	TOTAL 2010 POPULATION	TOTAL 2020 POPULATION	PERCENTAGE (based on 2020 Population)	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS ²		
				Youth (Under 5)	Elderly (Over 65)	Below Poverty Level
Town of Bartonville	1,469	1,725	0.19%	123	312	105
Town of Copper Canyon	1,334	1,731	0.19%	31	412	9
City of Corinth	19,935	22,634	2.50%	1,123	2,591	928
Town of Cross Roads	1,563	1,744	0.19%	102	139	21
City of Denton	113,383	139,869	15.43%	7,394	15,648	22,099
Town of DISH	201	437	0.05%	28	67	4
Town of Double Oak	2,867	3,054	0.34%	82	672	168
Town of Flower Mound	64,669	75,956	8.38%	4,059	8,364	3,114
Town of Hackberry	968	2,973	0.33%	360	204	181
Town of Hebron	415	803	0.09%	34	44	34
Town of Hickory Creek	3,247	4,718	0.52%	182	371	42
City of Highland Village	1,165	15,899	1.75%	494	2,262	286
City of Justin	3,247	4,409	0.49%	238	679	119
City of Krugerville	1,662	1,766	0.19%	17	383	19
City of Krum	4,157	5,483	0.60%	457	487	192
City of Lake Dallas	7,105	7,708	0.85%	231	670	401
City of Lakewood Village	545	635	0.07%	19	129	54
City of Lewisville	95,290	111,822	12.34%	7,782	9,112	10,735
Town of Little Elm	25,898	46,453	5.12%	2,176	3,041	3,484
Town of Northlake	1,724	5,201	0.57%	409	261	94
City of Oak Point	2,786	4,357	0.48%	505	589	78
City of Pilot Point	3,856	4,381	0.48%	478	656	342
Town of Ponder	1,395	2,442	0.27%	253	263	46
Town of Providence Village	4,786	7,691	0.85%	655	475	846

SECTION 3: COUNTY PROFILE

JURISDICTION	TOTAL 2010 POPULATION	TOTAL 2020 POPULATION	PERCENTAGE (based on 2020 Population)	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS ²		
				Youth (Under 5)	Elderly (Over 65)	Below Poverty Level
City of Roanoke	5,962	9,665	1.07%	683	864	242
City of Sanger	6,916	8,839	0.98%	717	1,132	902
Town of Shady Shores	2,612	2,764	0.30%	106	448	166
City of The Colony	36,328	44,534	4.91%	3,284	3,914	3,206
Town of Trophy Club	8,024	13,688	1.51%	634	1,563	342
Unincorporated Denton County	219,338	343,632	37.91%	20,312	35,210	16,257
Denton County	662,614	906,422	100%	53,454	92,300	65,262

POPULATION GROWTH

The official 2010 Denton County population is 662,614. By 2020, the census is 906,422. Overall, Denton County experienced an increase in population between 1980 and 2020 by 533%, or an increase of 763,296. All participating jurisdictions experienced an increase in population from 1980 to 2020. From 2010 to 2020, all participating jurisdictions, including Denton County as a whole, experienced an increase in population. Table 3-3 provides historic growth rates in Denton County.

Table 3-3. Population for Denton County, 1980-2020

JURISDICTIONS	1980	1990	2000	2010	2020	POP CHANGE 1980-2020	PERCENT OF CHANGE	POP CHANGE 2010-2020	PERCENT OF CHANGE
Town of Argyle	1,111	1,575	2,365	3,282	4,403	3,292	296%	1,121	34%
City of Aubrey	948	1,138	1,500	2,595	5,006	4,058	428%	2,411	93%
Town of Bartonville	441	849	1,093	1,469	1,725	1,284	291%	256	17%
Town of Copper Canyon	465	978	1,216	1,334	1,731	1,266	272%	397	30%
City of Corinth	1,264	3,944	11,325	19,935	22,634	21,370	1,691%	2,699	14%
Town of Cross Roads	302	361	603	1,563	1,744	1,442	477%	181	12%
City of Denton	48,063	66,270	80,537	113,383	139,869	91,806	191%	26,486	23%
Town of DISH	N/A	N/A	N/A	201	437	-	-	236	117%
Town of Double Oak	836	1,664	2,179	2,867	3,054	2,218	265%	187	7%

SECTION 3: COUNTY PROFILE

Section J, Item 9.

JURISDICTIONS	1980	1990	2000	2010	2020	POP CHANGE 1980-2020	PERCENT OF CHANGE	POP CHANGE 2010-2020	PERCENT OF CHANGE
Town of Flower Mound	4,402	15,527	50,702	64,669	75,956	71,554	1,625%	11,287	17%
Town of Hackberry	N/A	200	544	968	2,973	-	-	2,005	207%
Town of Hebron	385	1,128	874	415	803	418	109%	388	93%
Town of Hickory Creek	1,422	1,893	2,078	3,247	4,718	3,296	232%	1,471	45%
City of Highland Village	3,246	7,027	12,173	15,056	15,899	12,653	390%	843	6%
City of Justin	920	1,234	1,891	3,245	4,409	3,489	379%	1,163	36%
City of Krugerville	469	735	903	1,662	1,766	1,297	277%	104	6%
City of Krum	917	1,542	1,979	4,157	5,483	4,566	498%	1,326	32%
City of Lake Dallas	3,177	3,656	6,166	7,105	7,708	4,531	143%	603	8%
City of Lakewood Village	165	169	342	545	635	470	285%	90	17%
City of Lewisville	24,273	46,521	77,737	95,290	111,822	87,549	361%	16,532	17%
Town of Little Elm	926	1,255	3,646	25,898	46,453	45,527	4,917%	20,555	79%
Town of Northlake	143	250	921	1,724	5,201	5,058	3,537	3,477	202%
City of Oak Point	387	645	1,747	2,786	4,357	3,970	1,026%	1,571	56%
City of Pilot Point	2,211	2,538	3,538	3,856	4,381	2,170	98%	525	14%
Town of Ponder	297	432	507	1,395	2,442	2,145	722%	1,047	75%
Town of Providence Village	N/A	N/A	N/A	4,786	7,691	-	-	2,905	61%
City of Roanoke	910	1,616	2,810	5,962	9,665	8,755	962%	3,703	62%
City of Sanger	2,574	3,514	4,534	6,916	8,839	6,265	243%	1,923	28%
Town of Shady Shores	813	1,045	1,461	2,612	2,764	1,951	240%	152	6%
City of the Colony	11,586	22,113	26,531	36,328	44,534	32,948	284%	8,206	23%
Town of Trophy Club	N/A	3,922	6,350	8,024	13,688	-	-	5,664	71%
Unincorporated Denton County	30,473	79,784	124,724	219,338	343,632	313,159	1,028%	124,294	57%
Denton County	143,126	273,525	432,976	662,614	906,422	763,296	533%	243,808	37%

FUTURE DEVELOPMENT

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

Population projections from 2010 to 2050 are listed in Table 3-4, as provided by the Office of the State Demographer, Texas State Data Center, and the Institute for Demographic and Socioeconomic Research. Population projections are based on a 0.5 scenario growth rate, which is 50 percent of the population growth rate that occurred during 2000-2010. This information is only available at the County level; however, the population projection shows an increase in population density for the County, which would mean overall growth for the County.

Table 3-4. Denton County Population Projections

LAND AREA (SQ MI)	2010		2020		2030		2040		2050	
	Population									
	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)
878.43	662,614	754.3	897,953	1,022.2	1,234,110	1,404.9	1,708,302	1,944.7	2,332,269	2,655.0

ECONOMIC IMPACT

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

Denton County strives to continuously improve the quality of life for all its citizens while promoting high quality development across its jurisdiction. The County provides grants such as OPEN (Operational Plan for Economic Normalization) which provides \$20 million for businesses physically located in Denton County. The County likewise provides a Sales Tax Dashboard for businesses to view net payments versus the prior year.

The Town of Argyle has a Municipal Development District which is committed to the attraction and growth of high-quality developments that provide valued services or resources to the Town's residents. The Town has financial incentive opportunities that it releases on a case-by-case basis. Such incentives may include their Tax Abatement Policy, Freeport Exemption, and their Infrastructure improvement assistance.

The mission of the City of Aubrey's Municipal Development District is to promote business expansion in the area that builds a stronger, more diversified economy and increases the economic vitality and wealth of the community. The municipal district service area covers

SECTION 3: COUNTY PROFILE

approximately 35 square miles which is expected to increase as the pace of growth continues to gain speed.

The Town of Bartonville has challenged its Community Development Corporation (CDC) with the task of growing capital investment and creating additional primary jobs in its community, both in the form of new business attraction and existing business expansion in the Town's zoned commercial areas. The Bartonville CDC has begun a Business Retention and Expansion Program to develop the growth of existing businesses within the town.

As mentioned in their 2020 Master Plan, the Town of Copper Canyon highlights the creation and execution of an economic development strategy as a critical component to attracting high quality development. The Town encourages the strategy to consider specific issues such as demographics, traffic counts, engineering issues related to land development and sewer services, resources of the Town, location, and economic conditions.

The City of Corinth, in an effort to foster new investment and attract high quality development, adopted an Economic Development Program. The program was created to promote local economic growth, stimulate business, and attract commercial activity within the City of Corinth, with an emphasis on the retention, expansion, and attraction of retail, restaurant, office, hotel, and other commercial development.

The Town of Cross Roads Municipal Development District's mission is to continue to grow the tax base by attracting new business, creating a family-oriented, safe town environment while preserving our small town country living, making the community a better place to do business, live and work. Cross Roads Municipal Development District promotes the retention, and expansion of existing business for a sustainable economy leading to job creation.

The City of Dentons' Economic Development Department assists in offering a favorable business climate by expanding Denton's economy through the location of new businesses and the retention and expansion of current employers. The Department fostering the city's thriving culture of business, technology, and artistic creation, as well as attracting, developing, and retaining skilled workers to support existing and future employers.

The Town of Flower Mound is strategically located, with a low tax rate, excellent school system, and great quality of life. The town's close proximity to the DFW International and Alliance Airports have greatly influenced economic conditions within the town, leading to more than 1,300 businesses settling in the area.

The Town of Hickory Creek's Economic Development Corporation (EDC) was created in an effort to promote and develop new and expanded business enterprises that create or retain primary jobs. The town provides economic development assistance for job training, recycling facilities, land, buildings, equipment, facilities, and improvements.

The City of Highland Village is a prime location for retail development due to its rapidly expanding population, the key location of the nearby DFW Metroplex, and the appealing demographic base. The leaders of Highland Village are very aggressive in the recruitment of quality retail that meets the needs of the community. In addition to business recruitment, Highland Village works with existing businesses to ensure sustained economic growth.

The City of Justin offers ample business opportunities, ease of access in the DFW region, exceptional education, and commitment to growing and sustaining businesses. The city has the

goal of retaining their unique charm in their old town area, while also expanding their commercial spaces throughout the city. The city offers grants to local and new businesses and are always looking for way to bring new businesses to their community.

The City of Krum, through its Economic Development Boards offer incentives for new and expanding businesses creating primary jobs for its community. The City of Krum is strategically located 5 miles west of I-35 and 6 miles from Rayzor Ranch which features big box retailers, junior anchors, specialty retailers, restaurants, and financial/professional services.

The City of Lake Dallas created a Community Development Corporation (CDC) to foster improvements in the commercial area of the city and to enhance the quality of life in the city as a tool for attracting new businesses and residents. Revitalization of the city's downtown area is underway and there are currently excellent opportunities for development within the city.

The City of Lewisville is a thriving economic hub in the Dallas/Fort Worth (DFW) region with numerous advantages, including superior access, great infrastructure, a low tax environment, and quality workforce. The city is currently following the Lewisville 2025 plan, a strategic plan designed to guide the development of the area over the next several years as the city moves towards celebrating its centennial in 2025.

The Town of Little Elm Economic Development Corporation's (EDC) mission is to advance economic development in Little Elm while capitalizing on their lakeside character and sense of community. Its goals are to market Little Elm's strengths and increase awareness of the Town's investment opportunities and job creation potential, manage Little Elm's Economic Development Corporation to assure that the Corporation is leading the effort to maximize investment development and job creation. Partner with the Town to facilitate the vision and manage the progression of the Town Center development, attract job-creating entities to provide new investments in light industry, office park development, planned mixed-use developments, and tourism, and continue to simulate retail development and investment.

The Town of Northlake is conveniently located along Interstate 35 W between Fort Worth and Denton, just minutes from the Dallas Fort Worth (DFW) International Airport via State Highway 114. Recent patterns in regional development show Northlake is the next hot area for growth. The Town of Northlake enlists the help of the Northlake Economic Development Corporation (EDC) and the Northlake Community Development Corporation (CDC) to ensure business and development needs are met.

The City of Pilot Point's Development Services depart was created to provide enhanced economic opportunity, strong neighborhoods, and dynamic quality growth and development through collaborative planning to develop and implement creative community-based strategies, maintain development codes that are cohesive, consistent, fair and promote a high quality of life, ensure efficient capital project review and inspections, and promote high quality, positive, timely and facilitative review and inspection services.

The City of Roanoke, with low taxes and excellent location, is experiencing tremendous growth and has one of the lowest crime rates in the Dallas-Fort Worth (DFW) Metroplex. The city has adopted an economic development investment policy that awards significant grants to companies that retain a certain amount of inventory in their facilities. This new incentive, coupled with extremely low tax rates, make Roanoke a wonderful business destination.

SECTION 3: COUNTY PROFILE

The City of Sanger, through its Economic Development Boards offers incentives for new and expanding businesses creating primary jobs for the community. It is the policy of the City of Sanger to customize the provisions of economic development incentives on a case-by-case basis. The individualized design of a total incentive package is intended to allow maximum flexibility in addressing the unique concerns of each applicant while enabling the City of Sanger to better respond to the changing needs of the community.

The City of The Colony, in conjunction with The Colony Economic Development Corporation (TCEDC) provides incentives for qualified projects in accordance with guidelines that encourage economic growth and expansion. These incentives are considered on a case-by-case basis.

The Town of Trophy Club’s Economic Development Corporation’s mission is to promote economic development within the Town and the State of Texas in order to eliminate unemployment and underemployment, and to promote and encourage employment and the public welfare of, for, and on behalf of the town by undertaking, developing, providing, and financing projects under the Economic Development Act.

EXISTING AND FUTURE LAND USE AND DEVELOPMENT TRENDS

The following jurisdictions have a Master or Comprehensive Plan in place: Denton County, Town of Argyle, City of Aubrey, Town of Bartonville, Town of Copper Canyon, City of Corinth, Town of Cross Roads, City of Denton, Town of DISH, Town of Flower Mound, City of Hickory Creek, City of Highland Village, City of Justin, City of Krum, City of Lake Dallas, Town of Lakewood Village, City of Lewisville, Town of Little Elm, Town of Northlake, City of Oak Point, City of Pilot Point, Town of Providence Village, City of Roanoke, City of Sanger, City of The Colony, and Town of Trophy Club. These plans are part of a continuous process to provide an environment for the citizens and to consider the general desire of the community to conserve, preserve, and protect the natural environment of their jurisdiction. These plans are used to guide individuals in making decisions which affect the community with the understanding of the long-term effects.

Denton County has developed a 2040 Comprehensive Plan designed address the new challenges and opportunities that the county’s rapid growth bring. The Plan focuses on the shift the county’s demographics, citizen’s lifestyle and housing needs, the City’s Mobility Plan and Parks, Recreation, and Trails Master Plan updates, refers to other recently updated Plan, strengthen the city’s economy, enhance the quality of life of its residents, and protection of the environmental and natural resources.

The Town of Argyle has created a 2018 Comprehensive Plan to address the increased population challenges in the city, striving to ensure a balance between non-residential and residential development. The Plan provides opportunities to protect and preserve current citizens’ property values and quality of life.

The City of Aubrey’s Comprehensive Master Plan highlights the importance of the city’s downtown area. A large part of the Plan includes a Downtown Master Plan, designed to preserve, and enhance the historic part of the City of Aubrey.

The Town of Bartonville has crafted a 2037 Comprehensive Plan to provide guidance for Bartonville’s future development with guiding principles to fulfil the desires of the rural community. The document provides information about the community and insight into the land’s use pattern.

SECTION 3: COUNTY PROFILE

The Town of Copper Canyon utilizes a Comprehensive Plan as a planning tool to be used by the town's staff, elected officials, and citizens to guide the development and growth of a community for ten to twenty years. The Plan provides recommendations for policy regarding transportation, land use, housing, parks and recreation, and urban design.

The City of Corinth has developed a 2040 Comprehensive Plan, called the Envision Corinth. The Plan covers policy issues such as transportation, livability, homes, parks and trails, and land use. The Plan's guiding principles include a dynamic and aesthetically pleasing community, complete, connected, and safe neighborhoods, and future infill development.

The Town of Cross Roads has created a Comprehensive Plan, called the Town of Cross Roads Vision 2035. The Plan reports the vision and strategic action plan that had been drafted during a community engagement process. The update presents the Town's identified preferred future and strategic data.

The City of Denton's Comprehensive Plan, known as the Denton 2040 Comprehensive Plan, presents current and anticipated data as the city grows and evolves. The plan addresses changing demographics, shifting lifestyle and housing preferences, strengthening the city's economy, and protecting the life of its citizens.

The Town of DISH created a Comprehensive Plan was created for public health, safety and welfare. The purpose of this document was to promote the health, safety, morals, and general welfare of the Town of DISH.

Town of Flower Mound drafted a Master Plan in 2013 to continue the traditions of previous plans, guide growth, development of the town's land use, urban design, open space, parks and trails, public infrastructure and economic development. The plan highlights the importance of preserving its country atmosphere and natural environment.

With guidance from its citizens, the Town of Hickory Creek developed a Comprehensive Plan that eliminates the possibility of urban sprawl or uncontrolled developments, plans for a town square or downtown business district, managing I-35 expansion, plans for a community trails systems, protecting natural environment, and continuing to enhance the town's park.

The City of Highland Village created a Comprehensive Plan, known as the Comprehensive Plan of the City of Highland Village, with input from the city's residents. The plan is guided by the understanding that to develop and maintain a pleasant, attractive, dynamic, and healthy community. The Comprehensive Plan highlights the importance of maintaining the public welfare, providing facilities and services, protecting the land and natural environment, and reasonable land development.

The City of Justin is currently developing The Justin Comprehensive Plan and is encouraging its residents and business owners to provide their feedback. The city asks that citizens participate by sharing their feedback on their city's website.

The City of Krum adopted their Comprehensive Plan to guide the future development of the city. The plan highlights guidelines for appropriate and orderly growth, to encourage investment and reinvestment in the city, and to improve the quality of life for their citizens. The plan emphasizes that it is not law, but instead guidelines for city regulations like zoning and subdivision ordinances.

As the City of Lake Dallas continues to grow, the community recognized the need for a singular vision to guide future success for the community. In 2017, the city officials began the process for

SECTION 3: COUNTY PROFILE

a comprehensive plan, called Lake Dallas Vision 2030, to serve as guidance for future development and redevelopment in the city.

The Town of Lakewood Village created a shared vision for their community in a comprehensive plan. The community established guidelines for the city including the development of 175 acres of land, extraterritorial jurisdiction and associated growth, traffic planning, infrastructure improvements and facilities expansion, and evaluation and implementation of plan recommendations.

The City of Lewisville worked closely with the Lewisville 2025 Committee, city staff, and professional consultants to create a shared vision for the kind of community Lewisville would like to be when it turns 100 in 2025. Over a year of public engagement was utilized to develop ideas and suggestions from the citizenry.

The Town of Little Elm's Comprehensive Plan is a vision of what the community would like to become and provides guidance on public policy. It includes policy guidelines on the development of transportation, housing, and geographic growth. The plan serves as a framework for creating an attractive environment in which people can live and play.

The Town of Northlake created a Comprehensive Plan to serve as the official guide for growth of the Town and a framework and policy direction for the creation of land use and development regulations. An inclusive public participation process involved multiple meetings, surveys, and workshops so the citizenry could provide input to the plan.

The City of Oak Point's Comprehensive Plan was developed through a multi-stage process of identifying needs, building consensus with the citizenry, creating goals and objectives, and determining the most appropriate strategies for achieving these goals. The citizens of the City of Oak Point provided guidance to incorporate the community's values in terms of aesthetic appeal, the future of development, and quality of life.

The City of Pilot Point created the Comprehensive Plan for Pilot Point 2030 to set the vision of the future of their community and sets the goals, objectives, and actions to meet this vision. The plan informs the community about its existing demographics, develops a vision for how the community wants to grow, provides a framework for policy decisions, and covers at least a 10-year timeframe.

The Town of Providence Village drafted a Comprehensive Plan called the Town of Providence Village 2040 Comprehensive Plan. The document serves as a vision for Providence Village's future land, development, and people. The Plan lays out town-wide strategies and actions to serve as a framework for its citizens.

The City of Roanoke created a Comprehensive Plan called the Future Land Use Plan for the City of Roanoke in April of 2003. The plan highlights the opportunities for future development, particularly in the city's downtown area such as shopping, dining, and entertainment.

The City of Sanger is in the process of developing a Comprehensive Plan called Sanger 2040. The draft of the plan is viewable for citizen feedback and defines the vision and growth of the city over the next 20 years. The document provides a list of actions and strategies to best implement the created plan.

SECTION 3: COUNTY PROFILE

The City of The Colony created an update to its Community Development Master Plan in 2009. The document includes recommendations for local art and cultural opportunities, as well as park fields and trails.

The Town of Trophy Club drafted its Comprehensive Plan through field studies, analyses, and recommendations regarding the nature of future development in the town. The plan provides a list of existing lands, goals and objectives, demographic conditions, and a thorough description of plans for the future of the town.

SECTION 4: RISK OVERVIEW

Hazard Description 1

Natural Hazards and Climate Change 4

Overview of Hazard Analysis 4

HAZARD DESCRIPTION

Section 4 is the first phase of the Risk Assessment, providing background information for the hazard identification process and descriptions for the hazards identified. The Risk Assessment continues with Sections 5 through 16, which include hazard descriptions and vulnerability assessments.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, participating jurisdictions within Denton County identified twelve natural hazards that are addressed in the Hazard Mitigation Plan Update. Of the natural hazards identified, eleven natural hazards and one quasi-technological hazard (dam failure) were identified as significant, as shown in Table 4-1. The hazards were identified through input from Planning Team members and a review of the current 2018 State of Texas Hazard Mitigation Plan (State Plan). Readily available online information from reputable sources such as federal and state agencies were also evaluated and utilized to supplement information as needed.

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

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

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

For the Risk Assessment, the wildfire and earthquake hazards are considered “other,” since these hazards are not considered atmospheric, hydrologic, or technological.

Table 4-1. Hazard Descriptions

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

HAZARD	DESCRIPTION
Flood	The accumulation of water within a body of water, which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, and shallow flooding.
OTHER	
Earthquake	An earthquake is the sudden, rapid, shaking of the earth, caused by the breaking and shifting of subterranean rock as it releases strain that has accumulated over a long time. Initial mild shaking may strengthen and become extremely violent within seconds.
Wildfire	A wildfire is an uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.
TECHNOLOGICAL	
Dam and Levee Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam.

Hazards that weren't considered significant and were not included in the Plan Update are located in Table 4-2. Hazards not identified for inclusion at this time may be addressed during future evaluations and updates.

Table 4-2. Other Hazards Deferred

HAZARD CONSIDERED	REASON FOR DETERMINATION
Coastal Erosion	The planning area is not located on the coast, therefore coastal erosion does not pose a risk.
Hurricane Wind/Tropical Storm	The planning area is not located within 200 miles of the coast of the state. Therefore, there is no risk associated with this hazard.

HAZARD CONSIDERED	REASON FOR DETERMINATION
<p>Land Subsidence</p>	<p>There are no historical occurrences of land subsidence for the planning area, and none are anticipated in the future at this point. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of land subsidence and none is expected in the future.</p>

NATURAL HAZARDS AND CLIMATE CHANGE

Climate change is defined as a shift in average or typical weather conditions or patterns which can increase or decrease the risk of natural hazards. It directly endangers property due to sea level rise and biological organisms due to habitat destruction.

Global climate change is expected to exacerbate the risks of certain types of natural hazards impacted through rising sea levels, warmer ocean temperatures, higher humidity, the possibility of stronger storms, and an increase in wind and flood damages due to storm surges. While sea level rise is a natural phenomenon and has been occurring for several thousand years, the general scientific consensus is that the rate has increased in the past 200 years, from 0.5 millimeters per year to 2 millimeters per year.

Texas is considered one of the more vulnerable states in the U.S. to both abrupt climate changes and to the impact of gradual climate changes to the natural and built environments. Mega-droughts can trigger abrupt changes to regional ecosystems and the water cycle, drastically increase extreme summer temperature and fire risk, and reduce availability of water resources, as Texas experienced during 2011-2012.

Paleoclimate records also show that the climate over Texas had large changes between periods of frequent mega-droughts and the periods of mild droughts that Texas is currently experiencing. While the cause of these fluctuations is unclear, it would be wise to anticipate that such changes could occur again and may even be occurring now.

OVERVIEW OF HAZARD ANALYSIS

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

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

The use of geographic information system (GIS) technology to identify and assess risks for Denton County and evaluate community assets and their vulnerability to the hazards.

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

Frequency of return was calculated by dividing the number of events in the recorded time period for each hazard by the overall time period that the resource database was recording events. Frequency of return statements are defined in Table 4-3, and impact statements are defined in Table 4-4 below.

Table 4-3. Frequency of Return Statements

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

Table 4-4. Impact Statements

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

Each of the hazard profiles includes a description of a general vulnerability assessment. Vulnerability is the total of assets that are subject to damages from a hazard, based on historic recorded damages. Assets in the region were inventoried and defined in hazard zones where appropriate. Risk and consequences will be addressed and covered within each hazard profile under the Vulnerability and Impact section as well as under the Assessment of Impact sections, where applicable.

To better understand how future growth and development in the Denton County region might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management efforts. Hazard vulnerability for all participating jurisdictions within Denton County

was reviewed based on recent development changes that occurred throughout the planning area. Denton County has increased slightly between 2010 and 2020 according to the U.S. Census Bureau, therefore there has been no significant factors or development trends with a consequential effect or increase in vulnerability to the population, infrastructure and buildings for hazards.

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

Table 4-5. Hazard Risk Ranking

HAZARD	FREQUENCY OF OCCURENCE	POTENTIAL SEVERITY
Flood	Highly Likely	Substantial
Thunderstorm Winds	Highly Likely	Substantial
Tornado	Highly Likely	Substantial
Lightning	Highly Likely	Substantial
Hail	Highly Likely	Minor
Winter Storm	Highly Likely	Limited
Extreme Heat	Highly Likely	Substantial
Drought	Highly Likely	Limited
Wildfire	Highly Likely	Limited
Dam and Levee Failure	Unlikely	Substantial
Earthquake	Unlikely	Limited
Expansive Soils	Likely	Limited

SECTION 5: FLOOD

Hazard Description	1
Location	1
Extent.....	33
Historical Occurrences.....	36
Significant Events.....	39
Probability of Future Events.....	40
Vulnerability and Impact.....	41
Assessment of Impacts	49
National Flood Insurance Program (NFIP) Participation.....	51
NFIP Compliance and Maintenance	53
Repetitive Loss	54

HAZARD DESCRIPTION

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

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

LOCATION

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

- Zone A: Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance requirements and floodplain management standards apply.
- Zone AE: Areas subject to inundation by 1-percent-annual-chance shallow flooding. It is the base floodplain where BFEs are provided. AE zones are now used on new format FIRMs instead of A1-30 zones.

SECTION 5: FLOOD

- Zone AH: Areas subject to inundation by the 1-percent-annual-chance shallow flooding (usually in the form of a pond) where average depth is between one and three feet. These areas have a 26 percent 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 AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.
- Zone X: Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones.

Locations of flood zones in Denton County based on the digital Flood Insurance Rate Map (DFIRM) from FEMA are illustrated in Figures 5-1 to 5-32.

Figure 5-1. Estimated Flood Zones in Denton County

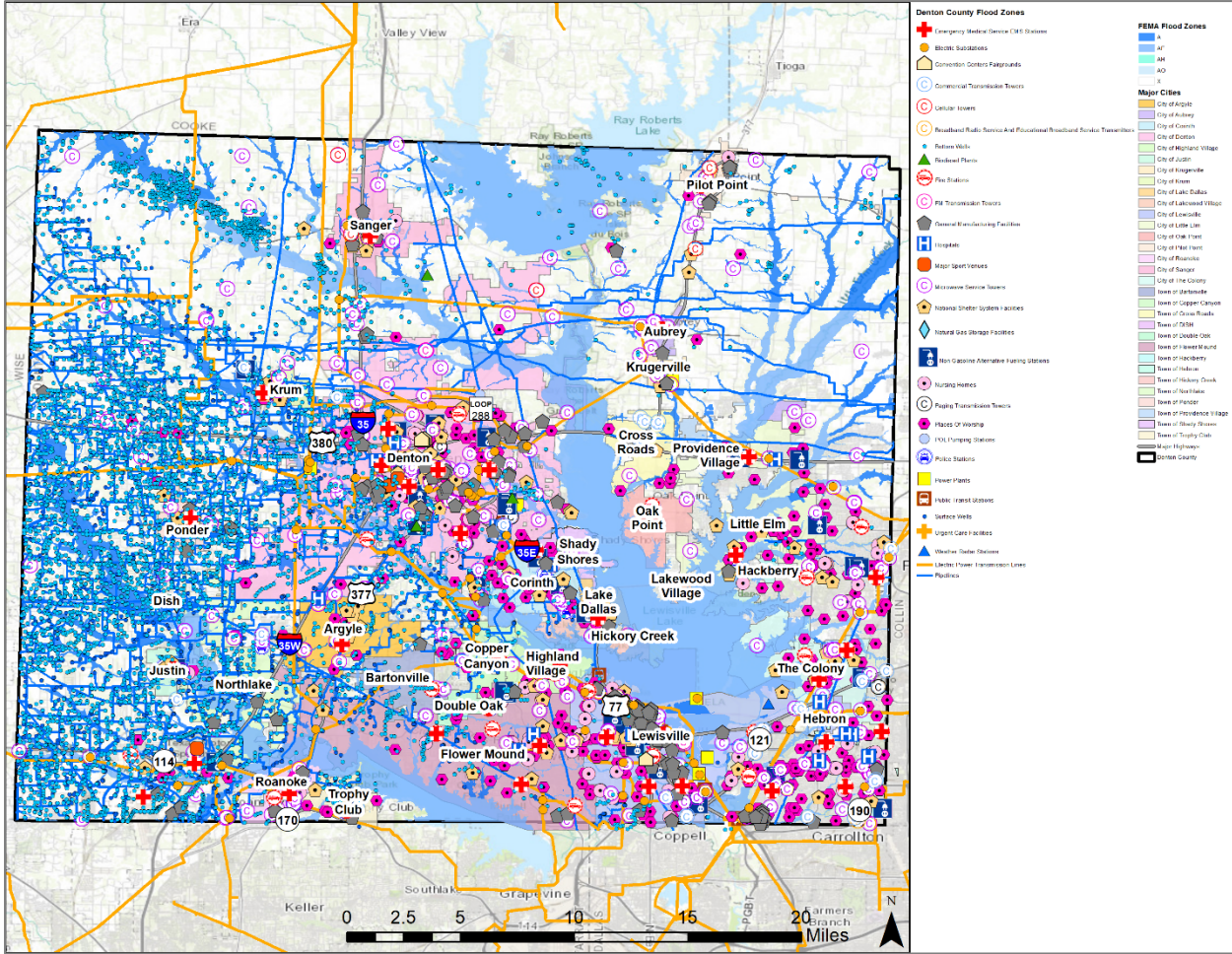


Figure 5-2. Estimated Flood Zones in the Town of Argyle

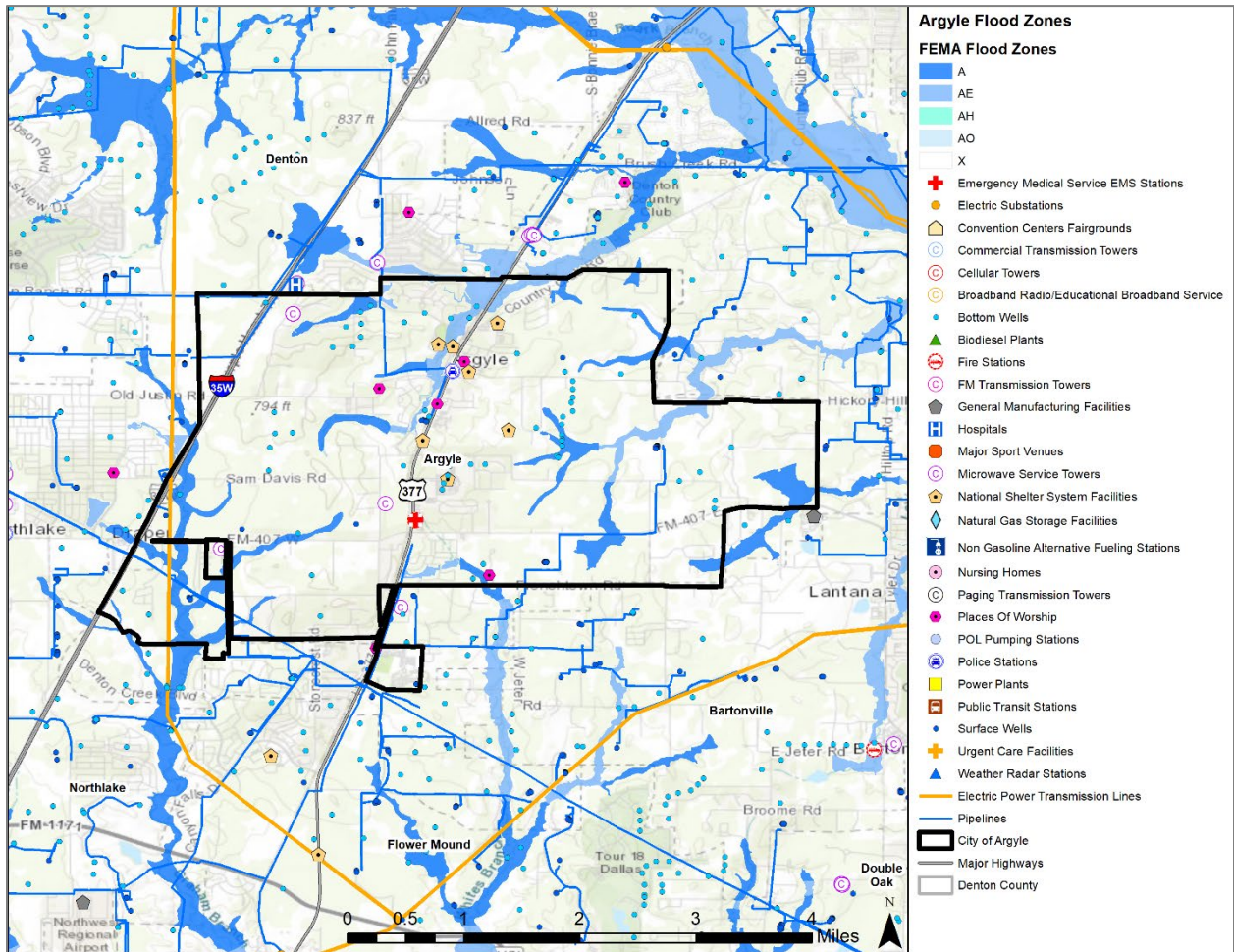


Figure 5-3. Estimated Flood Zones in the City of Aubrey

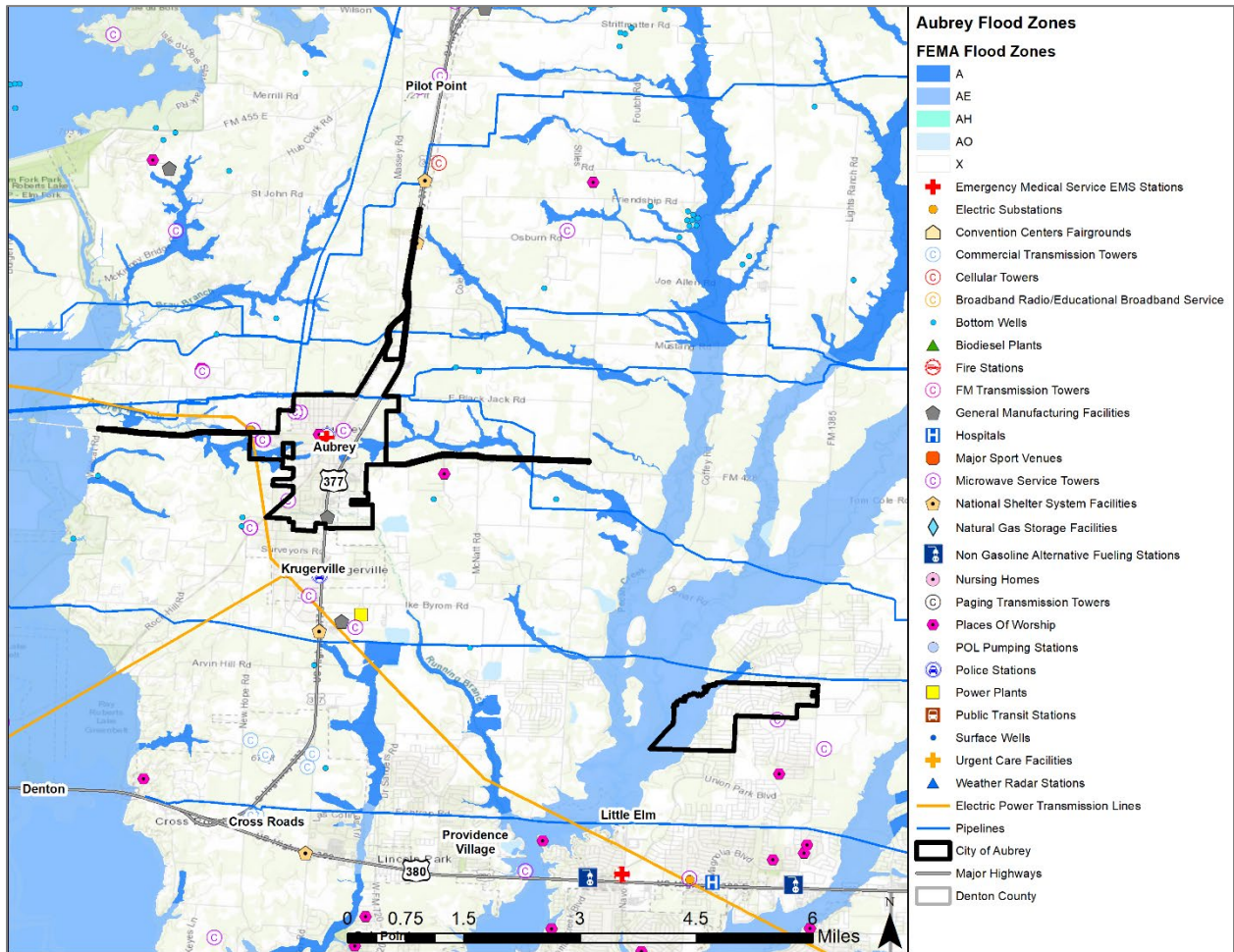


Figure 5-4. Estimated Flood Zones in the Town of Bartonville

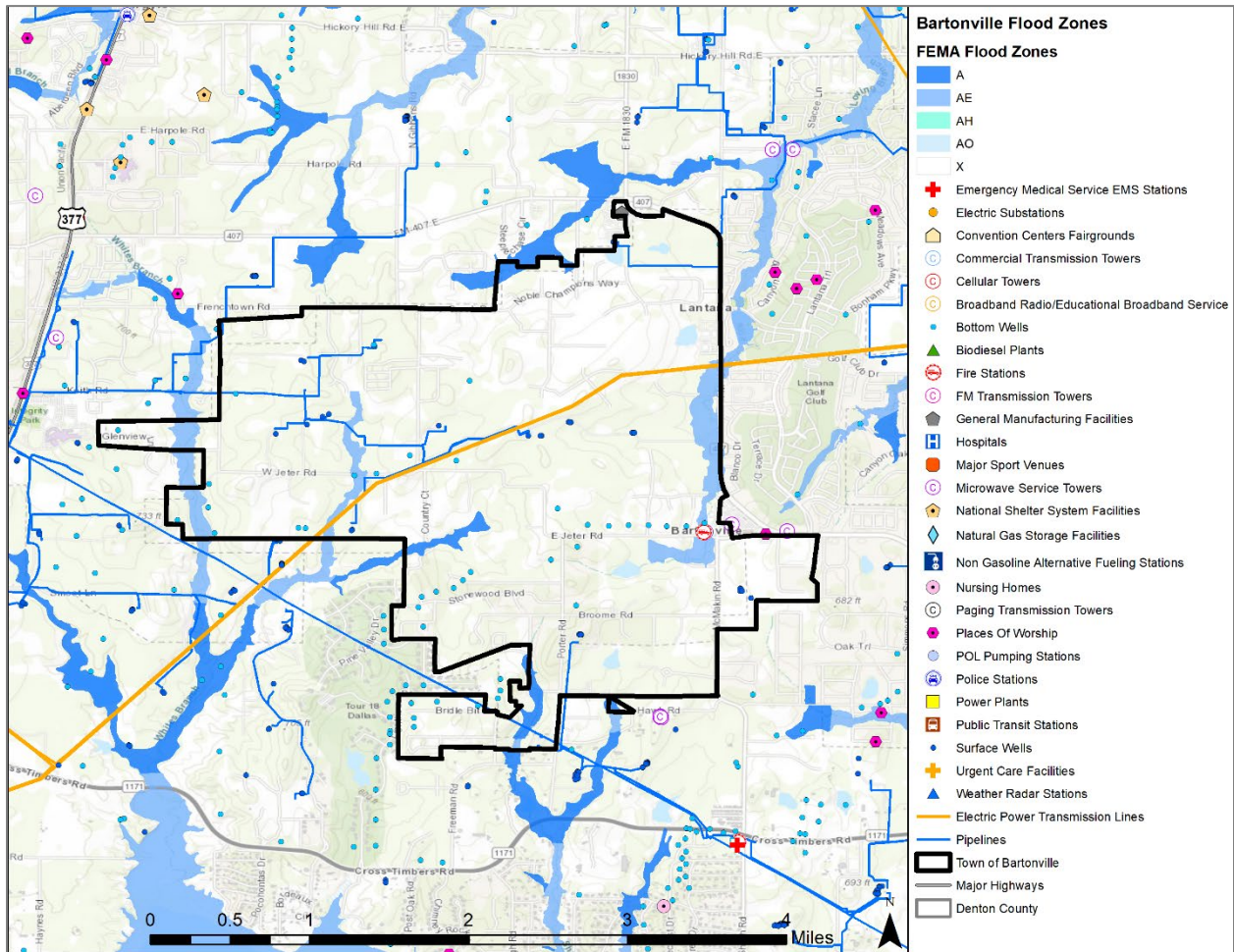


Figure 5-5. Estimated Flood Zones in the Town of Copper Canyon

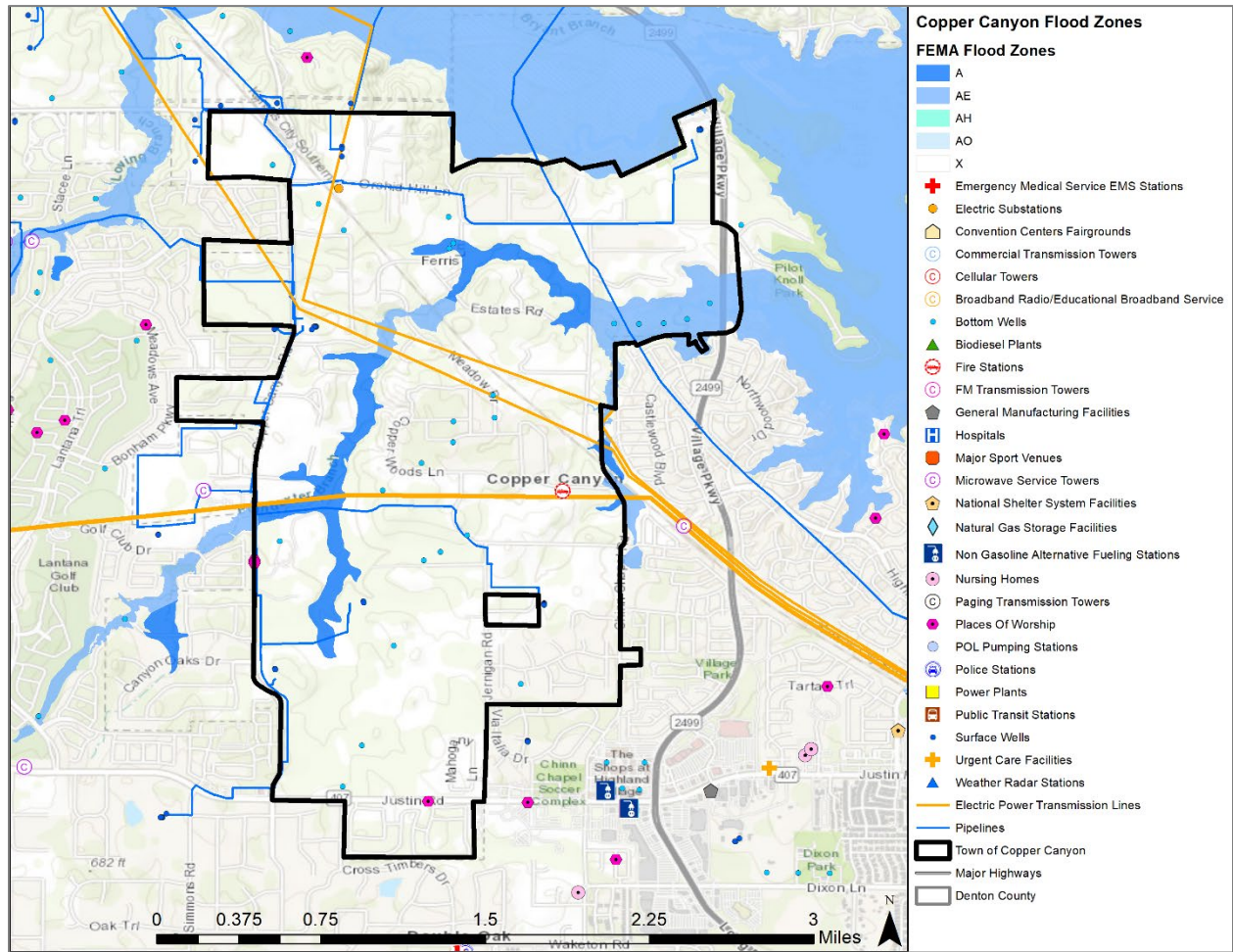


Figure 5-6. Estimated Flood Zones in the City of Corinth

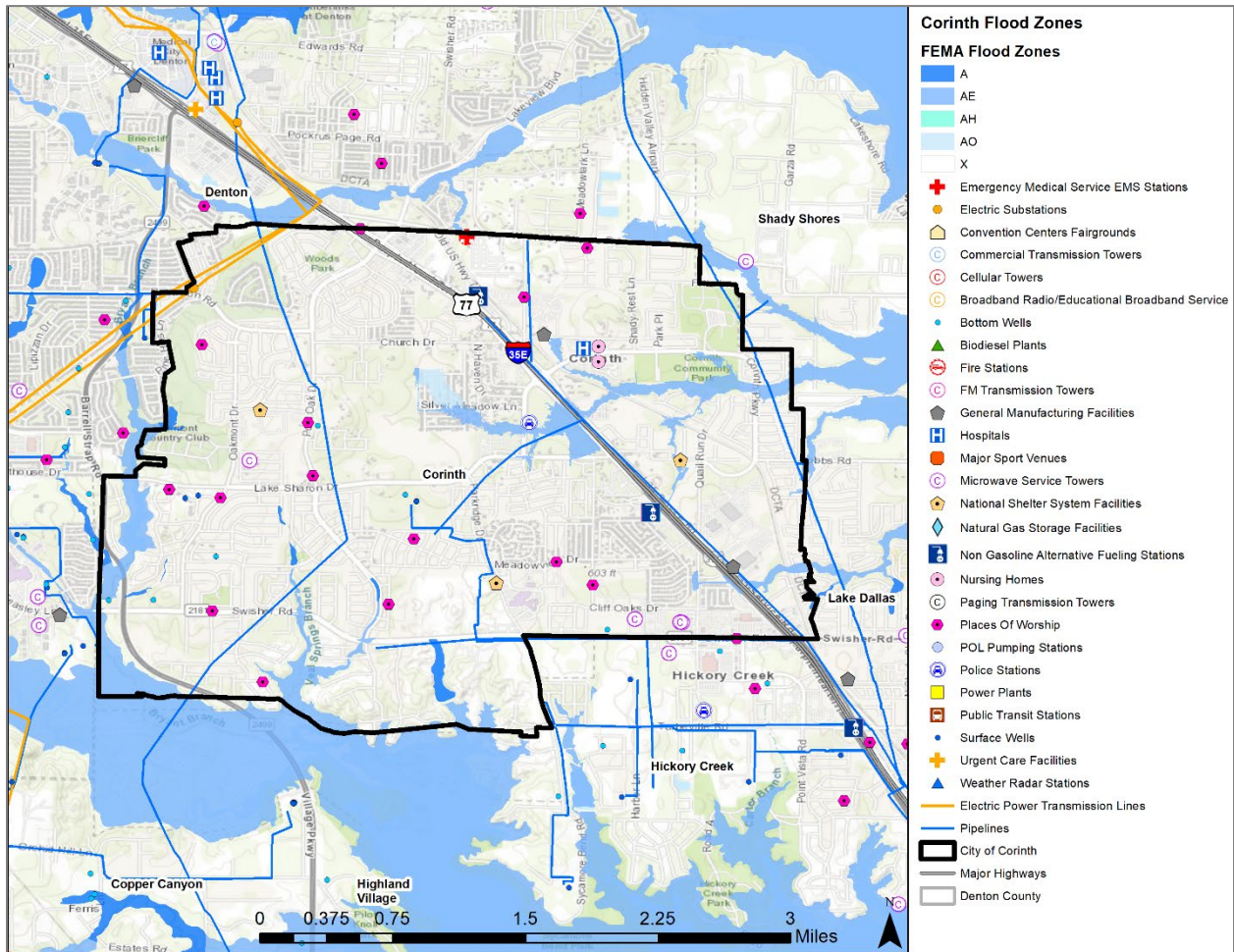


Figure 5-7. Estimated Flood Zones in the Town of Cross Roads

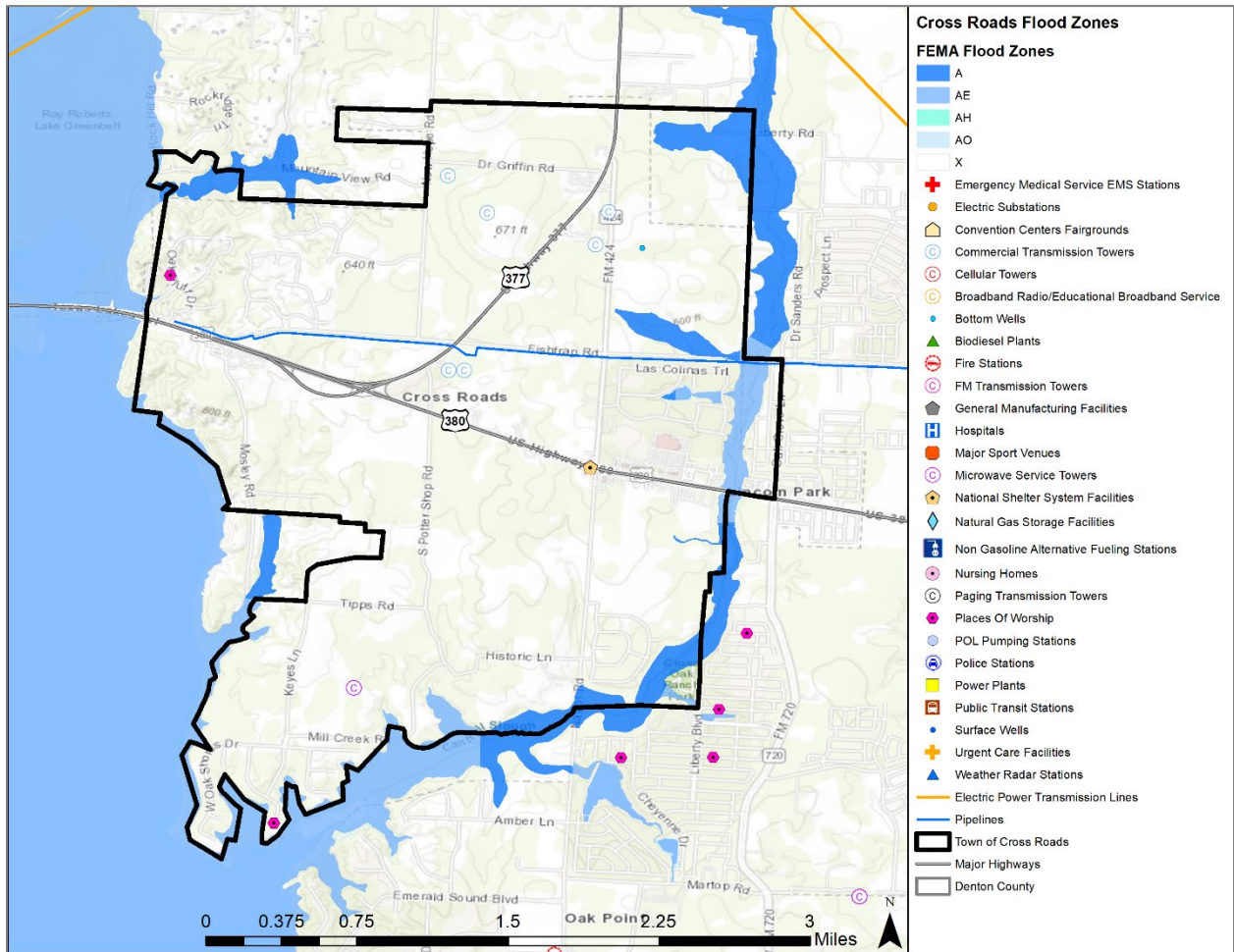


Figure 5-8. Estimated Flood Zones in the City of Denton

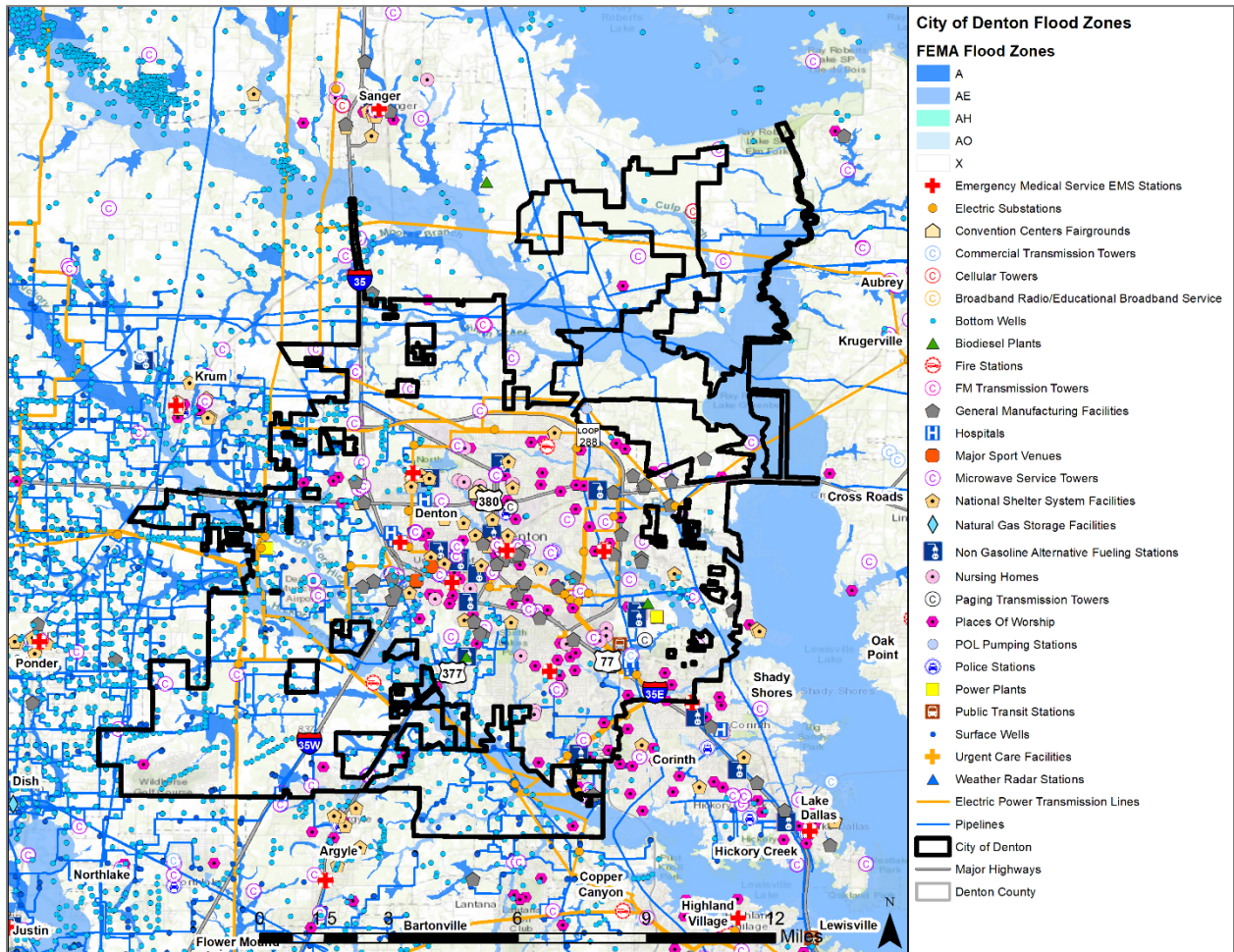


Figure 5-9. Estimated Flood Zones in the Town of DISH

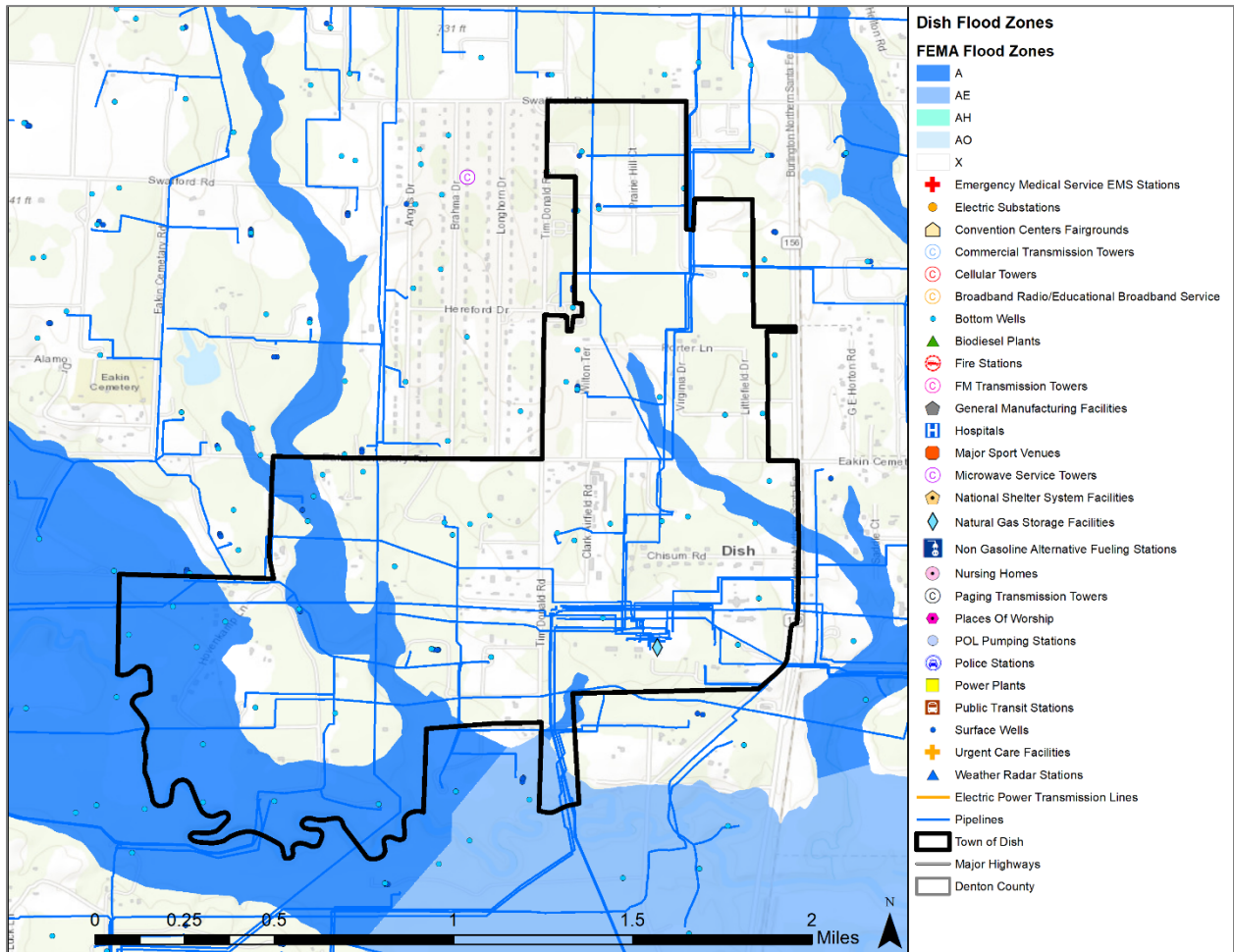


Figure 5-10. Estimated Flood Zones in the Town of Double Oak

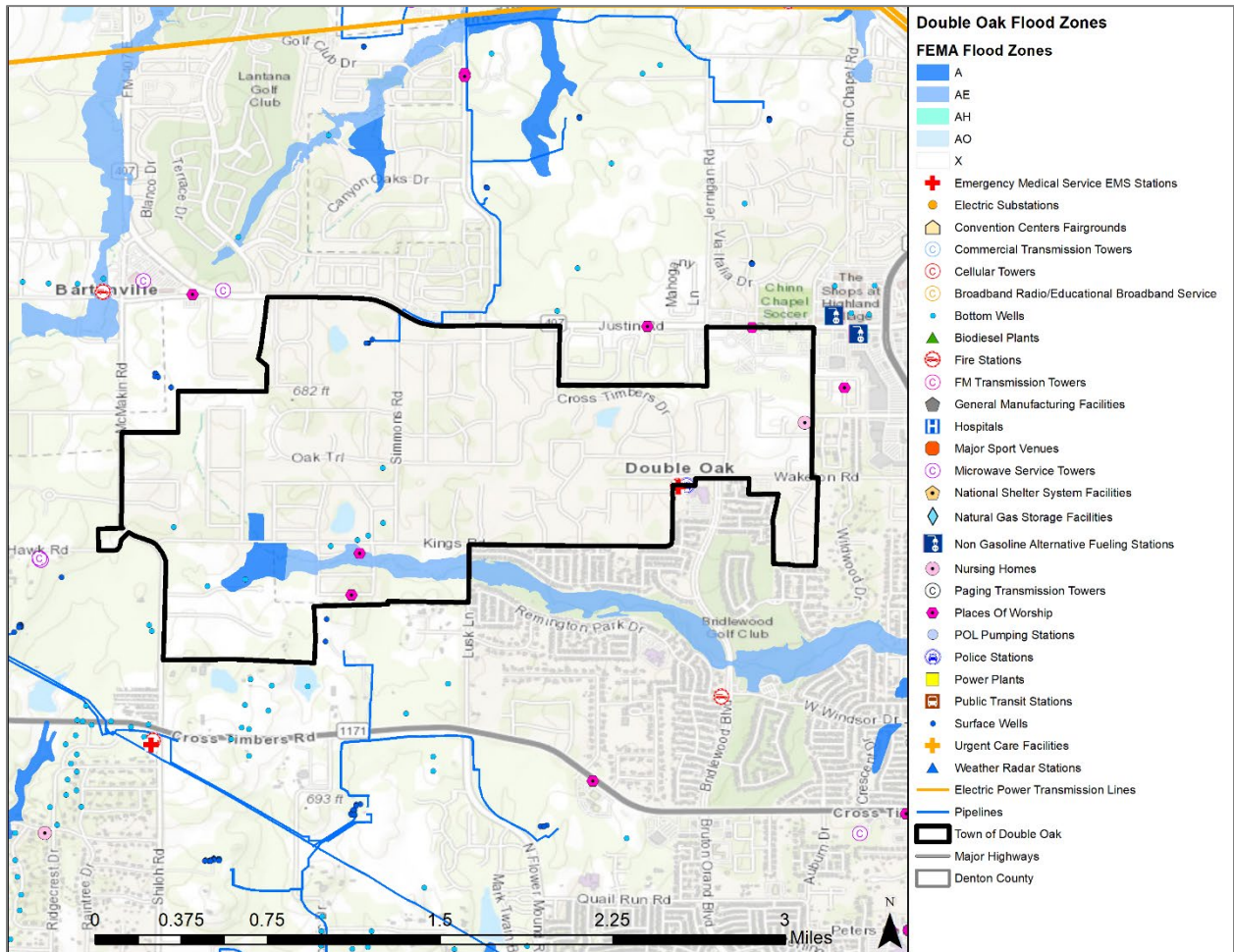


Figure 5-11. Estimated Flood Zones in the Town of Flower Mound

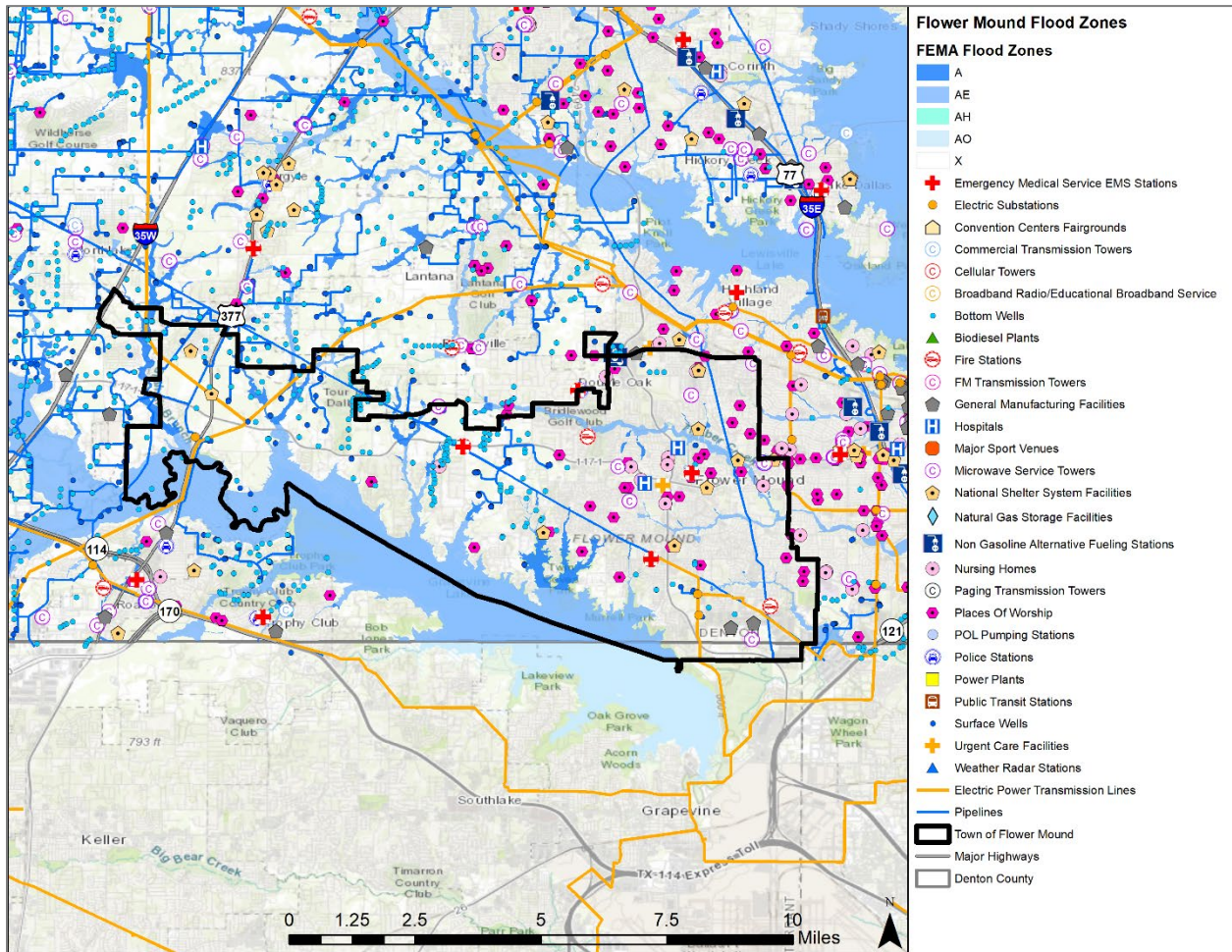


Figure 5-12. Estimated Flood Zones in the City of Hackberry

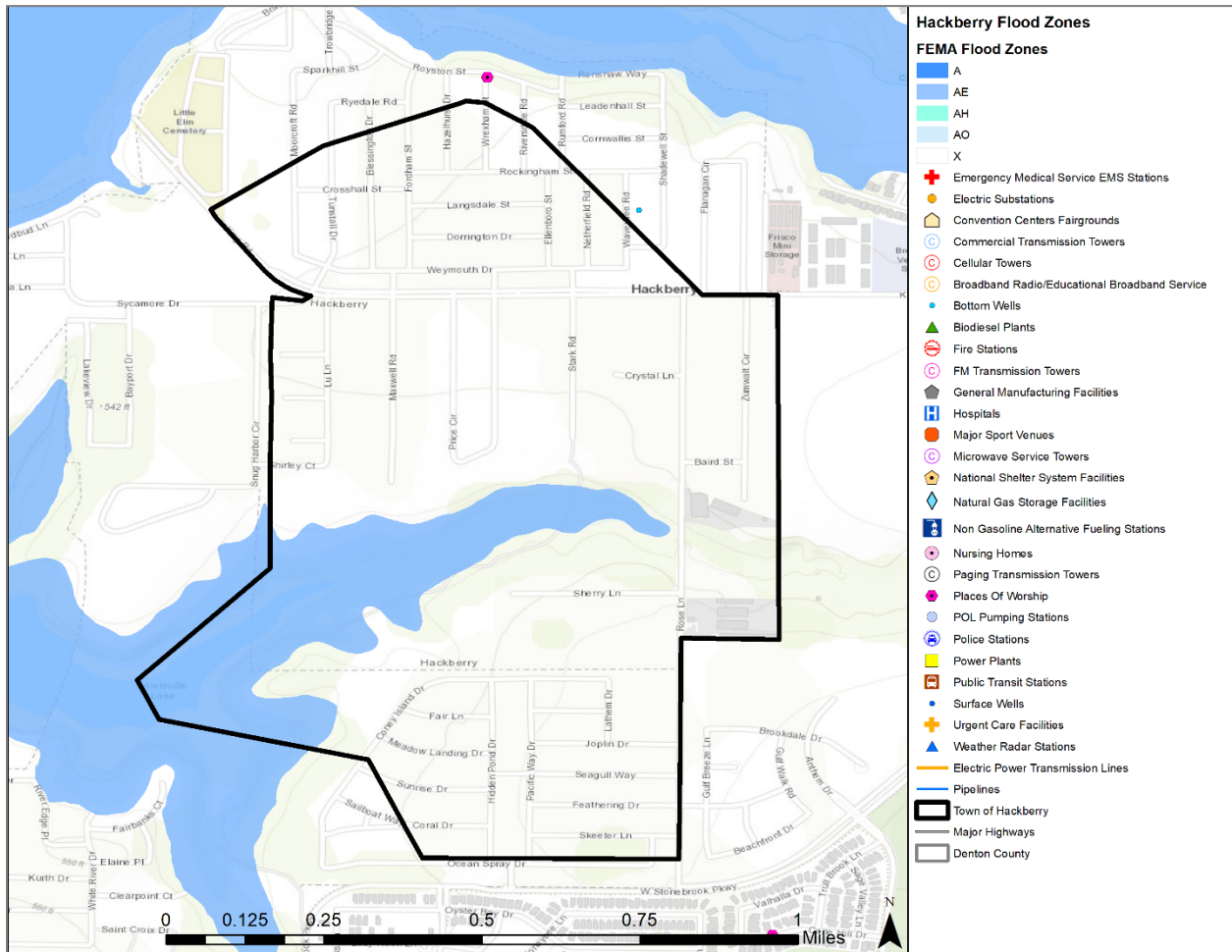


Figure 5-13. Estimated Flood Zones in the Town of Hebron

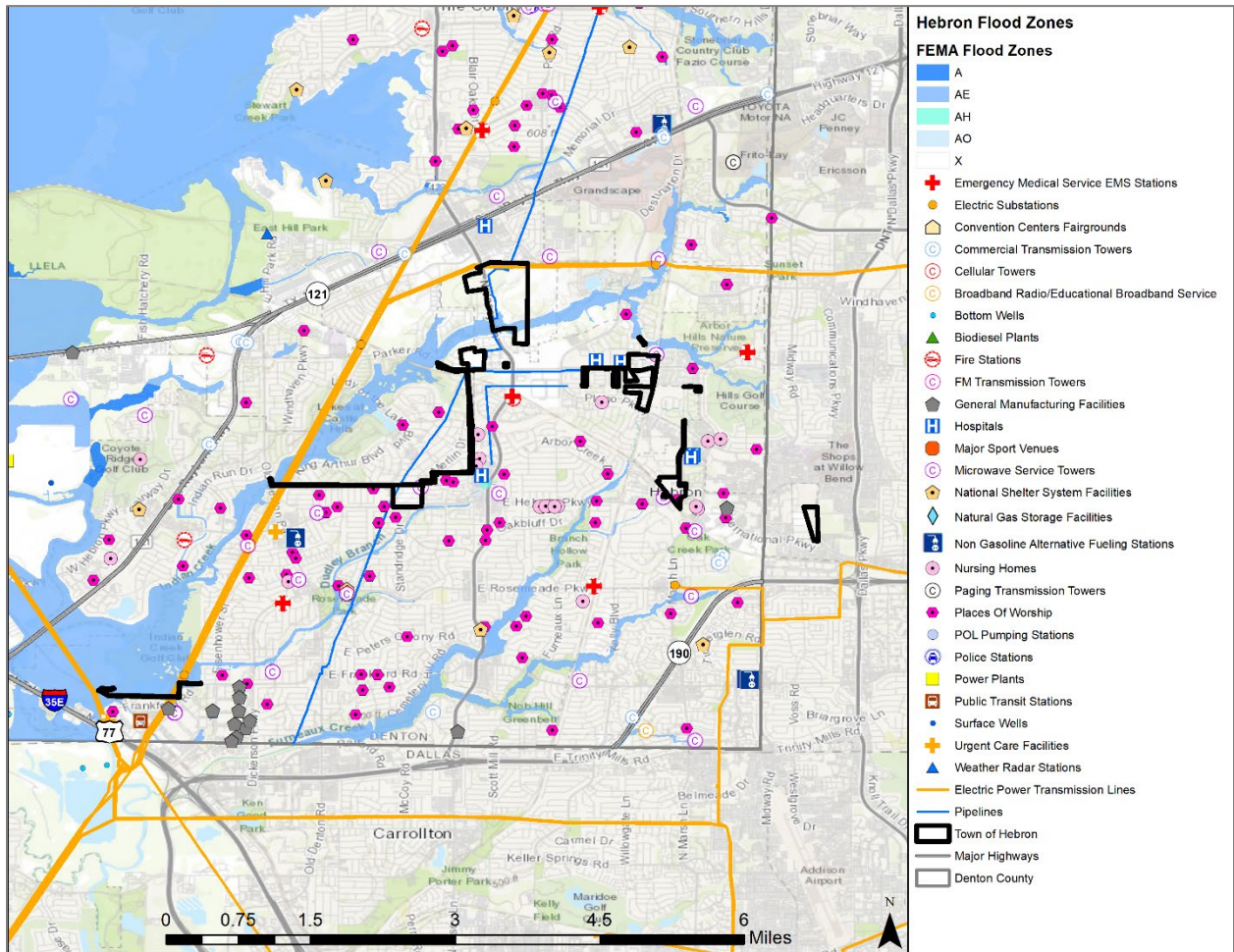


Figure 5-14. Estimated Flood Zones in the Town of Hickory Creek

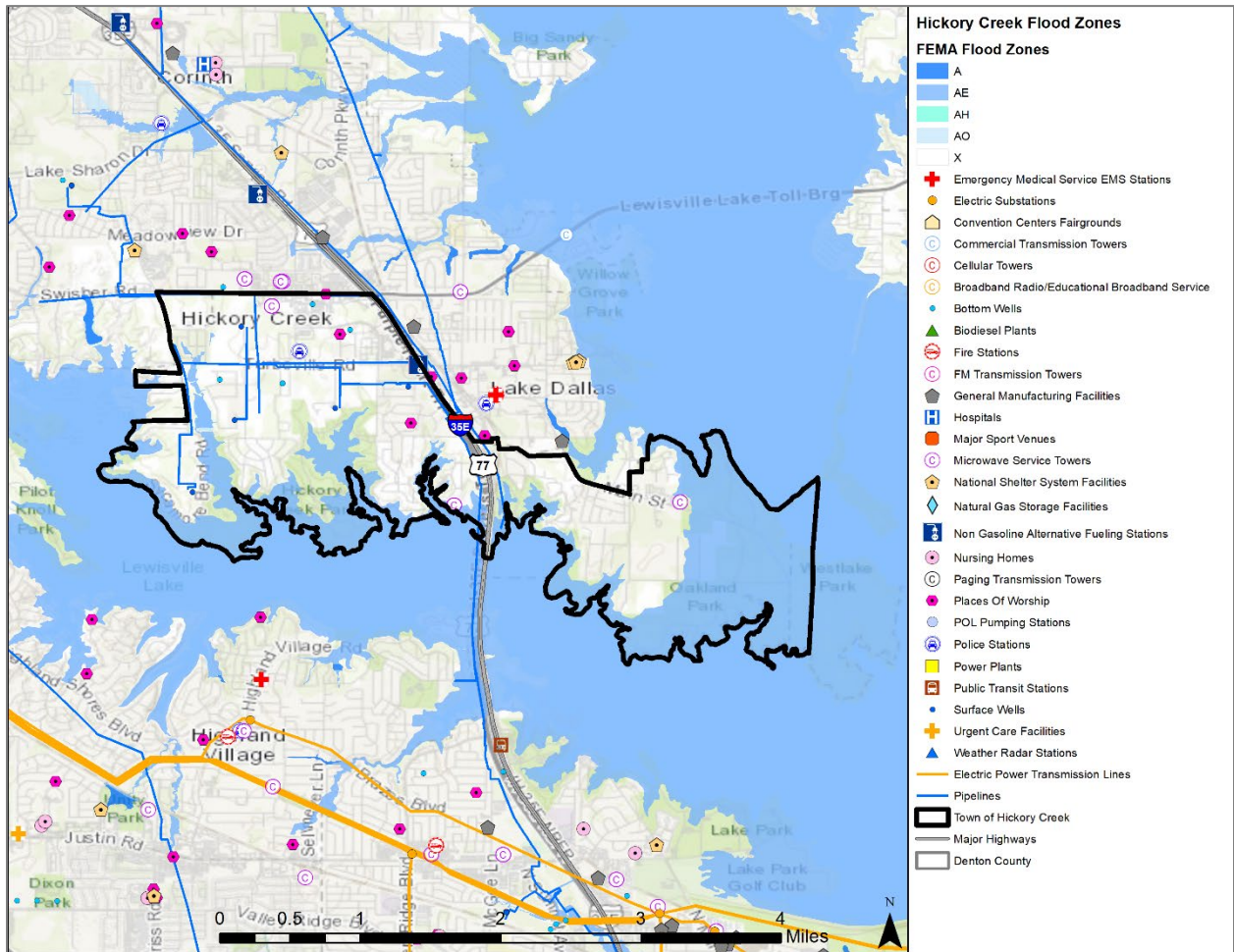


Figure 5-15. Estimated Flood Zones in the City of Highland Village

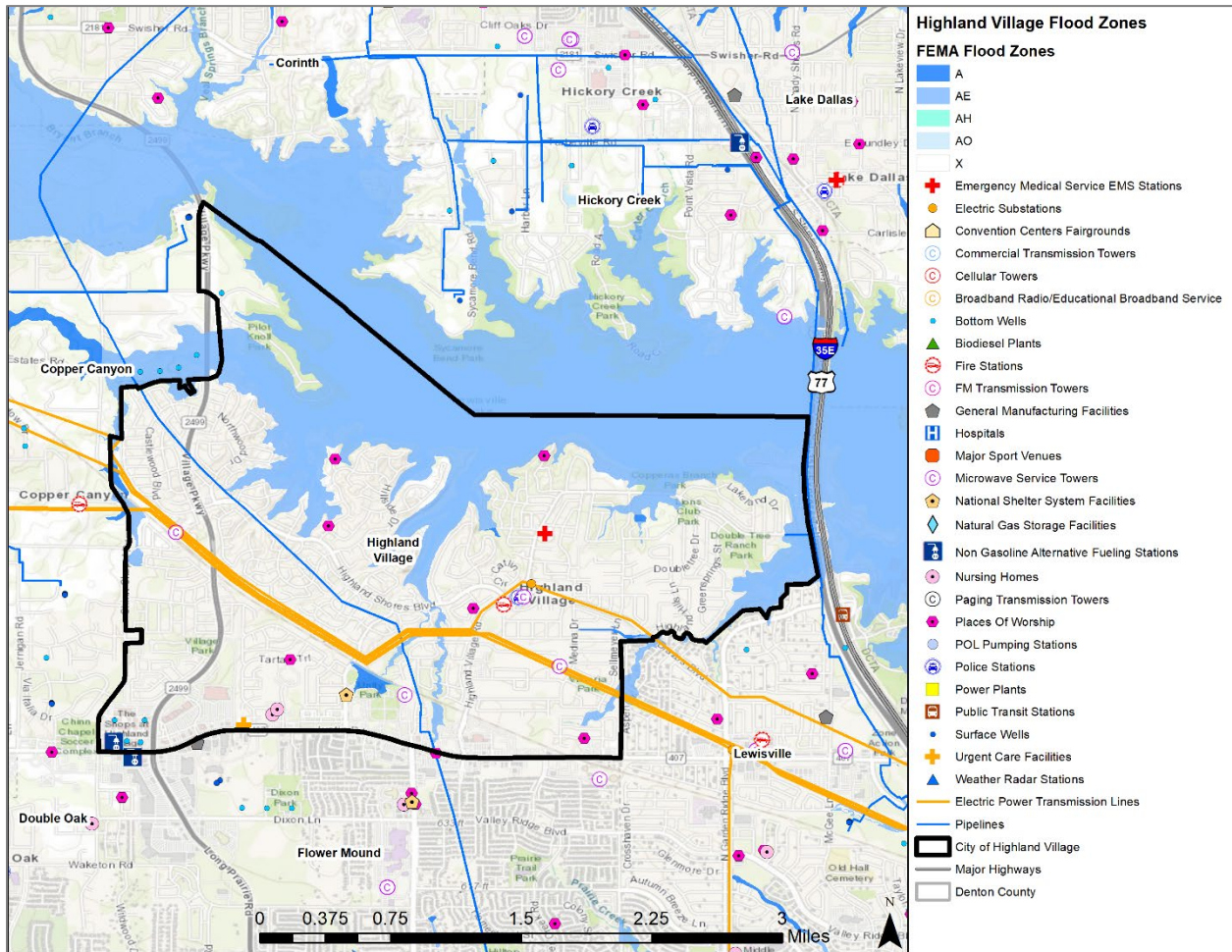


Figure 5-16. Estimated Flood Zones in the City of Justin

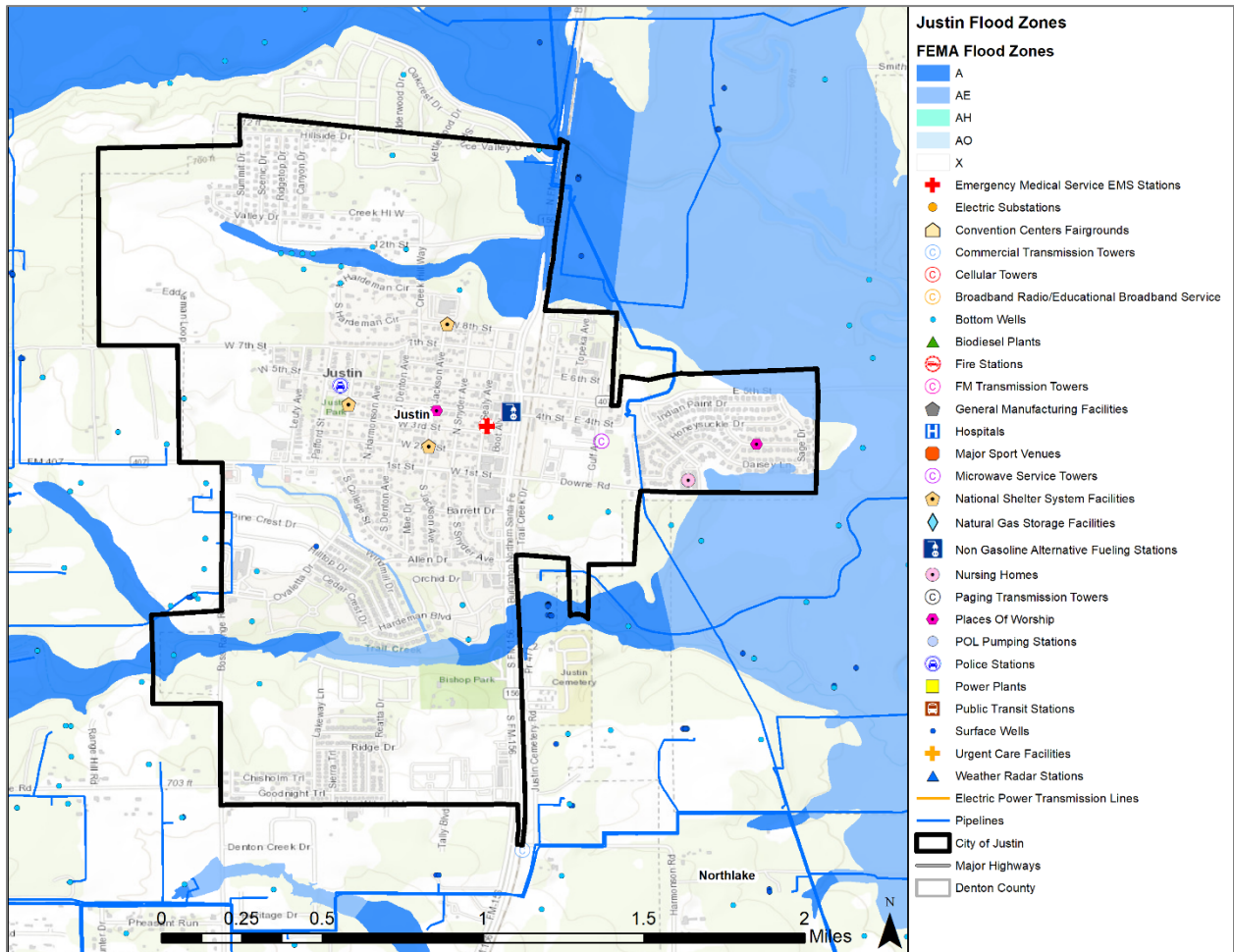


Figure 5-17. Estimated Flood Zones in the City of Krugerville

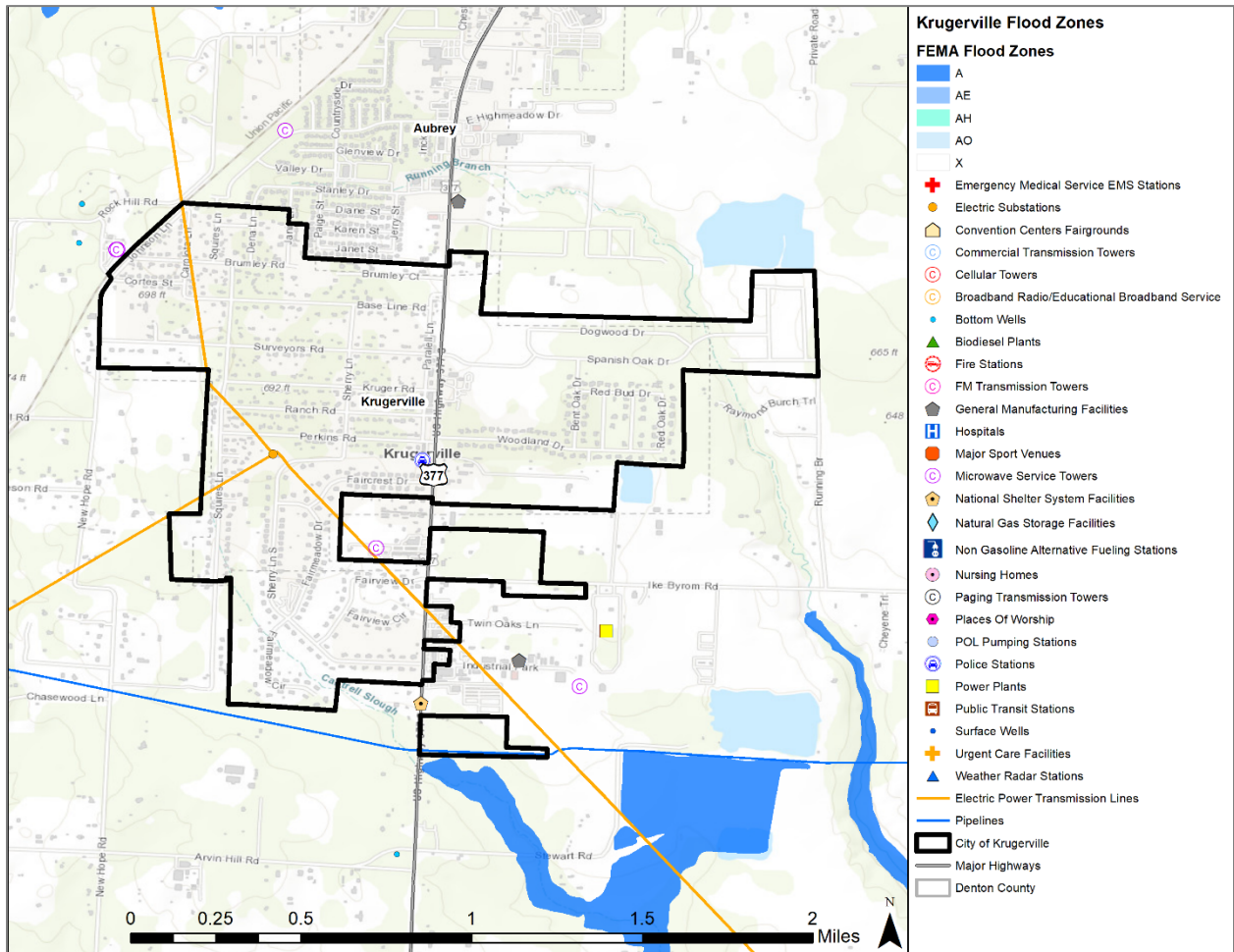


Figure 5-18. Estimated Flood Zones in the City of Krum

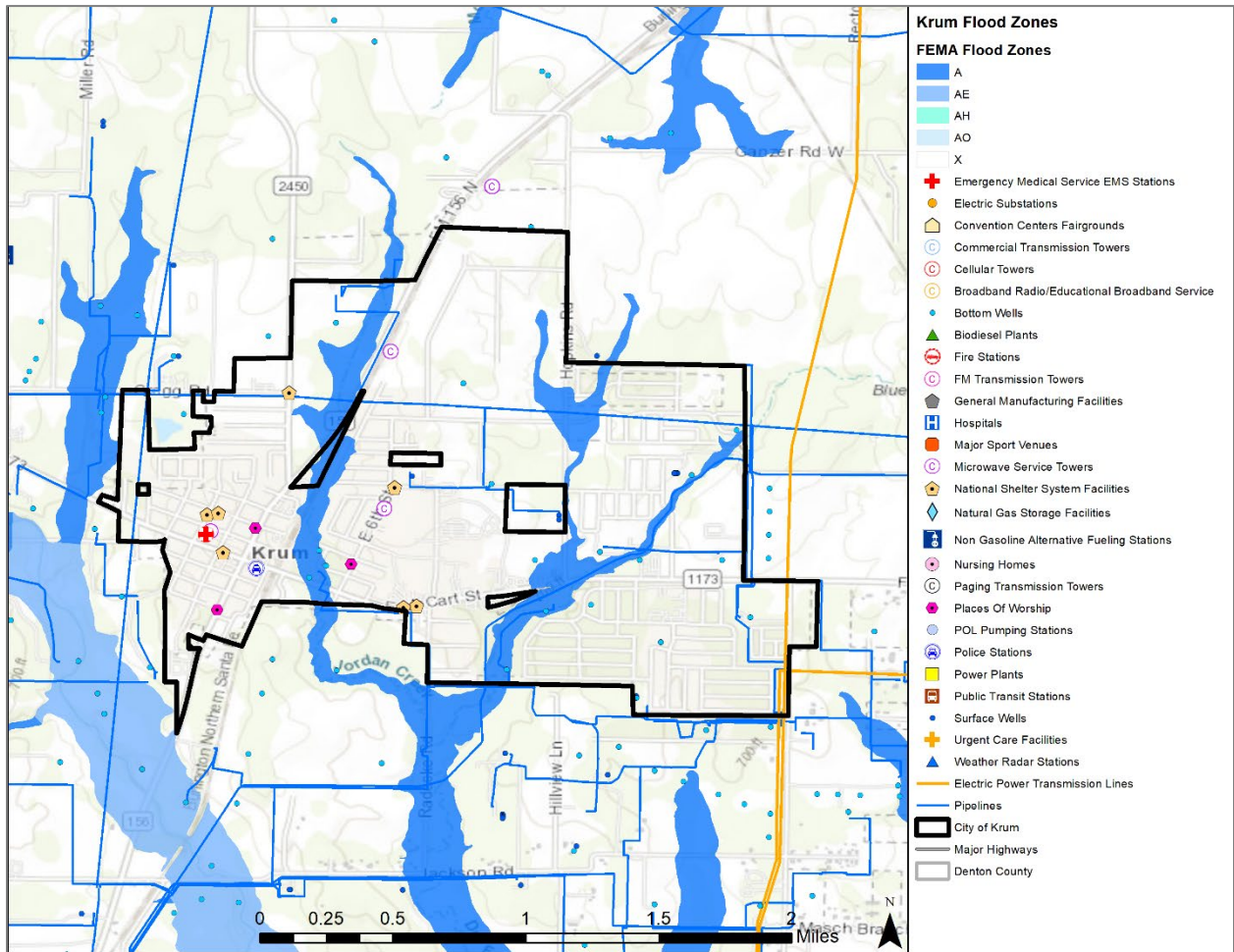


Figure 5-19. Estimated Flood Zones in the City of Lake Dallas

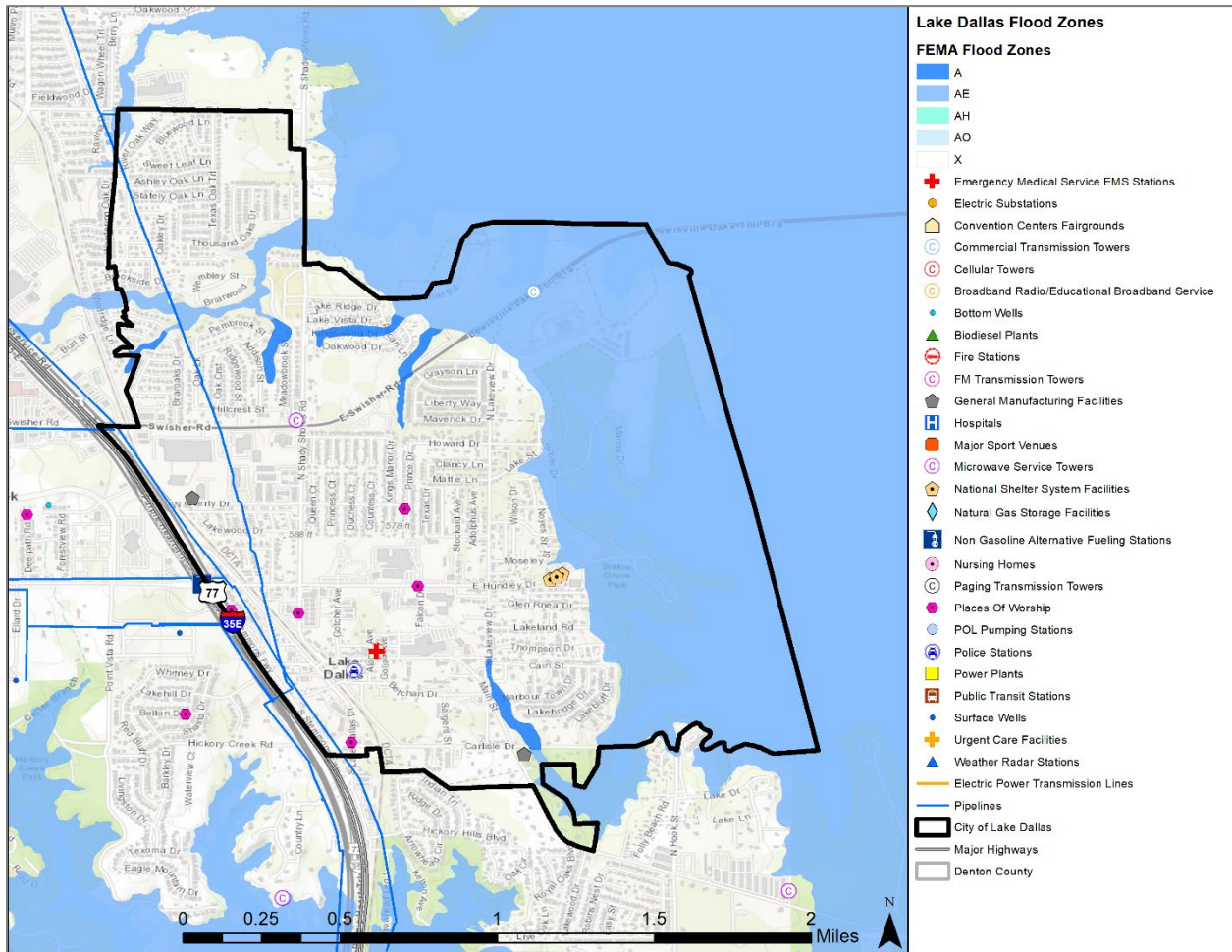


Figure 5-20. Estimated Flood Zones in the Town of Lakewood Village

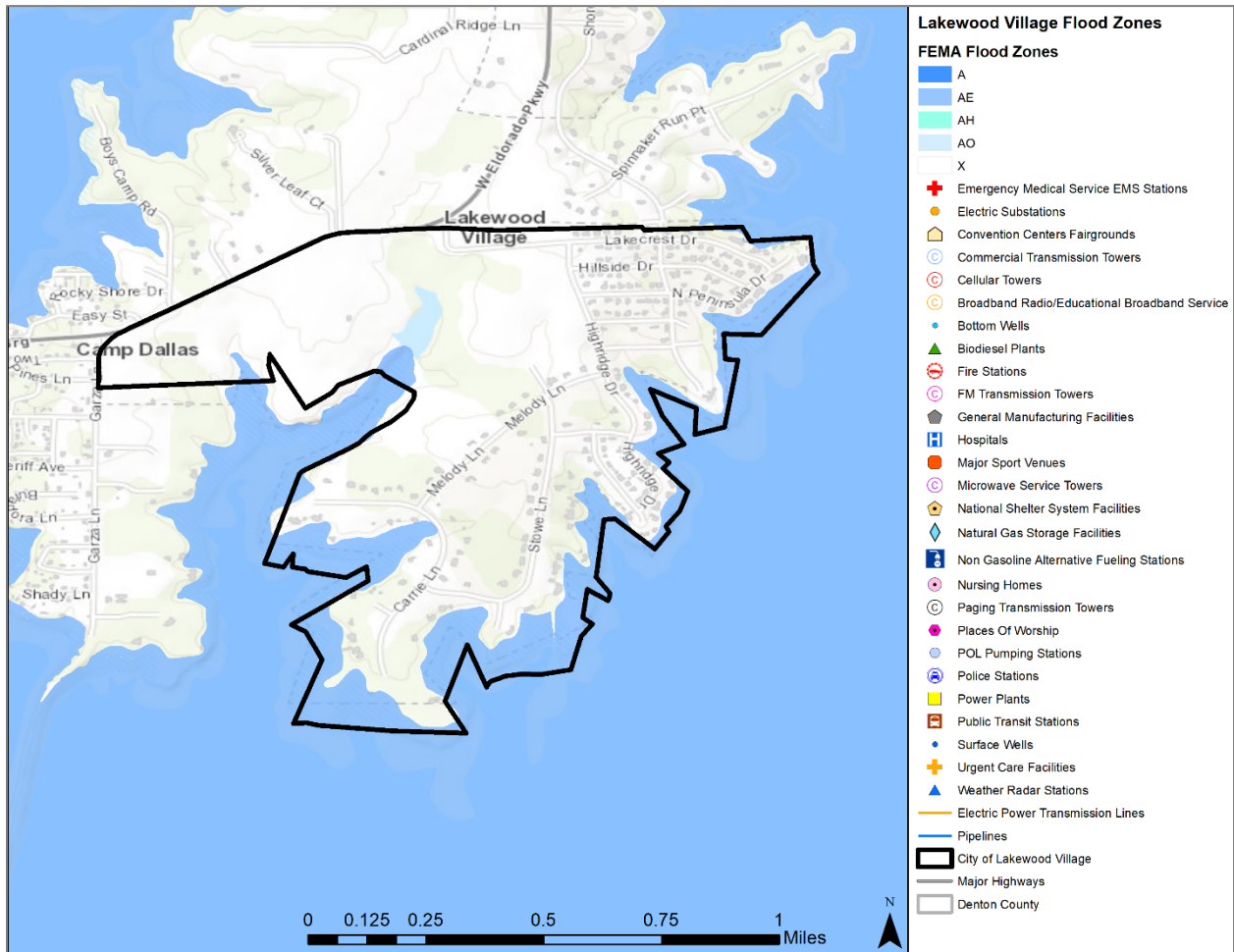


Figure 5-21. Estimated Flood Zones in the City of Lewisville

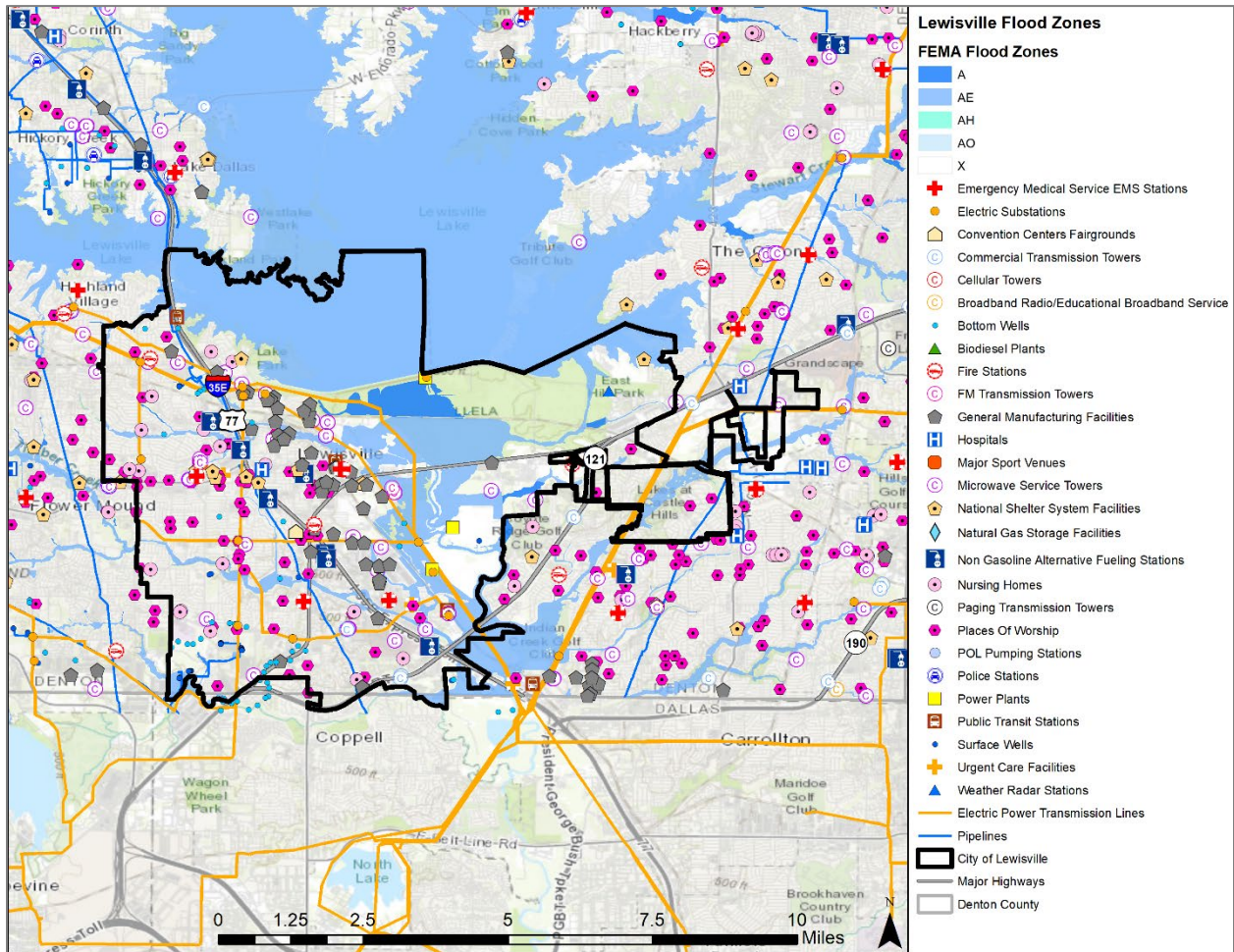


Figure 5-22. Estimated Flood Zones in the Town of Little Elm

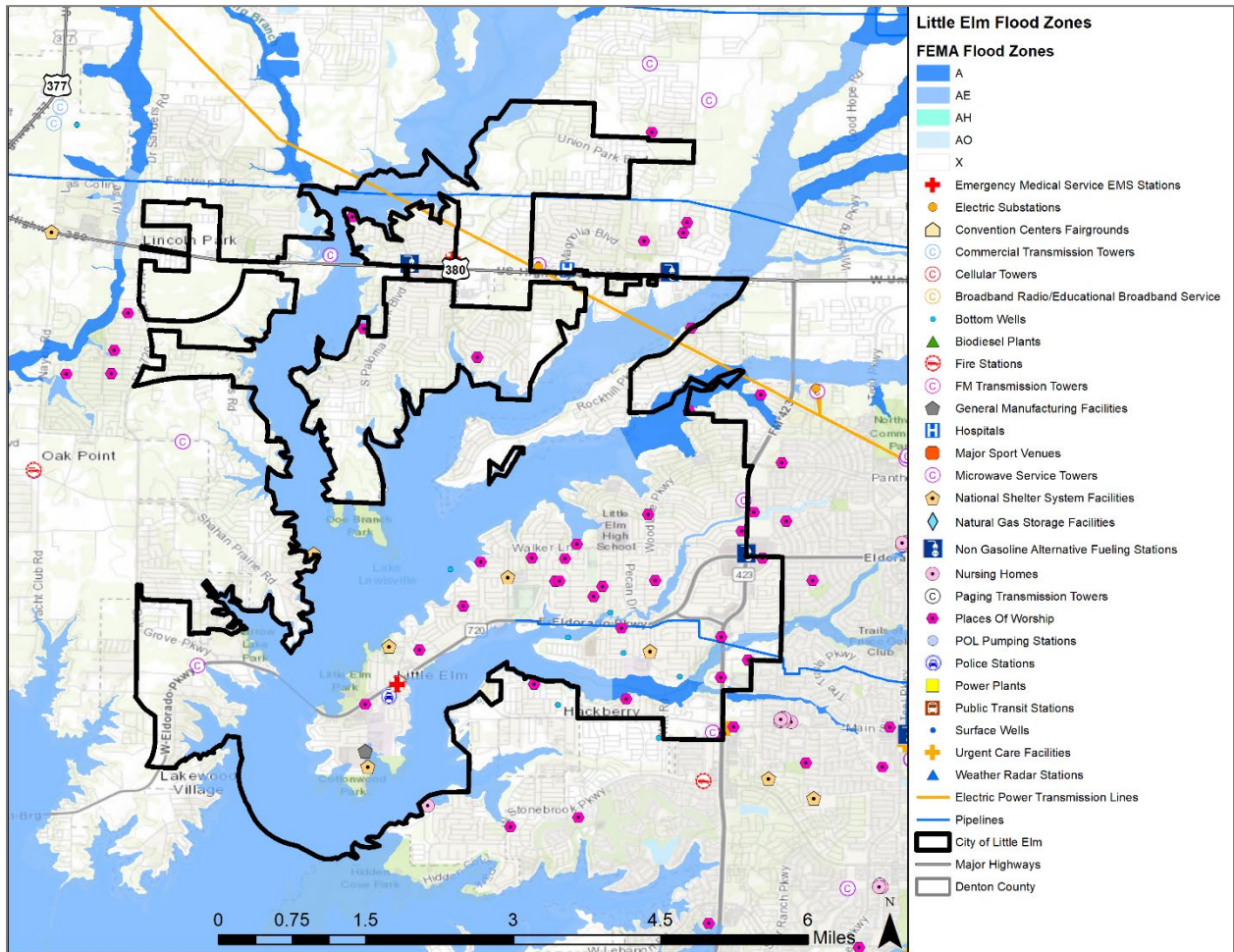


Figure 5-23. Estimated Flood Zones in the Town of Northlake

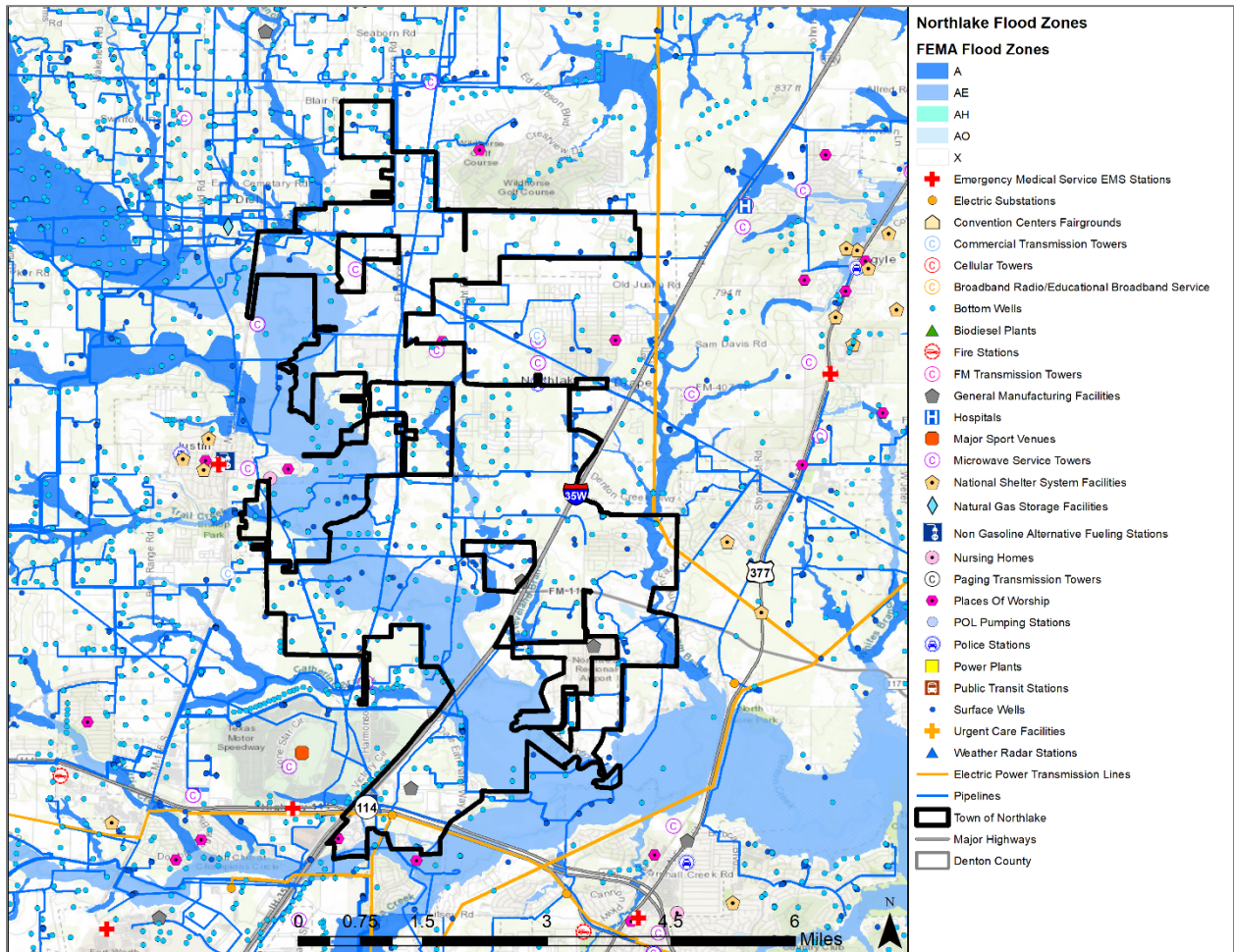


Figure 5-24. Estimated Flood Zones in the City of Oak Point

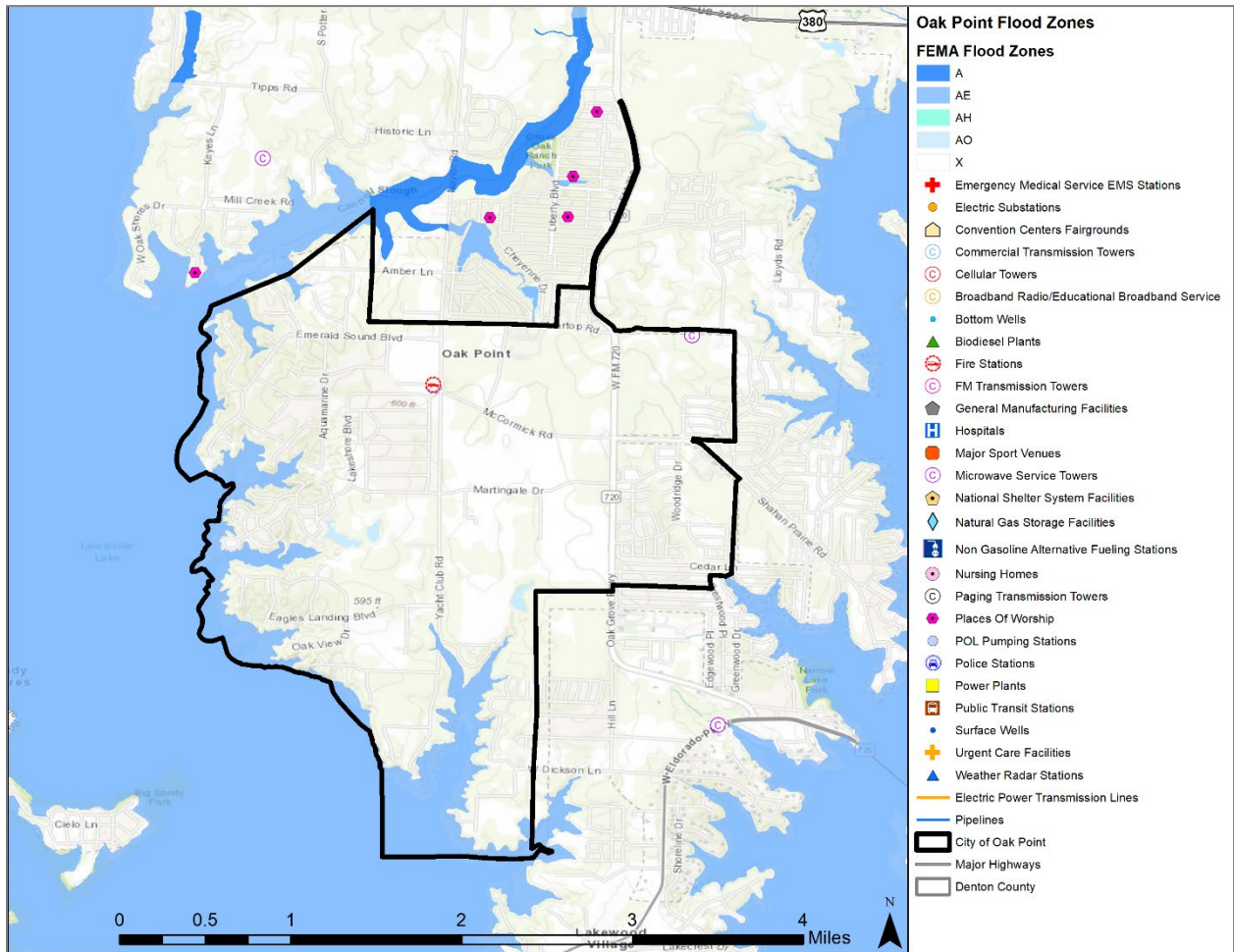


Figure 5-25. Estimated Flood Zones in the City of Pilot Point

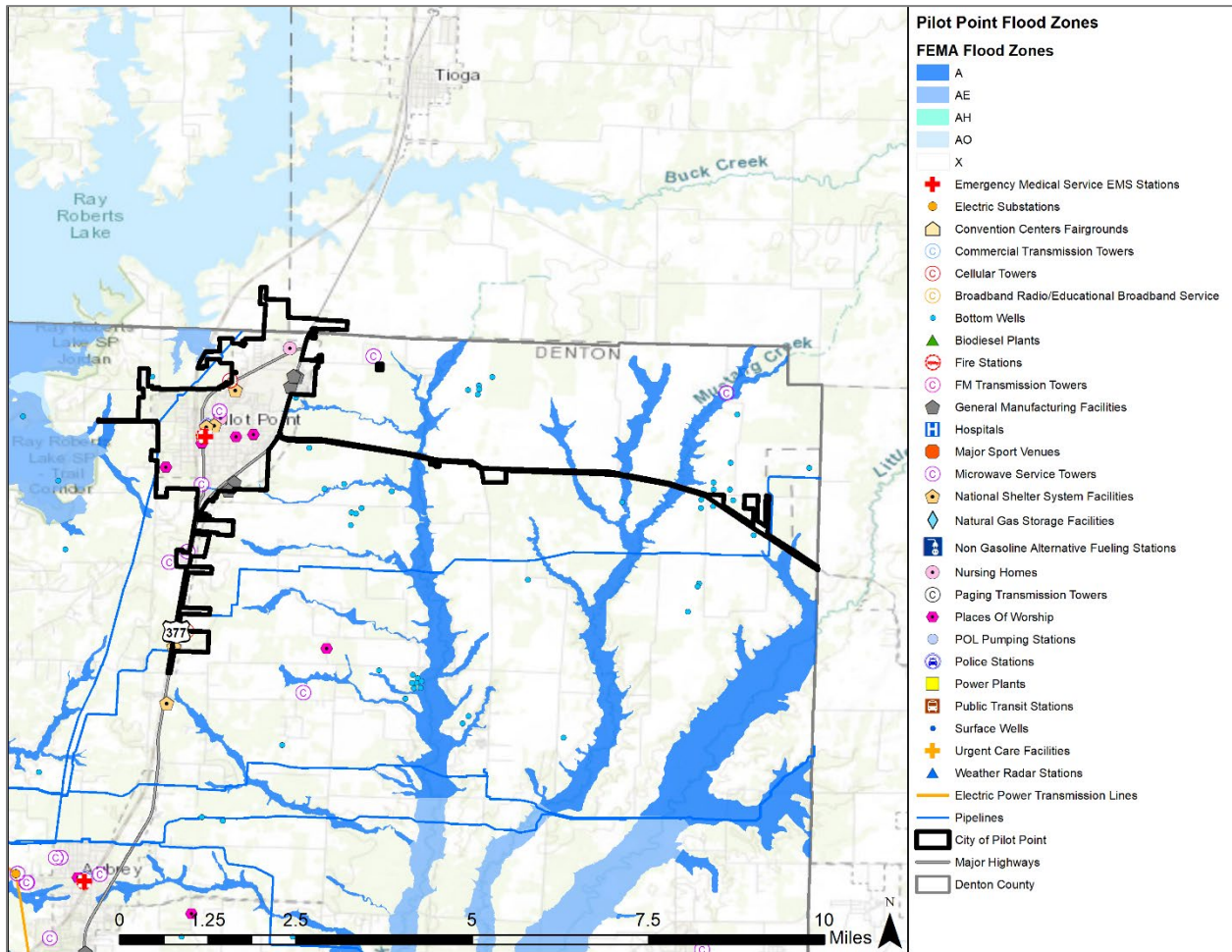


Figure 5-26 Estimated Flood Zones in the Town of Ponder

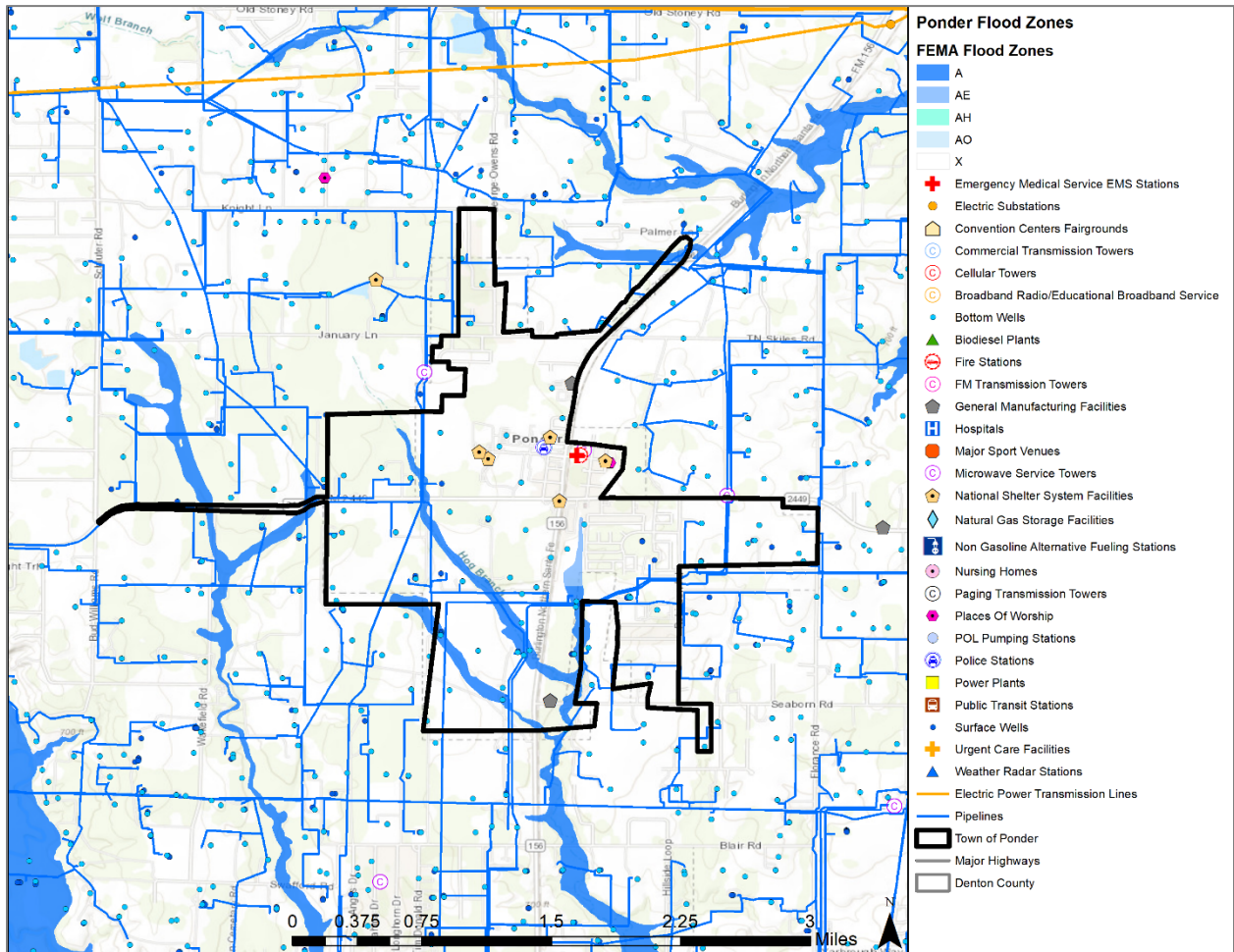


Figure 5-27. Estimated Flood Zones in the Town of Providence Village

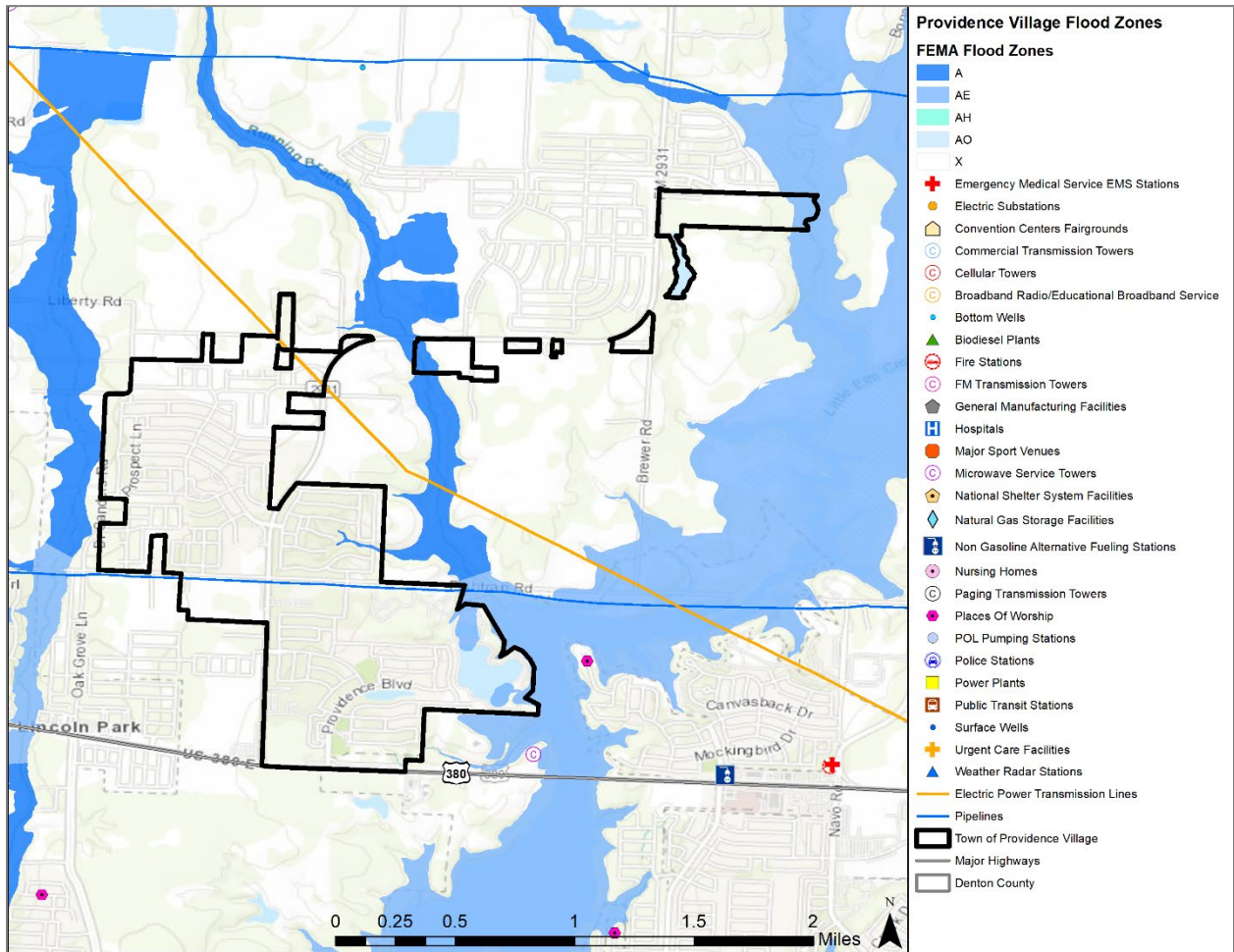


Figure 5-28. Estimated Flood Zones in the City of Roanoke

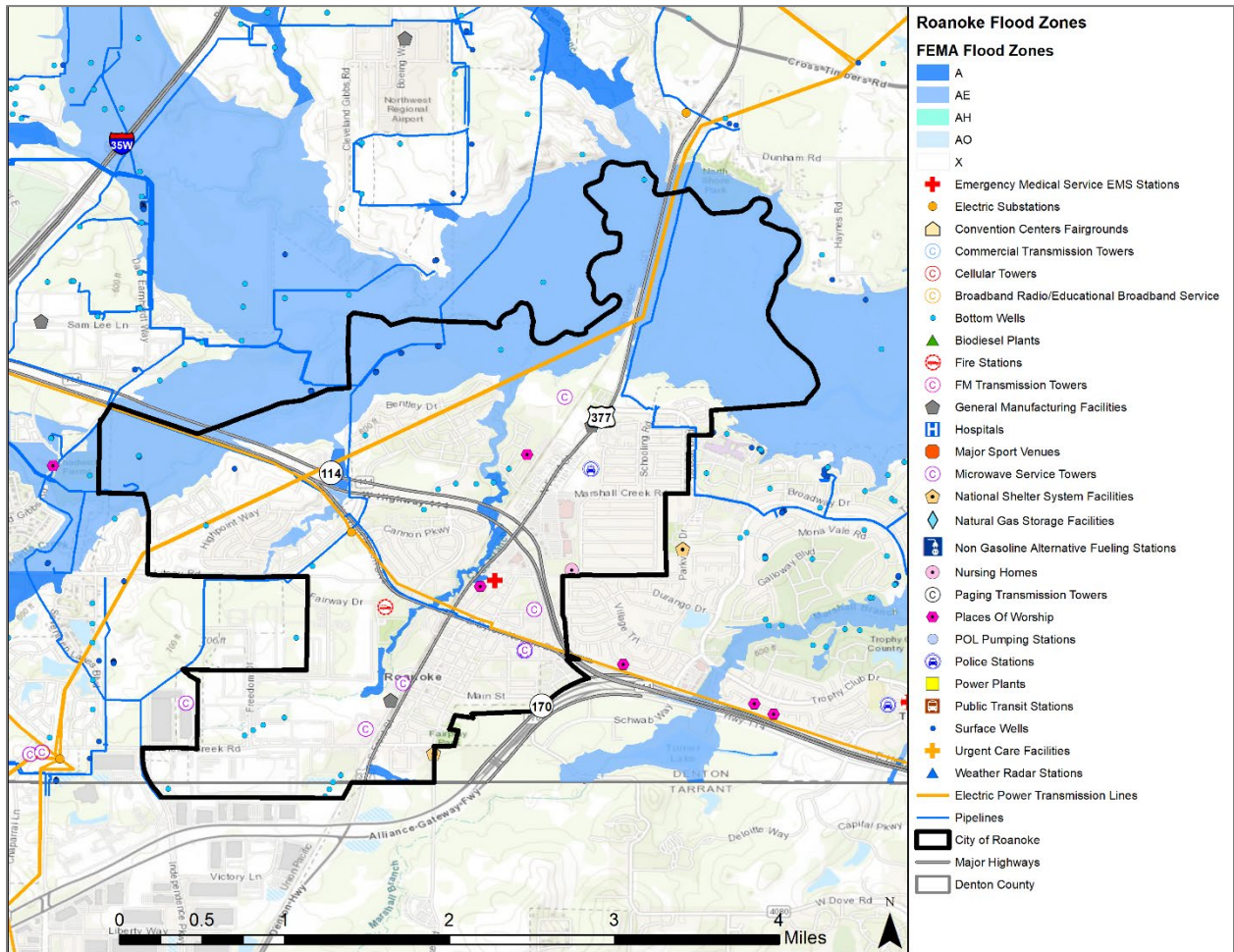


Figure 5-29. Estimated Flood Zones in the City of Sanger

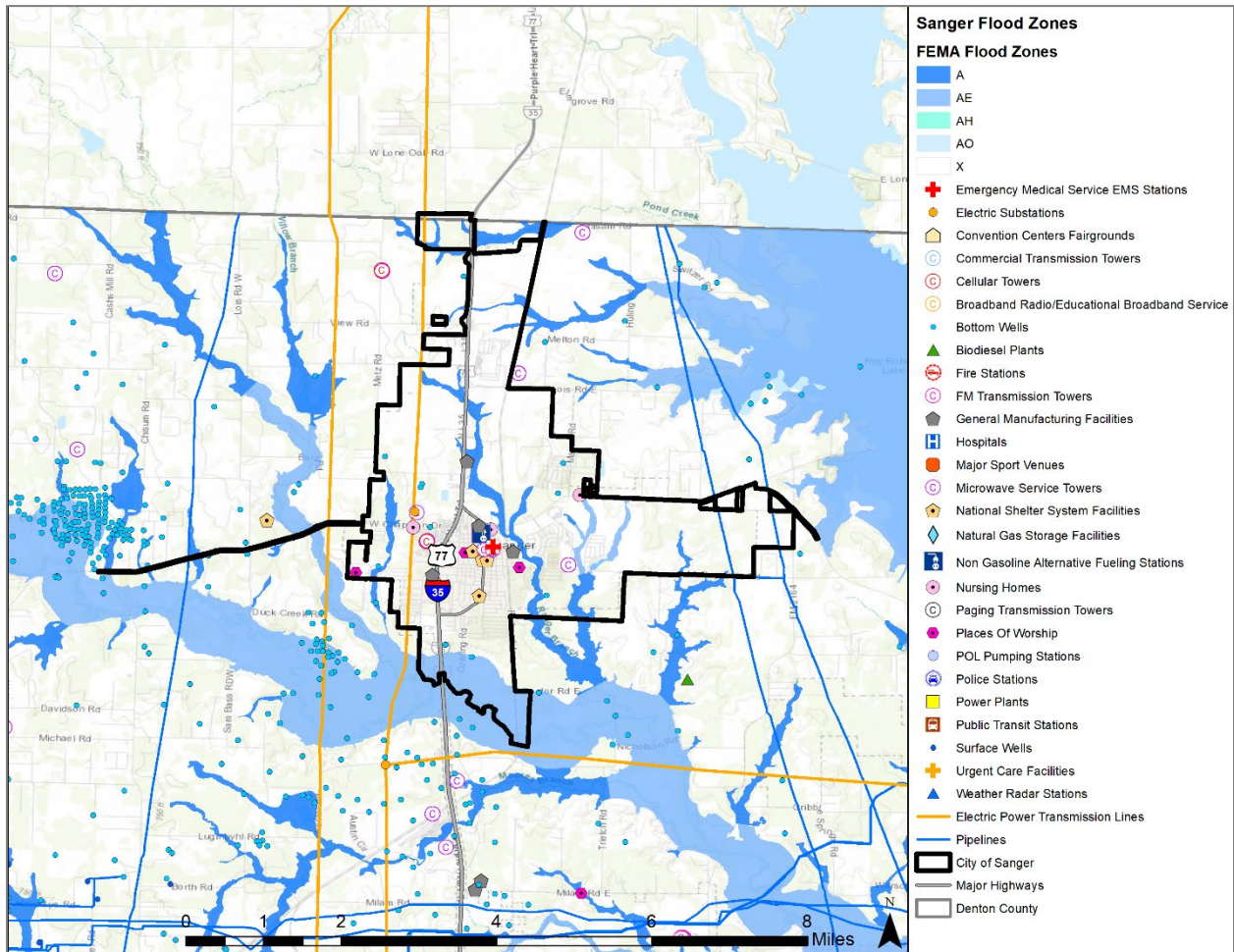


Figure 5-30. Estimated Flood Zones in the Town of Shady Shores

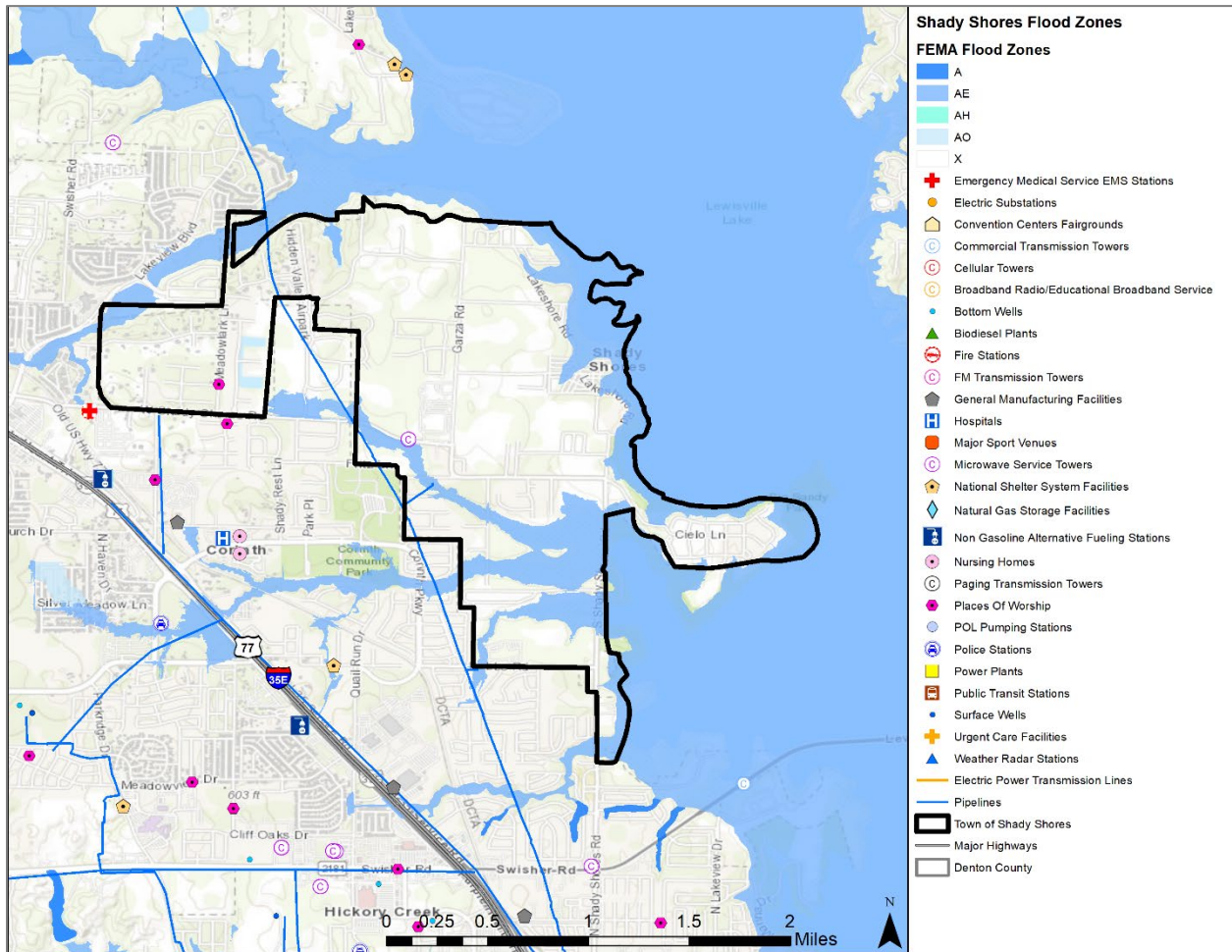


Figure 5-31. Estimated Flood Zones in the City of The Colony

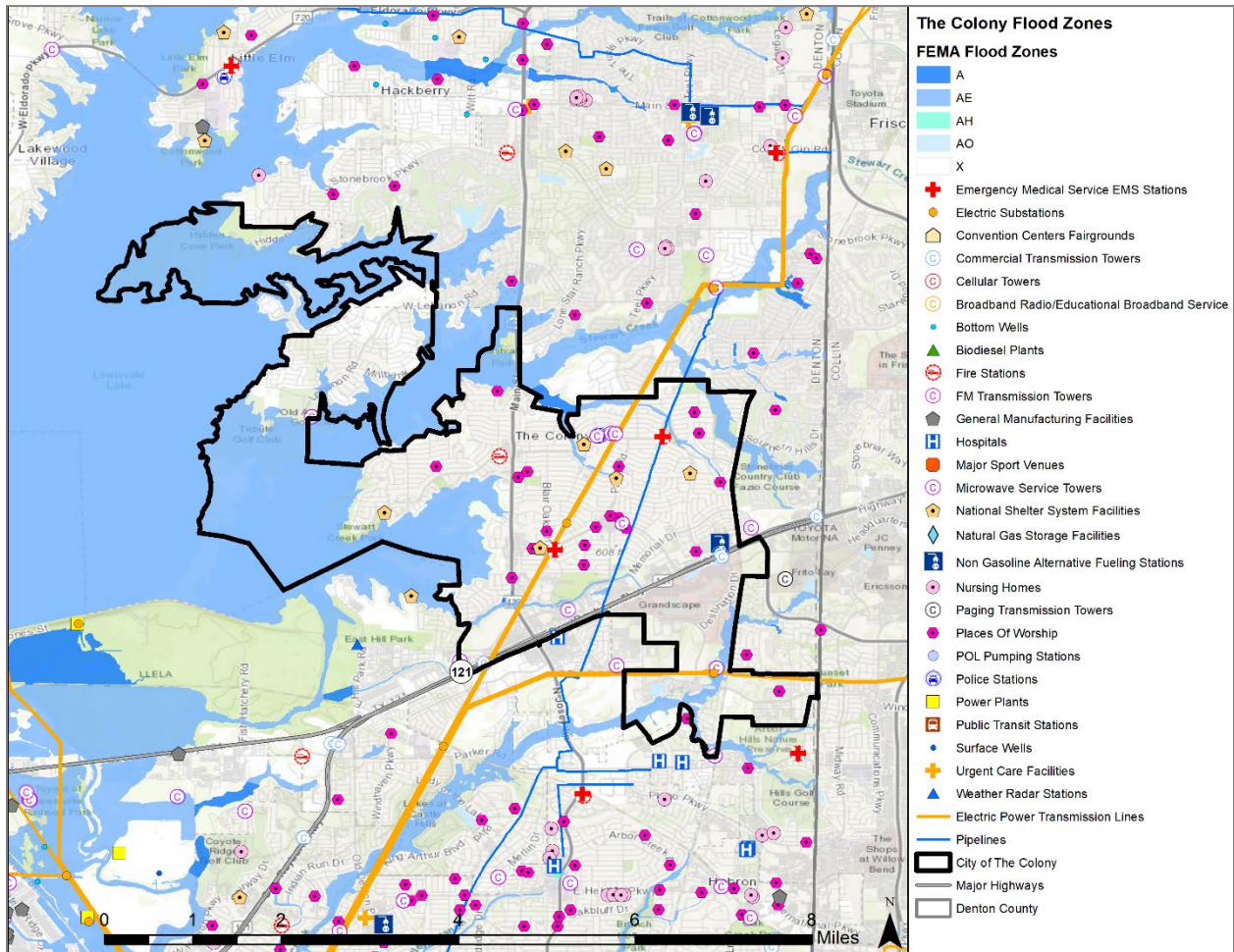
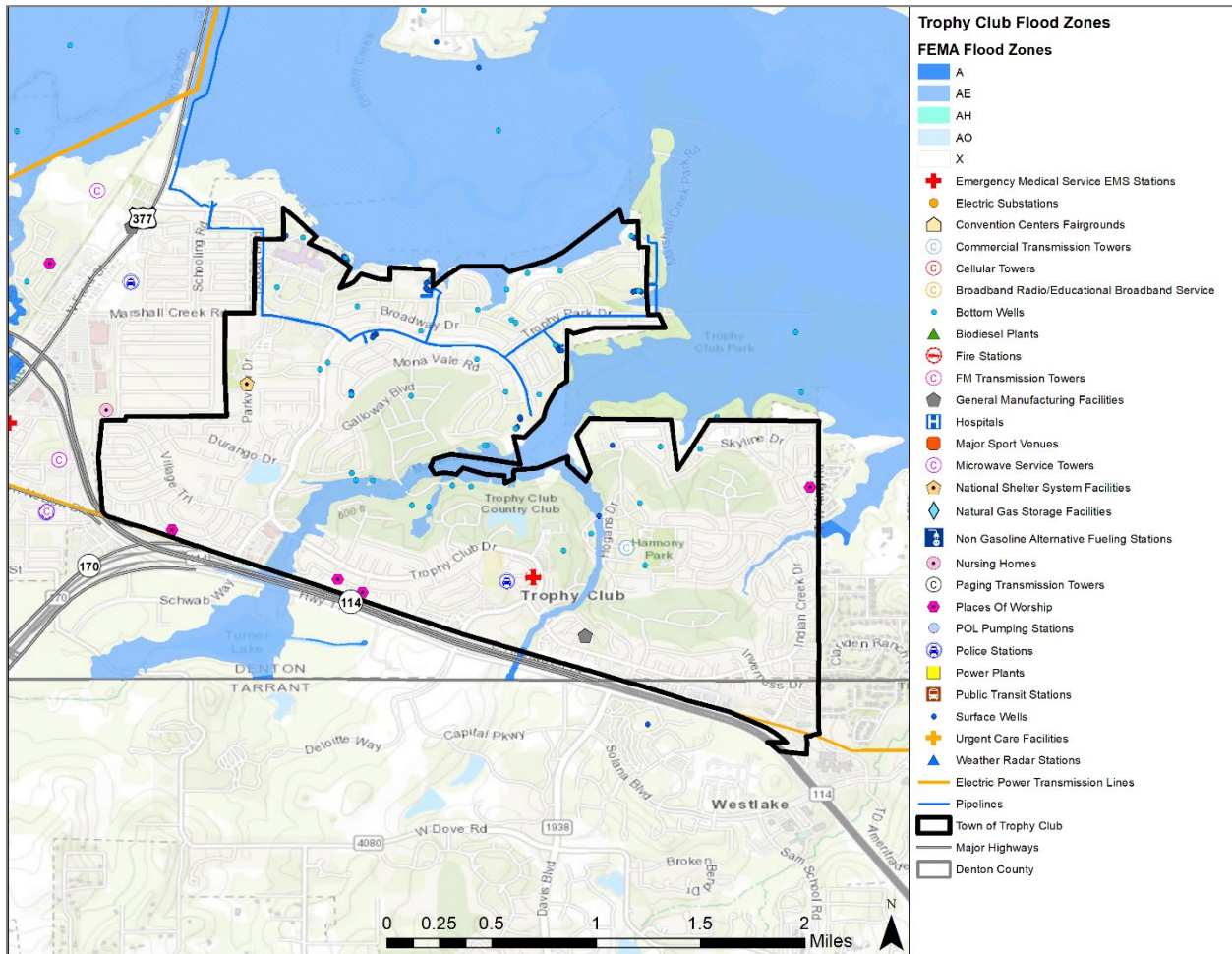


Figure 5-32. Estimated Flood Zones in the Town of Trophy Club



EXTENT

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

Determining the intensity and magnitude of a flood event is dependent upon the flood zone and location of the flood hazard area in addition to depths of flood waters. Extent of flood damages can be expected to be more damaging in the areas that will convey a base flood. FEMA categorizes areas on the terrain according to how the area will convey flood water. Flood zones are the categories that are mapped on Flood Insurance Rate Maps. Table 5-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm. Flood Zones A, AE, AO, AH and X are the only hazard areas mapped in the region. Figures 5-1 through 5-32 should be read in conjunction with the extent for flooding in Tables 5-1 and 5-2 to determine the intensity of a potential flood event.

Table 5-1. Flood Zones

INTENSITY	ZONE	DESCRIPTION
HIGH	ZONE A	Areas with a one percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
	ZONE A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a Base Flood Elevation (BFE) (old format).
	ZONE AE	The base floodplain where base flood elevations are provided. AE Zones are now used on the new format FIRMs instead of A1-A30 Zones.
	ZONE AO	River or stream flood hazard areas and areas with a one percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from one to three feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
	ZONE AH	Areas with a one percent annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from one to three feet. These areas have a 26 percent 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	Areas with a one percent annual chance of flooding that will be protected by a federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.
	ZONE AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
HIGH COASTAL	ZONE VE, V1-30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
MODERATE to LOW	ZONE X 500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than one foot or with drainage areas less than one square mile; or an area protected by levees from 100-year flooding.

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

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

The intensity and magnitude of a flood event is also determined by the depth of flood waters. Table 5-2 describes the stream gauge data provided by the United States Geological Survey (USGS).

Table 5-2. Extent for Denton County¹

JURISDICTION ²	PEAK FLOOD EVENT
Denton County	Elm Fork Trinity River at Greenbelt, near Pilot Point in Denton County, Texas reached an overflow elevation of 30.98 in May 2015. The average peak flow for the Elm Fork Trinity River at Greenbelt is 17.64 feet at this site.
Denton County	Elm Fork Trinity River, near Lewisville in Denton County, Texas reached an overflow elevation of 30.98 in May 2015. The average peak flow for the Elm Fork Trinity River is 19.55 feet at this site.
City of Denton	Hickory Creek at Denton, in Denton County, Texas reached an overflow elevation of 23.56 in March 2020. The average peak flow for the Hickory Creek is 19.76 feet at this site.
Denton County	Clear Creek, near Sanger, in Denton County, Texas reached an overflow elevation of 35.70 in October 1981. The average peak flow for the Clear Creek is 21.54 feet at this site.
Denton County	Denton Creek, near Justin, in Denton County, Texas reached an overflow elevation of 18.68 in October 1981. The average peak flow for the Denton Creek is 12.97 feet at this site.

The range of flood intensity that the planning area can experience is high, or Zone A. Based on historical occurrences, the planning area, including all participating jurisdictions, could expect to experience from 0-1 inches of rain within an hour period, resulting in flash flooding.

The data described in Tables 5-1 and 5-2, together with Figures 5-1 through 5-32, and historical occurrences for the area, provides an estimated potential magnitude and severity for the planning area. For example, the Town of Copper Canyon, as shown in Figure 5-5, has areas designated

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

² Severity is provided for jurisdictions where peak data was provided.

as Zone A and AE. Reading this figure in conjunction with Table 5-1 means the area is an area of high risk for flood.

HISTORICAL OCCURRENCES

Historical evidence indicates that areas within the planning area, including all participating jurisdictions, are susceptible to flooding, especially in the form of flash flooding. It is important to note that only flood events that have been reported have been factored into this risk assessment, therefore it is likely that additional flood occurrences have gone unreported before and during the recording period. Table 5-3 identifies historical flood events within the Denton County planning area, including all participating jurisdictions. Table 5-4 provides the historical flood event summary by jurisdiction. Historical data is provided by team members and the Storm Prediction Center (NOAA), NCEI database for Denton County.

Table 5-3. Historical Flood Events, 1996-2022³

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Denton	11/7/1996	2:35 AM	0	0	\$56,022	\$0
City of Denton	11/24/1996	12:30 AM	3	0	\$0	\$0
City of Justin	2/19/1997	7:30 PM	1	0	\$0	\$0
City of Pilot Point	6/6/2004	8:00 PM	0	0	\$23,419	\$0
City of Denton	4/24/2007	2:10 PM	0	0	\$2,865,903	\$0
City of Denton	5/30/2007	8:10 AM	0	0	\$35,606	\$0
Town of Ponder	6/18/2007	12:57 AM	0	0	\$284,299	\$0
City of Pilot Point	6/18/2007	3:00 AM	0	0	\$2,843	\$0
City of Aubrey	6/30/2007	1:42 AM	0	0	\$1,421	\$0
Denton County	5/2/2009	8:29 PM	0	0	\$692	\$0
Denton County	5/2/2009	8:29 PM	0	0	\$1,385	\$0
City of Corinth	5/2/2009	8:30 PM	0	0	\$138,491	\$0
City of Corinth	5/2/2009	6:16 PM	0	0	\$1,385	\$0
Town of Little Elm	5/2/2009	8:30 PM	0	0	\$103,868	\$0
City of Roanoke	5/2/2009	8:37 PM	0	0	\$103,868	\$0
City of Denton	6/10/2009	6:18 PM	0	0	\$2,746	\$0

³ Only recorded events with fatalities, injuries, and/or damages are listed, values are in 2022 dollars. Historical events are listed from January 1996 through June 2022.

SECTION 5: FLOOD

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Roanoke	10/9/2009	6:21 AM	0	0	\$685	\$0
Town of Hebron	9/8/2010	9:25 AM	0	0	\$2,711,704	\$0
Denton County	1/25/2012	5:00 AM	0	0	\$6,533	\$0
City of Roanoke	8/18/2012	5:41 PM	0	0	\$25,712	\$0
Denton County	4/3/2014	6:35 PM	0	0	\$49,971	\$0
Denton County	4/3/2014	7:38 PM	0	0	\$312,322	\$0
City of Roanoke	6/25/2014	2:35 PM	0	0	\$124,263	\$0
City of Roanoke	6/25/2014	3:22 PM	0	0	\$3,728	\$0
City of Krum	7/17/2014	9:18 AM	0	0	\$310,778	\$0
City of Pilot Point	7/17/2014	4:34 AM	0	0	\$932,333	\$0
City of Sanger	7/31/2014	12:22 AM	0	0	\$6,216	\$0
City of Pilot Point	7/31/2014	12:00 AM	0	0	\$6,216	\$0
Town of Bartonville	4/13/2015	9:20 AM	0	0	\$1,252	\$0
City of Denton	4/13/2015	9:20 AM	0	0	\$1,252	\$0
Denton County	4/24/2015	11:30 AM	0	0	\$100,143	\$0
Denton County	4/24/2015	6:00 PM	0	0	\$100,143	\$0
City of Sanger	5/9/2015	10:30 AM	0	0	\$8,095,337	\$622,718
City of Krum	5/10/2015	2:35 PM	0	0	\$6,227	\$0
City of Sanger	5/10/2015	5:00 PM	0	0	\$6,227	\$0
Denton County	5/20/2015	12:05 AM	0	0	\$12,454	\$0
City of Corinth	5/30/2015	7:00 AM	0	0	\$124,544	\$0
Denton County	11/27/2015	8:56 AM	0	0	\$12,479	\$0
Town of Bartonville	11/27/2015	4:00 AM	0	0	\$9,983	\$0
City of Denton	5/14/2016	4:00 AM	1	0	\$0	\$0
City of Denton	7/9/2017	8:20 PM	1	0	\$0	\$0
Town of Hebron	9/6/2018	4:43 PM	0	0	\$29,331	\$0
City of Lewisville	9/8/2018	7:15 AM	0	0	\$11,732	\$0
Denton County	9/21/2018	9:30 PM	0	0	\$5,866	\$0

SECTION 5: FLOOD

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	9/21/2018	9:33 PM	0	0	\$11,732	\$0
Town of Argyle	9/21/2018	8:00 PM	0	0	\$23,465	\$0
Town of Bartonville	9/21/2018	8:30 PM	0	0	\$11,732	\$0
City of Corinth	9/21/2018	7:22 PM	0	0	\$11,732	\$0
Town of Argyle	4/30/2019	6:26 PM	0	0	\$231,793	\$0
City of Justin	6/16/2019	2:15 PM	0	0	\$57,814	\$0
Town of Bartonville	6/23/2020	5:40 AM	0	0	\$51,698	\$0
Town of Bartonville	6/23/2020	4:29 AM	0	0	\$28,721	\$0
Town of Hebron	4/4/2022	9:15 PM	0	0	\$102,443	\$0
City of Lewisville	6/1/2022	2:45 PM	1	1	\$0	\$0
TOTALS			7	1	\$17,160,509	\$622,718

Table 5-4. Summary of Historical Flood Events, January 1996-2022

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	26	0	0	\$613,720	\$0
Town of Argyle	3	0	0	\$255,258	\$0
City of Aubrey	4	0	0	\$1,421	\$0
Town of Bartonville	6	0	0	\$103,386	\$0
Town of Copper Canyon	0	0	0	\$0	\$0
City of Corinth	6	0	0	\$276,152	\$0
Town of Cross Roads	0	0	0	\$0	\$0
City of Denton	32	5	0	\$2,961,529	\$0
Town of DISH	0	0	0	\$0	\$0
Town of Double Oak	0	0	0	\$0	\$0
Town of Flower Mound	0	0	0	\$0	\$0
City of Hackberry	0	0	0	\$0	0
Town of Hebron	3	0	0	\$2,843,478	\$0

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Town of Hickory Creek	0	0	0	\$0	\$0
City of Highland Village	0	0	0	\$0	\$0
City of Justin	12	1	0	\$57,814	\$0
City of Krugerville	0	0	0	\$0	\$0
City of Krum	9	0	0	\$317,005	\$0
City of Lake Dallas	1	0	0	\$0	\$0
Town of Lakewood Village	0	0	0	\$0	\$0
City of Lewisville	9	1	1	\$11,732	\$0
Town of Little Elm	6	0	0	\$103,868	\$0
Town of Northlake	0	0	0	\$0	\$0
City of Oak Point	0	0	0	\$0	\$0
City of Pilot Point	5	0	0	\$964,811	\$0
Town of Ponder	2	0	0	\$284,299	\$0
Town of Providence Village	0	0	0	\$0	\$0
City of Roanoke	6	0	0	\$258,256	\$0
City of Sanger	8	0	0	\$8,107,780	\$622,718
Town of Shady Shores	0	0	0	\$0	\$0
City of The Colony	0	0	0	\$0	\$0
Town of Trophy Club	0	0	0	\$0	\$0
TOTAL LOSSES	138	7	1	\$17,783,227	

Based on the list of historical flood events for the Denton County planning area (listed above), including all participating jurisdictions, 28 of the events have occurred since the 2016 Plan.

SIGNIFICANT EVENTS

November 24, 1996 – Denton County

Up to five inches of rain in a few hours caused Cooper Creek to overflow resulting in several feet of water across the Mayhill Road Bridge. A car driven into the flood waters had stalled and the driver was washed downstream and drowned as he attempted to leave the vehicle. Heavy rain also caused Pecan Creek to overflow and flood nearby Bell Avenue. A car drove into the flood

waters and was swept downstream. Two of the three passengers drowned while the third managed survive.

April 24, 2007 – Denton County / Little Elm

Low level moisture was in place across North Texas as an upper-level low pressure system moved into the western half of the state. Large hail reports along with damaging winds and flash flooding were common throughout this twelve-hour event. Major flash flooding was reported across the county, and more than 60 people were rescued from floodwaters. About a half foot of water was reported over streets in Shady Shores, Little Elm, the University of North Texas campus, and along I-35 east service roads. A nursing home and a mobile home park were both evacuated due to threatening flood waters. Several roads remained closed for more than 24 hours, including Corbin Road, Mayhill Road, and East Hickory Street. Several roads and guardrails were damaged by the water. Denton County was declared a disaster area and was therefore able to receive federal aid. At least a hundred people reported flood damage to their local jurisdictions. Some had water 3 feet high in their homes and businesses. Total damage estimates as a result of the flooding event were approximately \$2 million. No reported injuries or fatalities were reported.

September 8, 2010 – Denton County

The remnants of Tropical Storm Hermine moved through the western portions of north Texas dropping several inches of water in some locations and producing 8 tornadoes. Significant flash flooding occurred during the late evening hours, reports indicate up to 12 inches of rain fell across the area and numerous high-water rescues and evacuations were conducted across the region. Interstate 35 was closed in both directions in the cities of Corinth and Lewisville. Three people were rescued from stranded vehicles in Lake Dallas and evacuations of homes were conducted in the city of Aubrey. Flood waters reached homes along Timbercreek Drive in Lewisville after the homes were evacuated. A total of 30 homes suffered some degree of flood damage in the county. Approximate damage estimates as a result were \$2 million.

May 9, 2015 – City of Sanger / Krum

Widespread severe weather and flash flooding occurred in addition to the outbreak of tornadoes. It was reported that numerous roads across the county, including Rector Rd, Hwy 455, and Jackson Rd, were closed due to high water. Additionally, flooding impacted a total of 117 homes, 22 of which suffered moderate damage. Two homes had major damage, and another 23 businesses suffered major damage. The Denton County Emergency Services estimate the flooding damage to be approximately \$6.5 million.

July 9, 2017 – Denton County

An upper-level disturbance provided enough lift to generate scattered showers and thunderstorms. It was reported that 3 homeless men were swept away by flood waters. Two of the men made it out of the water, but the body of the third man was found and was pronounced deceased as a result.

PROBABILITY OF FUTURE EVENTS

Based on 138 recorded historical occurrences within a 26.5-year reporting period within the Denton County planning area, including all participating jurisdictions, flooding is highly likely with 5 to 6 events per year anticipated.

VULNERABILITY AND IMPACT

A property's vulnerability to a flood depends on its location and proximity to the floodplain. Structures that lie along banks of a waterway are the most vulnerable and are often repetitive loss structures. The County and all participating jurisdictions encourage development outside of the floodplain, and the impact for flood for the entire planning area is "Minor" as facilities and services would be shut down for one week, more than 10 percent of property destroyed or with major damage, and injuries or illness that would not potentially result in permanent disability. However, with seven reported fatalities the impact is considered "substantial", with multiple deaths possible depending on the size and magnitude of the flood event.

Table 5-5 includes the critical facilities identified in Appendix C that were determined to be located within the SFHA by FIRM mapping and further by each participating jurisdiction.

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

JURISDICTION	CRITICAL FACILITIES
Denton County	937 Wells, 1 Commercial Transmission Tower, 71 Power Transmission Lines, 3 Electrical Substations, 2 FM Transmission Towers, 6 General Manufacturing Facilities, 14 Microwave Transmission Towers, 7 Shelter Facilities, 1 Non-gasoline Alternative Fueling Station, 1,064 Pipelines, 6 Places of Worship, 2 Power Plants, 2 Public Transit Stations, 859 Surface Wells
Town of Argyle	None reported
City of Aubrey	None reported
Town of Bartonville	None reported
Town of Copper Canyon	None reported
City of Corinth	2 Pump Stations
Town of Cross Roads	None reported
City of Denton	None reported
Town of DISH	None reported
Town of Double Oak	None reported
Town of Flower Mound	5 Lift Stations (1 in the 500-year floodplain)
City of Hackberry	None reported
Town of Hebron	None reported.
Town of Hickory Creek	None reported
City of Highland Village	None reported

JURISDICTION	CRITICAL FACILITIES
City of Justin	None reported
City of Krugerville	None reported
City of Krum	None reported
City of Lake Dallas	None reported
Town of Lakewood Village	None reported
City of Lewisville	None reported
Town of Little Elm	None reported
Town of Northlake	1 Transmission Line
City of Oak Point	None reported
City of Pilot Point	None reported
Town of Ponder	None reported
Town of Providence Village	None reported
City of Roanoke	None reported
City of Sanger	None reported
Town of Shady Shores	None reported
City of The Colony	None reported
Town of Trophy Club	None reported

Historic loss estimates due to flood are presented in Table 5-6 below. Considering 138 flood events over a 26.5-year period, frequency is approximately five to six events every year.

Table 5-6. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Denton County	\$613,720	\$23,605
Town of Argyle	\$255,258	\$9,818
City of Aubrey	\$1,421	\$55
Town of Bartonville	\$103,386	\$3,976
Town of Copper Canyon	\$0	\$0

SECTION 5: FLOOD

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
City of Corinth	\$276,152	\$10,621
Town of Cross Roads	\$0	\$0
City of Denton	\$2,961,529	\$113,905
Town of DISH	\$0	\$0
Town of Double Oak	\$0	\$0
Town of Flower Mound	\$0	\$0
City of Hackberry	\$0	\$0
Town of Hebron	\$2,843,478	\$109,365
Town of Hickory Creek	\$0	\$0
City of Highland Village	\$0	\$0
City of Justin	\$57,814	\$2,224
City of Krugerville	\$0	\$0
City of Krum	\$317,005	\$12,193
City of Lake Dallas	\$0	\$0
Town of Lakewood Village	\$0	\$0
City of Lewisville	\$11,732	\$451
Town of Little Elm	\$103,868	\$3,995
Town of Northlake	\$0	\$0
City of Oak Point	\$0	\$0
City of Pilot Point	\$964,811	\$37,108
Town of Ponder	\$284,299	\$10,935
Town of Providence Village	\$0	\$0
City of Roanoke	\$258,256	\$9,933
City of Sanger	\$8,730,499	\$335,788
Town of Shady Shores	\$0	\$0
City of The Colony	\$0	\$0

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Town of Trophy Club	\$0	\$0
Planning Area	\$17,783,227	\$683,970

While all citizens are at risk to the impacts of a flood, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 7.4% of the planning area population live below the poverty level (Table 5-7).

Table 5-7. Populations at Greatest Risk by Jurisdiction⁴

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Denton County	63,765
Town of Argyle	0
City of Aubrey	287
Town of Bartonville	80
Town of Copper Canyon	8
City of Corinth	1,007
Town of Cross Roads	28
City of Denton	21,379
Town of DISH	6
Town of Double Oak	68
Town of Flower Mound	2,996
City of Hackberry	165
Town of Hebron	38
Town of Hickory Creek	85
City of Highland Village	367
City of Justin	182
City of Krugerville	14
City of Krum	204

⁴ US Census Bureau 2021 American Community Survey data for Denton County

JURISDICTION	POPULATION BELOW POVERTY LEVEL
City of Lake Dallas	568
Town of Lakewood Village	34
City of Lewisville	10,774
Town of Little Elm	4,083
Town of Northlake	153
City of Oak Point	66
City of Pilot Point	602
Town of Ponder	74
Town of Providence Village	720
City of Roanoke	203
City of Sanger	871
Town of Shady Shores	193
City of The Colony	2,496
Town of Trophy Club	250

The severity of a flooding event varies depending on the relative risk to citizens and structures located within each jurisdiction. Table 5-8 depicts the level of impact for Denton County and each participating jurisdiction.

Table 5-8. Impact by Jurisdiction

JURISDICTION	IMPACT	DESCRIPTION
Denton County	Substantial	While it is anticipated that Denton County could anticipate an impact of “minor” with critical facilities shut down for a week or more, and more than 10 percent of property would be destroyed or damaged, the historical deaths resulting from flood indicate a “substantial” impact.
Town of Argyle	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Aubrey	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.

JURISDICTION	IMPACT	DESCRIPTION
Town of Bartonville	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Copper Canyon	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Corinth	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Cross Roads	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Denton	Substantial	While it is anticipated that the City of Denton could anticipate an impact of “minor” with critical facilities shut down for a week or more, and more than 10 percent of property would be destroyed or damaged, the historical deaths resulting from flood indicate a “substantial” impact.
Town of DISH	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Double Oak	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Flower Mound	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Hackberry	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.

JURISDICTION	IMPACT	DESCRIPTION
Town of Hebron	Minor	Any injuries and/or illnesses do not result in permanent disability. Complete shutdown of facilities and services for more than 1 week. More than 10 percent of property is destroyed or with major damage
Town of Hickory Creek	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Highland Village	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Justin	Substantial	While it is anticipated that the City of Justin could anticipate an impact of “limited” with critical facilities shut down for 24-hours or less and less than 10 percent of property destroyed or damaged, the historical death resulting from flood indicates a “substantial” impact.
City of Krugerville	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Krum	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Lake Dallas	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Lakewood Village	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Lewisville	Substantial	While it is anticipated that the City of Lewisville could anticipate an impact of “limited” with critical facilities shut down for 24-hours or less and less than 10 percent of property destroyed or damaged, the historical death resulting from flood indicates a “substantial” impact.

JURISDICTION	IMPACT	DESCRIPTION
Town of Little Elm	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Northlake	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Oak Point	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Pilot Point	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Ponder	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Providence Village	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Roanoke	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
City of Sanger	Minor	Any injuries and/or illnesses do not result in permanent disability. Complete shutdown of facilities and services for more than 1 week. More than 10 percent of property is destroyed or with major damage
Town of Shady Shores	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.

JURISDICTION	IMPACT	DESCRIPTION
City of The Colony	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.
Town of Trophy Club	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged.

ASSESSMENT OF IMPACTS

Flooding is the deadliest natural disaster that occurs in the U.S. each year, and it poses a constant and significant threat to the health and safety of the people in the Denton County planning area. The impact of climate change could produce larger, more severe flood events, exacerbating the current flood impacts. Worsening flood conditions can be frequently associated with a variety of impacts, including:

- Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing first responders in harm's way.
- Evacuations may be required for entire neighborhoods because of rising floodwaters, further taxing limited response capabilities and increasing sheltering needs for displaced residents.
- Health risks and threats to residents are elevated after the flood waters have receded due to contaminated flood waters (untreated sewage and hazardous chemicals) and mold growth typical in flooded buildings and homes.
- Significant flood events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Floods can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.
- First responders are exposed to downed power lines, contaminated and potentially unstable debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities.
- Significant flooding can result in the inability of emergency response vehicles to access areas of the community.
- Critical staff may suffer personal losses or otherwise impacted by a flood event and unable to report for duty, limiting response capabilities.

- City or county departments may be flooded, delaying response and recovery efforts for the entire community.
- Private sector entities that the jurisdiction and its residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- Some businesses not directly damaged by the flood may be negatively impacted while utilities are being restored or water recedes, further slowing economic recovery.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, and normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures substantially damaged by a flood may not be rebuilt for years and uninsured or underinsured residential structures may never be rebuilt, reducing the tax base for the community.
- Large floods may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Flooding may cause significant disruptions of clean water and sewer services, elevating health risks and delaying recovery efforts.
- The psycho-social effects on flood victims and their families can traumatize them for long periods of time, creating long term increases in medical treatment and services.
- Extensive or repetitive flooding can lead to decreases in property value for the affected community.
- Flood poses a potential catastrophic risk to annual and perennial crop production and overall crop quality leading to higher food costs.
- Flood related declines in production may lead to an increase in unemployment.
- Large floods may result in loss of livestock, potential increased livestock mortality due to stress and water borne disease, and increased cost for feed.
- Recreation activities at areas such as Lake Ray Roberts and Lake Lewisville may be unavailable and tourism can be unappealing for years following a large flood event, devastating directly related local businesses and negatively impacting economic recovery.
- Parks, recreational areas and nature preserves, such as the Clear Creek Natural Heritage Center may suffer significant wildlife mortality during and following a flood due to damaged or destroyed ecosystems and water contamination.

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

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) PARTICIPATION

Flood insurance offered through the National Flood Insurance Program (NFIP) is the best way for home and business owners to protect themselves financially against the flood hazard. Denton County and all participating jurisdictions, except for the Town of Providence Village and the Town of Hebron, are currently participating in the NFIP and are in good standing.

Denton County and the Cities of: Denton, Flower Mound, Lakewood Village and Lewisville currently have adopted higher standards above the NFIP minimum such as a 2-foot freeboard for new construction and substantial Improvements of structures. All other participating jurisdictions, with the exception of the Town of Hebron and the Town of Providence Village, have adopted the minimum NFIP standards. These jurisdictions are considering adopting additional higher regulatory NFIP standards to limit floodplain development. The Town of Providence Village and the Town of Hebron are considering joining the NFIP.

As an additional indicator of floodplain management responsibility, communities may choose to participate in FEMA's Community Rating System (CRS). This is an incentive-based program that allows communities to undertake flood mitigation activities that go beyond NFIP requirements. Denton County, City of Denton, City of Flower Mound, and the City of Lewisville currently participate in the CRS program to provide flood insurance incentives and expand their community's current NFIP policy base and reduce risk through the adoption of higher regulatory standards. Table 5-9 provides a summary of NFIP policies for CRS participating communities in the planning area. Each participating jurisdictions CRS class is listed in Table 5-10 below.

Table 5-9. Summary of NFIP Policies for CRS Communities

JURISDICTION	INSURED STRUCTURES	TOTAL INSURANCE COVERAGE VALUE	ANNUAL PREMIUMS PAID	NUMBER OF INSURANCE CLAIMS FILED	TOTAL LOSS PAYMENTS
Denton County	319	\$101,575,400	\$196,579	85	\$2,138,065
City of Denton	338	\$95,884,500	\$340,581	143	\$2,142,197
City of Flower Mound	237	\$72,460,700	\$139,717	35	\$942,976
City of Lewisville	122	\$44,244,800	\$124,123	64	\$1,611,439
TOTAL	1,016	\$314,165,400	\$801,000	327	\$6,834,677

There are three categories in the Community Rating System for communities with repetitive loss properties. Categories A, B, and C are communities defined by having no unmitigated RL properties, having 1 to 49 unmitigated RL properties, and having 50 or more unmitigated RL properties respectively. Table 5-10 provides the category for each CRS participating community along with the current class.

Table 5-10. CRS Class and Repetitive Loss Community Category

JURISDICTION	Current Class	Community Category
Denton County	10	A
City of Denton	8	A
City of Flower Mound	8	A
City of Lewisville	9	A

The legislature of the State of Texas has, in Section 16.315, Texas Water Code, delegated the responsibility of local government units to adopt regulations designed to minimize flood losses. All NFIP participating communities have adopted ordinances to regulate development in the floodplain to reduce potential flood damages. The flood hazard areas throughout the planning area are subject to periodic inundation, which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, of which adversely affect public safety.

These flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities, and by the occupancy of flood hazard areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, flood-proofed or otherwise protected from flood damage. Mitigation actions are included to address flood maintenance issues as well, including routinely clearing debris from drainage systems and bridges and expanding drainage culverts and storm water structures to more adequately convey flood waters.

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

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

In order to accomplish these tasks, Denton County and all participating jurisdictions seek to follow these guidelines to achieve flood mitigation by:

SECTION 5: FLOOD

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

NFIP COMPLIANCE AND MAINTENANCE

As mentioned, Denton County and all participating jurisdictions have developed mitigation actions that relate to either NFIP maintenance, participation or compliance. These actions can be found in Section 19.

Flooding was identified by a majority of the participating communities as a high-risk hazard during hazard ranking activities at the Risk Assessment Workshop. As such, many of the mitigation actions were developed with flood mitigation in mind. A majority of these flood actions address compliance with the NFIP and implementing flood awareness programs. Denton County, City of Denton, City of Flower Mound, and the City of Lewisville continue to work towards maintaining and improving their CRS classes as well as implementing additional public flood awareness activities. In addition, to stay in compliance with the CRS program, participating jurisdictions review all properties that have received flood insurance claims.

All NFIP participating jurisdictions recognize the need and are working towards adopting higher NFIP regulatory standards to further minimize flood risk in their community. In addition, each jurisdiction is focusing on public flood awareness activities. This includes promoting the availability of flood insurance by placing NFIP brochures and flyers in public libraries or public meeting places in participating jurisdictions.

Each NFIP participating jurisdiction has a designated floodplain administrator. The floodplain administrators in the planning area will continue to maintain compliance with the NFIP including continued floodplain administration, zoning ordinances, and development regulation. The floodplain ordinance adopted by jurisdictions outline the minimum requirements for development in special flood hazard areas.

Actions were created and an overall priority was assigned by team Members from each participating community. The overall priority of each action is reflected in the mitigation actions found in Section 19 of the Plan. In prioritizing actions, a community must consider many factors. Of primary consideration is targeting specific mitigation actions for implementation following a major disaster. Other factors that determine prioritization are ease of implementation by the community, cost of the project compared to perceived benefit, timeframe for implementing the action, and available personnel to oversee and implement the project.

REPETITIVE LOSS

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

Repetitive Loss properties are defined as structures that are:

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

Severe Repetitive Loss properties are defined as residential properties that are:

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

In either scenario, at least two of the referenced claims must have occurred within any ten-year period and must be greater than 10 days apart.⁵ Table 5-11 shows repetitive loss and severe repetitive loss properties for the Denton County planning area.

Table 5-11. Repetitive Loss and Severe Repetitive Loss Properties

JURISDICTION	BUILDING TYPE ⁶	NUMBER OF STRUCTURES	NUMBER OF LOSSES
Denton County	Single Family	6	19
Town of Argyle	Single Family	1	2
City of Aubrey	-	0	0
Town of Bartonville	-	0	0
Town of Copper Canyon	-	0	0
City of Corinth	Single Family	2	5
Town of Cross Roads	-	0	0
City of Denton	Single Family	8	26

⁵ Source: Texas Water Development Board

⁶ Building type assumed single family residential when unavailable.

SECTION 5: FLOOD

JURISDICTION	BUILDING TYPE ⁶	NUMBER OF STRUCTURES	NUMBER OF LOSSES
	Non-Residential	1	3
Town of DISH	-	0	0
Town of Double Oak	Single Family	2	10
Town of Flower Mound	Single Family	6	19
City of Hackberry	-	0	0
Town of Hebron	-	0	0
Town of Hickory Creek	-	0	0
City of Highland Village	Single Family	1	3
City of Justin	-	0	0
City of Krugerville	-	0	0
City of Krum	-	0	0
City of Lake Dallas	-	0	0
Town of Lakewood Village	-	0	0
City of Lewisville	Single Family	10	28
Town of Little Elm	-	0	0
Town of Northlake	-	0	0
City of Oak Point	Single Family	1	3
City of Pilot Point	Single Family	1	2
Town of Ponder	-	0	0
Town of Providence Village	-	0	0
City of Roanoke	-	0	0
City of Sanger	Single Family	1	3
Town of Shady Shores	-	0	0
City of The Colony	Single Family	1	2
Town of Trophy Club	Single Family	2	4

SECTION 6: THUNDERSTORM WIND

Hazard Description	1
Location	1
Extent.....	2
Historical Occurrences.....	3
Significant Events.....	14
Probability of Future Events.....	15
Vulnerability and Impact.....	15
Assessment of Impacts	22

HAZARD DESCRIPTION

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



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

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

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

LOCATION

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

EXTENT

The extent or magnitude of a thunderstorm wind event is measured by the Beaufort Wind Scale. Table 6-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

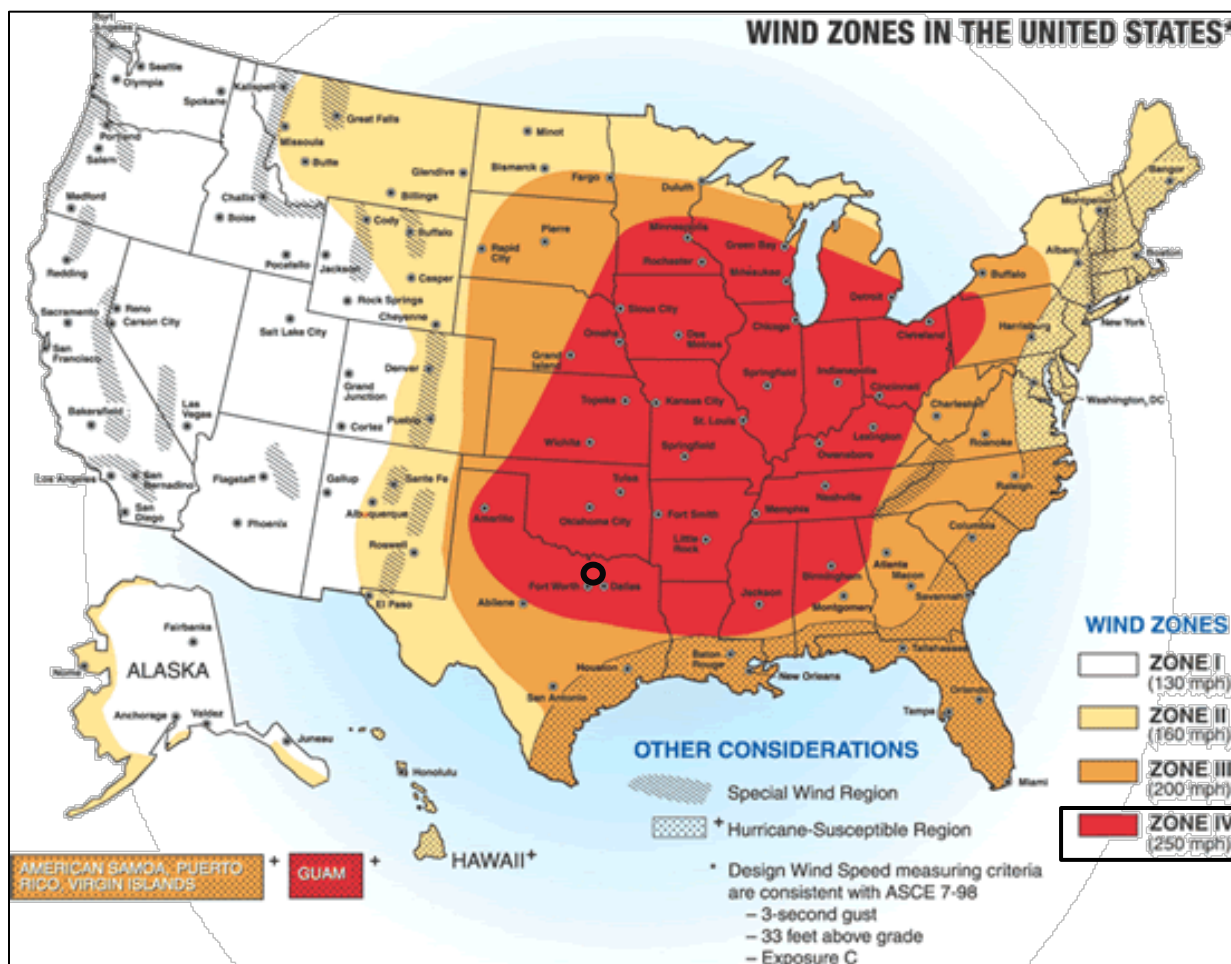
Table 6-1. Beaufort Wind Scale¹

FORCE	WIND (MHP)	WMO CLASSIFICATION	APPEARANCE OF WIND EFFECTS
0	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-8	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	9-14	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	15-21	Moderate Breeze	Dust, leaves and loose paper lifted, small tree branches move
5	22-28	Fresh Breeze	Small trees in leaf begin to sway
6	29-36	Strong Breeze	Larger tree branches moving, whistling in wires
7	37-44	Near Gale	Whole trees moving, resistance felt walking against wind
8	45-53	Gale	Whole trees in motion, resistance felt walking against wind
9	54-62	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	63-72	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	73-83	Violent Storm	If experienced on land, widespread damage
12	84+	Hurricane	Violence and destruction

Figure 6-1 displays the wind zones as derived from NOAA.

¹ Source: World Meteorological Organization

Figure 6-1. Wind Zones in the United States²



On average, the planning area experiences six to seven thunderstorm wind events every year. The County is located in Zone IV, meaning they can experience winds up to 250 mph. Denton County has experienced a significant wind event or an event with winds in the range of “Force 12” on the Beaufort Wind Scale with winds at or above 84 mph. Based on historical occurrences for thunderstorm wind events, a Force 12 on the Beaufort Wind scale is the maximum force anticipated for future events in the planning area.

HISTORICAL OCCURRENCES

Tables 6-2, 6-3, and 6-4 depict historical occurrences of thunderstorm wind events for the Denton County planning area according to the National Centers for Environmental Information (NCEI) data. Since January 1955, 446 thunderstorm wind events are known to have impacted the Denton County planning area, including all participating jurisdictions, based upon NCEI records. Table 6-3 presents information on known historical events impacting the Denton County planning area with resulting damages, injuries or fatalities. It is important to note that high wind events associated with other hazards, such as tornadoes, are not accounted for in this section.

² Denton County is indicated by the circle.

SECTION 6: THUNDERSTORM WIND

The NCEI is a national data source organized under the National Oceanic and Atmospheric Administration. The NCEI is the largest archive available for climate data; however, it is important to note that the only incidents recorded are those that are reported to the NCEI from 1955 through September 2022 have been factored into this risk assessment. In the tables that follow throughout this section, some occurrences seem to appear multiple times in one table. This is due to reports from various locations throughout the County. In addition, property damage estimates are not always available. Where an estimate has been provided in a table for losses, the dollar amounts have been altered to indicate the damage in 2022 dollars. Historical thunderstorm wind data for all of the participating jurisdictions are provided on a County-wide basis per the NCEI database.

Table 6-2. Historical Thunderstorm Wind Events by Maximum Wind Speed, 1955-2022

MAXIMUM WIND SPEED RECORDED (MPH)	NUMBER OF REPORTED EVENTS
0-30	83
31-40	3
41-50	55
51-60	170
61-70	6
71-80	13
81-90	0
91-100+	1
Unknown	55

Table 6-3. Historical Thunderstorm Wind Events, 1955-2022³

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	10/20/1984	8:00 AM	0	0	12	\$0	\$0
Denton County	2/14/1987	9:05 PM	0	0	1	\$0	\$0
Denton County	3/28/1993	10:00 AM	0	0	0	\$103,124	\$0
Denton County	8/24/1993	4:40 PM	0	0	0	\$10,227	\$0
City of Denton	8/24/1993	4:40 PM	0	0	0	\$10,227	\$0
City of Roanoke	8/24/1993	4:40 PM	0	0	0	\$10,227	\$0
City of Sanger	8/24/1993	4:55 PM	0	0	0	\$102,269	\$0

³ Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2022 dollars. Events are reported from January 1955 through June 2022.

SECTION 6: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Sanger	10/19/1993	2:45 AM	52	0	0	\$10,164	\$0
Denton County	11/14/1993	2:45 AM	0	0	0	\$101,568	\$0
City of Justin	4/2/1994	7:30 PM	0	0	0	\$10,047	\$0
City of Aubrey	5/12/1994	11:15 PM	0	0	0	\$10,040	\$0
City of Denton	5/13/1994	12:30 AM	0	0	0	\$10,040	\$0
City of Denton	7/14/1994	1:00 PM	0	0	0	\$99,788	\$0
City of Denton	7/15/1994	2:30 AM	0	0	0	\$99,788	\$0
City of Aubrey	8/20/1994	4:13 PM	0	0	0	\$9,939	\$0
City of Sanger	8/20/1994	3:37 PM	0	0	0	\$99,386	\$0
City of Krum	4/10/1995	11:30 AM	0	0	0	\$48,744	\$0
Town of Argyle	4/17/1995	9:00 PM	61	0	0	\$9,749	\$0
City of Denton	4/17/1995	8:35 PM	0	0	0	\$3,900	\$0
City of Denton	4/17/1995	8:45 PM	0	0	0	\$29,247	\$0
City of Sanger	4/17/1995	8:40 PM	0	0	0	\$9,749	\$0
City of Sanger	4/19/1995	7:50 PM	61	0	0	\$5,849	\$0
City of Lewisville	8/20/1995	5:45 PM	0	0	0	\$38,740	\$0
City of Lewisville	8/20/1995	5:55 PM	0	0	0	\$774,810	\$0
City of Sanger	3/24/1996	2:15 PM	Unknown	0	0	\$38,044	\$0
City of Lewisville	4/13/1996	9:10 PM	Unknown	0	0	\$3,790	\$0
City of Roanoke	4/13/1996	8:40 PM	Unknown	0	0	\$123,168	\$0
City of Lewisville	6/1/1996	10:20 AM	52	0	0	\$94,503	\$0
City of Lewisville	6/6/1996	9:55 PM	Unknown	0	0	\$3,780	\$0
City of Krum	7/4/1996	6:20 PM	Unknown	0	0	\$150,915	\$0
City of Lewisville	7/23/1996	1:20 PM	Unknown	0	0	\$94,322	\$0
City of Denton	8/11/1996	7:30 PM	61	0	0	\$1,882,842	\$0
City of Denton	8/11/1996	7:30 PM	67	0	0	\$37,657	\$0
City of Roanoke	4/11/1997	5:40 AM	61	0	0	\$92,438	\$0
City of Denton	4/22/1997	2:50 AM	Unknown	0	0	\$3,697,516	\$0

SECTION 6: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Denton	4/22/1997	2:50 AM	Unknown	0	0	\$3,698	\$0
City of Krum	4/22/1997	2:40 AM	Unknown	0	0	\$138,657	\$0
City of Lewisville	6/16/1997	6:36 PM	Unknown	0	0	\$3,695	\$0
City of Lewisville	6/16/1997	6:42 PM	Unknown	0	0	\$221,713	\$0
City of Roanoke	6/16/1997	7:00 PM	Unknown	0	0	\$9,238	\$0
City of Denton	6/22/1997	3:40 PM	Unknown	0	0	\$9,238	\$0
City of Sanger	6/22/1997	3:50 PM	Unknown	0	0	\$3,695	\$0
City of Pilot Point	8/20/1997	7:15 PM	Unknown	0	0	\$9,209	\$0
City of Aubrey	3/30/1998	5:20 PM	Unknown	0	0	\$54,779	\$0
City of Denton	6/4/1998	6:30 PM	Unknown	0	0	\$3,634	\$0
City of Lewisville	2/6/1999	7:52 PM	Unknown	0	0	\$3,601	\$0
City of Denton	4/26/1999	8:20 AM	Unknown	0	0	\$178	\$0
City of Krum	4/26/1999	7:19 AM	Unknown	0	0	\$3,564	\$0
City of Justin	5/4/1999	12:30 PM	Unknown	0	0	\$713	\$0
City of Sanger	5/4/1999	11:58 AM	Unknown	0	0	\$891	\$0
City of Sanger	5/9/1999	11:45 PM	Unknown	0	0	\$178	\$0
City of Denton	5/10/1999	1:00 AM	Unknown	0	0	\$8,910	\$0
Town of Ponder	6/1/1999	5:50 PM	Unknown	0	0	\$1,069	\$0
Denton County	9/10/1999	8:20 PM	Unknown	0	0	\$17,640	\$0
City of Roanoke	9/10/1999	8:20 PM	Unknown	0	0	\$353	\$0
City of Roanoke	9/10/1999	8:15 PM	Unknown	0	0	\$1,764	\$0
City of Denton	2/22/2000	9:00 PM	Unknown	0	0	\$34,885	\$0
City of Lewisville	3/28/2000	7:40 PM	Unknown	0	0	\$172,997	\$0
City of Denton	2/9/2001	2:00 AM	52	0	0	\$8,424	\$0
City of Denton	2/9/2001	2:20 AM	58	0	0	\$50,541	\$0
City of Justin	2/9/2001	1:45 AM	52	0	0	\$8,424	\$0
City of Krum	2/9/2001	1:50 AM	52	0	0	\$16,847	\$0

SECTION 6: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Krum	2/9/2001	1:55 AM	52	0	0	\$42,118	\$0
Town of Ponder	2/9/2001	2:00 AM	52	0	0	\$16,847	\$0
City of Roanoke	2/9/2001	1:45 AM	52	0	0	\$25,271	\$0
Denton County	2/24/2001	10:30 AM	Unknown	0	0	\$50,541	\$0
City of Sanger	2/24/2001	10:15 AM	60	0	0	\$126,353	\$0
City of Denton	5/4/2001	4:35 PM	Unknown	0	0	\$8,333	\$0
City of Denton	6/14/2001	6:45 PM	52	0	0	\$3,328	\$0
City of Krum	6/14/2001	5:24 PM	52	0	0	\$1,664	\$0
City of Justin	8/10/2001	2:27 PM	78	0	0	\$50,057	\$0
Town of Little Elm	10/12/2001	9:00 PM	Unknown	0	0	\$250,004	\$0
City of Pilot Point	4/7/2002	6:40 PM	52	0	0	\$4,942	\$0
City of Sanger	4/7/2002	6:30 PM	52	0	0	\$6,589	\$0
City of Corinth	8/25/2002	1:46 PM	52	0	0	\$4,917	\$0
Town of Hebron	8/27/2002	5:35 AM	52	0	0	\$3,278	\$0
Town of Little Elm	8/27/2002	5:45 AM	52	0	0	\$3,278	\$0
City of Aubrey	10/6/2002	3:54 PM	60	0	0	\$57,176	\$0
City of Denton	5/6/2003	8:35 PM	69	0	0	\$80,701	\$0
City of Lewisville	6/11/2003	9:41 PM	52	0	0	\$24,184	\$0
Town of Argyle	7/22/2003	5:15 PM	52	0	0	\$16,105	\$0
City of Corinth	8/11/2003	5:45 PM	52	0	0	\$8,022	\$0
City of Krum	3/4/2004	2:50 PM	52	0	0	\$15,804	\$0
City of Lewisville	7/28/2004	3:45 PM	52	0	0	\$3,127	\$0
City of Sanger	9/14/2004	3:30 PM	61	0	1	\$38,990	\$0
City of Sanger	4/10/2005	6:00 PM	73	0	0	\$30,439	\$0
City of Sanger	4/10/2005	5:50 PM	60	0	0	\$7,610	\$0
City of Denton	8/5/2005	1:00 PM	50	0	0	\$12,064	\$0
Denton County	11/15/2005	9:30 AM	40	0	0	\$7,494	\$0

SECTION 6: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Town of Ponder	6/17/2006	9:40 PM	50	0	0	\$29,194	\$0
Denton County	7/1/2006	8:00 PM	43	0	10	\$0	\$0
Denton County	8/6/2006	4:27 PM	52	0	0	\$43,576	\$0
Denton County	2/24/2007	12:00 PM	50	0	0	\$327,463	\$0
City of Denton	5/30/2007	9:00 AM	50	0	0	\$4,273	\$0
City of Pilot Point	5/30/2007	8:00 AM	50	0	0	\$71,212	\$0
City of Denton	4/4/2008	12:35 AM	56	0	0	\$275,735	\$0
City of Denton	4/4/2008	12:35 AM	56	0	0	\$27,573	\$0
City of Corinth	6/28/2008	5:29 PM	56	0	0	\$1,353,522	\$0
City of Krum	6/28/2008	4:48 PM	50	0	0	\$20,303	\$0
City of Pilot Point	7/15/2008	7:50 PM	52	0	0	\$26,929	\$0
City of Denton	7/30/2008	5:36 PM	50	0	0	\$1,346	\$0
Denton County	12/10/2008	4:00 PM	31	0	0	\$1,409	\$0
Denton County	2/9/2009	4:15 AM	75	0	0	\$27,915	\$0
Town of Argyle	2/9/2009	4:15 AM	75	0	0	\$13,958	\$0
City of Aubrey	2/9/2009	4:55 AM	70	0	0	\$2,792	\$0
City of Pilot Point	2/9/2009	4:55 AM	75	0	0	\$4,187	\$0
City of Krum	2/10/2009	8:38 PM	60	0	0	\$11,166	\$0
Town of Little Elm	4/30/2009	1:30 AM	60	0	0	\$13,889	\$0
City of Justin	5/27/2009	12:07 AM	61	0	0	\$8,309	\$0
Denton County	6/10/2009	6:12 PM	65	0	0	\$5,492	\$0
City of Aubrey	6/10/2009	6:04 PM	61	0	0	\$1,373	\$0
City of Corinth	6/10/2009	6:00 PM	65	0	0	\$10,985	\$0
Town of Hebron	6/10/2009	6:02 PM	65	0	0	\$6,866	\$0
City of Justin	6/10/2009	5:40 PM	61	0	0	\$6,866	\$0
City of Lewisville	6/10/2009	5:52 PM	61	0	0	\$6,866	\$0
City of Lewisville	6/10/2009	5:50 PM	61	0	0	\$8,239	\$0

SECTION 6: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Lewisville	6/10/2009	5:54 PM	61	0	0	\$20,597	\$0
City of Roanoke	6/10/2009	5:40 PM	61	0	0	\$4,119	\$0
City of Sanger	10/1/2009	3:50 PM	56	0	0	\$1,370	\$0
City of Justin	6/2/2010	5:25 PM	50	0	0	\$20,382	\$0
City of Corinth	8/6/2010	4:10 PM	61	0	0	\$13,566	\$0
City of Corinth	8/6/2010	4:10 PM	61	0	0	\$33,916	\$0
Denton County	4/10/2011	11:25 PM	61	0	0	\$32,922	\$0
City of Corinth	4/10/2011	11:08 PM	52	0	0	\$3,951	\$0
City of Denton	4/10/2011	11:15 PM	61	0	0	\$9,218	\$0
City of Roanoke	4/10/2011	10:57 PM	61	0	0	\$263,373	\$0
City of Lewisville	4/14/2011	9:35 PM	52	0	0	\$7,901	\$0
Denton County	4/23/2011	7:20 PM	56	0	0	\$9,218	\$0
City of Denton	4/23/2011	7:25 PM	58	0	0	\$5,267	\$0
City of Corinth	4/24/2011	6:25 PM	60	0	0	\$52,675	\$0
City of Denton	4/24/2011	6:15 PM	60	0	0	\$32,922	\$0
City of Justin	4/24/2011	6:05 PM	56	0	0	\$52,675	\$0
Town of Little Elm	4/24/2011	6:32 PM	56	0	0	\$52,675	\$0
City of Denton	4/25/2011	2:05 PM	52	0	0	\$10,535	\$0
Town of Ponder	5/22/2011	6:53 PM	52	0	0	\$6,553	\$0
Denton County	5/24/2011	7:00 PM	70	0	0	\$3,932	\$0
City of Corinth	5/24/2011	8:57 PM	61	0	0	\$3,932	\$0
City of Roanoke	5/24/2011	8:50 PM	56	0	0	\$6,553	\$0
City of Pilot Point	6/20/2011	10:15 PM	56	0	0	\$26,242	\$0
Denton County	6/21/2011	1:18 AM	52	0	0	\$6,561	\$0
Denton County	6/21/2011	1:56 AM	56	0	0	\$10,497	\$0
Denton County	6/21/2011	2:05 AM	56	0	0	\$10,497	\$0
Town of Argyle	6/21/2011	1:35 AM	65	0	0	\$13,121	\$0

SECTION 6: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Aubrey	6/21/2011	12:55 AM	56	0	0	\$9,185	\$0
Town of Bartonville	6/21/2011	1:45 AM	61	0	0	\$19,682	\$0
City of Corinth	6/21/2011	1:45 AM	65	0	0	\$9,185	\$0
City of Denton	6/21/2011	1:35 AM	65	0	0	\$19,682	\$0
City of Denton	6/21/2011	1:35 AM	65	0	0	\$13,121	\$0
Town of Hebron	6/21/2011	2:05 AM	56	0	0	\$10,497	\$0
City of Lewisville	6/21/2011	2:05 AM	56	0	0	\$15,745	\$0
City of Lewisville	6/21/2011	1:54 AM	56	0	0	\$10,497	\$0
Denton County	5/4/2012	8:25 PM	52	0	0	\$6,444	\$0
Denton County	5/4/2012	8:30 PM	52	0	0	\$6,444	\$0
Denton County	5/4/2012	8:27 PM	52	0	0	\$6,444	\$0
City of Lewisville	7/1/2012	4:25 PM	35	2	0	\$0	\$0
Denton County	7/7/2012	2:00 PM	43	2	0	\$0	\$0
Denton County	7/20/2012	3:50 PM	52	0	0	\$12,927	\$0
Denton County	7/21/2012	4:45 PM	56	0	0	\$32,318	\$0
City of Justin	7/26/2012	4:45 PM	52	0	0	\$12,927	\$0
City of Krum	8/6/2012	2:15 PM	50	0	0	\$6,428	\$0
Denton County	8/12/2012	5:08 PM	55	0	0	\$6,428	\$0
City of Krum	8/12/2012	5:38 PM	52	0	0	\$2,571	\$0
City of Denton	5/21/2013	12:38 PM	63	0	0	\$44,500	\$0
City of Pilot Point	5/21/2013	12:45 PM	54	0	0	\$25,428	\$0
City of Denton	4/3/2014	7:10 PM	61	0	0	\$24,986	\$0
City of Denton	4/3/2014	5:02 PM	71	0	0	\$187,393	\$0
City of Krum	4/3/2014	5:00 PM	52	0	0	\$6,246	\$0
City of Aubrey	6/9/2014	4:12 AM	50	0	0	\$6,213	\$0
City of Roanoke	6/24/2014	4:10 PM	56	0	0	\$18,639	\$0
Denton County	7/14/2014	2:10 PM	48	0	0	\$24,862	\$0

SECTION 6: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Denton	7/31/2014	12:10 AM	50	0	0	\$4,972	\$0
City of Justin	10/13/2014	12:25 AM	50	0	0	\$1,247	\$0
City of Denton	10/13/2014	12:30 AM	52	0	0	\$0	\$6,237
City of Justin	10/13/2014	12:50 AM	50	0	0	\$6,237	\$0
Denton County	10/13/2014	12:50 AM	50	0	0	\$6,237	\$0
City of Denton	10/13/2014	12:53 AM	50	0	0	\$6,237	\$0
Denton County	4/18/2015	7:00 PM	61	0	0	\$12,518	\$0
City of Denton	4/18/2015	6:55 PM	52	0	0	\$8,762	\$0
City of Roanoke	4/18/2015	7:00 PM	61	0	0	\$62,589	\$0
City of Denton	5/27/2015	7:41 PM	55	0	0	\$1,245	\$0
City of Krum	11/5/2015	5:27 PM	50	0	0	\$9,983	\$0
Town of Ponder	11/5/2015	6:03 PM	50	0	0	\$1,872	\$0
City of Sanger	11/5/2015	5:04 PM	48	0	0	\$49,916	\$0
City of Corinth	11/17/2015	3:41 AM	50	0	0	\$9,983	\$0
City of Lake Dallas	11/17/2015	3:40 AM	50	0	0	\$6,239	\$0
City of Lewisville	11/17/2015	3:48 AM	50	0	0	\$37,437	\$0
Town of Little Elm	11/17/2015	3:48 AM	50	0	0	\$124,790	\$0
Denton County	3/8/2016	8:54 AM	60	0	0	\$6,219	\$0
Denton County	3/8/2016	8:00 AM	48	0	0	\$6,219	\$0
Denton County	3/8/2016	9:00 AM	52	0	0	\$6,219	\$0
City of Denton	4/11/2016	4:33 PM	57	0	0	\$12,379	\$0
City of Lewisville	7/4/2016	4:30 AM	43	0	0	\$12,308	\$0
City of Lewisville	7/15/2016	7:55 AM	52	0	0	\$1,231	\$0
Town of Argyle	3/26/2017	6:55 PM	55	0	0	\$485,923	\$0
Denton County	3/29/2017	1:33 AM	50	0	0	\$6,074	\$0
Denton County	4/21/2017	7:13 PM	52	0	0	\$6,056	\$6,056
City of Denton	5/23/2017	11:55 PM	60	0	0	\$121,018	\$0

SECTION 6: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Town of Ponder	3/27/2018	5:42 AM	43	0	0	\$593	\$0
City of Denton	6/7/2018	4:13 PM	58	0	0	\$17,630	\$0
Denton County	6/20/2018	9:00 PM	50	0	0	\$29,383	\$0
Denton County	6/20/2018	8:48 PM	50	0	0	\$2,351	\$0
City of Sanger	3/13/2019	3:40 AM	55	0	0	\$11,651	\$0
City of Denton	4/17/2019	10:36 PM	64	0	0	\$6,954	\$0
City of Denton	4/17/2019	10:36 PM	64	0	0	\$231,793	\$0
City of Krum	6/1/2019	4:48 PM	50	0	0	\$5,781	\$0
Denton County	6/9/2019	12:43 PM	55	0	0	\$5,781	\$0
City of Corinth	6/9/2019	12:11 PM	56	0	0	\$2,313	\$0
Town of Hebron	6/9/2019	12:30 PM	45	0	0	\$2,313	\$0
City of Lewisville	6/9/2019	12:28 PM	48	0	0	\$5,706	\$0
City of Lewisville	6/9/2019	12:36 PM	55	0	0	\$5,706	\$0
Denton County	7/10/2019	4:40 PM	50	0	0	\$1,154	\$0
City of Corinth	7/10/2019	4:37 PM	61	0	0	\$2,309	\$0
City of Corinth	7/10/2019	4:37 PM	50	0	0	\$577	\$0
City of Sanger	10/20/2019	10:30 PM	55	0	0	\$11,509	\$0
Denton County	4/28/2020	9:45 PM	52	0	0	\$3,465	\$0
City of Denton	4/28/2020	9:35 PM	57	0	0	\$2,310	\$0
City of Sanger	4/28/2020	9:27 PM	48	0	0	\$578	\$0
Town of Argyle	8/27/2020	4:20 PM	48	0	0	\$11,395	\$0
City of Justin	8/27/2020	4:21 PM	48	0	0	\$11,395	\$0
City of Roanoke	10/10/2021	8:10 PM	59	0	0	\$3,212	\$0
City of Krum	10/27/2021	1:46 AM	53	0	0	\$3,212	\$0
Denton County	3/21/2022	4:05 PM	70	0	0	\$77,261	\$0
Town of Hebron	3/21/2022	5:40 PM	61	0	0	\$1,030	\$0
TOTALS			(Max Extent)	4	24	\$14,551,040	\$12,293

SECTION 6: THUNDERSTORM WIND

Table 6-4. Summary of Historical Thunderstorm Wind Events, 1955-2022

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	155	96	2	23	\$1,034,880	\$6,056
Town of Argyle	13	75	0	0	\$550,251	\$0
City of Aubrey	11	70	0	0	\$151,497	\$0
Town of Bartonville	2	61	0	0	\$19,682	\$0
Town of Copper Canyon	0	N/A	0	0	\$0	\$0
City of Corinth	18	65	0	0	\$1,509,853	\$0
Town of Cross Roads	0	N/A	0	0	\$0	\$0
City of Denton	73	76	0	0	\$7,164,790	\$6,237
Town of DISH	0	N/A	0	0	\$0	\$0
Town of Double Oak	0	N/A	0	0	\$0	\$0
Town of Flower Mound	0	N/A	0	0	\$0	\$0
City of Hackberry	0	N/A	0	0	\$0	\$0
Town of Hebron	6	65	0	0	\$23,984	\$0
Town of Hickory Creek	0	N/A	0	0	\$0	\$0
City of Highland Village	0	N/A	0	0	\$0	\$0
City of Justin	19	78	0	0	\$189,279	\$0
City of Krugerville	0	N/A	0	0	\$0	\$0
City of Krum	28	78	0	0	\$484,003	\$0
City of Lake Dallas	5	52	0	0	\$6,239	\$0
Town of Lakewood Village	0	N/A	0	0	\$0	\$0
City of Lewisville	34	61	2	0	\$1,571,495	\$0
Town of Little Elm	7	60	0	0	\$444,636	\$0
Town of Northlake	0	N/A	0	0	\$0	\$0
City of Oak Point	0	N/A	0	0	\$0	\$0

SECTION 6: THUNDERSTORM WIND

City of Pilot Point	10	75	0	0	\$168,149	\$0
Town of Ponder	11	61	0	0	\$56,128	\$0
Town of Providence Village	0	N/A	0	0	\$0	\$0
City of Roanoke	19	61	0	0	\$620,944	\$0
City of Sanger	33	73	0	1	\$555,230	\$0
Town of Shady Shores	0	N/A	0	0	\$0	\$0
City of The Colony	2	57	0	0	\$0	\$0
Town of Trophy Club	0	N/A	0	0	\$0	\$0
TOTAL LOSSES	446	(Max Extent)	4	24	\$14,563,333	

Based on the list of historical thunderstorm wind events for the Denton County planning area (listed above), including all participating jurisdictions, 65 of the events have occurred since the 2016 Plan.

SIGNIFICANT EVENTS

April 17, 2019 – Denton County

Thunderstorms developed as an upper level low pressure center and a dryline approached from the west. Storms continued as a cold front swept across the region. Hail was the primary severe weather occurrence while damaging winds were the primary occurrence overnight. It was reported that winds were approximately 74 mph with damage to roofs and when exposed to rain, interior damage as a result. Total approximately damage costs as a result was \$200,000.

March 26, 2017 – Town of Argyle

An upper-level trough, dryline and Pacific cold front all combined to produce a round of severe thunderstorms, with large hail affecting the region. It was reported hail as result of wind driven by severe thunderstorm winds, causing damage to multiple vehicles within the City of Argyle. Approximate total damage cost was \$400,000.

July 7, 2012 – Denton County

Thunderstorms developed with reports of being below severe limits, with reports of pea sized hail. Two thunderstorm produced outflow winds in excess of 45 mph, one of which produced outflow to the east Lake Lewisville. Two fatalities resulted due to this event, with no damage costs reported. One died after his small inflatable boat overturned from the gusty winds. The other died after he was overcome on his paddle board by choppy waters. Two fatalities resulted due to this event, with no damage costs reported.

July 1, 2012 – City of Lewisville

Strong outflow winds from a thunderstorm caused the deaths of two teenage boys at Lake Lewisville. Two teenage brothers drowned at Lake Lewisville after 40 mph outflow winds moved across the lake. The boys were swimming at the time and one brother was swept out due to the strong winds. The other went out to help him. Both boys were recovered that evening by dive teams.

SECTION 6: THUNDERSTORM WIND

April 10, 2011 – City of Roanoke

A strong upper level low pressure system over the southern Rockies produced severe thunderstorms along a dryline across north central and central Texas. Reported wind damage associated with this storm was between 70 to 80 mph. Other supercell thunderstorms in the area produced brief tornadoes and large hail. Approximately \$200,000 worth of damage was reported related to overturned RVs and trailers, and damages to signs and fencing

PROBABILITY OF FUTURE EVENTS

Most thunderstorm winds occur during the months of March, April, May, and September. Based on available records of historic events, there have been 446 events in a 67.5-year reporting period, which provides a frequency of approximately six to seven events every year. Even though the intensity of thunderstorm wind events is not always damaging for the Denton County planning area, the frequency of occurrence for a thunderstorm wind event is highly likely. This means that an event is probable within the next year for the Denton County planning area, including all participating jurisdictions.

VULNERABILITY AND IMPACT

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

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

The US Census data indicates a total of 9,871 manufactured homes located in the Denton County planning area (2.9%), including participating jurisdictions (Table 6-5). In addition, 14.3% (approximately 48,567 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant wind events.

Table 6-5. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Denton County	9,871	48,567
Town of Argyle	0	327

SECTION 6: THUNDERSTORM WIND

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
City of Aubrey	0	330
Town of Bartonville	60	112
Town of Copper Canyon	0	169
City of Corinth	100	194
Town of Cross Roads	13	72
City of Denton	1,981	16,567
Town of DISH	13	3
Town of Double Oak	0	147
Town of Flower Mound	611	1,555
City of Hackberry	62	59
Town of Hebron	9	8
Town of Hickory Creek	0	269
City of Highland Village	0	1,037
City of Justin	0	272
City of Krugerville	0	147
City of Krum	0	233
City of Lake Dallas	379	529
Town of Lakewood Village	0	56
City of Lewisville	1,663	7,387
Town of Little Elm	536	288
Town of Northlake	7	75
City of Oak Point	5	107
City of Pilot Point	100	551
Town of Ponder	2	126
Town of Providence Village	0	11
City of Roanoke	332	246
City of Sanger	93	794

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Town of Shady Shores	38	182
City of The Colony	42	4,382
Town of Trophy Club	0	543

While all citizens are at risk to the impacts of thunderstorm wind, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 7.2% of the planning area population live below the poverty level (Table 6-6).

Table 6-6. Populations at Greatest Risk by Jurisdiction⁴

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Denton County	65,262
Town of Argyle	0
City of Aubrey	746
Town of Bartonville	105
Town of Copper Canyon	9
City of Corinth	928
Town of Cross Roads	21
City of Denton	22,099
Town of DISH	4
Town of Double Oak	168
Town of Flower Mound	3,114
City of Hackberry	181
Town of Hebron	34
Town of Hickory Creek	42
City of Highland Village	286
City of Justin	119
City of Krugerville	19

⁴ US Census Bureau 2021 American Community Survey data for Denton County.

JURISDICTION	POPULATION BELOW POVERTY LEVEL
City of Krum	192
City of Lake Dallas	401
Town of Lakewood Village	54
City of Lewisville	10,735
Town of Little Elm	3,484
Town of Northlake	94
City of Oak Point	78
City of Pilot Point	342
Town of Ponder	46
Town of Providence Village	846
City of Roanoke	242
City of Sanger	902
Town of Shady Shores	166
City of The Colony	3,206
Town of Trophy Club	342

The following critical facilities would be vulnerable to thunderstorm wind events in each participating jurisdiction:

Table 6-7. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Denton County	3 Biodiesel Plants, 5,136 Wells, 4 Broadband Service Transmitters, 11 Cellular Towers, 51 Commercial Transmission Towers, 1 Convention Center, 4 Fairground Complexes, 93,047 Power Transmission Lines, 63 Electric Substations, 39 EMS Stations, 49 Fire Stations, 7 FM Transmission Towers, 141 General Manufacturing Facilities, 19 Hospitals, 3 Major Sport Venues, 792 Microwave Service Towers, 125 Shelter Facilities, 1 Natural Gas Storage Facility, 42 Non-gasoline Alternative Fueling Stations, 99 Nursing Homes, 14 Paging Transmission Towers, 4,879 Pipelines, 558 Places of Worship, 1 Pumping Station, 29 Police Stations, 7 Power Plants, 6 Public Transit Stations, 5,117 Surface Wells, 11 Urgent Care Facilities, 1 Weather Radar Station

SECTION 6: THUNDERSTORM WIND

JURISDICTION	CRITICAL FACILITIES
Town of Argyle	1 Town Hall, 1 Fire Station, 1 Police Station, 5 Schools
City of Aubrey	1 City Hall, 2 Fire Station, 1 Police Station, 1 Public Works Facility, 1 Wastewater Plant, 11 Lift Stations, 2 Elevated Water Wells, 2 Ground Storage Water Wells
Town of Bartonville	1 Government Building, 1 Shelter/Church, 2 Water Supply Facilities
Town of Copper Canyon	1 Government Building
City of Corinth	1 EOC Building, 1 City Hall, 2 Fire Stations, 14 Schools, 1 Public Works Facility, 2 Pump Station 14 Lift Stations, 2 Elevated Water Tanks, 9 Warning Sirens
Town of Cross Roads	1 Town Hall, 1 Police Station, 1 Assisted Living Facility, 1 Residential Facility, 2 Places of Worship, 1 Water Tower, Transmission Lines
City of Denton	10 Government Buildings, 7 Federal Buildings, 7 Fire Stations, 2 Water Treatment Plants, 23 Schools, 3 Universities/Colleges, 2 Daycare Facilities, 3 Community Centers, 2 Traffic/Service Centers, 2 Airport/Field, 1 Fairground, 1 Landfill, 1 Natatorium
Town of DISH	1 Government Building
Town of Double Oak	1 Town Hall, 1 VFD, 1 Police Station, 1 School, 1 Shelter/Church, 1 Water Tower, 1 Warning Siren
Town of Flower Mound	1 Town Hall, 7 Fire Stations, 1 Police/Government Building, 2 Community Centers, 1 Library, 2 Public Works Facility, 1 Animal Shelter, 1 Wastewater Treatment Plant, 19 Lift Stations, 2 Water Storage Facility, 3 Water Towers, 4 Fueling Station, 1 RV Park
City of Hackberry	1 Wastewater Treatment Plant, 1 Water Plant, 2 Water Towers
Town of Hebron	None reported.
Town of Hickory Creek	1 Town Hall, 1 Public Works Facility
City of Highland Village	1 Government Building, 1 Fire Station, 4 Schools, 10 Lift Stations, 7 Pump Stations
City of Justin	1 City Hall, 1 Sewer Plant, 3 Lift Stations
City of Krugerville	1 City Hall, 1 Police Station, 1 Solar Station, 1 Substation, 1 Utility District, 1 Maintenance Building
City of Krum	1 City Hall, 1 Fire Station, 1 Police Station, 1 Federal Building, 1 Community Center, 8 Schools, 2 Childcare Facilities, 1 Public Works Facility, 1 Wastewater Plant, 3 Water Towers, 1 Medical Center, 5 Churches, 4 Warning Sirens
City of Lake Dallas	1 Government Building, 1 Fire Station, 2 Schools, 1 Library, 2 Water and Wastewater Facilities, 1 Wastewater Treatment Plant, 1 Airport

SECTION 6: THUNDERSTORM WIND

JURISDICTION	CRITICAL FACILITIES
Town of Lakewood Village	1 Town Hall, 1 Wastewater Treatment Plant, 4 Lift Stations, 1 Water Plant, 1 Water Production Facility
City of Lewisville	3 EOC Facilities, 7 Fire Stations, 1 Police Station, 45 Government Facilities, 1 Dispatch, 17 Communication Facilities, 1 Jail, 17 Healthcare Facilities, 7 Chemical Facilities, 22 Commercial Facilities, 5 Critical Manufacturing Facilities, 4 Defense Industrial Facilities, 7 Energy Facilities, 8 Financial Institutions, 5 Food and Agriculture Facilities, 1 Information Technology Facility, 6 Transportation Systems, 34 Water and Wastewater Facilities, 1 Dam
Town of Little Elm	1 EOC, 1 Town Hall, 3 Fire Stations, 1 Public Safety Center, 1 Public Works Facility, 6 Bridges and Infrastructure, 23 Lift Stations, 3 Pump Stations, 3 Water Towers, 2 Water Tanks
Town of Northlake	1 Town Hall, 1 Government Building, 1 Police Department, 1 Public Works Facility, 1 Wastewater Treatment Plant, 3 Lift Stations, 3 Pump Stations, 6 Storage Tanks, 3 Meter Vaults, 1 Transmission Line
City of Oak Point	1 Government Building, 2 Shelter/Church, 2 Schools
City of Pilot Point	1 City Hall, 1 Fire Station, 1 Police Station, 5 Schools, 1 Wastewater Treatment Plant, 17 Lift Stations, 8 Pump Stations, 1 Library, 1 Senior Center
Town of Ponder	1 Town Hall, 1 VFD, 3 Schools, 4 Shelters/Churches, 1 Wastewater Plant, 3 Lift Stations, 6 Water Wells
Town of Providence Village	1 Town Hall, 1 Emergency Service Building, 2 Schools, 1 Medical Center, 2 Daycare Facilities, 1 Water Treatment Plant, 1 Storage Tank, 1 Grocery Store, 1 Fuel Station
City of Roanoke	1 EOC, 1 Fire Station, 1 Police Station, 1 Water and Wastewater Facility, 6 Lift Stations, 1 Pump Station, 1 Water Tower, 1 Alert System
City of Sanger	1 City Hall, 1 Fire Station, 1 Police Station, 4 Schools, 3 City Department Buildings, 1 Community Center, 2 Shelters/Churches, 1 Wastewater Plant, 6 Lift Stations, 6 Pump Stations
Town of Shady Shores	1 Community Center, 3 Schools, 1 Tornado Siren
City of The Colony	6 Government Buildings, 5 Fire Station, 1 Police Station, 2 Community Centers, 1 Assisted Living Facility, 1 911 Annex, 1 Radio Tower, 1 Wastewater Treatment Plant, 5 Lift Stations, 9 Pump Stations, 1 Storage Tank, 2 Water Wells, 1 Water Control Room, 10 Outdoor Sirens
Town of Trophy Club	1 EOC, 1 Town Hall, 1 Fire Station, 1 Police Station, 4 Schools, 1 Hospital, 2 Community Facilities, 8 Churches, 4 Parks, 1 Maintenance Building, 1 Municipal Utility District, 1 Wastewater Treatment Plant, 8 Lift Stations, 5 Pump Stations, 4 Water Storage Tanks

A thunderstorm wind event can also result in traffic disruptions, injuries and in rare cases, fatalities. Impact of thunderstorms winds experienced in the Denton County planning area has

SECTION 6: THUNDERSTORM WIND

resulted in twenty-four injuries and four fatalities. Impact of thunderstorm wind events experienced in the Denton County planning area, including all participating jurisdictions, would be “Minor,” and injuries would not result in permanent disability, more than ten percent of property damaged or destroyed, and facilities would be shut down for more than one week. However, based on the historical reported injuries and fatalities that occurred, impact could be considered “substantial” based on the severity of the thunderstorm event. Overall, the average loss estimate (in 2022 dollars) is \$14,563,333 having an approximate annual loss estimate of \$215,713 (Table 6-8).

Table 6-8. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Denton County	\$1,040,936	\$15,421
Town of Argyle	\$550,251	\$8,152
City of Aubrey	\$151,497	\$2,244
Town of Bartonville	\$19,682	\$292
Town of Copper Canyon	\$0	\$0
City of Corinth	\$1,509,853	\$22,368
Town of Cross Roads	\$0	\$0
City of Denton	\$7,171,027	\$106,237
Town of DISH	\$0	\$0
Town of Double Oak	\$0	\$0
Town of Flower Mound	\$0	\$0
City of Hackberry	\$0	\$0
Town of Hebron	\$23,984	\$355
Town of Hickory Creek	\$0	\$0
City of Highland Village	\$0	\$0
City of Justin	\$189,279	\$2,804
City of Krugerville	\$0	\$0
City of Krum	\$484,003	\$7,170
City of Lake Dallas	\$6,239	\$92
Town of Lakewood Village	\$0	\$0
City of Lewisville	\$1,571,495	\$23,281
Town of Little Elm	\$444,636	\$6,587

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Town of Northlake	\$0	\$0
City of Oak Point	\$0	\$0
City of Pilot Point	\$168,149	\$2,491
Town of Ponder	\$56,128	\$832
Town of Providence Village	\$0	\$0
City of Roanoke	\$620,944	\$9,199
City of Sanger	\$555,230	\$8,226
Town of Shady Shores	\$0	\$0
City of The Colony	\$0	\$0
Town of Trophy Club	\$0	\$0
Planning Area	\$14,563,333	\$215,753

ASSESSMENT OF IMPACTS

Thunderstorm wind events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. The impact of climate change could produce larger, more severe thunderstorm wind events, exacerbating the current thunderstorm wind impacts. Worsening thunderstorm wind conditions can be frequently associated with a variety of impacts, including:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- During exceptionally heavy wind events, first responders may be prevented from responding to calls, as the winds may reach a speed in which their vehicles and equipment are unsafe to operate.
- Thunderstorm wind events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning, as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.

SECTION 6: THUNDERSTORM WIND

- First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.
- Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.
- Critical staff may be unable to report for duty, limiting response capabilities.
- City, town, or county departments may be damaged, delaying response and recovery efforts for the entire community.
- Private sector entities that the City/Town and its residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Some businesses not directly damaged by thunderstorm wind events may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to thunderstorm winds.
- Large scale wind events can have significant economic impact on the affected area, as it must now fund expenses such as infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, and normal day-to-day operating expenses.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damages without a backup power source.
- Recreational areas and parks may be damaged or inaccessible due to downed trees or debris, causing temporary impacts to area businesses.

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

SECTION 7: TORNADO

Hazard Description 1
 Location 1
 Extent.....2
 Historical Occurrences.....5
 Significant Events..... 10
 Probability of Future Events..... 10
 Vulnerability and Impact..... 11
 Assessment of Impacts 18

HAZARD DESCRIPTION



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

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

Table 7-1. Variations among Tornadoes

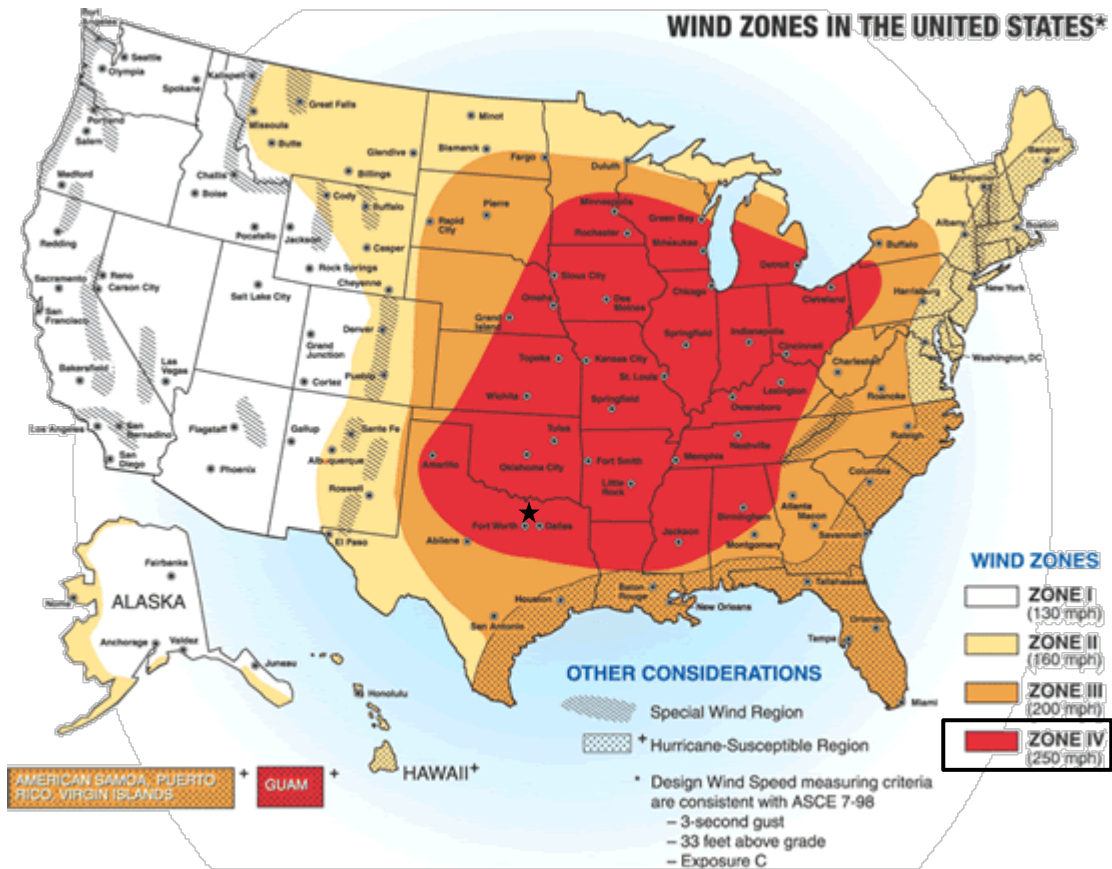
WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
<ul style="list-style-type: none"> 69% of all tornadoes Less than 5% of tornado deaths Lifetime 1-10+ minutes Winds less than 110 mph 	<ul style="list-style-type: none"> 29% of all tornadoes Nearly 30% of all tornado deaths May last 20 minutes or longer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

LOCATION

Tornadoes do not have any specific geographic boundary and can occur throughout the County planning area uniformly. It is assumed that the entire Denton County planning area, including all

participating jurisdictions, is uniformly exposed to tornado activity. The entire Denton County planning area is located in Wind Zone IV (Figure 7-1), where tornado winds can be as high as 250 mph.

Figure 7-1. FEMA Wind Zones in the United States¹



EXTENT

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

¹ Denton County is indicated by the star.







Table 7-2. The Fujita Tornado Scale²

F-SCALE NUMBER	INTENSITY	WIND SPEED (MPH)	TYPE OF DAMAGE DONE	PERCENT OF APPRAISED STRUCTURE VALUE LOST DUE TO DAMAGE
F0	Gale Tornado	40 – 72	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.	None Estimated
F1	Moderate Tornado	73 – 112	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads; attached garages may be destroyed.	0% – 20%
F2	Significant Tornado	113 – 157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	50% – 100%
F3	Severe Tornado	158 – 206	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	100%
F4	Devastating Tornado	207 – 260	Well-constructed homes leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.	100%
F5	Incredible Tornado	261 – 318	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles flying through the air in excess of 330 yards; trees debarked; steel reinforced concrete badly damaged.	100%

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

Tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (Table 7-2). Since February 2007, the Fujita Scale has been replaced by the Enhanced Fujita Scale (Table 7-3), which retains the same basic design and six strength categories as the previous scale. The newer scale reflects more refined assessments of tornado damage surveys, standardization, and damage consideration to a wider range of structures.

Table 7-3. Enhanced Fujita Scale for Tornadoes

STORM CATEGORY	DAMAGE LEVEL	3 SECOND GUST (MPH)	DESCRIPTION OF DAMAGES	PHOTO EXAMPLE
EF0	Gale	65 – 85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.	
EF1	Weak	86 – 110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads; attached garages may be destroyed.	
EF2	Strong	111 – 135	Considerable damage; roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	
EF3	Severe	136 – 165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	
EF4	Devastating	166 – 200	Well-constructed homes leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.	
EF5	Incredible	200+	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles flying through the air in excess of 330 yards; trees debarked; steel reinforced concrete badly damaged.	

Both the Fujita Scale and Enhanced Fujita Scale should be referenced in reviewing previous occurrences since tornado events prior to 2007 will follow the original Fujita Scale. The largest

magnitude reported within the planning area is an F3 on the Fujita Scale, a “Severe Tornado.” Based on the planning area’s location in Wind Zone IV, the planning area could experience anywhere from an EF0 to EF5 depending on the wind speed.

The events in Denton County (converted from the Fujita Scale) have been between EF0 and EF5 (Table 7-4). Therefore, the range of intensity that the Denton County planning area, including all participating jurisdictions, would be expected to mitigate is a tornado event that would be a low to severe risk, an EF0 to EF5. Historically, the strongest tornado to strike the planning area was an F3, which would be an EF5 on the Enhanced Fujita Scale with the highest wind speed. This is the strongest event the planning area can anticipate in the future.

HISTORICAL OCCURRENCES

Only reported tornadoes were factored into the Risk Assessment. It is likely that a high number of occurrences have gone unreported over the past 72.5 years. Historical tornado data for the county, participating jurisdictions and is provided within a jurisdiction-wide basis per the NCEI database.

Figure 7-2 identifies the locations of previous occurrences in the Denton County planning area from 1950 through June 2022. A total of 54 events have been recorded by the Storm Prediction Center (NOAA) and NCEI databases for the Denton County planning area, including all participating jurisdictions.

Figure 7-2. Spatial Historical Tornado Events, 1950-2022³

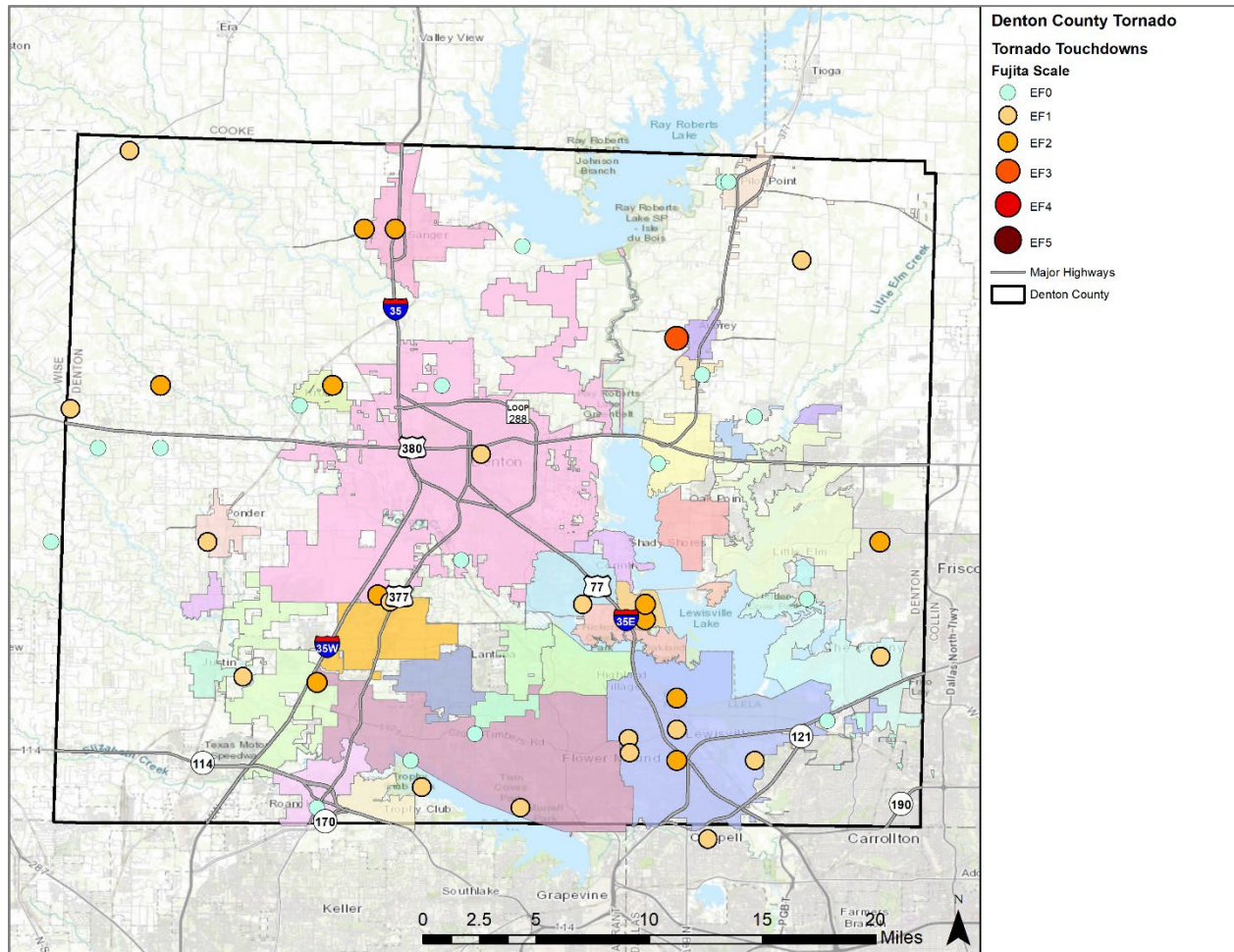


Table 7-4. Historical Tornado Events, 1950-2022⁴

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	4/6/1955	4:30 AM	F2	0	1	\$277,314	\$0
Denton County	4/2/1957	6:30 PM	Unknown	0	0	\$265,386	\$0
Denton County	4/3/1957	10:30 AM	F0	0	0	\$314	\$0
Denton County	11/3/1959	8:30 PM	F2	0	0	\$251,846	\$0
Denton County	5/4/1960	10:00 PM	F1	0	0	\$250,992	\$0
Denton County	8/21/1960	3:15 PM	F2	0	2	\$250,144	\$0

³ Source: NOAA Records

⁴ Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2022 dollars. Events are reported from January 1950 through June 2022.

SECTION 7: TORNADO

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	6/29/1967	5:30 PM	F2	0	0	\$22,235	\$0
Denton County	4/22/1968	6:40 AM	F1	0	0	\$21,524	\$0
Denton County	5/15/1969	4:30 PM	F2	0	0	\$203,414	\$0
Denton County	7/26/1971	3:40 PM	F2	0	1	\$181,923	\$0
Denton County	12/14/1971	6:10 PM	F2	0	0	\$180,153	\$0
Denton County	12/3/1973	1:10 PM	F2	0	0	\$16,027	\$0
Denton County	10/30/1979	8:58 AM	F0	0	0	\$9,846	\$0
Denton County	5/17/1981	5:53 PM	F2	0	0	\$8,245	\$0
Denton County	4/16/1982	4:37 PM	F0	0	0	\$78,022	\$0
Denton County	5/11/1982	8:25 PM	F1	0	0	\$772,889	\$0
Denton County	3/18/1984	4:03 PM	F0	0	0	\$722	\$0
Denton County	4/28/1991	12:33 PM	F2	0	0	\$547,653	\$0
Denton County	9/13/1993	8:00 AM	F1	0	0	\$1,020,575	\$0
City of Aubrey	9/13/1993	10:00 AM	F1	0	1	\$1,020,575	\$0
City of Lewisville	9/13/1993	8:23 AM	F1	0	0	\$1,020,575	\$0
City of Pilot Point	4/4/1997	4:50 PM	F0	0	0	\$18,488	\$0
Town of Little Elm	10/12/2001	8:20 PM	F1	0	0	\$16,667	\$0
City of Lewisville	12/30/2002	12:30 PM	F0	0	0	\$122,791	\$0
City of Sanger	6/6/2004	8:00 PM	F0	0	0	\$1,561	\$0
Town of Bartonville	4/24/2007	6:19 PM	EF1	0	0	\$143,295	\$0
City of Denton	4/24/2007	1:20 PM	EF0	0	0	\$57,318	\$0
City of Lewisville	6/10/2009	5:53 PM	EF1	0	0	\$274,623	\$0
City of Roanoke	6/10/2009	5:40 PM	EF0	0	0	\$6,866	\$0
Town of Argyle	5/24/2011	6:51 PM	EF2	0	0	\$983,025	\$0
Denton County	4/3/2012	1:40 PM	EF0	0	0	\$0	\$12,872
Denton County	5/7/2015	6:45 PM	EF1	0	0	\$249,087	\$12,454
Town of Argyle	5/10/2015	1:16 PM	EF1	0	0	\$4,359,027	\$0

SECTION 7: TORNADO

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Aubrey	5/10/2015	1:39 PM	EF0	0	0	\$49,817	\$24,909
City of Corinth	11/17/2015	3:44 AM	EF1	0	0	\$623,949	\$0
Denton County	3/8/2016	8:53 AM	EF1	0	0	\$111,935	\$0
City of Lewisville	3/29/2017	1:31 AM	EF1	0	0	\$728,884	\$0
City of Denton	4/30/2019	5:52 PM	EF1	0	0	\$231,793	\$0
City of Justin	4/30/2019	5:25 PM	EF1	0	0	\$57,948	\$0
City of Krum	5/29/2019	12:22 PM	EF0	0	0	\$1,157	\$0
Town of Hebron	3/21/2022	5:31 PM	EF0	0	0	\$20,603	\$0
TOTALS			(Max Extent)	0	5	\$14,459,208	\$50,235

Table 7-5. Summary of Historical Events, 1950-2022⁵

JURISDICTION	Number of Events	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	31	F3	0	4	\$4,720,252	\$25,327
Town of Argyle	2	EF2	0	0	\$5,342,052	\$0
City of Aubrey	2	F1	0	1	\$1,070,392	\$24,909
Town of Bartonville	1	EF1	0	0	\$143,295	\$0
Town of Copper Canyon	0	N/A	0	0	\$0	\$0
City of Corinth	1	EF1	0	0	\$623,949	\$0
Town of Cross Roads	0	N/A	0	0	\$0	\$0
City of Denton	3	EF1	0	0	\$289,111	\$0
Town of DISH	0	N/A	0	0	\$0	\$0
Town of Double Oak	0	N/A	0	0	\$0	\$0
Town of Flower Mound	0	N/A	0	0	\$0	\$0
City of Hackberry	0	N/A	0	0	\$0	\$0
Town of Hebron	1	EF0	0	0	\$20,603	\$0

⁵ Damages reported in 2022 dollars. Events are reported from January 1950 through June 2022.

SECTION 7: TORNADO

JURISDICTION	Number of Events	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Town of Hickory Creek	0	N/A	0	0	\$0	\$0
City of Highland Village	0	N/A	0	0	\$0	\$0
City of Justin	1	EF1	0	0	\$57,948	\$0
City of Krugerville	0	N/A	0	0	\$0	\$0
City of Krum	2	EF0	0	0	\$1,157	\$0
City of Lake Dallas	0	N/A	0	0	\$0	\$0
Town of Lakewood Village	0	N/A	0	0	\$0	\$0
City of Lewisville	4	F1	0	0	\$2,146,873	\$0
Town of Little Elm	1	F1	0	0	\$16,667	\$0
Town of Northlake	0	N/A	0	0	\$0	\$0
City of Oak Point	0	N/A	0	0	\$0	\$0
City of Pilot Point	2	EF0	0	0	\$18,488	\$0
Town of Ponder	0	N/A	0	0	\$0	\$0
Town of Providence Village	0	N/A	0	0	\$0	\$0
City of Roanoke	1	EF0	0	0	\$6,866	\$0
City of Sanger	2	F0	0	0	\$1,561	\$0
Town of Shady Shores	0	N/A	0	0	\$0	\$0
City of The Colony	0	N/A	0	0	\$0	\$0
Town of Trophy Club	0	N/A	0	0	\$0	\$0
TOTAL LOSSES	54	(Max Extent)	0	5	\$14,689,443	

Based on the list of historical tornado events for the Denton County planning area (listed above), including all participating jurisdictions, there have been 6 recorded events since the 2016 Plan.

SIGNIFICANT EVENTS

March 29, 2017 – City of Lewisville

A line of thunderstorms developed moving through much of north Texas with reports of hail and damaging wind gusts. A tornado produced EF-1 damage in the city of Lewisville. The damage began near the intersection of Fox Avenue and Boxwood, before moving to the north and northeast, ending near I-35E. Severe damage was done to about ten homes, with 5 homes losing part of the roof, along with blown out windows. The damage was most concentrated at the beginning of the tornado, yet several businesses and government buildings suffered damage as the storm quickly moved through part of Lewisville. Total damage estimates were approximately \$600,000.

May 10, 2015 – Denton County / Town of Argyle / Denton

An active weather pattern led to numerous severe thunderstorms, many of which produced tornadoes. Reports of EF-1 damage from a tornado that occurred central Denton County. This tornado began near the city of Argyle and moved in a north to northeast direction, towards the city of Denton. Several small buildings were damaged or destroyed along US 377 between Argyle and Denton. As the tornado entered into a sparsely populated area within the Denton city limits, trees were damaged. The Denton County Emergency Services estimate the tornado damage to be approximately \$3.5 million.

May 24, 2011 – Town of Argyle / Denton

Three rounds of thunderstorms affected north Texas with 10 tornadoes confirmed. The most significant, an EF-2 tornado began near the Argyle/Denton city line and traveled northeast for just over 1 mile. The tornado caused significant roof damage to numerous homes, and reports of trees were also damaged along the path of the tornado. Maximum winds with this tornado were estimated between 115 and 125 MPH. Total damage costs estimated \$750,000.

April 24, 2007 – Denton County / Town of Flower Mound

A tornado touched down with reported wind speed around 80-85 mpg and reports of large hail and flash flooding during the event. Significant tree damage and substantial property damage specially to roofs and fences. There were no reported injuries related to the event, but damage estimates were approximately \$100,000 for the impacted area of Flower Mound.

September 13, 1993 – City of Aubrey

A tornado touched down east of Aubrey on Farm-to-Market Road 1385. A ranch house, several barns, an apartment, and a mobile home were destroyed. A man was seriously injured from flying debris. Estimated damage totals were approximately \$500,000.

PROBABILITY OF FUTURE EVENTS

Tornadic events can occur at any time of year and at any time of day, but they are typically more common in the spring months during the late afternoon and evening hours. A smaller, high frequency period can emerge in the fall during the brief transition between the warm and cold seasons. According to historical records, Denton County, including all participating jurisdictions, can experience a tornado touchdown approximately once every one to two years. This frequency supports a “Highly Likely” probability of future events for Denton County, including all participating jurisdictions, or an event probable in the next year.

VULNERABILITY AND IMPACT

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities, and populations in the entire Denton County planning area, including all participating jurisdictions, are considered to be exposed to this hazard and could potentially be impacted. The damage caused by a tornado is typically a result of high wind velocity, wind-blown debris, lightning, and large hail.

The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Consequently, vulnerability of humans and property is difficult to evaluate since tornadoes form at different strengths, in random locations, and create relatively narrow paths of destruction. Although tornadoes strike at random, making all buildings vulnerable, three types of structures are more likely to suffer damage:

- Manufactured Homes;
- Homes on crawlspaces (more susceptible to lift); and
- Buildings with large spans, such as shopping malls, gymnasiums, and factories.

Tornadoes can cause a significant threat to people as they could be struck by flying debris, falling trees/branches, utility lines, and poles. Blocked roads could prevent first responders to respond to calls. Tornadoes commonly cause power outages which could cause health and safety risks to residents and visitors, as well as to patients in hospitals.

The Denton County planning area features multiple mobile or manufactured home parks throughout the planning area, including all participation jurisdictions. These parks are typically more vulnerable to tornado events than typical site-built structures. In addition, manufactured homes are located sporadically throughout the planning area including all participating jurisdictions and unincorporated areas of the county which would also be more vulnerable. The US Census data indicates a total of 9,871 manufactured homes located in the Denton County planning area (2.9%), including participating jurisdictions (Table 7-6). In addition, 14.3% (approximately 48,567 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant wind events.

Table 7-6. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Denton County	9,871	48,567
Town of Argyle	0	327
City of Aubrey	0	330
Town of Bartonville	60	112
Town of Copper Canyon	0	169
City of Corinth	100	194

SECTION 7: TORNADO

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Town of Cross Roads	13	72
City of Denton	1,981	16,567
Town of DISH	13	3
Town of Double Oak	0	147
Town of Flower Mound	611	1,555
City of Hackberry	62	59
Town of Hebron	9	8
Town of Hickory Creek	0	269
City of Highland Village	0	1,037
City of Justin	0	272
City of Krugerville	0	147
City of Krum	0	233
City of Lake Dallas	379	529
Town of Lakewood Village	0	56
City of Lewisville	1,663	7,387
Town of Little Elm	536	288
Town of Northlake	7	75
City of Oak Point	5	107
City of Pilot Point	100	551
Town of Ponder	2	126
Town of Providence Village	0	11
City of Roanoke	332	246
City of Sanger	93	794
Town of Shady Shores	38	182
City of The Colony	42	4,382
Town of Trophy Club	0	543

While all citizens are at risk to the impacts of a tornado, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 7.2% of the planning area population live below the poverty level (Table 7-7).

Table 7-7. Populations at Greatest Risk by Jurisdiction⁶

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Denton County	65,262
Town of Argyle	0
City of Aubrey	746
Town of Bartonville	105
Town of Copper Canyon	9
City of Corinth	928
Town of Cross Roads	21
City of Denton	22,099
Town of DISH	4
Town of Double Oak	168
Town of Flower Mound	3,114
City of Hackberry	181
Town of Hebron	34
Town of Hickory Creek	42
City of Highland Village	286
City of Justin	119
City of Krugerville	19
City of Krum	192
City of Lake Dallas	401
Town of Lakewood Village	54
City of Lewisville	10,735

⁶ US Census Bureau 2021 American Community Survey data for Denton County

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Town of Little Elm	3,484
Town of Northlake	94
City of Oak Point	78
City of Pilot Point	342
Town of Ponder	46
Town of Providence Village	846
City of Roanoke	242
City of Sanger	902
Town of Shady Shores	166
City of The Colony	3,206
Town of Trophy Club	342

The following critical facilities would be vulnerable to tornado events in each participating jurisdiction:

Table 7-8. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Denton County	3 Biodiesel Plants, 5,136 Wells, 4 Broadband Service Transmitters, 11 Cellular Towers, 51 Commercial Transmission Towers, 1 Convention Center, 4 Fairground Complexes, 93,047 Power Transmission Lines, 63 Electric Substations, 39 EMS Stations, 49 Fire Stations, 7 FM Transmission Towers, 141 General Manufacturing Facilities, 19 Hospitals, 3 Major Sport Venues, 792 Microwave Service Towers, 125 Shelter Facilities, 1 Natural Gas Storage Facility, 42 Non-gasoline Alternative Fueling Stations, 99 Nursing Homes, 14 Paging Transmission Towers, 4,879 Pipelines, 558 Places of Worship, 1 Pumping Station, 29 Police Stations, 7 Power Plants, 6 Public Transit Stations, 5,117 Surface Wells, 11 Urgent Care Facilities, 1 Weather Radar Station
Town of Argyle	1 Town Hall, 1 Fire Station, 1 Police Station, 5 Schools
City of Aubrey	1 City Hall, 2 Fire Station, 1 Police Station, 1 Public Works Facility, 1 Wastewater Plant, 11 Lift Stations, 2 Elevated Water Wells, 2 Ground Storage Water Wells
Town of Bartonville	1 Government Building, 1 Shelter/Church, 2 Water Supply Facilities

SECTION 7: TORNADO

JURISDICTION	CRITICAL FACILITIES
Town of Copper Canyon	1 Government Building
City of Corinth	1 EOC Building, 1 City Hall, 2 Fire Stations, 14 Schools, 1 Public Works Facility, 2 Pump Station 14 Lift Stations, 2 Elevated Water Tanks, 9 Warning Sirens
Town of Cross Roads	1 Town Hall, 1 Police Station, 1 Assisted Living Facility, 1 Residential Facility, 2 Places of Worship, 1 Water Tower, Transmission Lines
City of Denton	10 Government Buildings, 7 Federal Buildings, 7 Fire Stations, 2 Water Treatment Plants, 23 Schools, 3 Universities/Colleges, 2 Daycare Facilities, 3 Community Centers, 2 Traffic/Service Centers, 2 Airport/Field, 1 Fairground, 1 Landfill, 1 Natatorium
Town of DISH	1 Government Building
Town of Double Oak	1 Town Hall, 1 VFD, 1 Police Station, 1 School, 1 Shelter/Church, 1 Water Tower, 1 Warning Siren
Town of Flower Mound	1 Town Hall, 7 Fire Stations, 1 Police/Government Building, 2 Community Centers, 1 Library, 2 Public Works Facility, 1 Animal Shelter, 1 Wastewater Treatment Plant, 19 Lift Stations, 2 Water Storage Facility, 3 Water Towers, 4 Fueling Station, 1 RV Park
City of Hackberry	1 Wastewater Treatment Plant, 1 Water Plant, 2 Water Towers
Town of Hebron	None reported.
Town of Hickory Creek	1 Town Hall, 1 Public Works Facility
City of Highland Village	1 Government Building, 1 Fire Station, 4 Schools, 10 Lift Stations, 7 Pump Stations
City of Justin	1 City Hall, 1 Sewer Plant, 3 Lift Stations
City of Krugerville	1 City Hall, 1 Police Station, 1 Solar Station, 1 Substation, 1 Utility District, 1 Maintenance Building
City of Krum	1 City Hall, 1 Fire Station, 1 Police Station, 1 Federal Building, 1 Community Center, 8 Schools, 2 Childcare Facilities, 1 Public Works Facility, 1 Wastewater Plant, 3 Water Towers, 1 Medical Center, 5 Churches, 4 Warning Sirens
City of Lake Dallas	1 Government Building, 1 Fire Station, 2 Schools, 1 Library, 2 Water and Wastewater Facilities, 1 Wastewater Treatment Plant, 1 Airport
Town of Lakewood Village	1 Town Hall, 1 Wastewater Treatment Plant, 4 Lift Stations, 1 Water Plant, 1 Water Production Facility
City of Lewisville	3 EOC Facilities, 7 Fire Stations, 1 Police Station, 45 Government Facilities, 1 Dispatch, 17 Communication Facilities, 1 Jail, 17 Healthcare Facilities, 7 Chemical Facilities, 22 Commercial Facilities, 5 Critical Manufacturing Facilities, 4 Defense Industrial Facilities, 7 Energy Facilities, 8 Financial Institutions, 5 Food and Agriculture

JURISDICTION	CRITICAL FACILITIES
	Facilities, 1 Information Technology Facility, 6 Transportation Systems, 34 Water and Wastewater Facilities, 1 Dam
Town of Little Elm	1 EOC, 1 Town Hall, 3 Fire Stations, 1 Public Safety Center, 1 Public Works Facility, 6 Bridges and Infrastructure, 23 Lift Stations, 3 Pump Stations, 3 Water Towers, 2 Water Tanks
Town of Northlake	1 Town Hall, 1 Government Building, 1 Police Department, 1 Public Works Facility, 1 Wastewater Treatment Plant, 3 Lift Stations, 3 Pump Stations, 6 Storage Tanks, 3 Meter Vaults, 1 Transmission Line
City of Oak Point	1 Government Building, 2 Shelter/Church, 2 Schools
City of Pilot Point	1 City Hall, 1 Fire Station, 1 Police Station, 5 Schools, 1 Wastewater Treatment Plant, 17 Lift Stations, 8 Pump Stations, 1 Library, 1 Senior Center
Town of Ponder	1 Town Hall, 1 VFD, 3 Schools, 4 Shelters/Churches, 1 Wastewater Plant, 3 Lift Stations, 6 Water Wells
Town of Providence Village	1 Town Hall, 1 Emergency Service Building, 2 Schools, 1 Medical Center, 2 Daycare Facilities, 1 Water Treatment Plant, 1 Storage Tank, 1 Grocery Store, 1 Fuel Station
City of Roanoke	1 EOC, 1 Fire Station, 1 Police Station, 1 Water and Wastewater Facility, 6 Lift Stations, 1 Pump Station, 1 Water Tower, 1 Alert System
City of Sanger	1 City Hall, 1 Fire Station, 1 Police Station, 4 Schools, 3 City Department Buildings, 1 Community Center, 2 Shelters/Churches, 1 Wastewater Plant, 6 Lift Stations, 6 Pump Stations
Town of Shady Shores	1 Community Center, 3 Schools, 1 Tornado Siren
City of The Colony	6 Government Buildings, 5 Fire Station, 1 Police Station, 2 Community Centers, 1 Assisted Living Facility, 1 911 Annex, 1 Radio Tower, 1 Wastewater Treatment Plant, 5 Lift Stations, 9 Pump Stations, 1 Storage Tank, 2 Water Wells, 1 Water Control Room, 10 Outdoor Sirens
Town of Trophy Club	1 EOC, 1 Town Hall, 1 Fire Station, 1 Police Station, 4 Schools, 1 Hospital, 2 Community Facilities, 8 Churches, 4 Parks, 1 Maintenance Building, 1 Municipal Utility District, 1 Wastewater Treatment Plant, 8 Lift Stations, 5 Pump Stations, 4 Water Storage Tanks

The average loss estimate of property and crop is \$14,689,443 (in 2022 dollars), having an approximate annual loss estimate of \$202,613 (Table 7-9). Based on historic loss and damages, the impact of tornado on the Denton County planning area, including all participating jurisdictions, would be considered “Minor,” with more than 10 percent of property expected to be destroyed, injuries do not result in permanent disability, and critical facilities shut down for approximately one week. However, with five fatalities from historical events, the impact for the planning area is considered “Substantial” with multiple fatalities possible depending on the severity of the event.

Table 7-9. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Denton County	\$4,925,572	\$67,939
Town of Argyle	\$5,342,052	\$73,683
City of Aubrey	\$1,095,301	\$15,108
Town of Bartonville	\$143,295	\$1,976
Town of Copper Canyon	\$0	\$0
City of Corinth	\$623,949	\$8,606
Town of Cross Roads	\$0	\$0
City of Denton	\$289,111	\$3,988
Town of DISH	\$0	\$0
Town of Double Oak	\$0	\$0
Town of Flower Mound	\$0	\$0
City of Hackberry	\$0	\$0
Town of Hebron	\$20,603	\$284
Town of Hickory Creek	\$0	\$0
City of Highland Village	\$0	\$0
City of Justin	\$57,948	\$799
City of Krugerville	\$0	\$0
City of Krum	\$1,157	\$16
City of Lake Dallas	\$0	\$0
Town of Lakewood Village	\$0	\$0
City of Lewisville	\$2,146,873	\$29,612
Town of Little Elm	\$16,667	\$230
Town of Northlake	\$0	\$0
City of Oak Point	\$0	\$0
City of Pilot Point	\$18,488	\$255
Town of Ponder	\$0	\$0

Town of Providence Village	\$0	\$0
City of Roanoke	\$6,866	\$95
City of Sanger	\$1,561	\$22
Town of Shady Shores	\$0	\$0
City of The Colony	\$0	\$0
Town of Trophy Club	\$0	\$0
Planning Area	\$14,689,443	\$202,613

ASSESSMENT OF IMPACTS

Tornadoes have the potential to pose a significant risk to the population and can create dangerous situations. Often times, providing and preserving public health and safety is difficult. The impact of climate change could produce larger, more severe tornado events, exacerbating the current tornado impacts. More destructive tornado conditions can be frequently associated with a variety of impacts, including:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Manufactured homes may suffer substantial damage as they would be more vulnerable than typical site-built structures.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- Tornadoes often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outages can result in an increase in structure fires and/or carbon monoxide poisoning as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Tornadoes can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.
- First responders must enter the damage area shortly after the tornado passes to begin rescue operations and to organize cleanup and assessments efforts, therefore they are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities, loss of communications, and damaged emergency vehicles and equipment.
- City, town or county departments may be damaged or destroyed, delaying response and recovery efforts for the entire community.

SECTION 7: TORNADO

- Private sector entities that the City/Town and its residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- Some businesses not directly damaged by the tornado may be negatively impacted while roads and utilities are being restored, further slowing economic recovery.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, and normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures destroyed by a tornado may not be rebuilt for years, reducing the tax base for the community.
- Large or intense tornadoes may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable, and tourism can be unappealing for years following a large tornado, devastating directly related local businesses.

The economic and financial impacts of a tornado event on the community will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by government, businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a tornado event.

SECTION 8: LIGHTNING

Hazard Description	1
Location	1
Extent.....	1
Historical Occurrences.....	3
Significant Events.....	5
Probability of Future Events.....	6
Vulnerability and Impact.....	6
Assessment of Impacts	12

HAZARD DESCRIPTION

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

According to FEMA, an average of 300 people are injured and 80 people are killed in the United States each year by lightning. Direct lightning strikes also have the ability to cause significant damage to buildings, critical facilities, and infrastructure. Lightning is also responsible for igniting wildfires that can result in widespread damages to property before firefighters have the ability to contain and suppress the resultant fire.

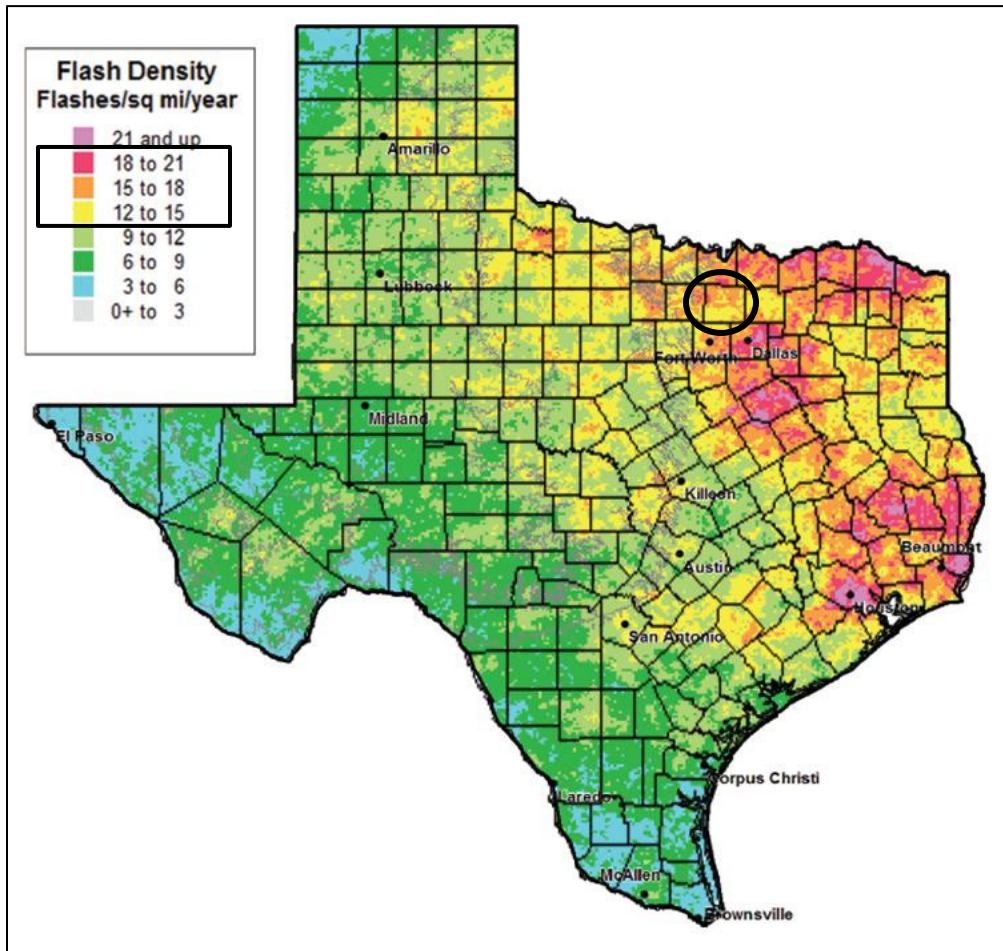
LOCATION

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

EXTENT

According to the NOAA, the average number of cloud-to-ground flashes for the State of Texas between 2006 and 2016 was 11.3 flashes per square mile. Vaisala’s U.S. National Lightning Detection Network lightning flash density map (Figure 8-1) shows a range of twelve to twenty-one cloud-to-ground lightning flashes per square mile per year for the entire Denton County planning area. This rate equates to approximately 11,436 to 20,013 flashes per year for the entire planning area.

Figure 8-1. Lightning Flash Density, 2006-2016



The extent for lightning can be expressed in terms of the number of strikes in an interval. NOAA utilizes lightning activity levels (LALs) on a scale from 1-6. LAL rankings reflect the frequency of cloud-to-ground lightning either forecast or observed (Table 8-1).

Table 8-1. NOAA Lightning Activity Levels (LAL)

LAL	CLOUD & STORM DEVELOPMENT	LIGHTNING STRIKES/ 15 MIN
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15

LAL	CLOUD & STORM DEVELOPMENT	LIGHTNING STRIKES/ 15 MIN
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common, and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy, and lightning is frequent and intense.	>25
6	Similar to LAL 3 except thunderstorms are dry.	

The NCEI does not include the LAL for historical lightning events, therefore in order to determine the extent of lightning strikes, the yearly average range of estimated number of lightning strikes within the planning area (11,436 to 20,013 flashes) and a cloud-to-ground flash density of twelve to twenty-one per square mile were divided by the number¹ of thunderstorm events that occur annually in the planning area. Denton County, including all participating jurisdictions, should expect an average range of five to nine lightning strikes within 15 minutes at any given time during a lightning or combined lightning and thunderstorm event, indicating lightning strikes have an average LAL range of 2 to 3. The highest being a 3 on the LAL for all participating jurisdictions in the future.

HISTORICAL OCCURRENCES

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

Table 8-2 Historical Lightning Events, 1996- 2022²

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Sanger	6/12/1996	1	2	\$0	\$0
City of Lewisville	9/3/1997	0	1	\$0	\$0
City of Lewisville	5/26/1999	0	0	\$17,820	\$0
City of Denton	3/8/2000	0	0	\$216,246	\$0
City of Lewisville	8/10/2001	0	0	\$116,800	\$0

¹ Analysis includes the highest number of events recorded in a given year during the reporting period in order to account for typical under reporting of thunderstorm and lightning events.

² Damages are reported in 2022 dollars. Events are reported from January 1996 through June 2022

SECTION 8: LIGHTNING

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Town of Ponder	5/27/2002	0	0	\$24,708	\$0
City of Denton	10/4/2004	0	0	\$15,514	\$0
City of Krum	7/12/2005	0	0	\$204,622	\$0
Town of Argyle	5/30/2007	0	0	\$306,213	\$0
City of Denton	6/28/2008	0	0	\$541,409	\$0
City of Lake Dallas	5/2/2009	0	1	\$0	\$0
City of Denton	3/10/2010	0	0	\$2,722	\$0
Town of Little Elm	5/2/2011	0	0	\$26,214	\$0
Denton County	5/22/2011	0	0	\$6,553	\$0
Denton County	6/21/2011	0	0	\$131,211	\$0
Town of Little Elm	6/21/2011	0	0	\$65,605	\$0
Denton County	1/25/2012	0	0	\$19,600	\$0
Denton County	5/30/2012	0	0	\$1,159,863	\$0
City of Roanoke	5/30/2012	0	0	\$644,368	\$0
Denton County	6/6/2012	0	0	\$90,344	\$0
Town of Hebron	6/6/2012	0	0	\$77,438	\$0
Town of Bartonville	5/29/2013	0	0	\$139,856	\$0
City of Sanger	4/3/2014	0	0	\$24,986	\$0
Denton County	6/24/2014	0	0	\$621,313	\$0
Denton County	10/13/2014	0	0	\$24,948	\$0
City of Lewisville	5/6/2015	0	0	\$62,272	\$0
Town of Little Elm	5/7/2015	0	0	\$320,077	\$0
Denton County	6/26/2015	0	0	\$124,109	\$0
City of Sanger	11/5/2015	0	0	\$1,248	\$0
Denton County	3/23/2016	0	0	\$24,875	\$0
Denton County	3/23/2016	0	0	\$24,875	\$0
City of Roanoke	7/4/2016	0	0	\$12,308	\$0
Town of Hebron	9/6/2018	0	0	\$58,662	\$0

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Town of Bartonville	6/23/2020	0	0	\$172,328	\$0
Town of Bartonville	6/23/2020	0	0	\$114,885	\$0
Town of Bartonville	6/23/2020	0	0	\$57,443	\$0
Town of Bartonville	6/23/2020	0	0	\$287,213	\$0
City of Justin	6/23/2020	0	0	\$57,443	\$0
Denton County	9/1/2020	0	0	\$568,947	\$0
Denton County	2/28/2021	0	0	\$16,891	\$0
TOTALS		1	4	\$6,381,929	\$0

Based on the list of historical lightning events for the Denton County planning area (listed above), including all participating jurisdictions, 11 events have occurred since the 2016 Plan.

SIGNIFICANT EVENTS

September 1, 2020 – Denton County

An upper-level trough moved very slowly resulting in several days of showers and thunderstorms. Many storms became strong with gusty winds and hail, but the primary result was heavy rain and flooding. Lightning started a house fire in the 7000 block of Rainbow Falls Drive in Frisco, Denton County. There was fire damage to the roof, attic, and second floor, along with smoke and water damage throughout the structure. The damage is estimated at \$500,000.

June 24, 2014- Denton County

A stationary front draped across central portions of North Texas served as a focus for thunderstorm development while a second thunderstorm complex advanced from the northwest. Several thunderstorms became severe with damaging winds being the primary occurrence. Lightning started a house fire. Estimated losses from this event were \$500,000.

May 30, 2012 – Denton County / Town of Flower Mound

A surface low and dryline remained over North Texas causing several rounds of severe storms, with reports of hail up to the size of golf balls and wind gusts up to 70 mph. Four homes and one apartment building were struck by lightning in Flower Mound when a complex of thunderstorms moved through in the late evening hours. Multiple house fires were reported within the area related to the storm event occurring on Dickens Lane Remington Park Drive, Beacon Street, and Crescent Drive. There were no reported injuries, however damage estimates were approximately \$900,000.

May 2, 2009 – City of Lake Dallas

Several rounds of severe thunderstorms and thunderstorm clusters moved through north Texas in a very unstable environment. Flash flooding and flooding became a problem as several clusters of storms produced heavy rainfall over repeated areas. A man was struck by lightning after it first hit a tree and then struck him. He was not seriously injured but taken to the hospital.

PROBABILITY OF FUTURE EVENTS

Based on historical records and input from the planning team the probability of occurrence for future lightning events in the Denton County planning area, including all participating jurisdictions, is considered highly likely, or an event probable in the next year. The planning team stated that lightning occurs regularly in the area. According to NOAA, the Denton County planning area is located in an area of the country that experiences twelve to twenty-one lightning flashes per square mile per year (approximately 11,436 to 20,013 flashes per year). Given this estimated probability of events, it can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the planning area, including all participating jurisdictions.

VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since lightning events can occur at different strength levels, in random locations, and can create a broad range of damages depending on the strike location. Due to the randomness of these events, all existing and future structures and facilities in the Denton County planning area could potentially be impacted and remain vulnerable to possible injury and property loss from lightning strikes. The Denton County planning area has 40 reported lightning events per the NCEI, however the county, including all participating jurisdictions, are vulnerable and could be impacted by lightning.

The direct and indirect losses associated with these events include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on community resources. The entire population of Denton County, including all participating jurisdictions, is considered exposed to the lightning hazard. The peak lightning season in the State of Texas is from June to August; however, the most fatalities occur in July. Fatalities occur most often when people are outdoors and/or participating in some form of recreation. Population located outdoors is considered at risk and more vulnerable to a lightning strike compared to being inside a structure. Moving to a lower risk location will decrease a person's vulnerability.

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

While all citizens are at risk to the impacts of lightning, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 7.2% of the planning area population live below the poverty level (Table 8-3).

Table 8-3. Populations at Greatest Risk by Jurisdiction³

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Denton County	65,262

³ US Census Bureau 2021 American Community Survey data for Denton County.

SECTION 8: LIGHTNING

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Town of Argyle	0
City of Aubrey	746
Town of Bartonville	105
Town of Copper Canyon	9
City of Corinth	928
Town of Cross Roads	21
City of Denton	22,099
Town of DISH	4
Town of Double Oak	168
Town of Flower Mound	3,114
City of Hackberry	181
Town of Hebron	34
Town of Hickory Creek	42
City of Highland Village	286
City of Justin	119
City of Krugerville	19
City of Krum	192
City of Lake Dallas	401
Town of Lakewood Village	54
City of Lewisville	10,735
Town of Little Elm	3,484
Town of Northlake	94
City of Oak Point	78
City of Pilot Point	342
Town of Ponder	46
Town of Providence Village	846
City of Roanoke	242
City of Sanger	902

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Town of Shady Shores	166
City of The Colony	3,206
Town of Trophy Club	342

The following critical facilities would be vulnerable to lightning events in each participating jurisdiction:

Table 8-4. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Denton County	3 Biodiesel Plants, 5,136 Wells, 4 Broadband Service Transmitters, 11 Cellular Towers, 51 Commercial Transmission Towers, 1 Convention Center, 4 Fairground Complexes, 93,047 Power Transmission Lines, 63 Electric Substations, 39 EMS Stations, 49 Fire Stations, 7 FM Transmission Towers, 141 General Manufacturing Facilities, 19 Hospitals, 3 Major Sport Venues, 792 Microwave Service Towers, 125 Shelter Facilities, 1 Natural Gas Storage Facility, 42 Non-gasoline Alternative Fueling Stations, 99 Nursing Homes, 14 Paging Transmission Towers, 4,879 Pipelines, 558 Places of Worship, 1 Pumping Station, 29 Police Stations, 7 Power Plants, 6 Public Transit Stations, 5,117 Surface Wells, 11 Urgent Care Facilities, 1 Weather Radar Station
Town of Argyle	1 Town Hall, 1 Fire Station, 1 Police Station, 5 Schools
City of Aubrey	1 City Hall, 2 Fire Station, 1 Police Station, 1 Public Works Facility, 1 Wastewater Plant, 11 Lift Stations, 2 Elevated Water Wells, 2 Ground Storage Water Wells
Town of Bartonville	1 Government Building, 1 Shelter/Church, 2 Water Supply Facilities
Town of Copper Canyon	1 Government Building
City of Corinth	1 EOC Building, 1 City Hall, 2 Fire Stations, 14 Schools, 1 Public Works Facility, 2 Pump Station 14 Lift Stations, 2 Elevated Water Tanks, 9 Warning Sirens
Town of Cross Roads	1 Town Hall, 1 Police Station, 1 Assisted Living Facility, 1 Residential Facility, 2 Places of Worship, 1 Water Tower, Transmission Lines
City of Denton	10 Government Buildings, 7 Federal Buildings, 7 Fire Stations, 2 Water Treatment Plants, 23 Schools, 3 Universities/Colleges, 2 Daycare Facilities, 3 Community Centers, 2 Traffic/Service Centers, 2 Airport/Field, 1 Fairground, 1 Landfill, 1 Natatorium
Town of DISH	1 Government Building

SECTION 8: LIGHTNING

JURISDICTION	CRITICAL FACILITIES
Town of Double Oak	1 Town Hall, 1 VFD, 1 Police Station, 1 School, 1 Shelter/Church, 1 Water Tower, 1 Warning Siren
Town of Flower Mound	1 Town Hall, 7 Fire Stations, 1 Police/Government Building, 2 Community Centers, 1 Library, 2 Public Works Facility, 1 Animal Shelter, 1 Wastewater Treatment Plant, 19 Lift Stations, 1 Water Storage Facility, 2 Water Towers, 1 Fueling Station, 1 RV Park
City of Hackberry	1 Wastewater Treatment Plant, 1 Water Plant, 2 Water Towers
Town of Hebron	None reported.
Town of Hickory Creek	1 Town Hall, 1 Public Works Facility
City of Highland Village	1 Government Building, 1 Fire Station, 4 Schools, 10 Lift Stations, 7 Pump Stations
City of Justin	1 City Hall, 1 Sewer Plant, 3 Lift Stations
City of Krugerville	1 City Hall, 1 Police Station, 1 Solar Station, 1 Substation, 1 Utility District, 1 Maintenance Building
City of Krum	1 City Hall, 1 Fire Station, 1 Police Station, 1 Federal Building, 1 Community Center, 8 Schools, 2 Childcare Facilities, 1 Public Works Facility, 1 Wastewater Plant, 3 Water Towers, 1 Medical Center, 5 Churches, 4 Warning Sirens
City of Lake Dallas	1 Government Building, 1 Fire Station, 2 Schools, 1 Library, 2 Water and Wastewater Facilities, 1 Wastewater Treatment Plant, 1 Airport
Town of Lakewood Village	1 Town Hall, 1 Wastewater Treatment Plant, 4 Lift Stations, 1 Water Plant, 1 Water Production Facility
City of Lewisville	3 EOC Facilities, 7 Fire Stations, 1 Police Station, 45 Government Facilities, 1 Dispatch, 17 Communication Facilities, 1 Jail, 17 Healthcare Facilities, 7 Chemical Facilities, 22 Commercial Facilities, 5 Critical Manufacturing Facilities, 4 Defense Industrial Facilities, 7 Energy Facilities, 8 Financial Institutions, 5 Food and Agriculture Facilities, 1 Information Technology Facility, 6 Transportation Systems, 34 Water and Wastewater Facilities, 1 Dam
Town of Little Elm	1 EOC, 1 Town Hall, 3 Fire Stations, 1 Public Safety Center, 1 Public Works Facility, 6 Bridges and Infrastructure, 23 Lift Stations, 3 Pump Stations, 3 Water Towers, 2 Water Tanks
Town of Northlake	1 Town Hall, 1 Government Building, 1 Police Department, 1 Public Works Facility, 1 Wastewater Treatment Plant, 3 Lift Stations, 3 Pump Stations, 6 Storage Tanks, 3 Meter Vaults, 1 Transmission Line
City of Oak Point	1 Government Building, 2 Shelter/Church, 2 Schools
City of Pilot Point	1 City Hall, 1 Fire Station, 1 Police Station, 5 Schools, 1 Wastewater Treatment Plant, 17 Lift Stations, 8 Pump Stations, 1 Library, 1 Senior Center

JURISDICTION	CRITICAL FACILITIES
Town of Ponder	1 Town Hall, 1 VFD, 3 Schools, 4 Shelters/Churches, 1 Wastewater Plant, 3 Lift Stations, 6 Water Wells
Town of Providence Village	1 Town Hall, 1 Emergency Service Building, 2 Schools, 1 Medical Center, 2 Daycare Facilities, 1 Water Treatment Plant, 1 Storage Tank, 1 Grocery Store, 1 Fuel Station
City of Roanoke	1 EOC, 1 Fire Station, 1 Police Station, 1 Water and Wastewater Facility, 6 Lift Stations, 1 Pump Station, 1 Water Tower, 1 Alert System
City of Sanger	1 City Hall, 1 Fire Station, 1 Police Station, 4 Schools, 3 City Department Buildings, 1 Community Center, 2 Shelters/Churches, 1 Wastewater Plant, 6 Lift Stations, 6 Pump Stations
Town of Shady Shores	1 Community Center, 3 Schools, 1 Tornado Siren
City of The Colony	6 Government Buildings, 5 Fire Station, 1 Police Station, 2 Community Centers, 1 Assisted Living Facility, 1 911 Annex, 1 Radio Tower, 1 Wastewater Treatment Plant, 5 Lift Stations, 9 Pump Stations, 1 Storage Tank, 2 Water Wells, 1 Water Control Room, 10 Outdoor Sirens
Town of Trophy Club	1 EOC, 1 Town Hall, 1 Fire Station, 1 Police Station, 4 Schools, 1 Hospital, 2 Community Facilities, 8 Churches, 4 Parks, 1 Maintenance Building, 1 Municipal Utility District, 1 Wastewater Treatment Plant, 8 Lift Stations, 5 Pump Stations, 4 Water Storage Tanks

Impact of lightning experienced in the Denton County planning area has resulted in four injuries and one fatality. The historical injuries and fatality indicates a “Substantial” impact with multiple fatalities possible depending on the severity of the event. Overall, the average loss estimate for Denton County, including all participating jurisdictions, (in 2022 dollars) is \$6,381,929 having an approximate annual loss estimate of \$240,828 (Table 8-5).

Table 8-5. Potential Annualized Losses by Jurisdiction⁴

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Denton County	\$2,813,529	\$106,171
Town of Argyle	\$306,213	\$11,555
City of Aubrey	\$0	\$0
Town of Bartonville	\$771,725	\$29,122
Town of Copper Canyon	\$0	\$0
City of Corinth	\$0	\$0
Town of Cross Roads	\$0	\$0

⁴ Damage values are in 2022 dollars.

SECTION 8: LIGHTNING

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
City of Denton	\$775,891	\$29,279
Town of DISH	\$0	\$0
Town of Double Oak	\$0	\$0
Town of Flower Mound	\$0	\$0
City of Hackberry	\$0	\$0
Town of Hebron	\$136,100	\$5,136
Town of Hickory Creek	\$0	\$0
City of Highland Village	\$0	\$0
City of Justin	\$57,443	\$2,168
City of Krugerville	\$0	\$0
City of Krum	\$204,622	\$7,722
City of Lake Dallas	\$0	\$0
Town of Lakewood Village	\$0	\$0
City of Lewisville	\$196,892	\$7,430
Town of Little Elm	\$411,896	\$15,543
Town of Northlake	\$0	\$0
City of Oak Point	\$0	\$0
City of Pilot Point	\$0	\$0
Town of Ponder	\$24,708	\$932
Town of Providence Village	\$0	\$0
City of Roanoke	\$656,676	\$24,780
City of Sanger	\$26,234	\$990
Town of Shady Shores	\$0	\$0
City of The Colony	\$0	\$0
Town of Trophy Club	\$0	\$0
PLANNING AREA	\$6,381,929	\$240,828

ASSESSMENT OF IMPACTS

Lightning events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. The impact of climate change could produce more frequent and severe lightning events, exacerbating the current lightning impacts. Additional impacts to the planning area can include:

- Individuals exposed to the storm can be directly struck, posing significant health risks and potential death.
- Structures can be damaged or crushed by falling trees damaged by lightning, which can result in physical harm to the occupants.
- Lightning strikes can result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Lightning strikes can be associated with structure fires and wildfires, creating additional risk to residents and first responders.
- Emergency operations and services may be significantly impacted due to power outages and/or loss of communications.
- City, town or county departments may be damaged, delaying response and recovery efforts for the entire community.
- Economic disruption due to power outages and fires negatively impacts the programs and services provided by the community due to short and long term loss in revenue.
- Some businesses not directly damaged by lightning events may be negatively impacted while utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damages without a backup power source.

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

SECTION 9: HAIL

Hazard Description	1
Location	1
Extent.....	1
Historical Occurrences.....	3
Significant Events.....	10
Probability of Future Events.....	10
Vulnerability and Impact.....	11
Assessment of Impacts	18

HAZARD DESCRIPTION



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

LOCATION

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

EXTENT

The National Weather Service (NWS) classifies a storm as “severe” if there is hail three-quarters of an inch in diameter (approximately the size of a penny) or greater, based on radar intensity or as seen by observers. The intensity category of a hailstorm depends on hail size and the potential damage it could cause, as depicted in the National Centers for Environmental Information (NCEI) Intensity Scale in Table 9-1.

Table 9-1. Hail Intensity and Magnitude¹

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

The intensity scale in Table 9-1 ranges from H0 to H10, with increments of intensity or damage potential in relation to hail size (distribution and maximum), texture, fall speed, speed of storm translation, and strength of the accompanying wind. Based on available data regarding the previous occurrences for the area, the Denton County planning area, including all participating jurisdictions, may experience hailstorms ranging from an H0 to an H10. The County can mitigate a storm from low risk or hard hail to a super hailstorm with baseball size hail that leads to extensive structural damage and could cause fatal injuries. The largest hail event in the Denton County planning area resulted in hail measuring 4.5 inches in diameter, or a H10, which is considered very destructive. This is the worst extent the planning area can anticipate in the future.

¹ NCEI Intensity Scale, based on the TORRO Hailstorm Intensity Scale.

HISTORICAL OCCURRENCES

Historical evidence shown in Figure 9-1 demonstrates that the planning area is vulnerable to hail events overall, which typically result from severe thunderstorm activity. Historical events with reported damages, injuries, or fatalities are shown in Table 9-2. A total of 645 reported historical hail events impacted the Denton County planning area between January 1955 through June 2022 (Summary Table 9-3). These events were reported to NCEI and NOAA databases and may not represent all hail events to have occurred during the past 67.5 years. Only those events for the Denton County planning area with latitude and longitude available were plotted (Figure 9-1).

Figure 9-1. Spatial Historical Hail Events, 1955-2022

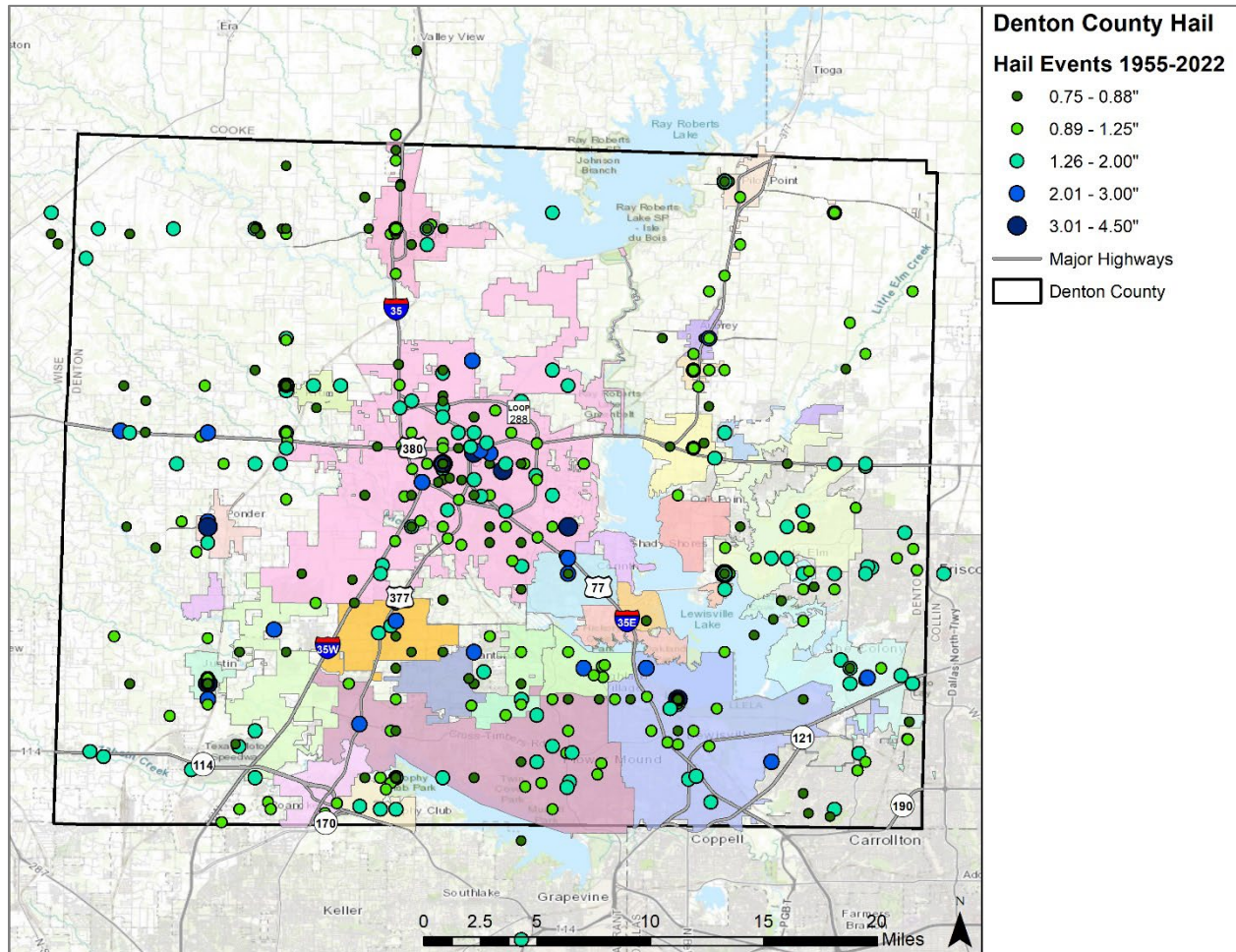


Table 9-2. Historical Hail Events, 1955-2022²

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
City of Sanger	4/19/1995	1.75	0	0	\$48,744	\$0

² Only recorded events with fatalities, injuries, and/or damages are listed. Events are reported from January 1955 through June 2022.

SECTION 9: HAIL

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
City of Lewisville	10/21/1996	4.5	0	0	\$187,095	\$0
Town of Ponder	4/28/2006	2.75	0	0	\$29,397	\$0
Town of Little Elm	7/8/2007	1.25	0	0	\$7,109	\$0
City of Lake Dallas	3/31/2008	2.75	0	0	\$13,870	\$0
Denton County	4/4/2008	1.75	0	0	\$27,573	\$0
City of Denton	4/4/2008	2.5	0	0	\$68,934	\$0
City of Denton	4/4/2008	1.75	0	0	\$34,467	\$0
City of Justin	3/30/2009	1.75	0	0	\$6,962	\$0
City of Justin	3/30/2009	1.75	0	0	\$6,962	\$0
Town of Argyle	5/2/2009	1.75	0	0	\$6,925	\$0
Town of Argyle	5/2/2009	1.75	0	0	\$6,925	\$0
City of Corinth	7/19/2009	1.75	0	0	\$5,501	\$0
City of Sanger	10/25/2009	1	0	0	\$685	\$0
Denton County	4/10/2011	1.5	0	0	\$197,530	\$0
Denton County	4/10/2011	1.75	0	0	\$6,584	\$0
City of Roanoke	4/14/2011	2	0	0	\$52,675	\$0
City of Roanoke	4/14/2011	1.75	0	0	\$32,922	\$0
Denton County	4/19/2011	1.75	0	0	\$65,843	\$0
City of Denton	4/19/2011	1.75	0	0	\$59,259	\$0
City of Krum	4/19/2011	1.75	0	0	\$26,337	\$0
City of Lewisville	4/19/2011	1.25	0	0	\$9,218	\$0
City of Lewisville	4/19/2011	1.75	0	0	\$65,843	\$0
Denton County	4/25/2011	2.5	0	0	\$13,169	\$0
City of Krum	4/25/2011	1.75	0	0	\$5,267	\$0
Denton County	6/21/2011	1.5	0	0	\$26,424	\$0
Town of Argyle	6/21/2011	1.75	0	0	\$328,026	\$0
Town of Bartonville	6/21/2011	1	0	0	\$19,682	\$0

SECTION 9: HAIL

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Town of Bartonville	6/21/2011	1.75	0	0	\$328,026	\$0
Denton County	2/3/2012	1.5	0	0	\$2,602	\$0
Denton County	4/3/2012	1.75	0	0	\$1,930,836	\$0
Denton County	4/3/2012	1.75	0	0	\$1,930,836	\$0
City of Lewisville	4/3/2012	1.75	0	0	\$643,612	\$0
City of Lewisville	4/3/2012	2	0	0	\$2,574,449	\$0
Denton County	5/30/2012	1.75	0	0	\$9,021	\$0
Denton County	6/6/2012	2	0	0	\$25,813	\$0
Denton County	5/29/2013	2	0	0	\$12,714	\$0
Denton County	5/29/2013	1.25	0	0	\$6,357	\$0
Town of Bartonville	5/29/2013	1.5	0	0	\$12,714	\$0
City of Corinth	5/29/2013	1.75	0	0	\$6,357	\$0
City of Denton	5/29/2013	2	0	0	\$12,714	\$0
City of Lewisville	5/29/2013	1.5	0	0	\$0	\$12,714
Denton County	4/3/2014	1.75	0	0	\$99,943	\$0
Denton County	4/3/2014	1.75	0	0	\$124,929	\$0
Denton County	4/3/2014	1.75	0	0	\$187,393	\$0
Denton County	4/3/2014	2	0	0	\$62,464	\$0
Denton County	4/3/2014	2.75	0	0	\$6,246,436	\$0
City of Aubrey	4/3/2014	1.75	0	0	\$49,971	\$0
City of Aubrey	4/3/2014	1.75	0	0	\$99,943	\$0
City of Aubrey	4/3/2014	2.75	0	0	\$187,393	\$0
City of Denton	4/3/2014	1.75	0	0	\$62,464	\$0
City of Denton	4/3/2014	2	0	0	9,994	\$0
City of Denton	4/3/2014	2.75	0	0	\$12,492,871	\$0
City of Denton	4/3/2014	3.5	0	0	\$14,991,446	\$0
City of Denton	4/3/2014	2	0	0	\$18,739,307	\$0

SECTION 9: HAIL

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
City of Denton	4/3/2014	1.5	0	0	\$624,644	\$0
City of Denton	4/3/2014	2.5	0	0	\$12,492,871	\$0
City of Denton	4/3/2014	1.75	0	0	\$312,322	\$0
City of Denton	4/3/2014	4.25	0	0	\$624,643,568	\$0
City of Denton	4/3/2014	1.75	0	0	\$62,464	\$0
City of Denton	4/3/2014	2	0	0	\$124,929	\$0
City of Krum	4/3/2014	1.75	0	0	\$12,493	\$0
City of Krum	4/3/2014	1.5	0	0	\$12,493	\$0
City of Denton	10/2/2014	1.75	0	0	\$6,237	\$0
City of Justin	10/2/2014	1.75	0	0	\$12,474	\$0
Town of Ponder	10/2/2014	1.75	0	0	\$12,474	\$0
City of Denton	3/17/2016	1.75	0	0	\$18,656	\$0
City of Lewisville	3/23/2016	1.25	0	0	\$6,219	\$0
City of Lewisville	3/23/2016	1.75	0	0	\$62,186,308	\$0
City of Lewisville	3/23/2016	1.5	0	0	\$124,373	\$0
City of Lewisville	3/23/2016	1.75	0	0	\$62,186,308	\$0
Denton County	4/11/2016	1.75	0	0	\$123,786	\$0
Denton County	4/11/2016	2.75	0	0	\$618,929	\$0
City of Corinth	4/11/2016	2.75	0	0	\$618,929	\$0
City of Denton	4/11/2016	1.75	0	0	\$185,679	\$0
City of Denton	4/11/2016	4	0	0	\$61,892,870	\$0
City of Denton	4/11/2016	2.5	0	0	\$618,929	\$0
City of Denton	4/11/2016	1.75	0	0	\$185,679	\$0
City of Krum	4/11/2016	1.75	0	0	\$123,786	\$0
Town of Little Elm	4/11/2016	2.75	0	0	\$618,929	\$0
Town of Ponder	4/11/2016	2.5	0	0	\$247,571	\$0
City of Denton	4/29/2016	1.75	0	0	\$7,427	\$0

SECTION 9: HAIL

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Denton County	3/26/2017	1.75	0	0	\$12,148	\$0
Denton County	3/26/2017	1.75	0	0	\$12,148	\$0
Denton County	3/26/2017	2	0	0	\$12,148	\$0
Town of Argyle	3/26/2017	2	0	0	\$12,148	\$0
Town of Argyle	3/26/2017	2.75	0	0	\$364,442	\$0
Town of Bartonville	3/26/2017	2.75	0	0	\$607,403	\$0
City of Corinth	3/26/2017	2.75	0	0	\$60,740	\$0
City of Corinth	3/26/2017	4.25	0	0	\$121,481	\$0
City of Corinth	3/26/2017	2.5	0	0	\$60,740	\$0
City of Justin	3/26/2017	2.75	0	0	\$485,923	\$0
City of Lake Dallas	3/26/2017	2.75	0	0	\$24,296	\$0
City of Lake Dallas	3/26/2017	1.75	0	0	\$24,296	\$0
City of Lewisville	3/26/2017	2.75	0	0	\$24,296	\$0
Town of Little Elm	3/26/2017	1.75	0	0	\$12,148	\$0
City of Pilot Point	3/26/2017	1.75	0	0	\$6,074	\$0
Town of Ponder	3/26/2017	2	0	0	\$303,702	\$0
City of Sanger	3/26/2017	1.75	0	0	\$12,148	\$0
Denton County	4/10/2017	1.75	0	0	\$6,056	\$0
Town of Little Elm	4/10/2017	2	0	0	\$12,112	\$0
Denton County	4/21/2017	1.25	0	0	\$1,211	\$0
Town of Argyle	4/21/2017	1	0	0	\$1,211	\$0
Town of Hebron	4/21/2017	1.75	0	0	\$3,634	\$0
City of Krum	4/21/2017	1	0	0	\$1,211	\$0
City of Lake Dallas	4/21/2017	1.25	0	0	\$2,422	\$0
Town of Hebron	6/6/2018	1.75	0	0	\$11,753	\$0
Town of Hebron	6/6/2018	2.75	0	0	\$352,600	\$0

SECTION 9: HAIL

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Denton County	3/24/2019	1.75	0	0	\$11,651	\$0
City of Lewisville	3/24/2019	2	0	0	\$17,477	\$0
Denton County	4/13/2019	2.75	0	0	\$115,896	\$0
City of Sanger	6/1/2019	1.75	0	0	\$11,563	\$0
City of Denton	5/24/2020	2	0	0	\$115,514	\$0
City of Denton	5/24/2020	2	0	0	\$28,879	\$0
Denton County	3/24/2021	1.75	0	0	\$559,073	\$0
Denton County	3/24/2021	2.5	0	0	\$67,088,724	\$0
City of Roanoke	3/24/2021	2	0	0	\$55,907,270	\$0
Denton County	4/28/2021	2	0	0	\$19,962,547	\$0
City of Roanoke	4/28/2021	1.75	0	0	\$19,962,547	\$0
City of Krum	5/10/2021	1.75	0	0	\$16,503	\$0
Town of Ponder	5/10/2021	4	0	0	\$5,501,049	\$0
Denton County	2/21/2022	1.75	0	0	\$6,263	\$0
Denton County	2/22/2022	1.75	0	0	\$26,097	\$0
Town of Little Elm	2/22/2022	1.5	0	0	\$3,132	\$0
TOTALS		(Max Extent)	0	0	\$1,062,174,374	\$12,714

Table 9-3. Historical Hail Events Summary, 1955-2022

JURISDICTION	NUMBER of EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	213	3.5 inches	0	0	\$99,532,962	\$0
Town of Argyle	24	2.75 inches	0	0	\$719,677	\$0
City of Aubrey	26	2.75 inches	0	0	\$337,307	\$0
Town of Bartonville	13	2.75 inches	0	0	\$967,825	\$0
Town of Copper Canyon	0	N/A	0	0	\$0	\$0
City of Corinth	17	4.25 inches	0	0	\$873,748	\$0
Town of Cross Roads	0	N/A	0	0	\$0	\$0

SECTION 9: HAIL

JURISDICTION	NUMBER of EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Denton	73	4.25 inches	0	0	\$747,792,124	\$0
Town of DISH	0	N/A	0	0	\$0	\$0
Town of Double Oak	0	N/A	0	0	\$0	\$0
Town of Flower Mound	0	N/A	0	0	\$0	\$0
City of Hackberry	0	N/A	0	0	\$0	\$0
Town of Hebron	10	2.75 inches	0	0	\$367,987	\$0
Town of Hickory Creek	1	0.75 inches	0	0	\$0	\$0
City of Highland Village	0	N/A	0	0	\$0	\$0
City of Justin	22	2.75 inches	0	0	\$512,321	\$0
City of Krugerville	0	N/A	0	0	\$0	\$0
City of Krum	33	2.75 inches	0	0	\$198,090	\$0
City of Lake Dallas	13	2.75 inches	0	0	\$64,884	\$0
Town of Lakewood Village	0	N/A	0	0	\$0	\$0
City of Lewisville	59	4.5 inches	0	0	\$128,025,198	\$12,714
Town of Little Elm	34	4 inches	0	0	\$653,430	\$0
Town of Northlake	0	N/A	0	0	\$0	\$0
City of Oak Point	0	N/A	0	0	\$0	\$0
City of Pilot Point	11	1.75 inches	0	0	\$6,074	\$0
Town of Ponder	24	4 inches	0	0	\$6,094,193	\$0
Town of Providence Village	0	N/A	0	0	\$0	\$0
City of Roanoke	37	2 inches	0	0	\$75,955,414	\$0
City of Sanger	35	1.75 inches	0	0	\$73,140	\$0
Town of Shady Shores	0	N/A	0	0	\$0	\$0

JURISDICTION	NUMBER of EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of The Colony	0	N/A	0	0	\$0	\$0
Town of Trophy Club	0	N/A	0	0	\$0	\$0
TOTAL LOSSES	645	(Max Extent)	0	0	\$1,062,187,088	

Based on the list of historical hail events for the Denton County planning area (listed above), including all participating jurisdictions, 205 of the reported events have occurred since the 2016 Plan.

SIGNIFICANT EVENTS

May 10, 2021 – Town of Ponder

Severe thunderstorm entered the region producing large hail with reports of 1.75 to 4 inches in diameter seen in the Town of Ponder. Total damage estimates as a result of the storm event were approximately \$5 million dollars.

April 28, 2021 – Denton County

The development of showers and thunderstorms were reported across North and Central Texas. Storms produced damaging winds, and hail approximately 1.5-2 inches. Hail damage estimates from the storm were reported to be over \$500 million, with larger hail damage seen to roofs, windows, and cars.

March 24, 2021 – Denton County/Town of Flower Mound

Storms advanced east into North and Central Texas, producing hail and reports of tornadoes throughout the area. Hail between 1.5-2.5 inches were reported in the western area of Flower Mound. Damage estimates related to the storm event totaled \$60 million.

June 6, 2018 – Town of Hebron

Multiple thunderstorms occurred across the region with reported indicating that baseball sized hail and vehicle damage occurred approximately 3-miles northwest of the City of Carrollton. Damage estimates as a result were approximately \$300,000.

March 23, 2016 – City of Lewisville

Severe thunderstorms developed producing damaging winds, hail and one tornado. Hail was reported up to the size of golf balls in Lewisville. Estimates damages as a result of the storm were approximately \$50 million.

April 3, 2014 – Denton County

A severe thunderstorm developed moving across the region. The worst damage was done in Denton where hail up to the size of softballs. The Insurance Council of Texas estimated approximately 35,000 vehicles, and 22,000 homes were damaged as a result of this storm. The damage estimate is approximately \$500 million dollars.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 645 events in a 67.5-year reporting period for the Denton County planning area, provides a probability of nine to ten events per year. This frequency

supports a highly likely probability of future events for the Denton County planning area including all participating jurisdictions.

VULNERABILITY AND IMPACT

Damage from hail approaches 1 billion dollars in the U.S. each year. Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are most commonly damaged by hail.

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

The Denton County planning area features mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to hail events than typical site-built structures. In addition, manufactured homes are located sporadically throughout the planning area including all participating jurisdictions which would also be more vulnerable. The US Census data indicates a total of 9,871 manufactured homes located in the Denton County planning area (2.9%), including participating jurisdictions (Table 9-4). In addition, 14.3% (approximately 48,567 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant wind events.

Table 9-4. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Denton County	9,871	48,567
Town of Argyle	0	327
City of Aubrey	0	330
Town of Bartonville	60	112
Town of Copper Canyon	0	169
City of Corinth ²	100	194
Town of Cross Roads	13	72
City of Denton	1,981	16,567
Town of DISH	13	3
Town of Double Oak	0	147
Town of Flower Mound	611	1,555

SECTION 9: HAIL

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
City of Hackberry	62	59
Town of Hebron	9	8
Town of Hickory Creek	0	269
City of Highland Village	0	1,037
City of Justin	0	272
City of Krugerville	0	147
City of Krum	0	233
City of Lake Dallas	379	529
Town of Lakewood Village	0	56
City of Lewisville	1,663	7,387
Town of Little Elm	536	288
Town of Northlake	7	75
City of Oak Point	5	107
City of Pilot Point	100	551
Town of Ponder	2	126
Town of Providence Village	0	11
City of Roanoke	332	246
City of Sanger	93	794
Town of Shady Shores	38	182
City of The Colony	42	4,382
Town of Trophy Club	0	543

While all citizens are at risk to the impacts of hail, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 7.2% of the planning area population live below the poverty level (Table 9-5).

Table 9-5. Populations at Greatest Risk by Jurisdiction³

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Denton County	65,262
Town of Argyle	0
City of Aubrey	746
Town of Bartonville	105
Town of Copper Canyon	9
City of Corinth	928
Town of Cross Roads	21
City of Denton	22,099
Town of DISH	4
Town of Double Oak	168
Town of Flower Mound	3,114
City of Hackberry	181
Town of Hebron	34
Town of Hickory Creek	42
City of Highland Village	286
City of Justin	119
City of Krugerville	19
City of Krum	192
City of Lake Dallas	401
Town of Lakewood Village	54
City of Lewisville	10,735
Town of Little Elm	3,484
Town of Northlake	94
City of Oak Point	78
City of Pilot Point	342

³ US Census Bureau 2021 American Community Survey data for Denton County

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Town of Ponder	46
Town of Providence Village	846
City of Roanoke	242
City of Sanger	902
Town of Shady Shores	166
City of The Colony	3,206
Town of Trophy Club	342

The following critical facilities would be vulnerable to hail events in each participating jurisdiction:

Table 9-6. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Denton County	3 Biodiesel Plants, 5,136 Wells, 4 Broadband Service Transmitters, 11 Cellular Towers, 51 Commercial Transmission Towers, 1 Convention Center, 4 Fairground Complexes, 93,047 Power Transmission Lines, 63 Electric Substations, 39 EMS Stations, 49 Fire Stations, 7 FM Transmission Towers, 141 General Manufacturing Facilities, 19 Hospitals, 3 Major Sport Venues, 792 Microwave Service Towers, 125 Shelter Facilities, 1 Natural Gas Storage Facility, 42 Non-gasoline Alternative Fueling Stations, 99 Nursing Homes, 14 Paging Transmission Towers, 4,879 Pipelines, 558 Places of Worship, 1 Pumping Station, 29 Police Stations, 7 Power Plants, 6 Public Transit Stations, 5,117 Surface Wells, 11 Urgent Care Facilities, 1 Weather Radar Station
Town of Argyle	1 Town Hall, 1 Fire Station, 1 Police Station, 5 Schools
City of Aubrey	1 City Hall, 2 Fire Station, 1 Police Station, 1 Public Works Facility, 1 Wastewater Plant, 11 Lift Stations, 2 Elevated Water Wells, 2 Ground Storage Water Wells
Town of Bartonville	1 Government Building, 1 Shelter/Church, 2 Water Supply Facilities
Town of Copper Canyon	1 Government Building
City of Corinth	1 EOC Building, 1 City Hall, 2 Fire Stations, 14 Schools, 1 Public Works Facility, 2 Pump Station 14 Lift Stations, 2 Elevated Water Tanks, 9 Warning Sirens
Town of Cross Roads	1 Town Hall, 1 Police Station, 1 Assisted Living Facility, 1 Residential Facility, 2 Places of Worship, 1 Water Tower, Transmission Lines

JURISDICTION	CRITICAL FACILITIES
City of Denton	10 Government Buildings, 7 Federal Buildings, 7 Fire Stations, 2 Water Treatment Plants, 23 Schools, 3 Universities/Colleges, 2 Daycare Facilities, 3 Community Centers, 2 Traffic/Service Centers, 2 Airport/Field, 1 Fairground, 1 Landfill, 1 Natatorium
Town of DISH	1 Government Building
Town of Double Oak	1 Town Hall, 1 VFD, 1 Police Station, 1 School, 1 Shelter/Church, 1 Water Tower, 1 Warning Siren
Town of Flower Mound	1 Town Hall, 7 Fire Stations, 1 Police/Government Building, 2 Community Centers, 1 Library, 2 Public Works Facility, 1 Animal Shelter, 1 Wastewater Treatment Plant, 19 Lift Stations, 2 Water Storage Facility, 3 Water Towers, 4 Fueling Station, 1 RV Park
City of Hackberry	1 Wastewater Treatment Plant, 1 Water Plant, 2 Water Towers
Town of Hebron	None reported.
Town of Hickory Creek	1 Town Hall, 1 Public Works Facility
City of Highland Village	1 Government Building, 1 Fire Station, 4 Schools, 10 Lift Stations, 7 Pump Stations
City of Justin	1 City Hall, 1 Sewer Plant, 3 Lift Stations
City of Krugerville	1 City Hall, 1 Police Station, 1 Solar Station, 1 Substation, 1 Utility District, 1 Maintenance Building
City of Krum	1 City Hall, 1 Fire Station, 1 Police Station, 1 Federal Building, 1 Community Center, 8 Schools, 2 Childcare Facilities, 1 Public Works Facility, 1 Wastewater Plant, 3 Water Towers, 1 Medical Center, 5 Churches, 4 Warning Sirens
City of Lake Dallas	1 Government Building, 1 Fire Station, 2 Schools, 1 Library, 2 Water and Wastewater Facilities, 1 Wastewater Treatment Plant, 1 Airport
Town of Lakewood Village	1 Town Hall, 1 Wastewater Treatment Plant, 4 Lift Stations, 1 Water Plant, 1 Water Production Facility
City of Lewisville	3 EOC Facilities, 7 Fire Stations, 1 Police Station, 45 Government Facilities, 1 Dispatch, 17 Communication Facilities, 1 Jail, 17 Healthcare Facilities, 7 Chemical Facilities, 22 Commercial Facilities, 5 Critical Manufacturing Facilities, 4 Defense Industrial Facilities, 7 Energy Facilities, 8 Financial Institutions, 5 Food and Agriculture Facilities, 1 Information Technology Facility, 6 Transportation Systems, 34 Water and Wastewater Facilities, 1 Dam
Town of Little Elm	1 EOC, 1 Town Hall, 3 Fire Stations, 1 Public Safety Center, 1 Public Works Facility, 6 Bridges and Infrastructure, 23 Lift Stations, 3 Pump Stations, 3 Water Towers, 2 Water Tanks
Town of Northlake	1 Town Hall, 1 Government Building, 1 Police Department, 1 Public Works Facility, 1 Wastewater Treatment Plant, 3 Lift Stations, 3 Pump Stations, 6 Storage Tanks, 3 Meter Vaults, 1 Transmission Line

SECTION 9: HAIL

JURISDICTION	CRITICAL FACILITIES
City of Oak Point	1 Government Building, 2 Shelter/Church, 2 Schools
City of Pilot Point	1 City Hall, 1 Fire Station, 1 Police Station, 5 Schools, 1 Wastewater Treatment Plant, 17 Lift Stations, 8 Pump Stations, 1 Library, 1 Senior Center
Town of Ponder	1 Town Hall, 1 VFD, 3 Schools, 4 Shelters/Churches, 1 Wastewater Plant, 3 Lift Stations, 6 Water Wells
Town of Providence Village	1 Town Hall, 1 Emergency Service Building, 2 Schools, 1 Medical Center, 2 Daycare Facilities, 1 Water Treatment Plant, 1 Storage Tank, 1 Grocery Store, 1 Fuel Station
City of Roanoke	1 EOC, 1 Fire Station, 1 Police Station, 1 Water and Wastewater Facility, 6 Lift Stations, 1 Pump Station, 1 Water Tower, 1 Alert System
City of Sanger	1 City Hall, 1 Fire Station, 1 Police Station, 4 Schools, 3 City Department Buildings, 1 Community Center, 2 Shelters/Churches, 1 Wastewater Plant, 6 Lift Stations, 6 Pump Stations
Town of Shady Shores	1 Community Center, 3 Schools, 1 Tornado Siren
City of The Colony	6 Government Buildings, 5 Fire Station, 1 Police Station, 2 Community Centers, 1 Assisted Living Facility, 1 911 Annex, 1 Radio Tower, 1 Wastewater Treatment Plant, 5 Lift Stations, 9 Pump Stations, 1 Storage Tank, 2 Water Wells, 1 Water Control Room, 10 Outdoor Sirens
Town of Trophy Club	1 EOC, 1 Town Hall, 1 Fire Station, 1 Police Station, 4 Schools, 1 Hospital, 2 Community Facilities, 8 Churches, 4 Parks, 1 Maintenance Building, 1 Municipal Utility District, 1 Wastewater Treatment Plant, 8 Lift Stations, 5 Pump Stations, 4 Water Storage Tanks

Hail has been known to cause injury to humans and occasionally has been fatal. Overall, the average loss estimate of property and crops in the planning area over the reporting period is \$1,062,187,088 with annualized losses estimated at \$15,853,539. Based on historic loss and damages, the impact of hail damages on the Denton County planning area, including all participating jurisdictions, can be considered “Minor” severity of impact meaning injuries and illness would not result in permanent disability, community critical facilities are shut down for one week or more, and more than ten percent of property destroyed or with major damage.

Table 9-7. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Denton County	\$99,532,962	\$1,474,562
Town of Argyle	\$719,667	\$10,662
City of Aubrey	\$337,307	\$4,997
Town of Bartonville	\$967,825	\$14,338

SECTION 9: HAIL

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Town of Copper Canyon	\$0	\$0
City of Corinth	\$873,748	\$12,944
Town of Cross Roads	\$0	\$0
City of Denton	\$747,792,124	\$11,078,402
Town of DISH	\$0	\$0
Town of Double Oak	\$0	\$0
Town of Flower Mound	\$0	\$0
City of Hackberry	\$0	\$0
Town of Hebron	\$367,987	\$5,452
Town of Hickory Creek	\$0	\$0
City of Highland Village	\$0	\$0
City of Justin	\$512,321	\$7,590
City of Krugerville	\$0	\$0
City of Krum	\$198,090	\$2,935
City of Lake Dallas	\$64,884	\$961
Town of Lakewood Village	\$0	\$0
City of Lewisville	\$128,037,912	\$1,896,858
Town of Little Elm	\$653,430	\$9,680
Town of Northlake	\$0	\$0
City of Oak Point	\$0	\$0
City of Pilot Point	\$6,074	\$90
Town of Ponder	\$6,094,193	\$90,284
Town of Providence Village	\$0	\$0
City of Roanoke	\$75,955,414	\$1,125,265
City of Sanger	\$73,140	\$1,084
Town of Shady Shores	\$0	\$0
City of The Colony	\$0	\$0

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Town of Trophy Club	\$0	\$0
Planning Area	\$1,062,187,088	\$15,736,105

ASSESSMENT OF IMPACTS

Hail events have the potential to pose a significant risk to people and can create dangerous situations. The impact of climate change could produce larger, more severe hail events, exacerbating the current hail impacts. Worsening hail conditions can be frequently associated with a variety of impacts, including:

- Hail may create hazardous road conditions during and immediately following an event, delaying first responders from providing for or preserving public health and safety.
- Individuals and first responders who are exposed to the storm may be struck by hail, falling branches, or downed trees resulting in injuries or possible fatalities.
- Residential structures can be damaged by falling trees, which can result in physical harm to occupants.
- Large hail events will likely cause extensive roof damage to residential structures along with siding damage and broken windows, creating a spike in insurance claims and a rise in premiums.
- Automobile damage may be extensive depending on the size of the hail and length of the storm.
- Hail events can result in power outages over widespread areas increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- First responders are exposed to downed power lines, damaged structures, hazardous spills, and debris that often accompany hail events, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Downed power lines and large debris, such as downed trees, can result in the inability of emergency response vehicles to access areas of the community.
- Hazardous road conditions may prevent critical staff from reporting for duty, limiting response capabilities.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Some businesses not directly damaged by the hail event may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damages without a backup power source.
- Hazardous road conditions will likely lead to increases in automobile accidents, further straining emergency response capabilities.
- Depending on the severity and scale of damage caused by large hail events, damage to power transmission and distribution infrastructure can require days or weeks to repair.

SECTION 9: HAIL

- A significant hail event could significantly damage agricultural crops, resulting in extensive economic losses for the community and surrounding area.
- Hail events may injure or kill livestock and wildlife.
- A large hail event could impact the accessibility of recreational areas and parks due to extended power outages or debris clogged access roads.

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

SECTION 10: WINTER STORM

Hazard Description 1

Location 3

Extent..... 3

Historical Occurrences..... 4

 Significant Events..... 5

Probability of Future Events..... 6

Vulnerability and Impact..... 6

 Assessment of Impacts 11

HAZARD DESCRIPTION



A severe winter storm event is identified as a storm with snow, ice, or freezing rain. This type of storm can cause significant problems for area residents. Winter storms are associated with freezing or frozen precipitation such as freezing rain, sleet, snow, and the combined effects of winter precipitation and strong winds. Wind chill is a function of temperature and wind. Low wind chill is a product of high winds and freezing temperatures.

Winter storms that threaten Denton County planning area usually begin as powerful cold fronts that push south from central Canada. Although the county is at risk to ice hazards, extremely cold temperatures, and snow, the effects and frequencies of winter storm events are generally mild and short-lived.

As indicated in Figure 10-1, the Denton County planning area, including all participating jurisdictions, is located in USDA Hardiness Zone 7b and a small portion in 8a, with annual minimum temperatures between 5° and 15°. During times of ice and snow accumulation, response times will increase until public works road crews are able to make major roads passable. Table 10-1 describes the types of winter storms possible to occur in the Denton County planning area including all participating jurisdictions.

Figure 10-1. Annual Minimum Temperature

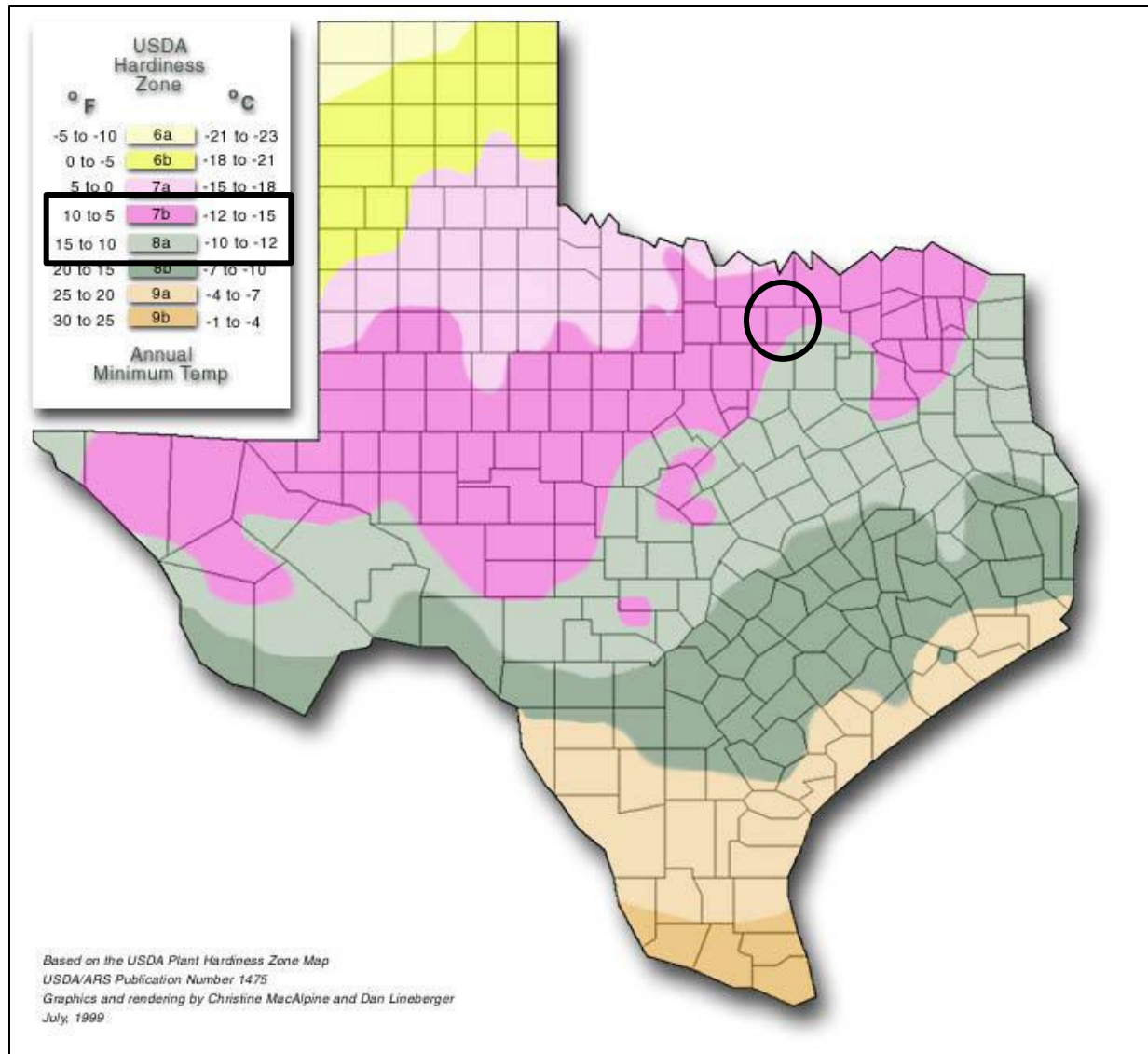


Table 10-1. Types of Winter Storms

TYPE OF WINTER STORM	DESCRIPTION
Winter Weather Advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter Storm Watch	Severe winter weather conditions may affect your area (freezing rain, sleet, or heavy snow may occur separately or in combination).
Winter Storm Warning	Severe winter weather conditions are imminent.

TYPE OF WINTER STORM	DESCRIPTION
Freezing Rain or Freezing Drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard Warning	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/Freeze Warning	Below freezing temperatures are expected and may cause significant damage to plants, crops, and fruit trees.
Wind Chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.

LOCATION

Winter storm events are not confined to specific geographic boundaries. Therefore, all existing and future buildings, facilities, and populations in the Denton County planning area, including all participating jurisdictions, are considered to be exposed to a winter storm hazard and could potentially be impacted.

EXTENT

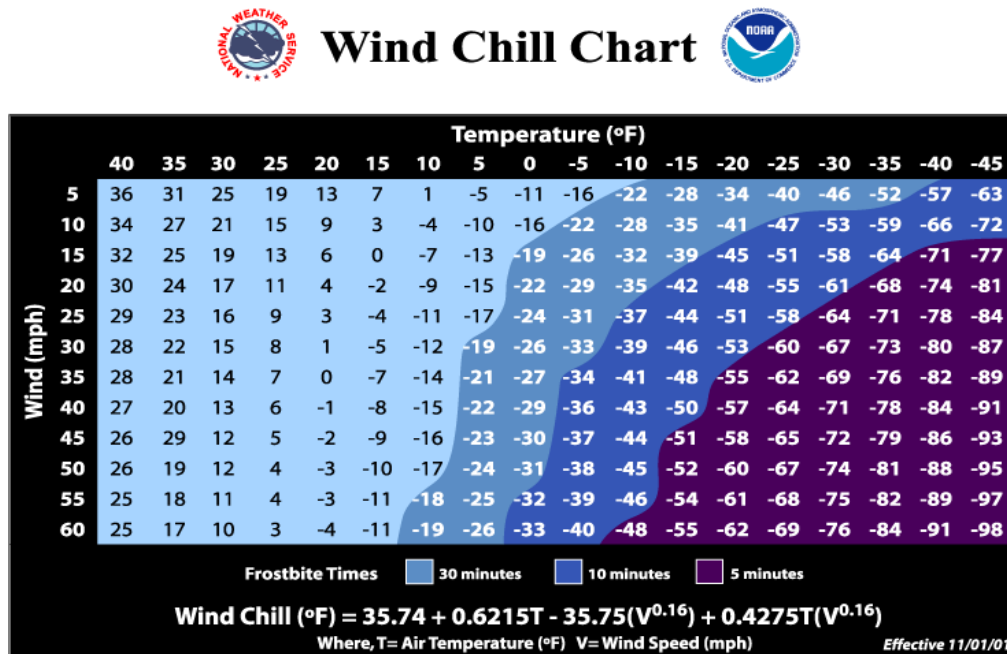
The extent or magnitude of a severe winter storm is measured in intensity based on the temperature and level of accumulations as shown in Table 10-2. Table 10-2 should be read in conjunction with the wind-chill factor described in Figure 10-2 to determine the intensity of a winter storm. The chart is not applicable when temperatures are over 50°F or winds are calm. This is an index developed by the National Weather Service.

Table 10-2. Magnitude of Severe Winter Storms

INTENSITY	TEMPERATURE RANGE (Fahrenheit)	EXTENT DESCRIPTION
Mild	40° – 50°	Winds less than 10 mph and freezing rain or light snow falling for short durations with little or no accumulations
Moderate	30° – 40°	Winds 10 – 15 mph and sleet and/or snow up to 4 inches
Significant	25° – 30°	Intense snow showers accompanied with strong gusty winds between 15 and 20 mph with significant accumulation
Extreme	20° – 25°	Wind driven snow that reduces visibility, heavy winds (between 20 to 30 mph), and sleet or ice up to 5 millimeters in diameter

INTENSITY	TEMPERATURE RANGE (Fahrenheit)	EXTENT DESCRIPTION
Severe	Below 20°	Winds of 35 mph or more and snow and sleet greater than 4 inches

Figure 10-2. Wind Chill Chart



Wind chill temperature is a measure of how cold the wind makes real air temperature feel to the human body. Since wind can dramatically accelerate heat loss from the body, a blustery 30°F day would feel just as cold as a calm day with 0°F temperatures. The Denton County planning area, including all participating jurisdictions, has never experienced a blizzard, but based on 53 previous occurrences recorded from 1996 through September 2022, it has been subject to winter storm watches, warnings, freezing rain, sleet, and snow.

The average number of cold days is similar for the entire planning area, including all participating jurisdictions. Therefore, the intensity or extent of a winter storm event to be mitigated for the area ranges from mild to significant according to the definitions at Table 10-2. Denton County planning area, including all participating jurisdictions, can expect anywhere between 0.1 to greater than 4.0 inches of ice and snow during a winter storm event and temperatures between 5 and 10 degrees with winds ranging from 35 mph or more. This is the worst that can be anticipated to mitigate against in the future for all participating jurisdictions.

HISTORICAL OCCURRENCES

Table 10-3 shows historical occurrences for Denton County from 1996 through September 2022 provided by the NCEI database. There have been 54 recorded winter storm events in Denton County, including all participating jurisdictions. Historical winter storm information, as provided by the NCEI, identifies winter storm activity across a multi-county forecast area for each event. The appropriate percentage of the total property and crop damage reported for the entire forecast area

has been allocated to each county impacted by the event. Historical winter storm data for the county and all participating jurisdictions are provided on a County-wide basis per the NCEI database. Table 10-3 shows historical incident information for the planning area.

Table 10-3. Historical Winter Storm Events, 1996-2022¹

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	1/13/2007	0	0	\$14,632	\$0
Denton County	1/17/2007	0	0	\$43,895	\$0
Denton County	2/2/2007	0	0	\$21,831	\$0
Denton County	1/27/2009	0	0	\$84,162	\$0
Denton County	12/24/2009	0	0	\$137,149	\$0
Denton County	2/11/2010	0	0	\$2,732,949	\$0
Denton County	3/20/2010	0	0	\$40,827	\$0
Denton County	2/1/2011	0	0	\$200,740	\$0
Denton County	2/3/2011	0	0	\$8,030	\$0
Denton County	12/25/2012	0	0	\$644,969	\$0
Denton County	12/5/2013	0	0	\$63,543	\$0
Denton County	2/10/2014	0	0	\$37,844	\$0
Denton County	2/22/2015	0	0	\$11,356	\$0
Denton County	3/4/2015	0	0	\$25,087	\$0
TOTALS		0	0	\$4,067,014	

Based on the list of historical winter storm events for the Denton County planning area (listed above), including all participating jurisdictions, 5 events have occurred since the 2016 Plan.

SIGNIFICANT EVENTS

February 13 - 17, 2021 – Denton County

A historic winter storm impacted the region with a combination of extreme cold/wind chills, freezing drizzle, and then 2 rounds of snow, ice and sleet. In Denton County, the first round of winter weather during this period (February 13-15) resulted in snow accumulations of 3-6 inches of snow. The second round of winter weather (February 16-17) resulted in an additional 1-2 inches of snow along with impacts related to extreme cold and wind chills. The cold temperatures resulted in power outages and an immense amount of pipe, infrastructure and building damage. Damage totals that have been reported up to \$140 million for North and Central Texas. In addition, 30

¹ Values are in 2022 dollars.

SECTION 10: WINTER STORM

deaths were officially reported during this period/event, fortunately none of those fatalities were reported in Denton County.

March 4, 2015 – Denton County

A winter storm produced up to 4 inches of snow reported in some areas of north Texas, along with a batch of sleet and freezing rain before the snow. Multiple traffic accidents were reported, however one fatal traffic accident occurred at Hwy 380 and Paloma Creek.

December 25, 2012 – Denton County

A strong upper-level system and cold front brought hail-producing thunderstorms turning into a winter weather event. The storms produced lots of pea sized hail and occasionally slightly larger hail. An average of 4-5 inches of snow fell across Denton County, with temperatures averaging in the upper teens. This resulted in icy conditions on roadways. The City of Denton reported 48 accidents, three of which were classified as major. Damages estimates were roughly \$500,000.

February 12, 2010 – Denton County

A record snowfall fell across north Texas beginning the early morning hours of February 11th and continuing until the early morning hours of the 12th. An average of 9-10 inches of snow fell, with the highest report being 12 inches of snow near Denton. Nearly 100 minor vehicle accidents were reported around the County. Five injuries were reported in vehicle accidents. A seven-car accident occurred on I-35E in Corinth, but no serious injuries were reported. Near the University of North Texas campus, a large post oak tree branch fell on four vehicles, damaging them all. Estimated damage costs due to storm event were approximately \$2 million.

PROBABILITY OF FUTURE EVENTS

According to historical records, the planning area experiences approximately one to two winter storm event each year. Hence, the probability of a future winter storm event affecting the Denton County planning area, including all participating jurisdictions, is highly likely, with a winter storm likely to occur within the next year.

VULNERABILITY AND IMPACT

During periods of extreme cold and freezing temperatures, water pipes can freeze and crack, and ice can build up on power lines, causing them to break under the weight or causing tree limbs to fall on the lines. These events can disrupt electric service for long periods.

An economic impact may occur due to increased consumption of heating fuel, which can lead to energy shortages and higher prices. House fires and resulting deaths tend to occur more frequently from increased and improper use of alternate heating sources. Fires during winter storms also present a greater danger because water supplies may freeze and impede firefighting efforts.

All populations, buildings, critical facilities, and infrastructure in the entire Denton County planning area, including all participating jurisdictions, are vulnerable to severe winter events.

The following critical facilities would be vulnerable to Winter Storm events in each participating jurisdiction:

Table 10-4. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Denton County	3 Biodiesel Plants, 5,136 Wells, 4 Broadband Service Transmitters, 11 Cellular Towers, 51 Commercial Transmission Towers, 1 Convention Center, 4 Fairground Complexes, 93,047 Power Transmission Lines, 63 Electric Substations, 39 EMS Stations, 49 Fire Stations, 7 FM Transmission Towers, 141 General Manufacturing Facilities, 19 Hospitals, 3 Major Sport Venues, 792 Microwave Service Towers, 125 Shelter Facilities, 1 Natural Gas Storage Facility, 42 Non-gasoline Alternative Fueling Stations, 99 Nursing Homes, 14 Paging Transmission Towers, 4,879 Pipelines, 558 Places of Worship, 1 Pumping Station, 29 Police Stations, 7 Power Plants, 6 Public Transit Stations, 5,117 Surface Wells, 11 Urgent Care Facilities, 1 Weather Radar Station
Town of Argyle	1 Town Hall, 1 Fire Station, 1 Police Station, 5 Schools
City of Aubrey	1 City Hall, 2 Fire Station, 1 Police Station, 1 Public Works Facility, 1 Wastewater Plant, 11 Lift Stations, 2 Elevated Water Wells, 2 Ground Storage Water Wells
Town of Bartonville	1 Government Building, 1 Shelter/Church, 2 Water Supply Facilities
Town of Copper Canyon	1 Government Building
City of Corinth	1 EOC Building, 1 City Hall, 2 Fire Stations, 14 Schools, 1 Public Works Facility, 2 Pump Station 14 Lift Stations, 2 Elevated Water Tanks, 9 Warning Sirens
Town of Cross Roads	1 Town Hall, 1 Police Station, 1 Assisted Living Facility, 1 Residential Facility, 2 Places of Worship, 1 Water Tower, Transmission Lines
City of Denton	10 Government Buildings, 7 Federal Buildings, 7 Fire Stations, 2 Water Treatment Plants, 23 Schools, 3 Universities/Colleges, 2 Daycare Facilities, 3 Community Centers, 2 Traffic/Service Centers, 2 Airport/Field, 1 Fairground, 1 Landfill, 1 Natatorium
Town of DISH	1 Government Building
Town of Double Oak	1 Town Hall, 1 VFD, 1 Police Station, 1 School, 1 Shelter/Church, 1 Water Tower, 1 Warning Siren
Town of Flower Mound	1 Town Hall, 7 Fire Stations, 1 Police/Government Building, 2 Community Centers, 1 Library, 2 Public Works Facility, 1 Animal Shelter, 1 Wastewater Treatment Plant, 19 Lift Stations, 2 Water Storage Facility, 3 Water Towers, 4 Fueling Station, 1 RV Park
City of Hackberry	1 Wastewater Treatment Plant, 1 Water Plant, 2 Water Towers
Town of Hebron	None reported.
Town of Hickory Creek	1 Town Hall, 1 Public Works Facility

SECTION 10: WINTER STORM

JURISDICTION	CRITICAL FACILITIES
City of Highland Village	1 Government Building, 1 Fire Station, 4 Schools, 10 Lift Stations, 7 Pump Stations
City of Justin	1 City Hall, 1 Sewer Plant, 3 Lift Stations
City of Krugerville	1 City Hall, 1 Police Station, 1 Solar Station, 1 Substation, 1 Utility District, 1 Maintenance Building
City of Krum	1 City Hall, 1 Fire Station, 1 Police Station, 1 Federal Building, 1 Community Center, 8 Schools, 2 Childcare Facilities, 1 Public Works Facility, 1 Wastewater Plant, 3 Water Towers, 1 Medical Center, 5 Churches, 4 Warning Sirens
City of Lake Dallas	1 Government Building, 1 Fire Station, 2 Schools, 1 Library, 2 Water and Wastewater Facilities, 1 Wastewater Treatment Plant, 1 Airport
Town of Lakewood Village	1 Town Hall, 1 Wastewater Treatment Plant, 4 Lift Stations, 1 Water Plant, 1 Water Production Facility
City of Lewisville	3 EOC Facilities, 7 Fire Stations, 1 Police Station, 45 Government Facilities, 1 Dispatch, 17 Communication Facilities, 1 Jail, 17 Healthcare Facilities, 7 Chemical Facilities, 22 Commercial Facilities, 5 Critical Manufacturing Facilities, 4 Defense Industrial Facilities, 7 Energy Facilities, 8 Financial Institutions, 5 Food and Agriculture Facilities, 1 Information Technology Facility, 6 Transportation Systems, 34 Water and Wastewater Facilities, 1 Dam
Town of Little Elm	1 EOC, 1 Town Hall, 3 Fire Stations, 1 Public Safety Center, 1 Public Works Facility, 6 Bridges and Infrastructure, 23 Lift Stations, 3 Pump Stations, 3 Water Towers, 2 Water Tanks
Town of Northlake	1 Town Hall, 1 Government Building, 1 Police Department, 1 Public Works Facility, 1 Wastewater Treatment Plant, 3 Lift Stations, 3 Pump Stations, 6 Storage Tanks, 3 Meter Vaults, 1 Transmission Line
City of Oak Point	1 Government Building, 2 Shelter/Church, 2 Schools
City of Pilot Point	1 City Hall, 1 Fire Station, 1 Police Station, 5 Schools, 1 Wastewater Treatment Plant, 17 Lift Stations, 8 Pump Stations, 1 Library, 1 Senior Center
Town of Ponder	1 Town Hall, 1 VFD, 3 Schools, 4 Shelters/Churches, 1 Wastewater Plant, 3 Lift Stations, 6 Water Wells
Town of Providence Village	1 Town Hall, 1 Emergency Service Building, 2 Schools, 1 Medical Center, 2 Daycare Facilities, 1 Water Treatment Plant, 1 Storage Tank, 1 Grocery Store, 1 Fuel Station
City of Roanoke	1 EOC, 1 Fire Station, 1 Police Station, 1 Water and Wastewater Facility, 6 Lift Stations, 1 Pump Station, 1 Water Tower, 1 Alert System
City of Sanger	1 City Hall, 1 Fire Station, 1 Police Station, 4 Schools, 3 City Department Buildings, 1 Community Center, 2 Shelters/Churches, 1 Wastewater Plant, 6 Lift Stations, 6 Pump Stations
Town of Shady Shores	1 Community Center, 3 Schools, 1 Tornado Siren

JURISDICTION	CRITICAL FACILITIES
City of The Colony	6 Government Buildings, 5 Fire Station, 1 Police Station, 2 Community Centers, 1 Assisted Living Facility, 1 911 Annex, 1 Radio Tower, 1 Wastewater Treatment Plant, 5 Lift Stations, 9 Pump Stations, 1 Storage Tank, 2 Water Wells, 1 Water Control Room, 10 Outdoor Sirens
Town of Trophy Club	1 EOC, 1 Town Hall, 1 Fire Station, 1 Police Station, 4 Schools, 1 Hospital, 2 Community Facilities, 8 Churches, 4 Parks, 1 Maintenance Building, 1 Municipal Utility District, 1 Wastewater Treatment Plant, 8 Lift Stations, 5 Pump Stations, 4 Water Storage Tanks

People and animals are subject to health risks from extended exposure to cold air. Elderly people are at greater risk of death from hypothermia during these events, especially in the rural areas of the county where populations are sparse, icy roads may impede travel, and there are fewer neighbors to check in on the elderly. According to the U.S. Center for Disease Control, every year hypothermia kills about 600 Americans, half of whom are 65 years of age or older. In addition, populations living below the poverty level may not be able to afford to run heat on a regular basis. Population over 65 in the entire Denton County planning area is estimated at 10.2% of the total population or an estimated total of 92,300² potentially vulnerable residents in the planning area based on age. An estimated 7.2% of the planning area population live below the poverty level (Table 10-5).

Table 10-5. Population at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION BELOW POVERTY LEVEL
Denton County	92,300	65,262
Town of Argyle	839	0
City of Aubrey	499	746
Town of Bartonville	312	105
Town of Copper Canyon	412	9
City of Corinth	2,591	928
Town of Cross Roads	139	21
City of Denton	15,648	22,099
Town of DISH	67	4
Town of Double Oak	672	168
Town of Flower Mound	8,364	3,114

² US Census Bureau 2021 American Community Survey data for Denton County.

SECTION 10: WINTER STORM

JURISDICTION	POPULATION 65 AND OLDER	POPULATION BELOW POVERTY LEVEL
Town of Hackberry	204	181
Town of Hebron	44	34
City of Hickory Creek	371	42
City of Highland Village	2,262	286
City of Justin	679	119
City of Krugerville	383	19
City of Krum	487	192
City of Lake Dallas	670	401
Town of Lakewood Village	129	54
City of Lewisville	9,112	10,735
Town of Little Elm	3,041	3,484
Town of Northlake	261	94
City of Oak Point	589	78
City of Pilot Point	656	342
Town of Ponder	263	46
Town of Providence Village	475	846
City of Roanoke	864	242
City of Sanger	1,132	902
Town of Shady Shores	448	166
City of The Colony	3,914	3,206
Town of Trophy Club	1,563	342

Historic loss, in 2022 dollars, is estimated at \$4,067,014 in damages over the 26.5-year reporting period giving an approximate loss of \$153,472 in damages annually (Table 10-6). The potential severity of impact for the Denton County planning area, including all participating jurisdictions, is “Limited” meaning injuries would typically be treated with first aid, shutdown of facilities and services for 24-hours or less, and less than 10% of property destroyed or with major damage.

Table 10-6. Potential Annualized Losses for Hardin County

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Denton County	\$4,067,014	\$153,472

ASSESSMENT OF IMPACTS

The greatest risk from a winter storm hazard is to public health and safety. The impact of climate change could produce longer, more intense winter storm events, exacerbating the current winter storm impacts. Worsening winter storm conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly, can face serious or life-threatening health problems from exposure to extreme cold including hypothermia and frostbite.
- Loss of electric power or other heat source can result in increased potential for fire injuries or hazardous gas inhalation because residents burn candles for light or use fires or generators to stay warm.
- Response personnel, including utility workers, public works personnel, debris removal staff, tow truck operators, and other first responders, are subject to injury or illness resulting from exposure to extreme cold temperatures.
- Response personnel may be required to travel in potentially hazardous conditions, elevating the life safety risk to accidents and potential contact with downed power lines.
- Operations or service delivery may experience impacts from electricity blackouts due to winter storms.
- Power outages are possible throughout the planning area due to downed trees and power lines and/or rolling blackouts.
- Critical facilities without emergency backup power may not be operational during power outages.
- Emergency response and service operations may be impacted by limitations on access and mobility if roadways are closed, unsafe, or obstructed.
- Hazardous road conditions will likely lead to increases in automobile accidents, further straining emergency response capabilities.
- Depending on the severity and scale of damage caused by ice and snow events, damage to power transmission and distribution infrastructure can require days or weeks to repair.
- A winter storm event could lead to tree, shrub, and plant damage or death.
- Severe cold and ice could significantly damage agricultural crops.
- Schools may be forced to shut early due to treacherous driving conditions.
- Exposed water pipes may be damaged by severe or late season winter storms at both residential and commercial structures, causing significant damages.

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

SECTION 11: EXTREME HEAT

Hazard Description 1

Location 1

Extent..... 1

Historical Occurrences..... 4

 Significant Events..... 6

Probability of Future Events..... 6

Vulnerability and Impact..... 6

 Assessment of Impacts 9

HAZARD DESCRIPTION

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



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

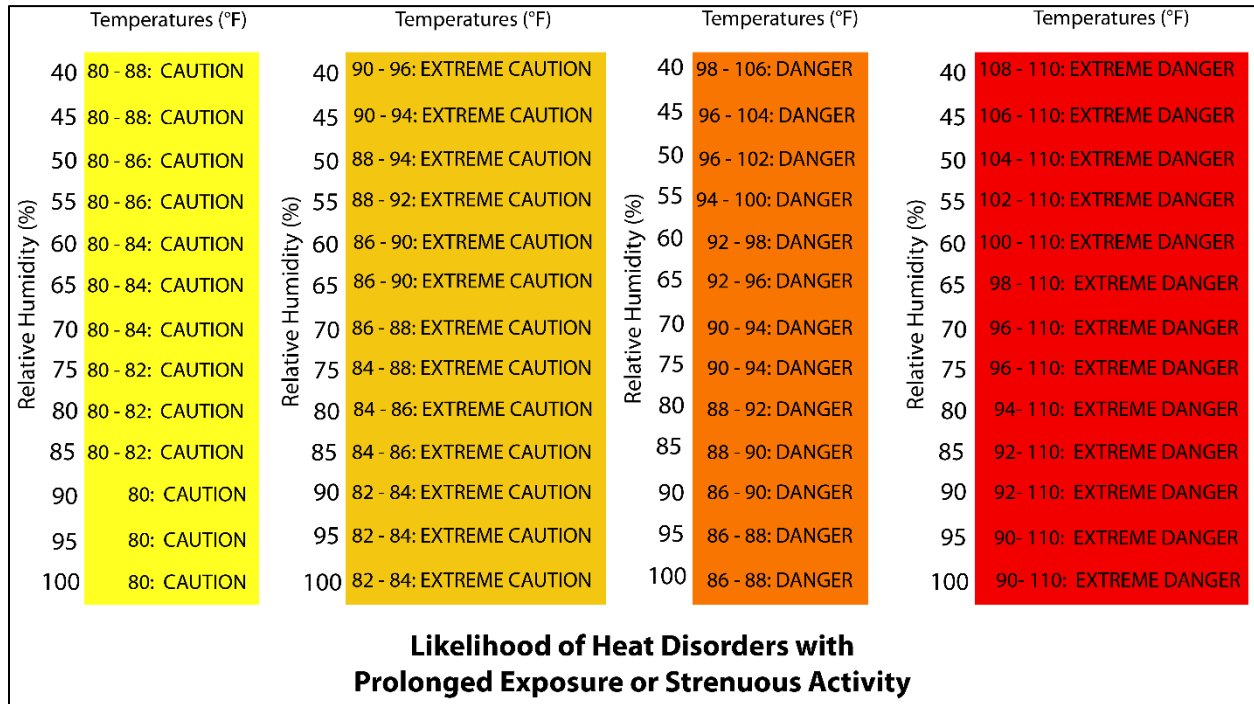
LOCATION

There is no specific geographic boundary to the extreme heat hazard. Extreme heat could occur anywhere within the Denton County planning area, including all participating jurisdictions.

EXTENT

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmospheric Administration (NOAA), this relationship is referred to as the “Heat Index” and is depicted in Figure 11-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

Figure 11-1. Extent Scale for Extreme Summer Heat¹



The Extent Scale in Figure 11-1 displays varying categories of caution depending on the relative humidity combined with the temperature. For example, when the temperature is at 90 degrees Fahrenheit (°F) or lower, caution should be exercised if the humidity level is at or above 40 percent.

The shaded zones on the chart indicate varying symptoms or disorders that could occur depending on the magnitude or intensity of the event. “Caution” is the first category of intensity, and it indicates when fatigue due to heat exposure is possible. “Extreme Caution” indicates that sunstroke, muscle cramps, or heat exhaustion are possible, and a “Danger” level means that these symptoms are likely. “Extreme Danger” indicates that heat stroke is likely. The National Weather Service (NWS) initiates alerts based on the Heat Index as shown in Table 11-1.

Table 11-1. Heat Index and Warnings

CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Danger	125°F and higher	Heat stroke or sun stroke likely.	A heat advisory will be issued to warn that the Heat Index may exceed 105°F.
Danger	103 – 124°F	Sunstroke, muscle cramps, and/or heat exhaustion are likely. Heatstroke possible with prolonged exposure and/or physical activity.	

¹ Source: NOAA

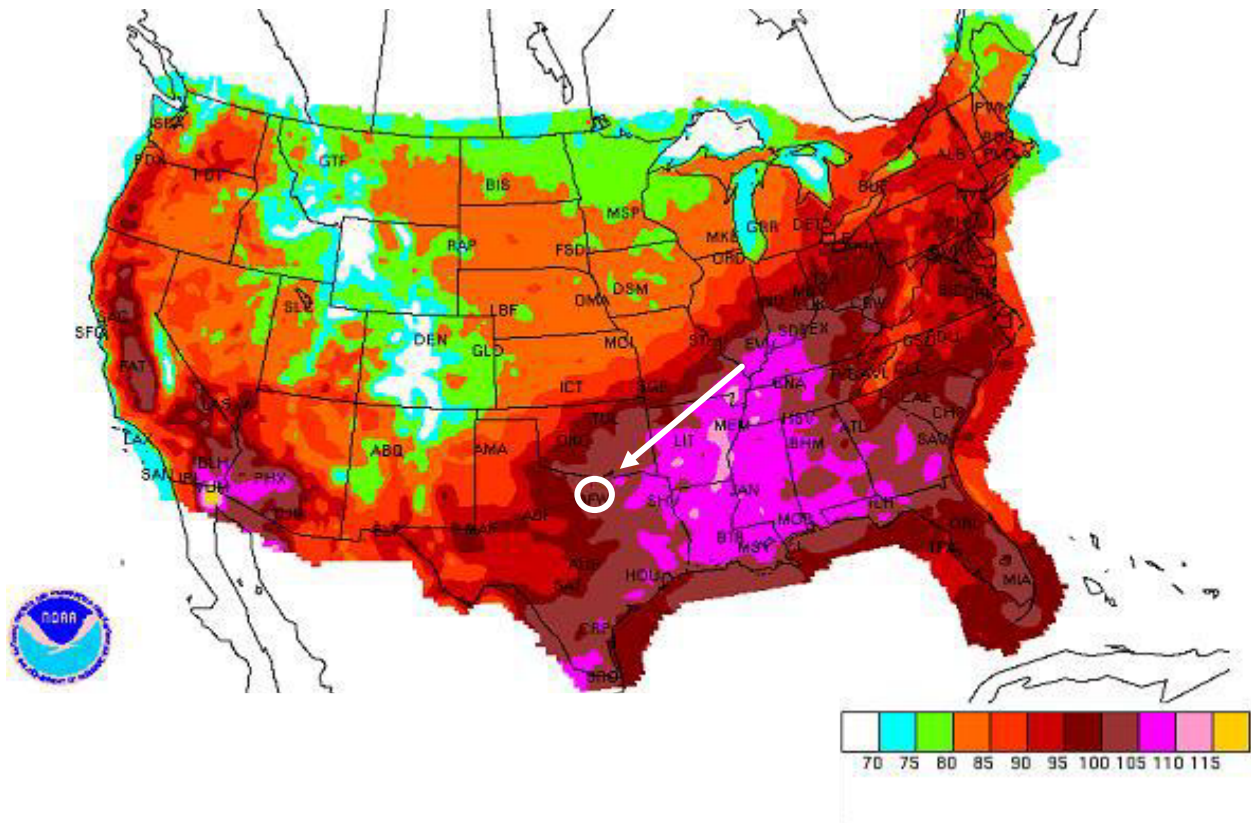
CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Caution	90 – 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.	An Excessive Heat Warning is issued if the Heat Index rises above 105°F at least 3 hours during the day or above 80°F at night.
Caution	80 – 90°F	Fatigue is possible with prolonged exposure and/or physical activity.	

Denton County’s terrain is relatively level terrain with elevation variations between 500-900 feet located in North Central Texas. The western half of the county is surfaced by the black soil of the Grand Prairie. An eastern sliver is on the western edge of the Blackland Prairie, where the rich black soil contrasts sharply with the sandy land of the Eastern Cross Timbers jutting down from Oklahoma through the central part of the county. Denton County has an annual average rainfall of about thirty-three inches, and a temperature average ranging from a minimum of 34° F in January to a maximum of 96° in July. The average growing season is 226 days.

Due to its geography, the Denton County planning area can expect an extreme heat event each summer. Citizens, especially children and the elderly should exercise caution by staying out of the heat for prolonged periods when a heat advisory or excessive heat warning is issued. Also at risk are those working or remaining outdoors.

Figure 11-2 displays the daily maximum heat index as derived from NOAA based on data compiled from 1838 to 2015. The white circle shows the Denton County planning area. The primary brown colors and partial red indicate a daily maximum heat index of 95-105°F. The Denton County planning area, including all participating jurisdictions, could experience extreme heat from 95° to 105° and should mitigate to the extent of “extreme caution”, which can include sunstroke, muscle cramps, heat exhaustion and potential heatstroke with prolonged exposure. The record high temperature for the Denton County planning area was 113°F in 1954. This is the highest temperature (danger category) the planning area can expect.

Figure 11-2. Average Daily Maximum Heat Index Days²



HISTORICAL OCCURRENCES

Every summer, the hazard of heat-related illness becomes a significant public health issue throughout much of the US. Mortality from all causes increases during heat waves, and excessive heat is an important contributing factor to deaths from other causes, particularly among the elderly. Table 11-2 depicts historical occurrences of mortality from heat from 1994 to 2004 from the Texas Department of State Health Services and from 2005 through June 2022 from the NCEI database.

Table 11-2. Extreme Heat Related Deaths in Texas

YEAR	DEATHS	YEAR	DEATHS	YEAR	DEATHS
1994	1	2004	3	2014	0
1995	12	2005	49	2015	5
1996	10	2006	2	2016	6
1997	2	2007	2	2017	3

² Source: NRDC and the white circle indicates the Denton County planning area.

YEAR	DEATHS	YEAR	DEATHS	YEAR	DEATHS
1998	66	2008	7	2018	7
1999	22	2009	120	2019	7
2000	71	2010	4	2020	1
2001	20	2011	46	2021	0
2002	1	2012	3	2022	6
2003	0	2013	2	-	-

Because the Texas Department of State Health Services reports on total events statewide, previous occurrences for extreme heat are derived from the NCEI database. According to heat related incidents located solely within Denton County, there are only eleven heat waves³ on record for the Denton County planning area (Table 11-3) since 1996. Historical extreme heat information, as provided by the NCEI, shows extreme heat activity across a multi-county forecast area for each event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event. Historical extreme heat data for all participating jurisdictions are provided on a County-wide basis per the NCEI database. Only extreme heat events that have been reported have been factored into this Risk Assessment in terms of fatalities, injuries or damages. It is highly likely additional extreme heat occurrences have gone unreported before and during the recording period. Due to the limited number of reported events, average high temperatures have been analyzed in order to determine the average annual occurrence and the estimated probability of future events.

Table 11-3. Historical Extreme Heat Events, 1996-2022⁴

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	7/1/1996	1	0	\$0	\$0
Denton County	7/1/1998	4	0	\$0	\$0
Denton County	6/26/2012	0	4	\$0	\$0
Denton County	6/22/2019	1	0	\$0	\$0
Denton County	7/16/2019	0	2	\$0	\$0
Denton County	8/7/2019	0	13	\$0	\$0
Denton County	8/17/2019	0	7	\$0	\$0
Denton County	8/26/2019	0	3	\$0	\$0

³ Even though the County experiences heat waves each summer, NCEI data only records events reported. Based on reports, only one event is on record.

⁴ Events reported from January 1996 through June 2022.

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	7/7/2020	1	0	\$0	\$0
Denton County	6/11/2022	0	4	\$0	\$0
Denton County	6/23/2022	0	2	\$0	\$0
TOTALS		7	35	\$0	\$0

Based on the list of historical extreme heat events for the Denton County planning area (listed above), including all participating jurisdictions, 23 events were reported to the NCEI since the 2016 Plan.

SIGNIFICANT EVENTS

July 7, 2020 – Denton County / Town of Little Elm

Reported by law enforcement, a 4-year-old boy from Little Elm was reported deceased after being in a hot vehicle.

August 7-13, 2019 – Denton County

Heat index noted temperatures between 105 -110 degrees occurring across most of North and Central Texas. Denton County Public Health reports 13 cases of heat related illnesses during these periods, most were related to heat exhaustion.

June 26, 2012 – Denton County

Temperatures were around 105 degrees, where reports in Denton County noted four heat related illnesses during the month of June.

PROBABILITY OF FUTURE EVENTS

Average high temperatures for the planning area through the summer months indicate a probability of one event or more every year. This frequency supports a highly likely probability of future events.

VULNERABILITY AND IMPACT

There is no defined geographic boundary for extreme heat events. While the entire Denton County planning area, including all participating jurisdictions, is exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not likely to sustain significant damage from extreme heat events. Therefore, any estimated property losses associated with the extreme heat hazard are anticipated to be minimal across the area.

Extreme temperatures do, however, present a significant threat to life and safety for the population of the County as a whole. Heat casualties for example are typically caused by a lack of adequate air-conditioning or heat exhaustion. The most vulnerable population to heat casualties are the elderly or infirmed who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well-being. Children may also be more vulnerable if left unattended in vehicles. In addition, populations living below the poverty level are unable to run air-conditioning on a regular basis and are limited in their ability to seek medical treatment. Another segment of

SECTION 11: EXTREME HEAT

the population at risk are those whose jobs consist of strenuous labor outdoors. Additionally, livestock and crops can become stressed, decreasing in quality or in production, during times of extreme heat.

The population over 65 in the Denton County planning area is estimated at 10.2% of the total population and children under the age of 5 are estimated at 5.9%, or an estimated total of 145,754 potentially vulnerable residents in the planning area based on age. In addition, an estimated 7.2% of the planning area population live below the poverty level (Table 11-4). Under privileged populations disproportionately impacted by extreme heat events as they are less likely to be able to afford air conditioning during the hot summer months as well as less likely to have access to medical care.

Table 11-4. Populations at Greater Risk by Jurisdiction⁵

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION BELOW POVERTY LEVEL
Denton County	92,300	53,454	65,262
Town of Argyle	839	52	0
City of Aubrey	499	435	746
Town of Bartonville	312	123	105
Town of Copper Canyon	412	31	9
City of Corinth	2,591	1,123	928
Town of Cross Roads	139	102	21
City of Denton	15,648	7,394	22,099
Town of DISH	67	28	4
Town of Double Oak	672	82	168
Town of Flower Mound	8,364	4,059	3,114
City of Hackberry	204	360	181
Town of Hebron	44	34	34
Town of Hickory Creek	371	182	42
City of Highland Village	2,262	494	286
City of Justin	679	238	119
City of Krugerville	383	17	19

⁵ US Census Bureau 2021 American Community Survey data for Denton County.

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION BELOW POVERTY LEVEL
City of Krum	487	457	192
City of Lake Dallas	670	231	401
Town of Lakewood Village	129	19	54
City of Lewisville	9,112	7,782	10,735
Town of Little Elm	3,041	2,176	3,484
Town of Northlake	261	409	94
City of Oak Point	589	505	78
City of Pilot Point	656	478	342
Town of Ponder	263	253	46
Town of Providence Village	475	655	846
City of Roanoke	864	683	242
City of Sanger	1,132	717	902
Town of Shady Shores	448	106	166
City of The Colony	3,914	3,284	3,206
Town of Trophy Club	1,563	634	342

Extreme high temperatures can have significant secondary impacts, leading to droughts, water shortages, increased fire danger, and prompt excessive demands for energy. The possibility of rolling blackouts increases with unseasonably high temperatures in what is a normally mild month with low power demands. Typically, more than 12 hours of warning time would be given before the onset of an extreme heat event.

The potential impact of extreme heat for the entire Denton County planning area, including all participating jurisdictions, can be considered negligible in terms of damages. It is possible that critical facilities and infrastructure could be shut down for 24 hours if cooling units are running constantly, leading to a temporary power outage. Less than ten percent of residential and commercial property could be damaged if extreme heat events lead to structure fires. Based on historical records over a 26.5-year period, annualized property and crop losses for the Denton County planning area are considered negligible. In terms of vulnerability to structures, the impact from extreme heat is considered “Limited” with shutdown of critical facilities for 24-hours or less, typically driven by rolling blackouts. However, with 35 reported injuries and 7 fatalities in the planning area over the reporting period, the potential impact is considered “Substantial”, with multiple fatalities possible depending on the severity and duration of the event.

ASSESSMENT OF IMPACTS

The greatest risk from extreme heat is to public health and safety. The impact of climate change could produce longer, more severe heat waves, exacerbating the current impacts. Worsening extreme heat conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly and children under 5, can face serious or life-threatening health problems from exposure to extreme heat including hyperthermia, heat cramps, heat exhaustion, and heat stroke (or sunstroke).
- Response personnel, including utility workers, public works personnel, and any other professions where individuals are required to work outside, are more subject to extreme heat related illnesses since their exposure would typically be greater.
- High energy demand periods can outpace the supply of energy, potentially creating the need for rolling brownouts which would elevate the risk of illness to vulnerable residents.
- Highways and roads may be damaged by excessive heat causing asphalt roads to soften and concrete roads to shift or buckle.
- Vehicles engines and cooling systems typically run harder during extreme heat events resulting in increases in mechanical failures.
- Extreme heat events during times of drought can exacerbate the environmental impacts associated with drought, decreasing water and air quality and further degrading wildlife habitat.
- Extreme heat increases ground-level ozone (smog), increasing the risk of respiratory illnesses.
- Food suppliers can anticipate an increase in food costs due to increases in production costs and crop and livestock losses.
- Fisheries may be negatively impacted by extreme heat, suffering damage to fish habitats (either natural or man-made) and a loss of fish and/or other aquatic organisms due to decreased water flows or availability.
- Negatively impacted water suppliers may face increased costs resulting from the transport of water resources or development of supplemental water resources.
- Tourism and recreational activities predominant in and around Lake Ray Roberts, Lake Lewisville, or similar areas, may be negatively impacted during extreme heat events, reducing seasonal revenue.

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

SECTION 12: DROUGHT

Hazard Description 1
 Location 2
 Extent..... 3
 Historical Occurrences 5
 Significant Events 7
 Probability of Future Events 8
 Vulnerability and Impact..... 8
 Assessment of Impacts 11

HAZARD DESCRIPTION

Drought is a period of time without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period of time, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic. Table 12-1 presents definitions for these different types of droughts.



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

Table 12-1. Drought Classification Definitions¹

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

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

LOCATION

Droughts occur regularly throughout Texas and the Denton County planning area and are a normal condition. However, they can vary greatly in their intensity and duration. The Drought Monitor shows the planning area is currently experiencing abnormally dry conditions throughout most of the county and moderate drought in the southern area of the county (Figure 12-1). However, the planning area has experienced a range of conditions from normal to extreme drought conditions over the last two decades (Figure 12-2). There is no distinct geographic boundary to drought; therefore, it can occur throughout the Denton County planning area equally, including all participating jurisdictions.

Figure 12-1. U.S. Drought Monitor, May 2022

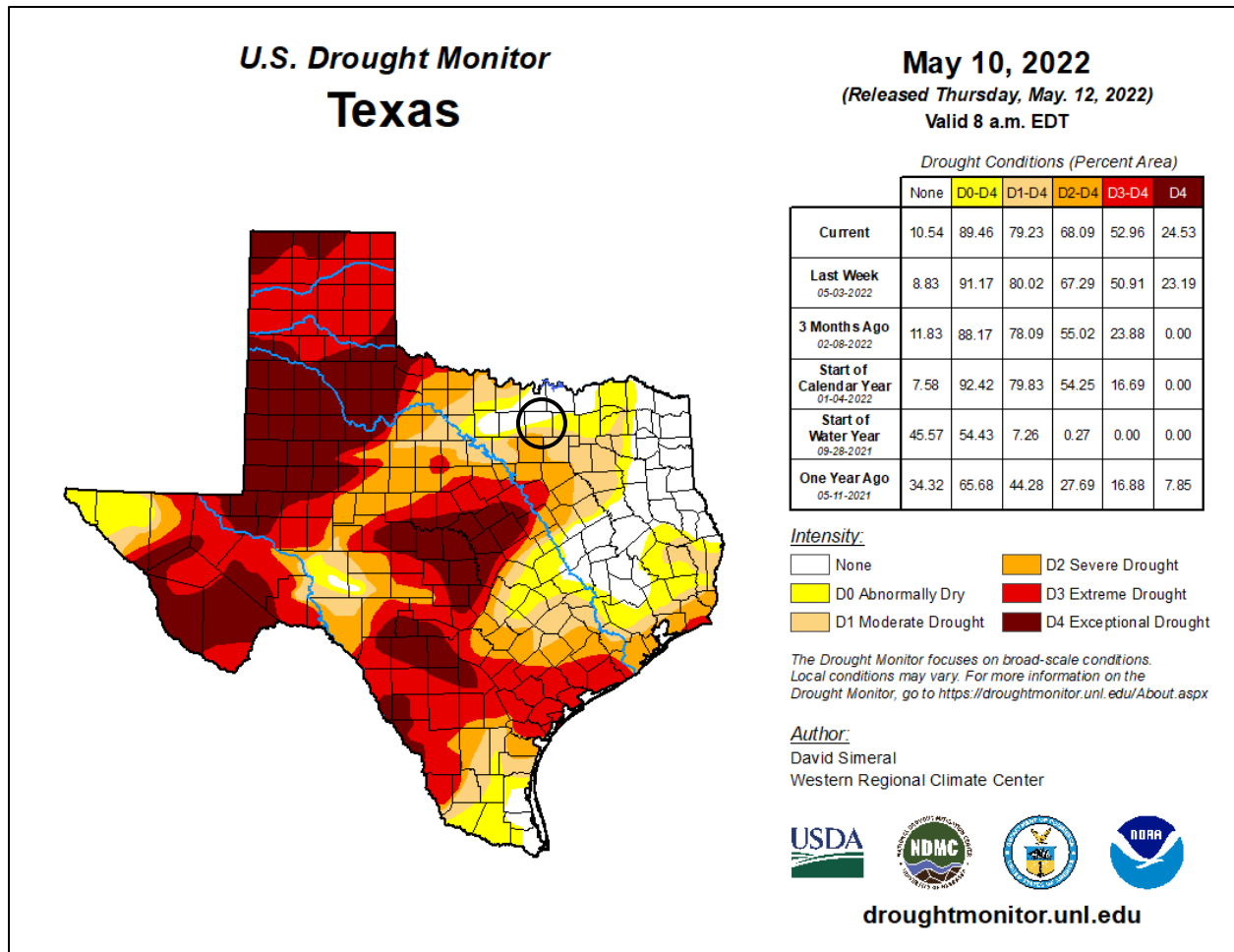
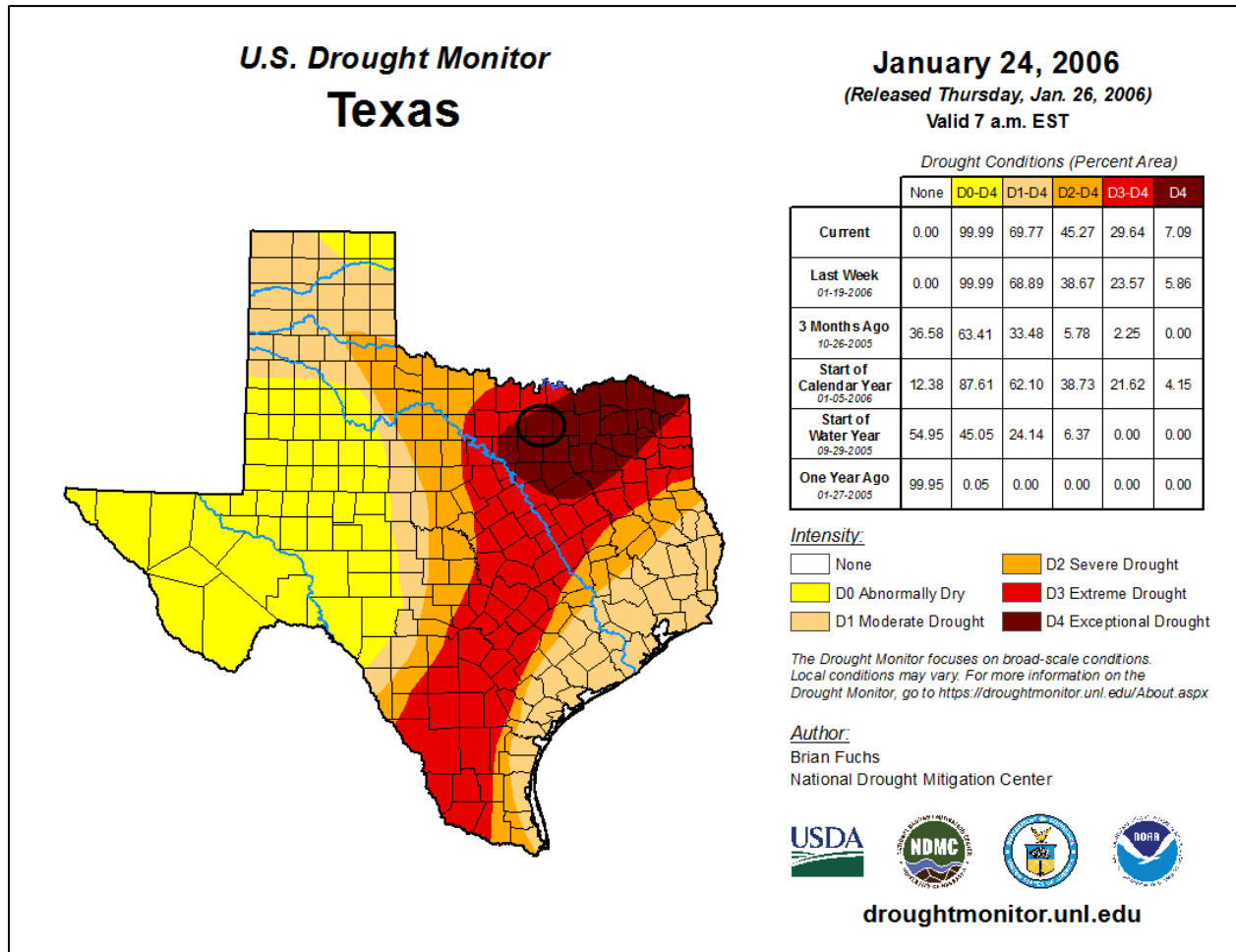


Figure 12-2. U.S. Drought Monitor, May 2011



EXTENT

The Palmer Drought Index is used to measure the extent of drought by measuring the duration and intensity of long-term drought-inducing circulation patterns. Long-term drought is cumulative, with the intensity of drought during the current month dependent upon the current weather patterns plus the cumulative patterns of previous months. The hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop. Table 12-2 depicts magnitude of drought, while Table 12-3 describes the classification descriptions.

Table 12-2. Palmer Drought Index

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

Table 12-3. Palmer Drought Category Descriptions²

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

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

² Source: National Drought Mitigation Center

Based on the historical occurrences for drought and the location of the Denton County planning area, including all participating jurisdictions, the area can anticipate a range of drought from abnormally dry to moderate, or D0 to D1, based on the Palmer Drought Category. The entire planning area has experienced moderate drought conditions. This is the most extreme drought conditions the planning area can anticipate in the future.

HISTORICAL OCCURRENCES

The Denton County planning area may typically experience a severe drought. Table 12-4 lists historical events that have occurred in the Denton County planning area as reported in the National Centers for Environmental Information (NCEI). Historical events are shown in Table 12-5. A total of 75 reported historical drought events, with 15 unique drought periods that have impacted the Denton County planning area between 1996 through September 2022 (Summary Table 12-6).

Historical drought information shows drought activity across a multi-county forecast area for each event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event. Historical drought data for all participating jurisdictions in the Denton County planning area are provided on a county-wide basis per the NCEI database.

Table 12-4. Historical Drought Years, 1996-2022³

DROUGHT YEAR
1996
1998
2000
2005-2006
2006
2011 ⁴
2012-2013
2014-2015
2015
2017
2018 ⁵
2019

³ Historical data is reported from January 1996 through June 2022.

⁴ Two unique events recorded in 2011: March – April 2011; and August – October 2011.

⁵ Two unique events recorded in 2018: February 2018; and June – August 2018.

DROUGHT YEAR
2021
2022
15 unique events

Table 12-5. Historical Drought Events, 1996-2022

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	10/1/2006	0	0	\$733,823	\$733,823
Denton County	11/1/2006	0	0	\$0	\$1,175,865
Denton County	3/25/2011	0	0	\$0	\$6,627
Denton County	4/1/2011	0	0	\$0	\$13,169
Denton County	8/1/2011	0	0	\$0	\$13,073
Denton County	9/1/2011	0	0	\$0	\$32,634
Denton County	10/1/2011	0	0	\$0	\$9,156
Denton County	7/31/2012	0	0	\$0	\$1,293
Denton County	9/25/2012	0	0	\$0	\$2,560
Denton County	10/1/2012	0	0	\$0	\$6,402
Denton County	11/1/2012	0	0	\$0	\$6,432
Denton County	12/1/2012	0	0	\$0	\$2,580
Denton County	1/1/2013	0	0	\$0	\$3,858
Denton County	2/1/2013	0	0	\$0	\$2,551
Denton County	3/1/2013	0	0	\$2,545	\$0
Denton County	4/1/2013	0	0	\$0	\$1,274
Denton County	5/1/2013	0	0	\$0	\$6,357
Denton County	7/9/2013	0	0	\$0	\$1,268
Denton County	8/1/2013	0	0	\$0	\$3,799
Denton County	9/1/2013	0	0	\$0	\$3,795
Denton County	10/1/2013	0	0	\$0	\$3,804
Denton County	3/25/2014	0	0	\$0	\$2,507

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Denton County	4/1/2014	0	0	\$0	\$2,499
Denton County	5/1/2014	0	0	\$0	\$2,490
Denton County	6/1/2014	0	0	\$2,485	\$0
Denton County	7/1/2014	0	0	\$0	\$6,216
Denton County	8/1/2014	0	0	\$0	\$2,490
Denton County	9/1/2014	0	0	\$6,221	\$0
Denton County	10/1/2014	0	0	\$0	\$3,742
Denton County	11/1/2014	0	0	\$0	\$2,508
Denton County	12/1/2014	0	0	\$0	\$6,307
Denton County	1/1/2015	0	0	\$0	\$1,267
Denton County	2/1/2015	0	0	\$0	\$2,524
Denton County	3/1/2015	0	0	\$0	\$2,509
Denton County	4/1/2015	0	0	\$0	\$1,252
Denton County	9/1/2015	0	0	\$0	\$1,245
Denton County	10/1/2015	0	0	\$1,245	\$0
Denton County	12/1/2017	0	0	\$0	\$1,201
Denton County	7/1/2018	0	0	\$0	\$5,876
Denton County	8/1/2018	0	0	\$0	\$2,349
TOTALS		0	0	\$2,823,621	

Table 12-6. Historical Drought Events Summary, 1996-2022

JURISDICTION	NUMBER of EVENTS	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Denton County	75	0	0	\$746,319	\$2,077,302

Based on the historical drought events for the Denton County planning area, including all participating jurisdictions, 15 of the reported drought events over 6 periods have occurred since the 2016 Plan.

SIGNIFICANT EVENTS

July 1-31, 2018 – Denton County

Severe drought conditions, reducing to extreme conditions towards the end of the month were reported within Denton County. Below normal rainfall however, continued with higher

temperatures reported for the area than usual. Crop damage estimates were approximately \$5,000.

September 1-30, 2014 – Denton County

According to the US Drought Monitor, Denton County began the month under D2/Severe drought conditions, but conditions worsened throughout the eastern half of the County with reports of D3/Extreme conditions. Total damages reported was \$5,000 in property, and fortunately, no crop damage was reported for this event period.

September 1-30, 2011 – Denton County

According to the US Drought Monitor, Denton County was classified as extreme drought (D3) throughout the month. The county received very little rainfall and conditions did not improve. Effected counties had burn bans established by local officials throughout the month. Total crop damage was reported to be \$25,000 as a result of the drought period.

October 1-31, 2006 – Denton County

Drought conditions were reported across portions of north Texas. According to the U.S. Drought Monitor, much of the region was still experiencing extreme (D3) drought conditions. Even though drought conditions were lessened by a few rain events this month, serious hydrological problems remained, for example most lakes in north Texas remained well below conservation levels. Property and crop damages both totaled \$500,000, respectively.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been 15 extended time periods of drought (ranging in length from approximately 30 days to over 390 days) within a 26.5-year reporting period, which provides a frequency of one drought period approximately every one to two years. This frequency supports an “Highly Likely” probability of future events.

VULNERABILITY AND IMPACT

Loss estimates were based on 26.5 years of statistical data from the NCEI. A drought event frequency-impact was then developed to determine an impact profile on agriculture and estimate potential losses due to drought in the area. Table 12-7 shows annualized exposure.

Table 12-7. Potential Annualized Losses for Denton County

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Denton County	\$2,823,621	\$106,552

Drought impacts large areas and crosses jurisdictional boundaries. All existing and future buildings, facilities, and populations are exposed to this hazard and could potentially be impacted. However, drought impacts are mostly experienced in water shortages and crop/livestock losses on agricultural lands and typically have no impact on buildings.

In terms of vulnerability, population, agriculture, property, socioeconomics, and environment are all vulnerable to drought in the Denton County planning area, including all participating jurisdictions. Typical demand can deplete water resources during extreme drought conditions. As resources are depleted, potable water is in short supply and overall water quality can suffer, elevating health concerns for all residents but especially vulnerable populations – typically

children, the elderly, the ill, and those living below the poverty level. In addition, potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities.

The average person will survive only a few days without potable water, and this timeframe can be drastically shortened for those people with more fragile health – typically children, the elderly, and the ill. The population over 65 in the Denton County planning area is estimated at 10.2% of the total population, and children under the age of 5 are estimated at 5.9% or an estimated total of 145,754 potentially vulnerable residents in the planning area based on age. In addition, an estimated 7.2% of the planning area population lives below the poverty level (Table 12-8) which may contribute to the overall health impacts of a drought.

Table 12-8. Populations at Greater Risk by Jurisdiction⁶

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION BELOW POVERTY LEVEL
Denton County	92,300	53,454	65,262
Town of Argyle	839	52	0
City of Aubrey	499	435	746
Town of Bartonville	312	123	105
Town of Copper Canyon	412	31	9
City of Corinth	2,591	1,123	928
Town of Cross Roads	139	102	21
City of Denton	15,648	7,394	22,099
Town of DISH	67	28	4
Town of Double Oak	672	82	168
Town of Flower Mound	8,364	4,059	3,114
City of Hackberry	204	360	181
Town of Hebron	44	34	34
Town of Hickory Creek	371	182	42
City of Highland Village	2,262	494	286
City of Justin	679	238	119
City of Krugerville	383	17	19

⁶ US Census Bureau 2021 American Community Survey data for Denton County.

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION BELOW POVERTY LEVEL
City of Krum	487	457	192
City of Lake Dallas	670	231	401
Town of Lakewood Village	129	19	54
City of Lewisville	9,112	7,782	10,735
Town of Little Elm	3,041	2,176	3,484
Town of Northlake	261	409	94
City of Oak Point	589	505	78
City of Pilot Point	656	478	342
Town of Ponder	263	253	46
Town of Providence Village	475	655	846
City of Roanoke	864	683	242
City of Sanger	1,132	717	902
Town of Shady Shores	448	106	166
City of The Colony	3,914	3,284	3,206
Town of Trophy Club	1,563	634	342

The population is also vulnerable to food shortages when drought conditions exist, and potable water is in short supply. Potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities. All residents in the Denton County planning area could be adversely affected by drought conditions, which could limit water supplies and present health threats. During summer drought, or hot and dry conditions, elderly persons, small children, infants and the chronically ill who do not have adequate cooling units in their homes may become more vulnerable to injury and/or death.

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

Habitat damage is a vulnerability of the environment during periods of drought for both aquatic and terrestrial species. The environment also becomes vulnerable during periods of extreme or prolonged drought due to severe erosion and land degradation.

Impact of droughts experienced in the Denton County planning area, including all participating jurisdictions, has resulted in no injuries or fatalities supporting a “Limited” severity of impact meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property is destroyed or with major damage. Annualized loss over the 26.5-year reporting period in Denton County is \$106,552.

ASSESSMENT OF IMPACTS

The Drought Impact Reporter was developed in 2005 by the University of Nebraska-Lincoln to provide a national database of drought impacts. Droughts can have an impact on agriculture; business and industry; energy; fire; plants and wildlife; relief, response, and restrictions; society and public health; tourism and recreation; and water supply and quality. The reports are submitted from individuals from Federal, State, and local agencies, as well as the general public. Table 12-9 lists the drought impacts to Denton County from 2005 to 2021 based on reports received by the Drought Impact Reporter.

Table 12-9. Drought Impacts, 2005-2022

DROUGHT IMPACTS	
Agriculture	72
Business & Industry	2
Energy	3
Fire	23
Plants & Wildlife	46
Relief, Response & Restrictions	19
Society & Public Health	8
Tourism & Recreation	2
Water Supply & Quality	52

Drought has the potential to impact people in the Denton County planning area. While it is rare that drought, in and of itself, leads to a direct risk to the health and safety of people in the U.S., severe water shortages could result in inadequate supply for human needs. The impact of climate change could produce longer, more severe droughts, exacerbating the current drought impacts. Worsening drought conditions can be frequently associated with a variety of impacts, including:

- The number of health-related low-flow issues (e.g., diminished sewage flows, increased pollution concentrations, reduced firefighting capacity, and cross-connection contamination) will increase as the drought intensifies.
- Public safety from forest/range/wildfires will increase as water availability and/or pressure decreases.
- Respiratory ailments may increase as the air quality decreases.
- There may be an increase in disease due to wildlife concentrations (e.g., rabies, Rocky Mountain spotted fever, Lyme disease).

- Jurisdictions and residents may disagree over water use/water rights, creating conflict.
- Political conflicts may increase between municipalities, counties, states, and regions.
- Water management conflicts may arise between competing interests.
- Increased law enforcement activities may be required to enforce water restrictions.
- Severe water shortages could result in inadequate supply for human needs as well as lower quality of water for consumption.
- Firefighters may have limited water resources to aid in firefighting and suppression activities, increasing risk to lives and property.
- During drought there is an increased risk for wildfires and dust storms.
- The community may need increased operational costs to enforce water restriction or rationing.
- Prolonged drought can lead to increases in illness and disease related to drought.
- Utility providers can see decreases in revenue as water supplies diminish.
- Utilities providers may cut back energy generation and service to their customers to prioritize critical service needs.
- Hydroelectric power generation facilities and infrastructure would have significantly diminished generation capability. Dams simply cannot produce as much electricity from low water levels as they can from high water levels.
- Fish and wildlife food and habitat will be reduced or degraded over time during a drought and disease will increase, especially for aquatic life.
- Wildlife will move to more sustainable locations creating higher concentrations of wildlife in smaller areas, increasing vulnerability, and further depleting limited natural resources.
- Severe and prolonged drought can result in the reduction of a species or cause the extinction of a species altogether.
- Plant life will suffer from long-term drought. Wind and erosion will also pose a threat to plant life as soil quality will decline.
- Dry and dead vegetation will increase the risk of wildfire.
- Drought poses a significant risk to annual and perennial crop production and overall crop quality leading to higher food costs.
- Drought related declines in production may lead to an increase in unemployment.
- Drought may limit livestock grazing resulting in decreased livestock weight, potential increased livestock mortality, and increased cost for feed.
- Negatively impacted water suppliers may face increased costs resulting from the transport water or develop supplemental water resources.
- Long term drought may negatively impact future economic development.

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

SECTION 13: WILDFIRE

Hazard Description	1
Location	1
Extent.....	33
Historical Occurrences.....	67
Probability of Future Events.....	71
Vulnerability and Impact.....	71
Assessment of Impacts	114

HAZARD DESCRIPTION

A wildfire event can rapidly spread out of control and occurs most often in the summer when the brush is dry and flames can move unchecked through a highly vegetative area. Wildfires can start as a slow burning fire along the forest floor, killing and damaging trees. The fires often spread more rapidly as they reach the tops of trees with wind carrying the flames from tree to tree. Usually, dense smoke is the first indication of a wildfire.

A wildfire event often begins unnoticed and spreads quickly, lighting brush, trees, and homes on fire. For example, a wildfire may be started by a campfire that was not doused properly, a tossed cigarette, burning debris, or arson.

Texas has seen a significant increase in the number of wildfires in the past 30 years, which included wildland, interface, or intermix fires. Wildland fires are fueled almost exclusively by natural vegetation, while interface or intermix fires are urban/wildland fires in which vegetation and the built environment provide the fuel.

LOCATION

A wildfire event can be a potentially damaging consequence of drought. Wildfires can vary greatly in terms of size, location, intensity, and duration. While wildfires are not confined to any specific geographic location, they are most likely to occur in open grasslands. The threat to people and property from a wildfire event is greater in the fringe areas where developed areas meet open grass lands, such as the Wildfire Urban Interface (WUI). (Figures 13-1 through 13-32). It is estimated that 32.4 percent of the total population in Denton County live within the WUI. However, the entire Denton County planning area is at some risk for wildfires.

Figure 13-1. Wildland Urban Interface Map – Denton County

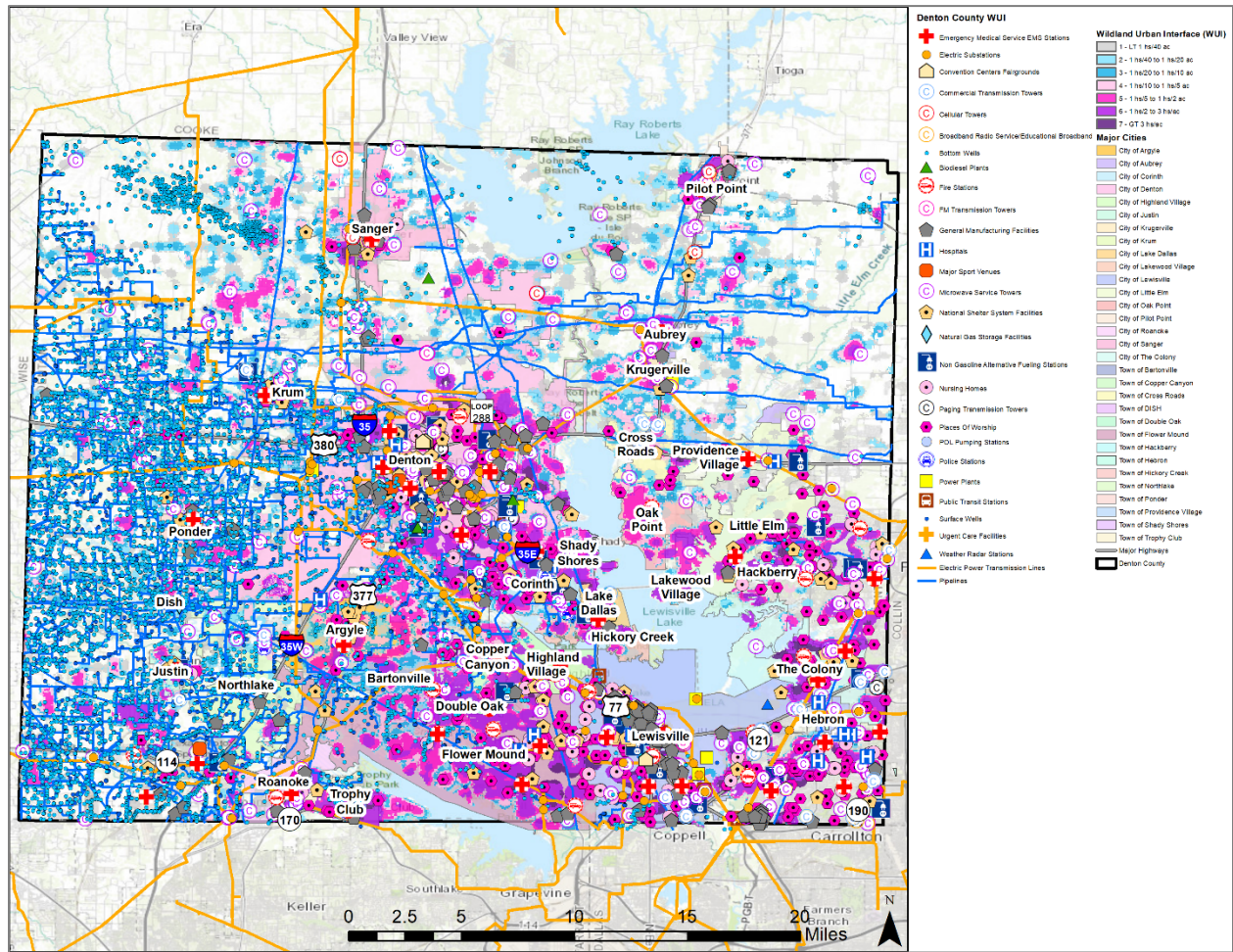
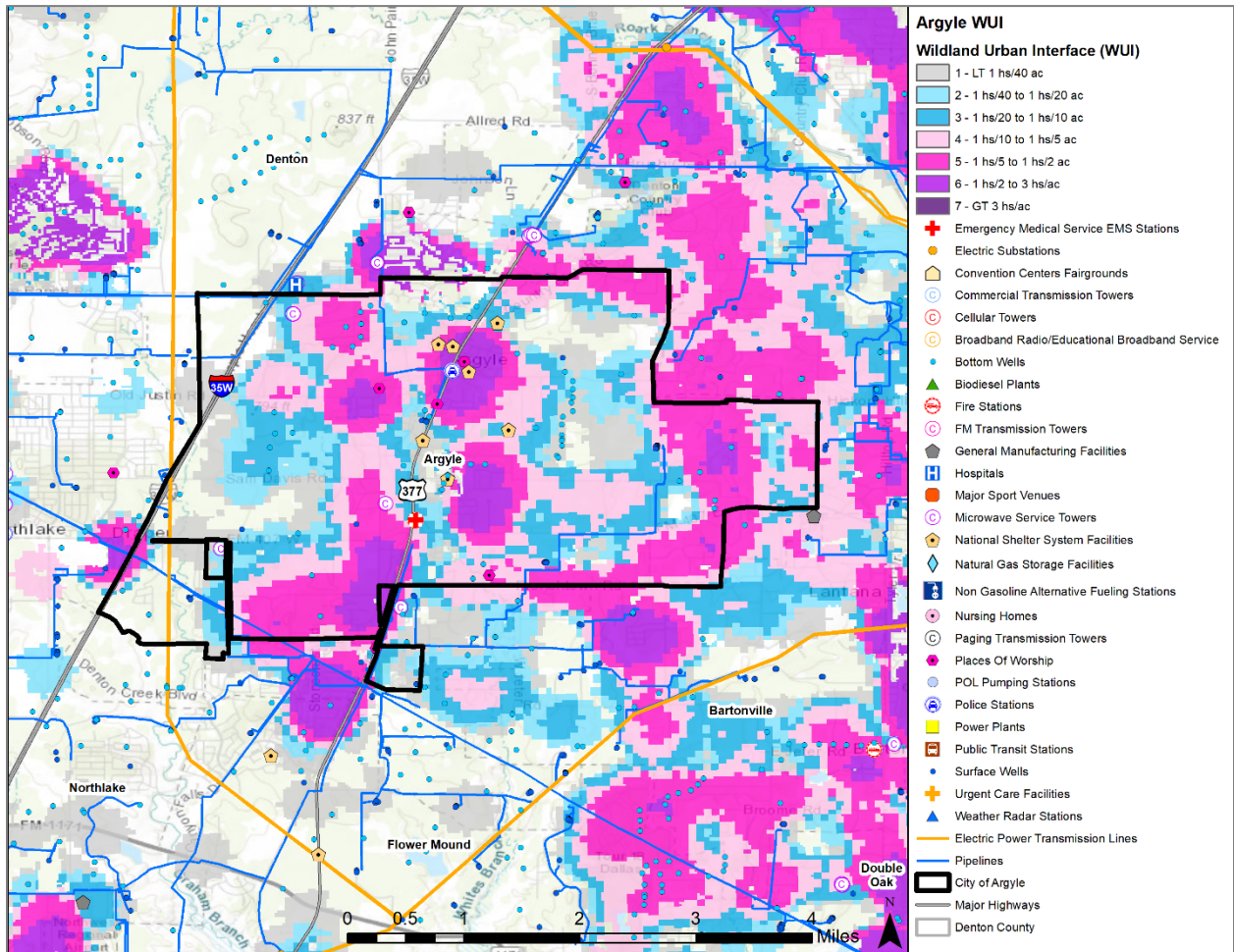
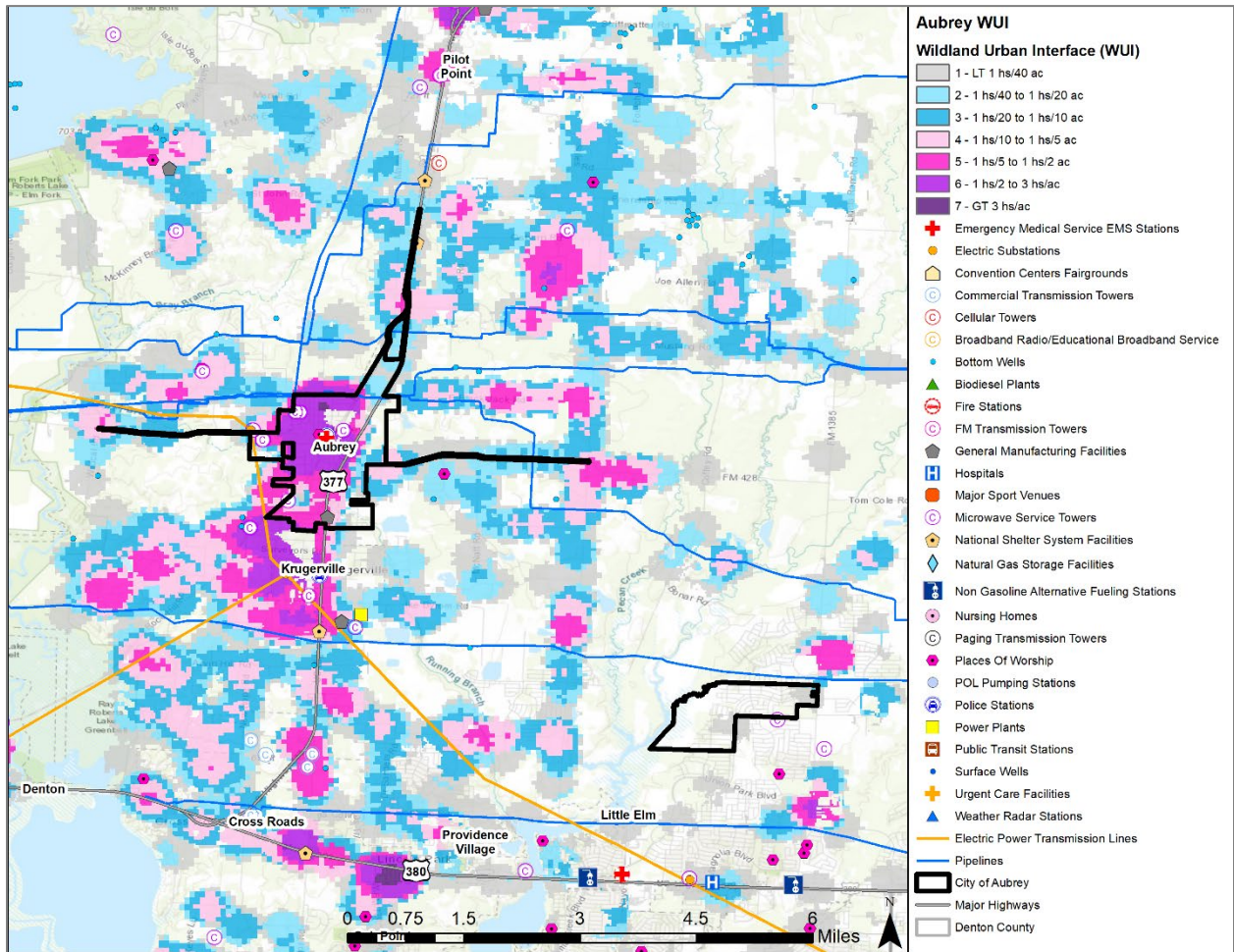


Figure 13-2. Wildland Urban Interface Map – Town of Argyle



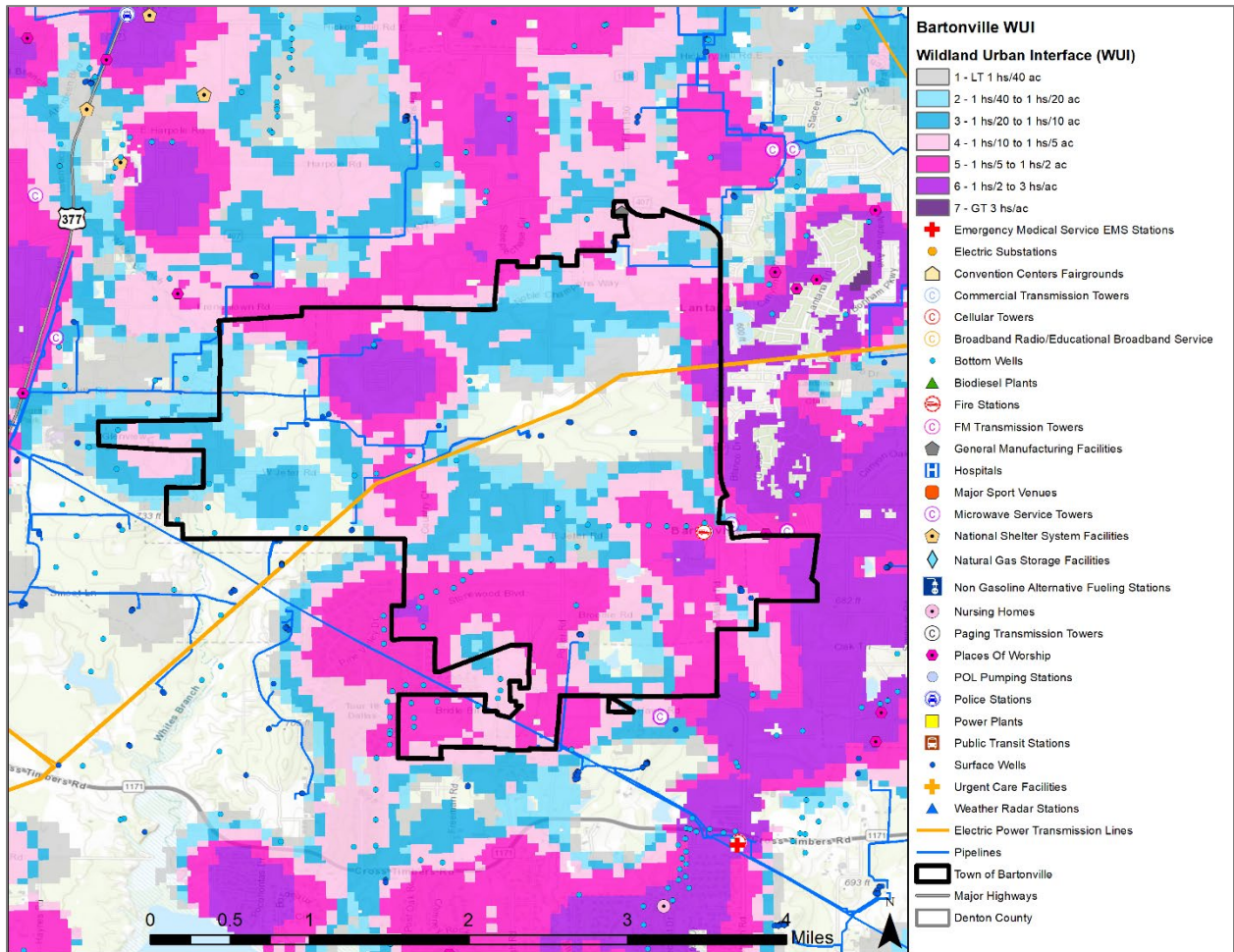
It is estimated that 98.7 percent of the total population in the Town of Argyle live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-3. Wildland Urban Interface Map – City of Aubrey



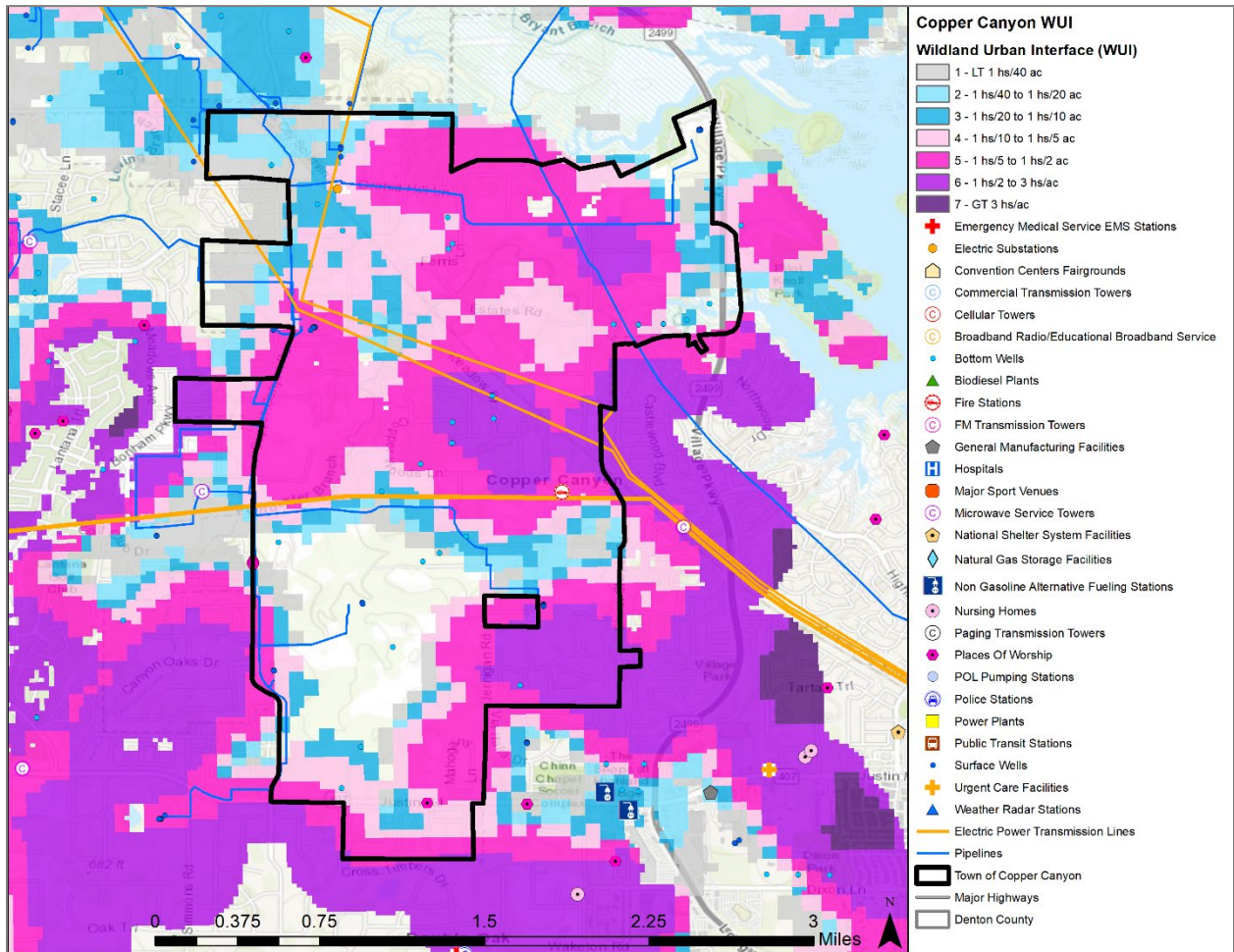
It is estimated that 93.9 percent of the total population in the City of Aubrey live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-4. Wildland Urban Interface Map – Town of Bartonville



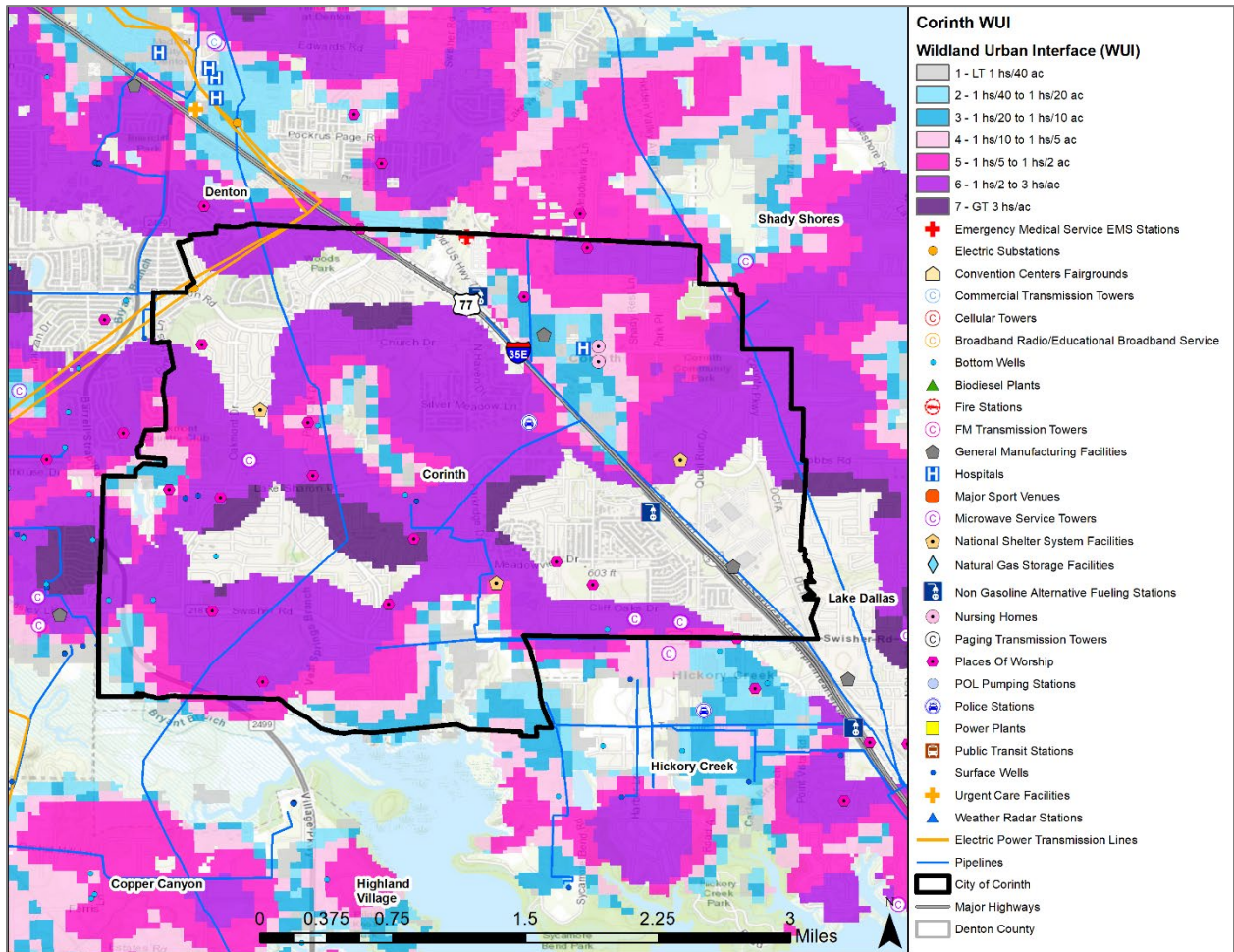
It is estimated that 100 percent of the total population in the Town of Bartonville live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-5. Wildland Urban Interface Map – Town of Copper Canyon



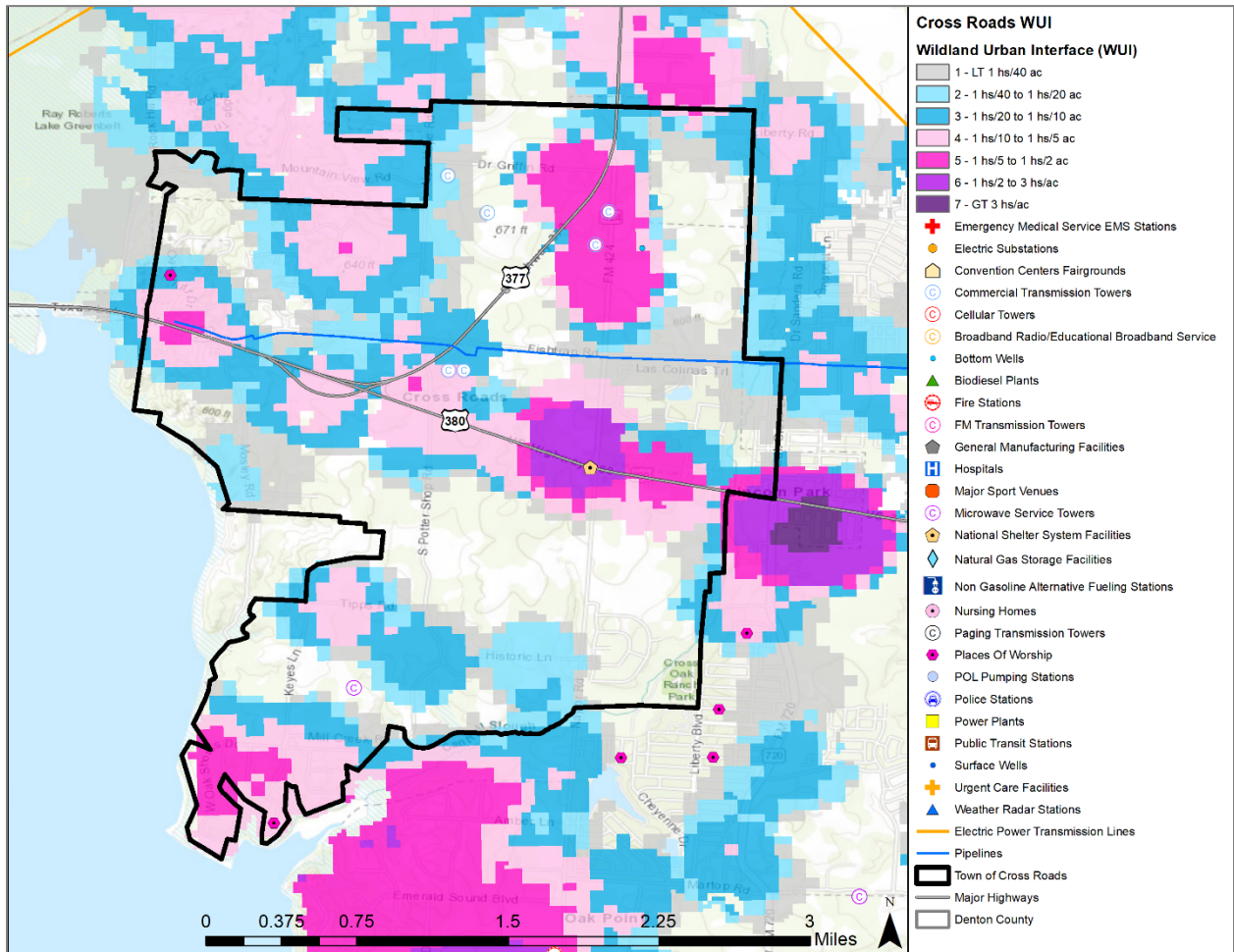
It is estimated that 99.1 percent of the total population in the Town of Cooper Canyon live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-6. Wildland Urban Interface Map – City of Corinth



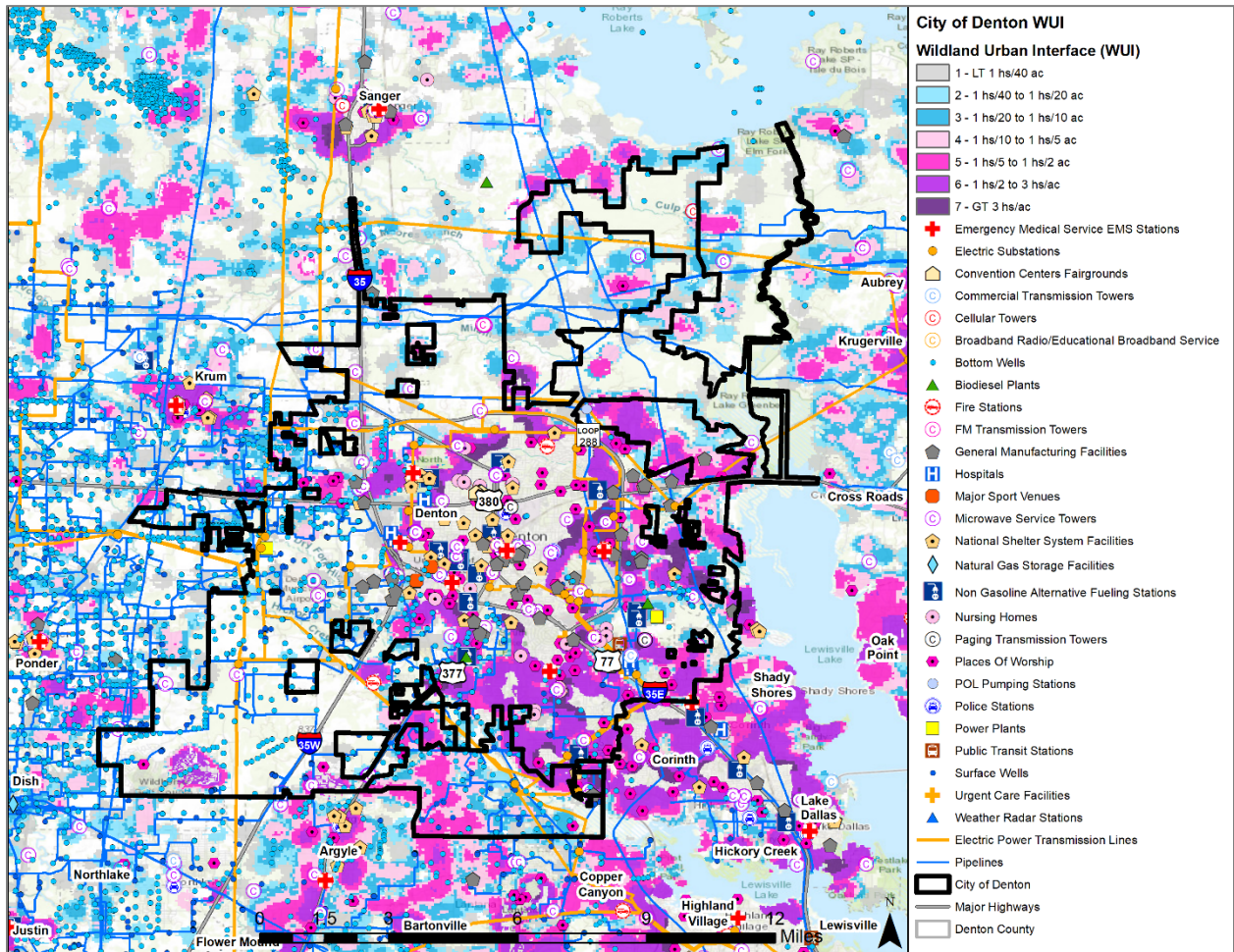
It is estimated that 55.5 percent of the total population in the City of Corinth live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-7. Wildland Urban Interface Map – Town of Cross Roads



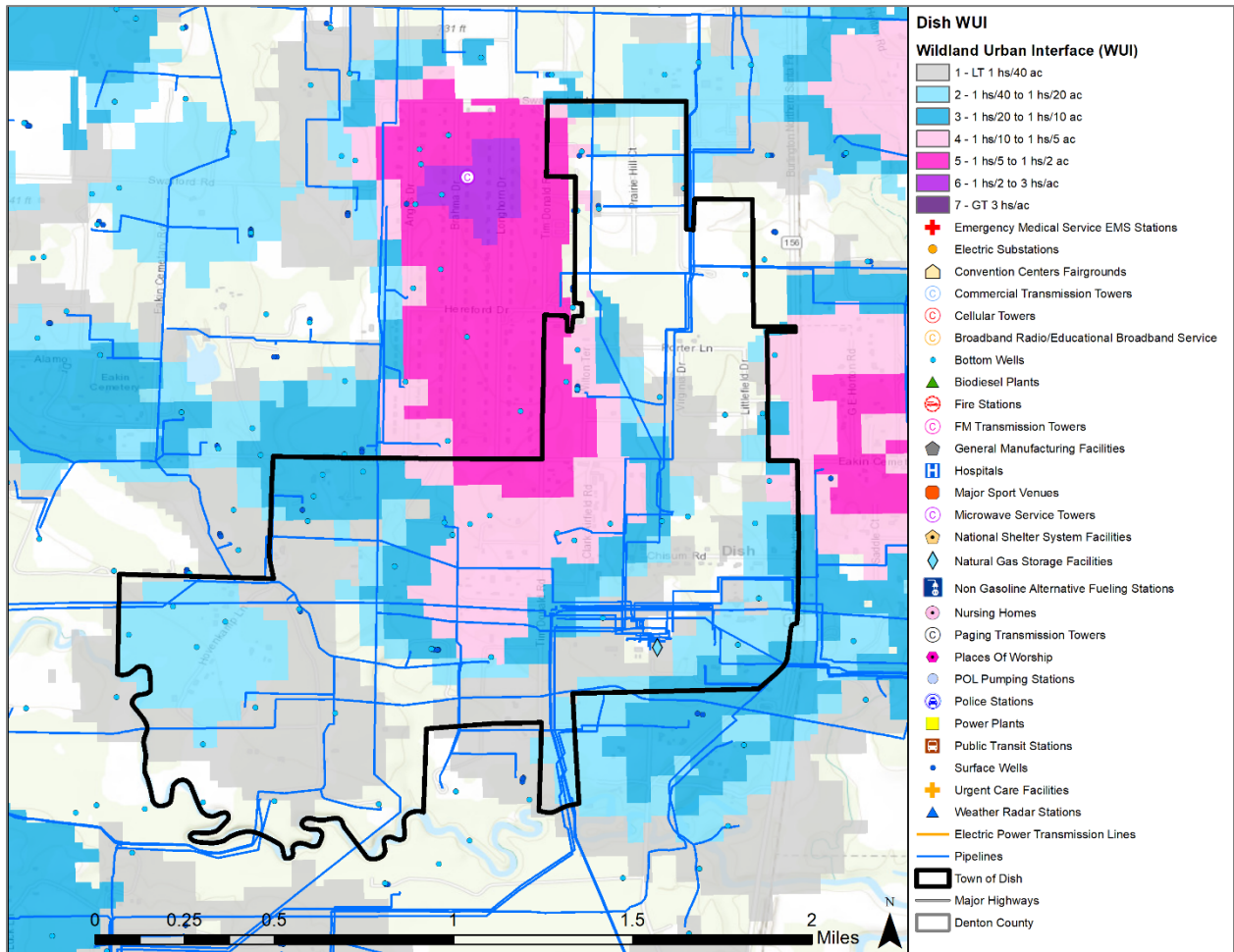
It is estimated that 100 percent of the total population in the Town of Cross Roads live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-8. Wildland Urban Interface Map – City of Denton



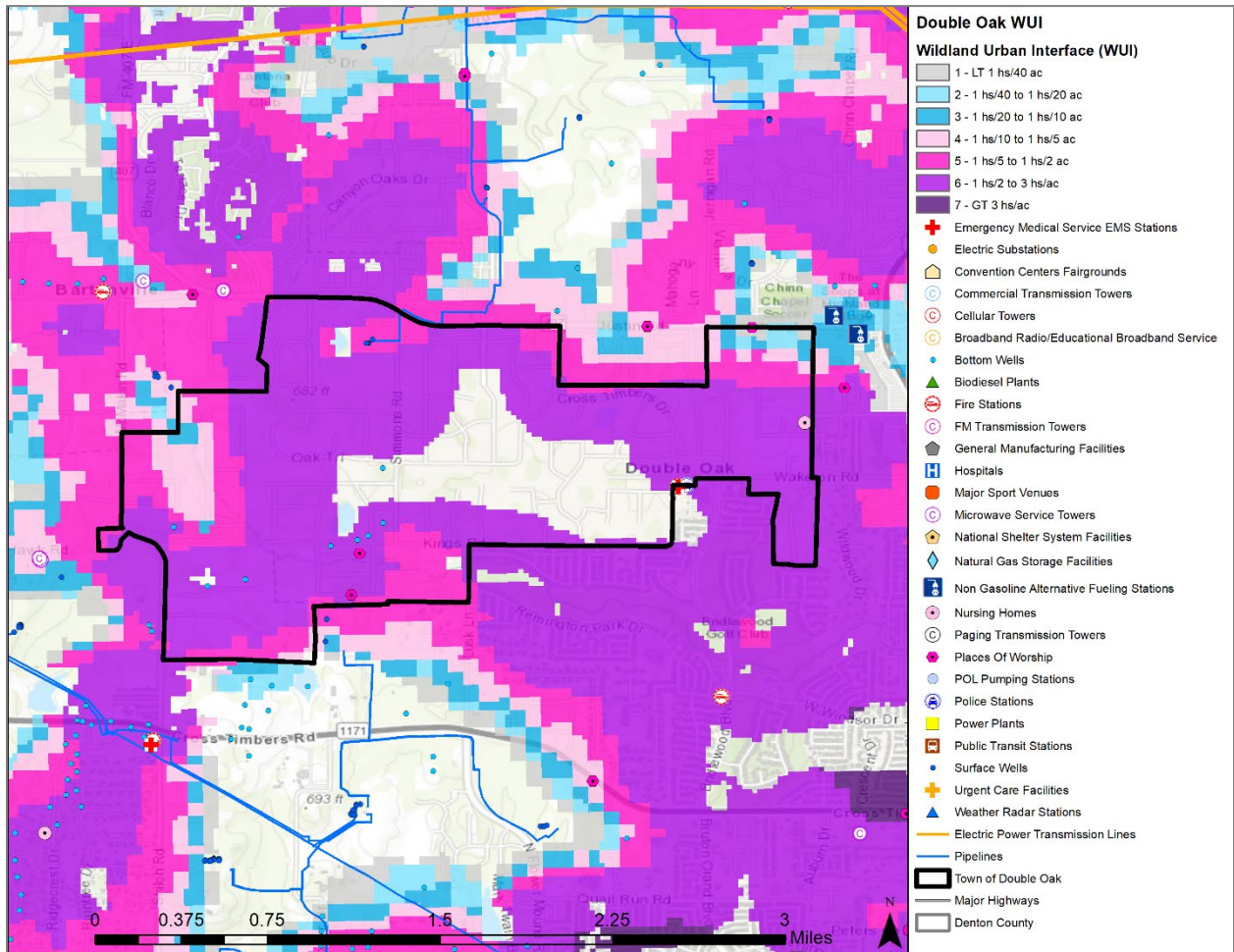
It is estimated that 37.8 percent of the total population in the City of Denton live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-9. Wildland Urban Interface Map – Town of DISH



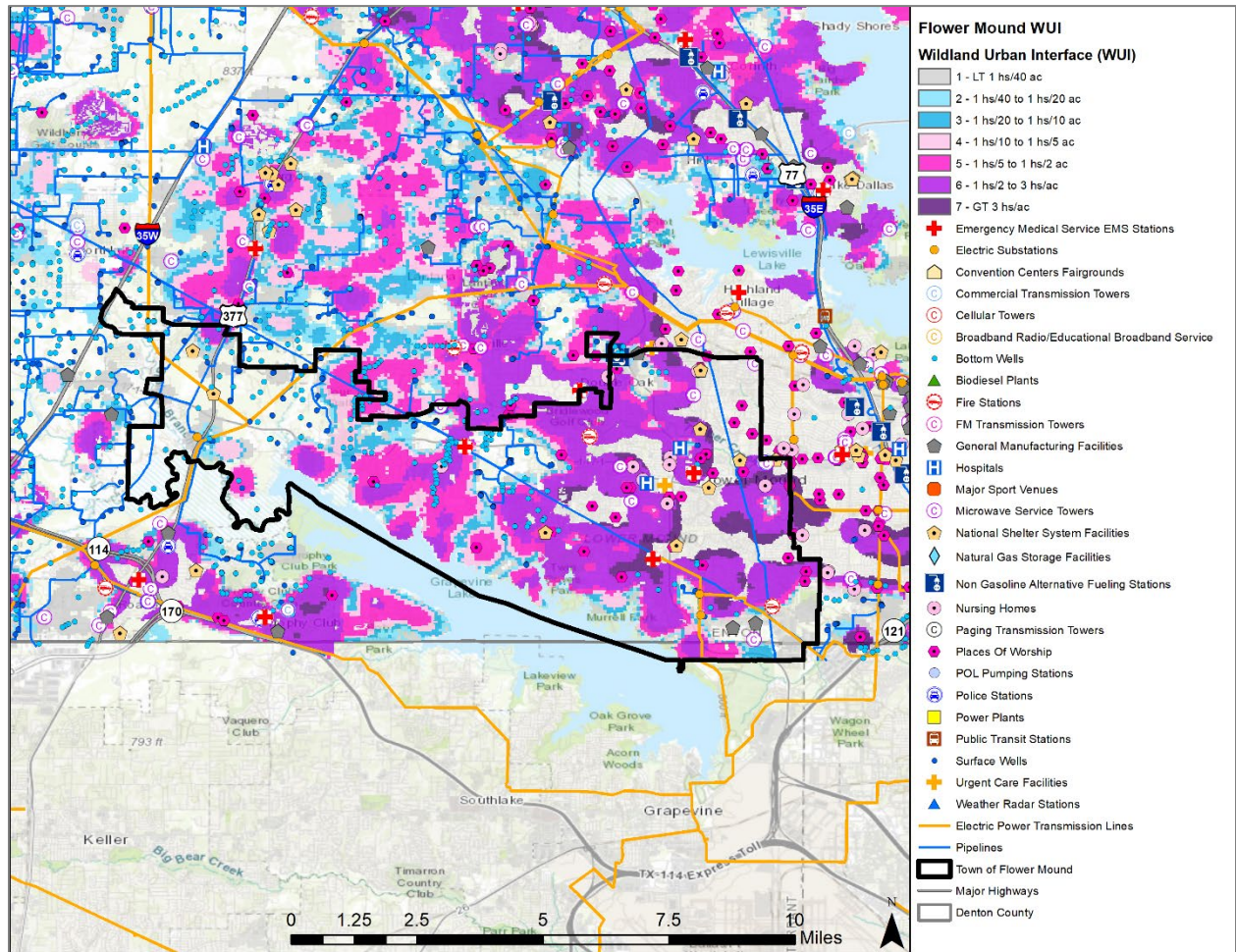
It is estimated that 100 percent of the total population in the Town of DISH live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-10. Wildland Urban Interface Map – Town of Double Oak



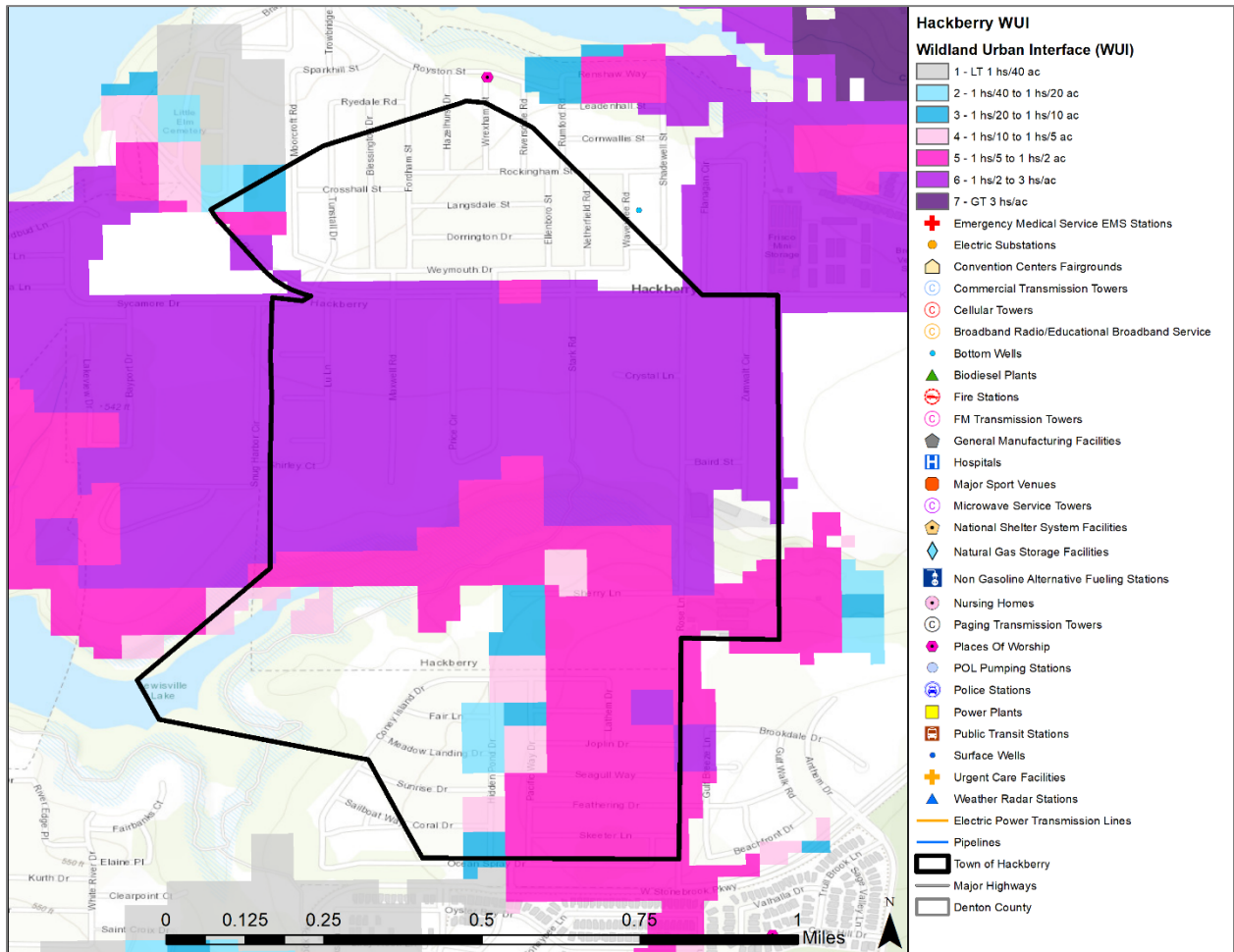
It is estimated that 74.9 percent of the total population in the Town of Double Oak live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-11. Wildland Urban Interface Map – Town of Flower Mound



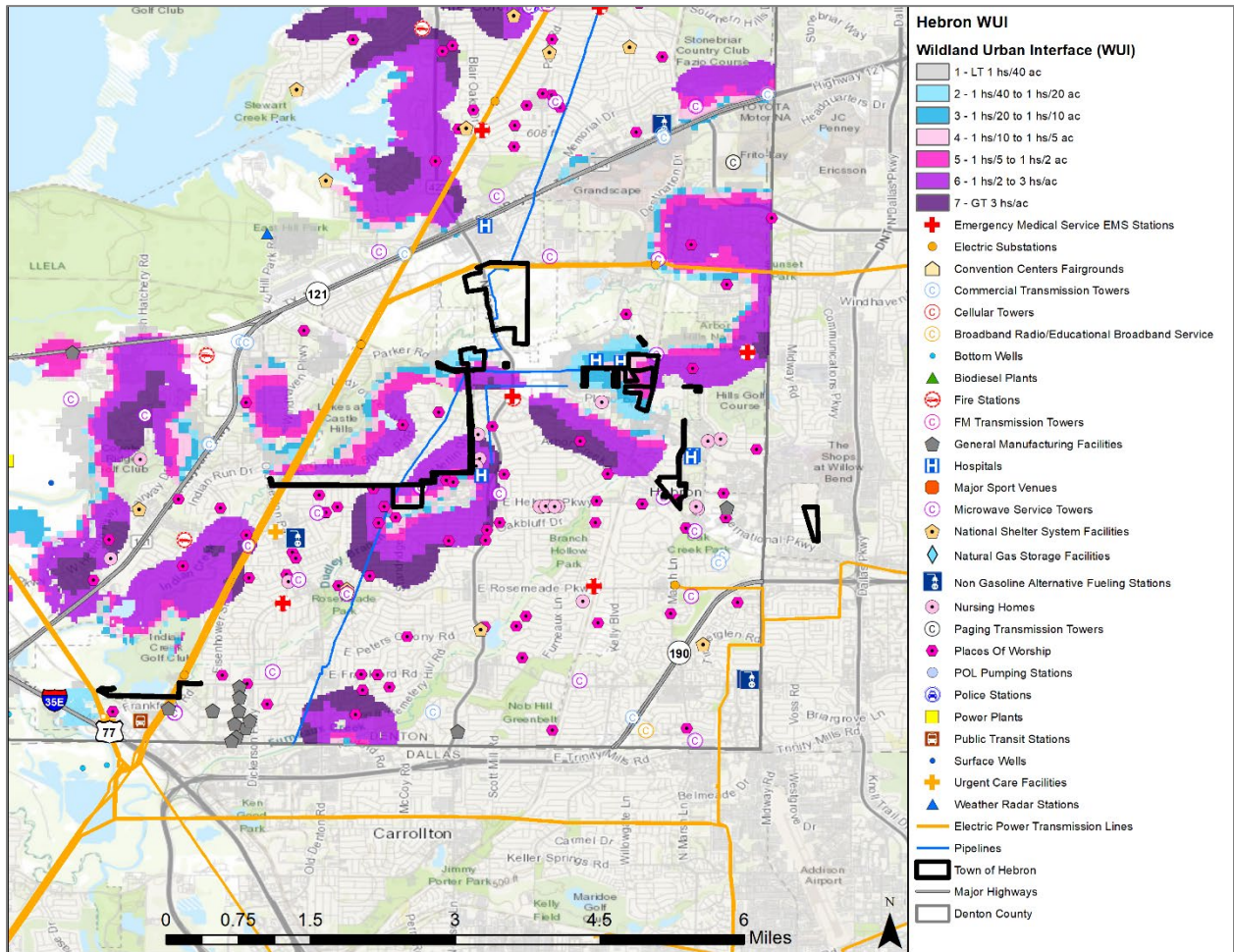
It is estimated that 57.1 percent of the total population in the Town of Flower Mound live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-12. Wildland Urban Interface Map – City of Hackberry



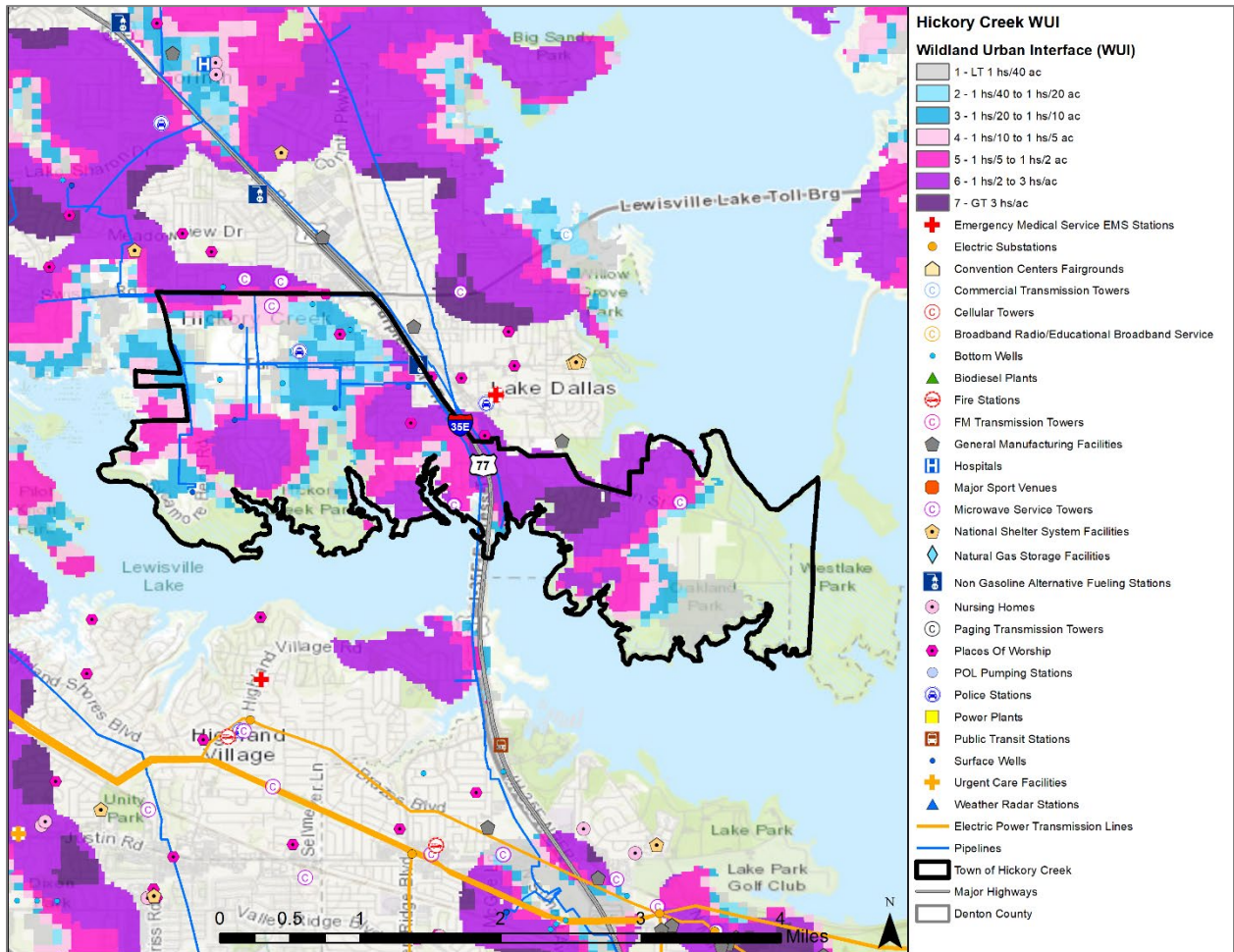
It is estimated that 98.5 percent of the total population in the City of Hackberry live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-13. Wildland Urban Interface Map – Town of Hebron



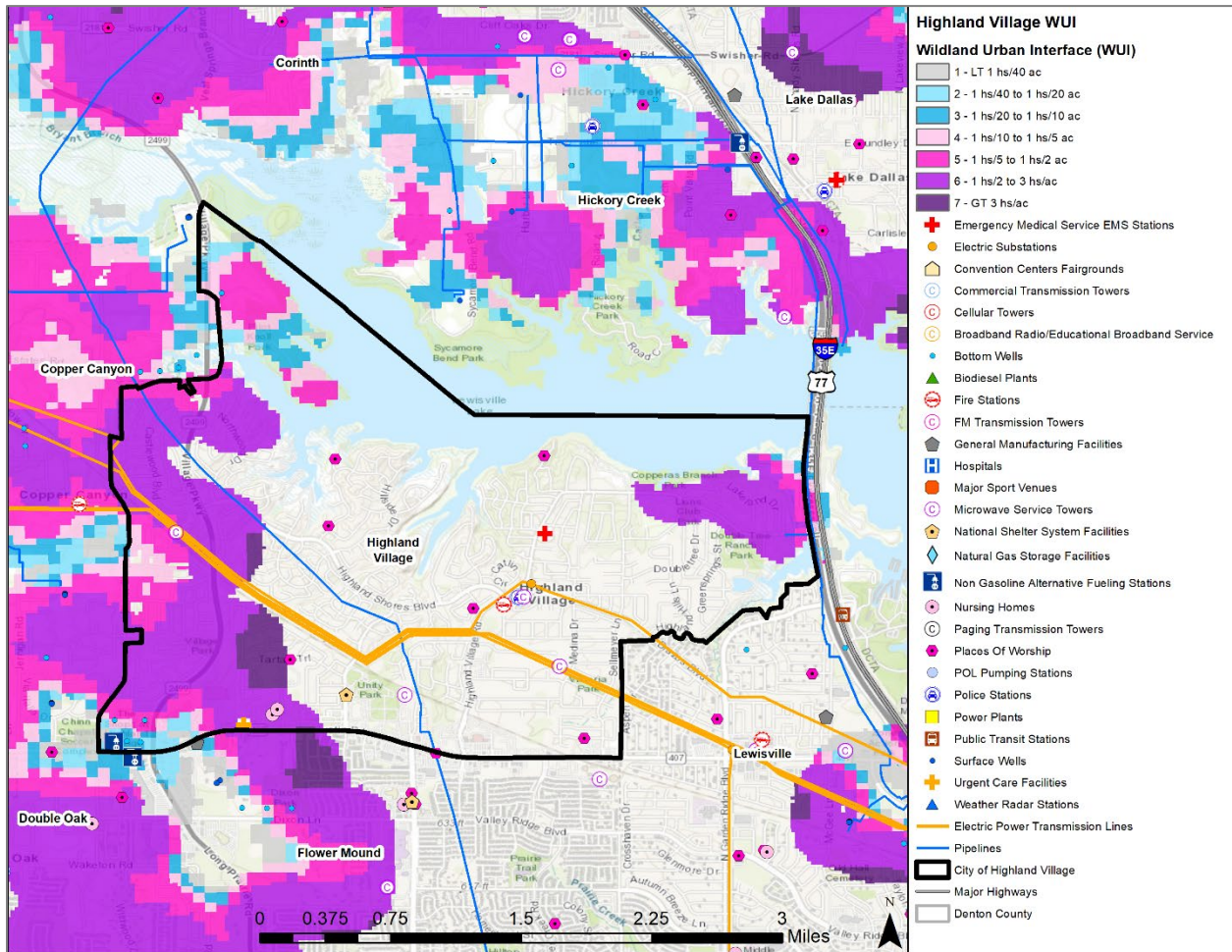
It is estimated that 59.2 percent of the total population in the Town of Hebron live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-14. Wildland Urban Interface Map – Town of Hickory Creek



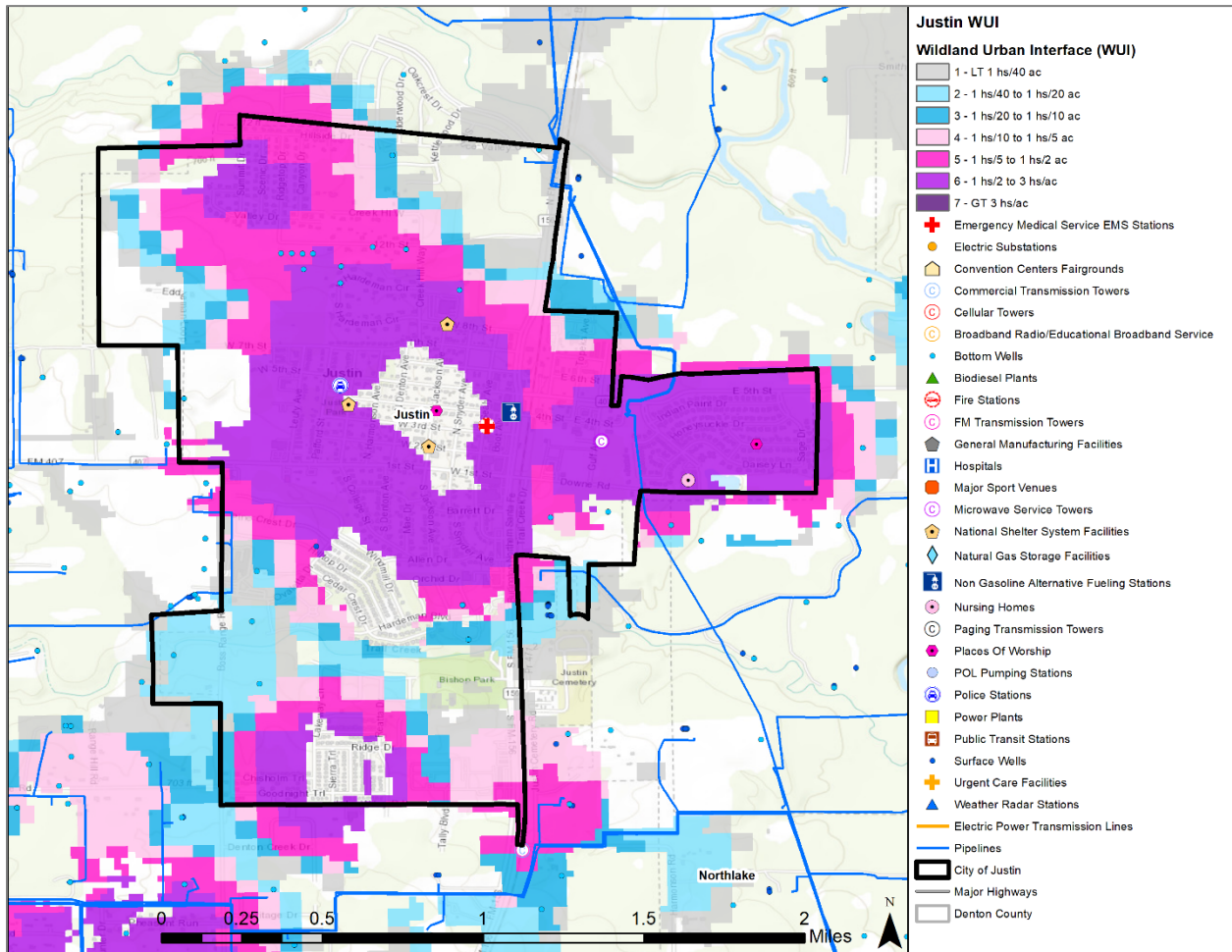
It is estimated that 95.9 percent of the total population in the Town of Hickory Creek live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-15. Wildland Urban Interface Map – City of Highland Village



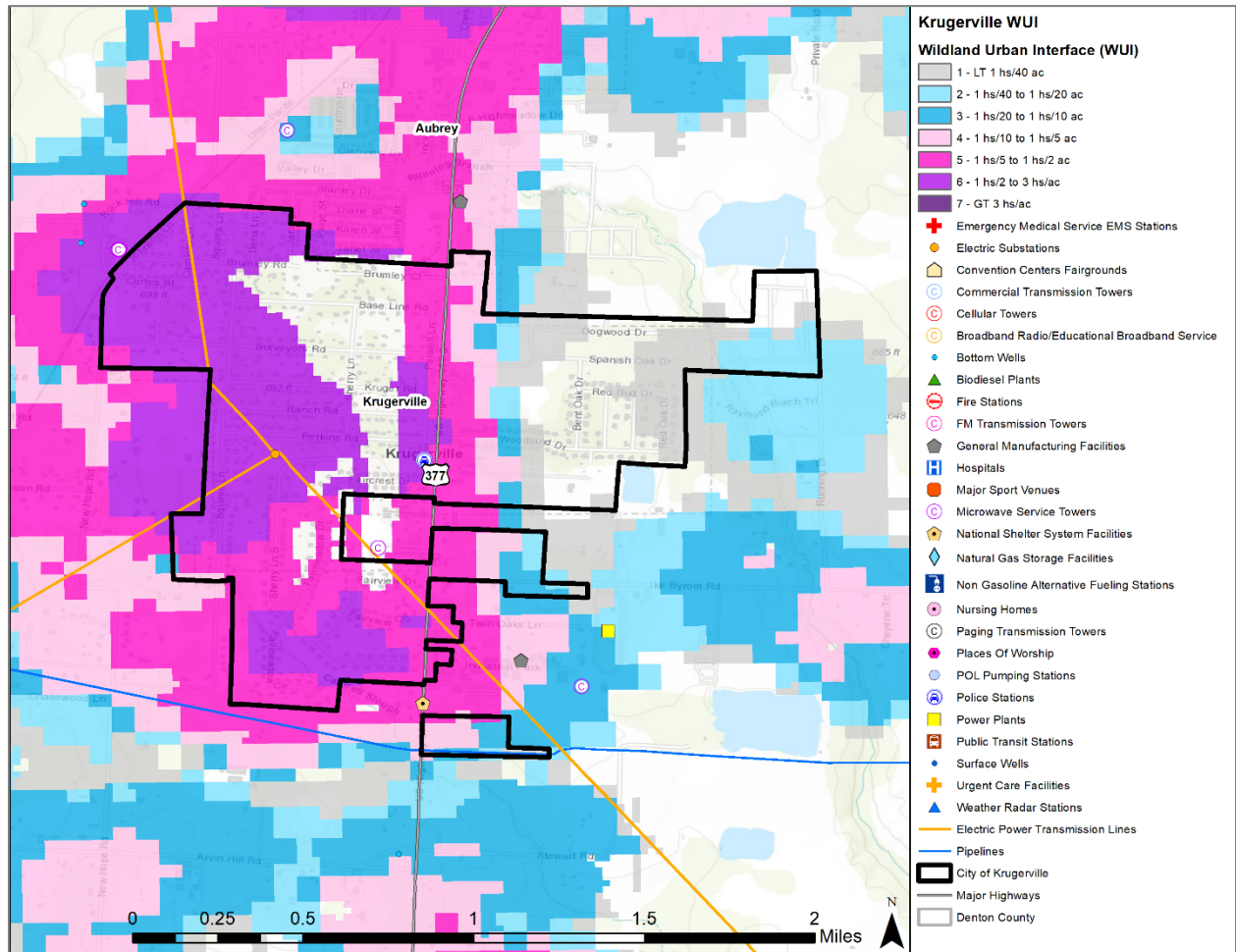
It is estimated that 21.9 percent of the total population in the City of Highland Village live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-16. Wildland Urban Interface Map – City of Justin



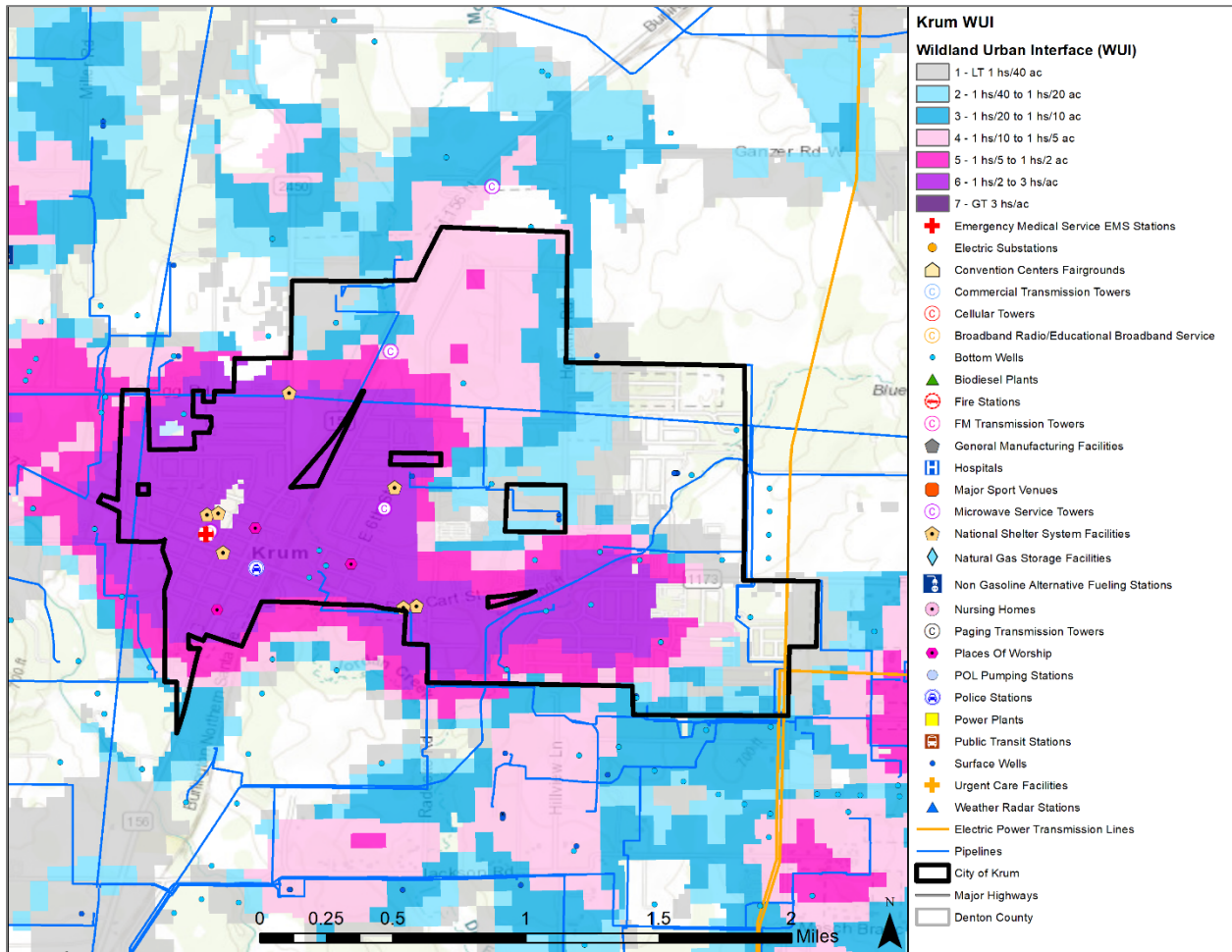
It is estimated that 79.2 percent of the total population in the City of Justin live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-17. Wildland Urban Interface Map – City of Krugerville



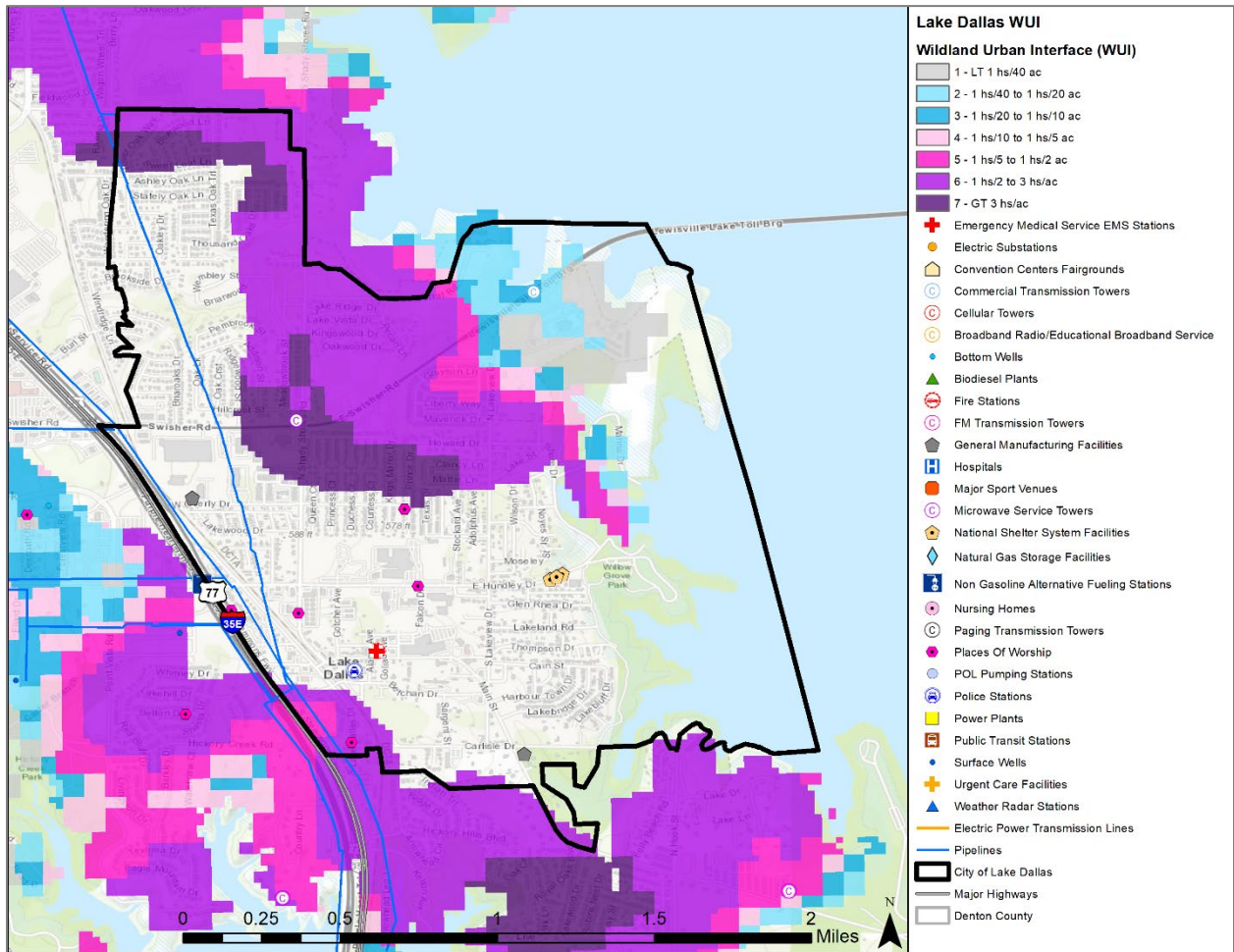
It is estimated that 84 percent of the total population in the City of Krugerville live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-18. Wildland Urban Interface Map – City of Krum



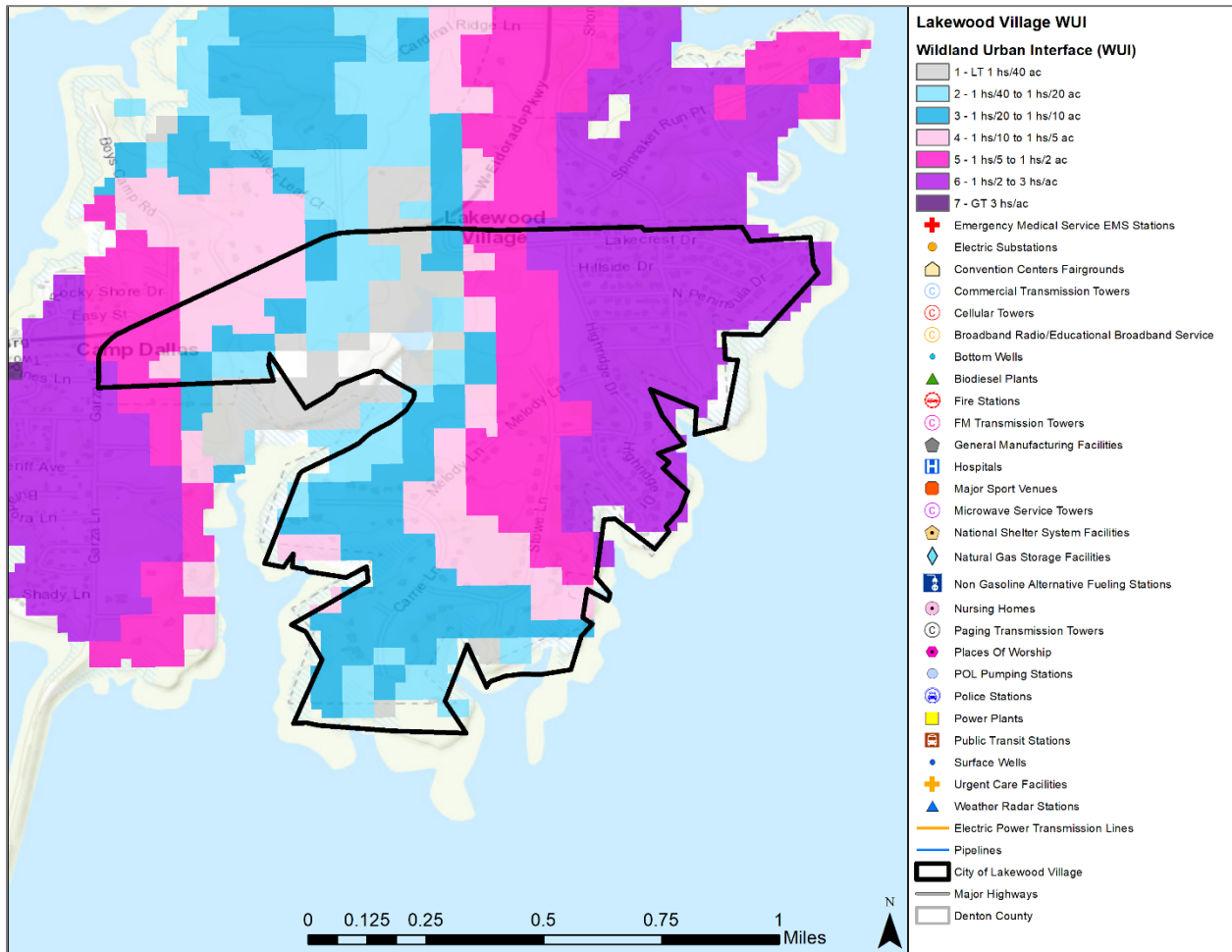
It is estimated that 98.9 percent of the total population in the City of Krum live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-19. Wildland Urban Interface Map – City of Lake Dallas



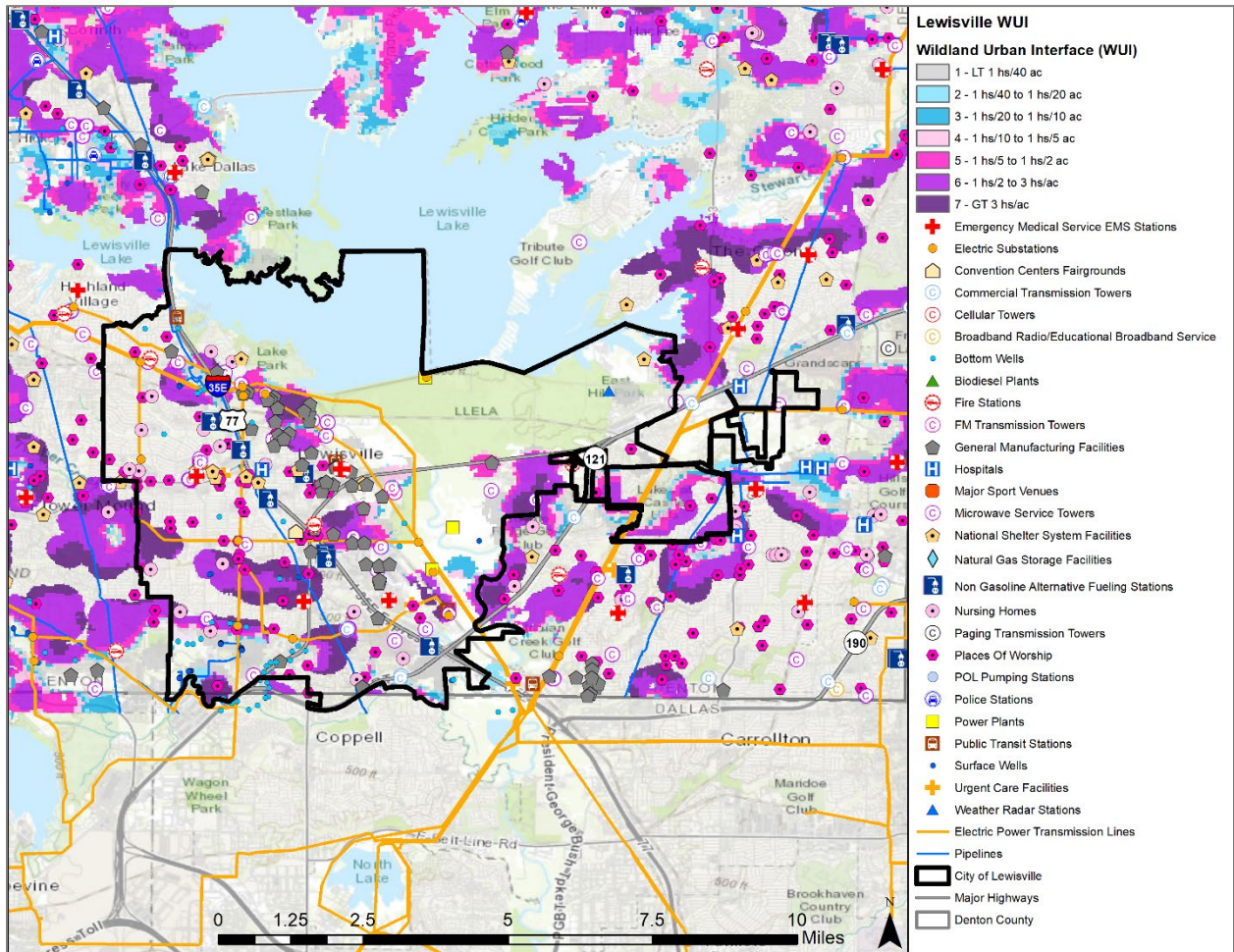
It is estimated that 36.4 percent of the total population in the City of Lake Dallas live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-20. Wildland Urban Interface Map – Town of Lakewood Village



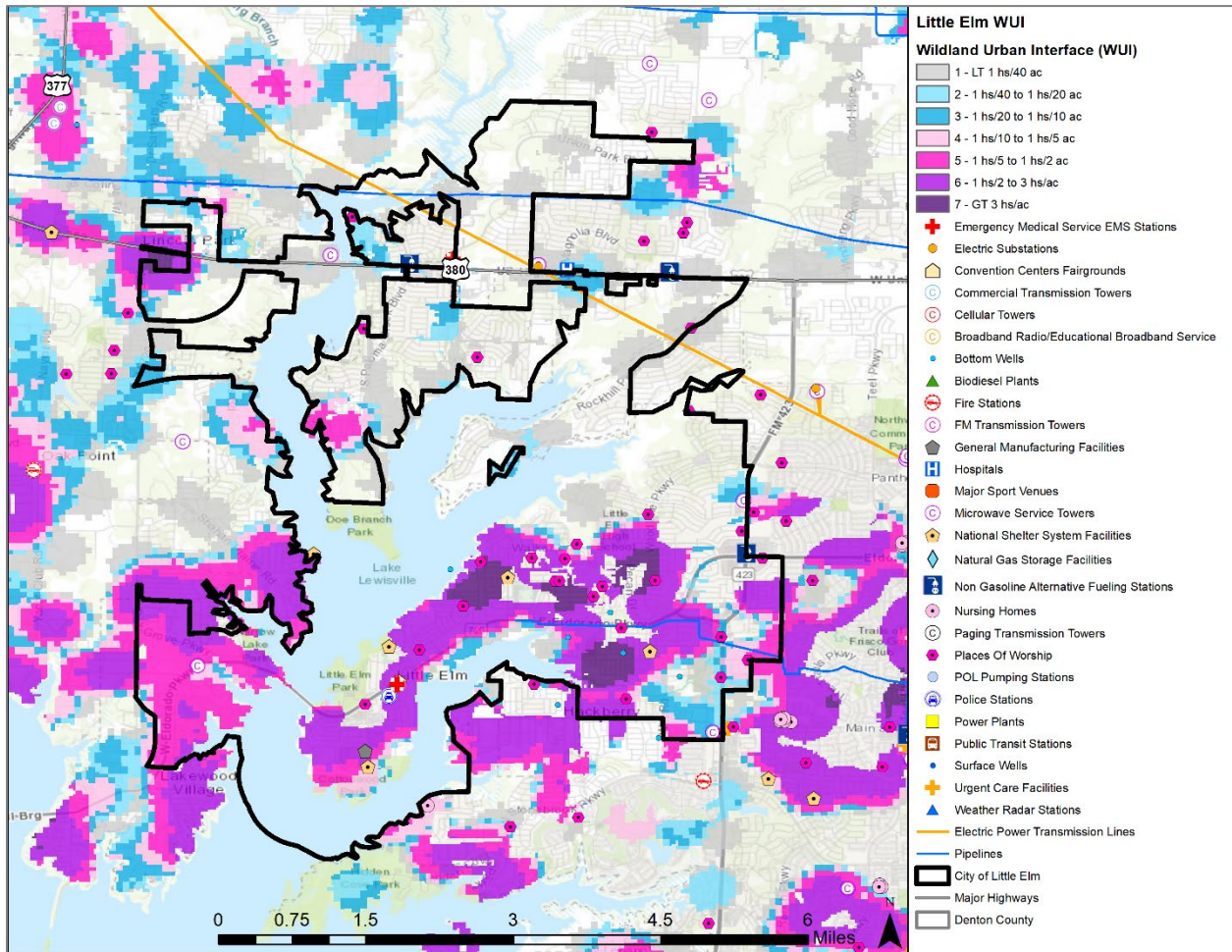
It is estimated that 99.3 percent of the total population in the Town of Lakewood Village live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-21. Wildland Urban Interface Map – City of Lewisville



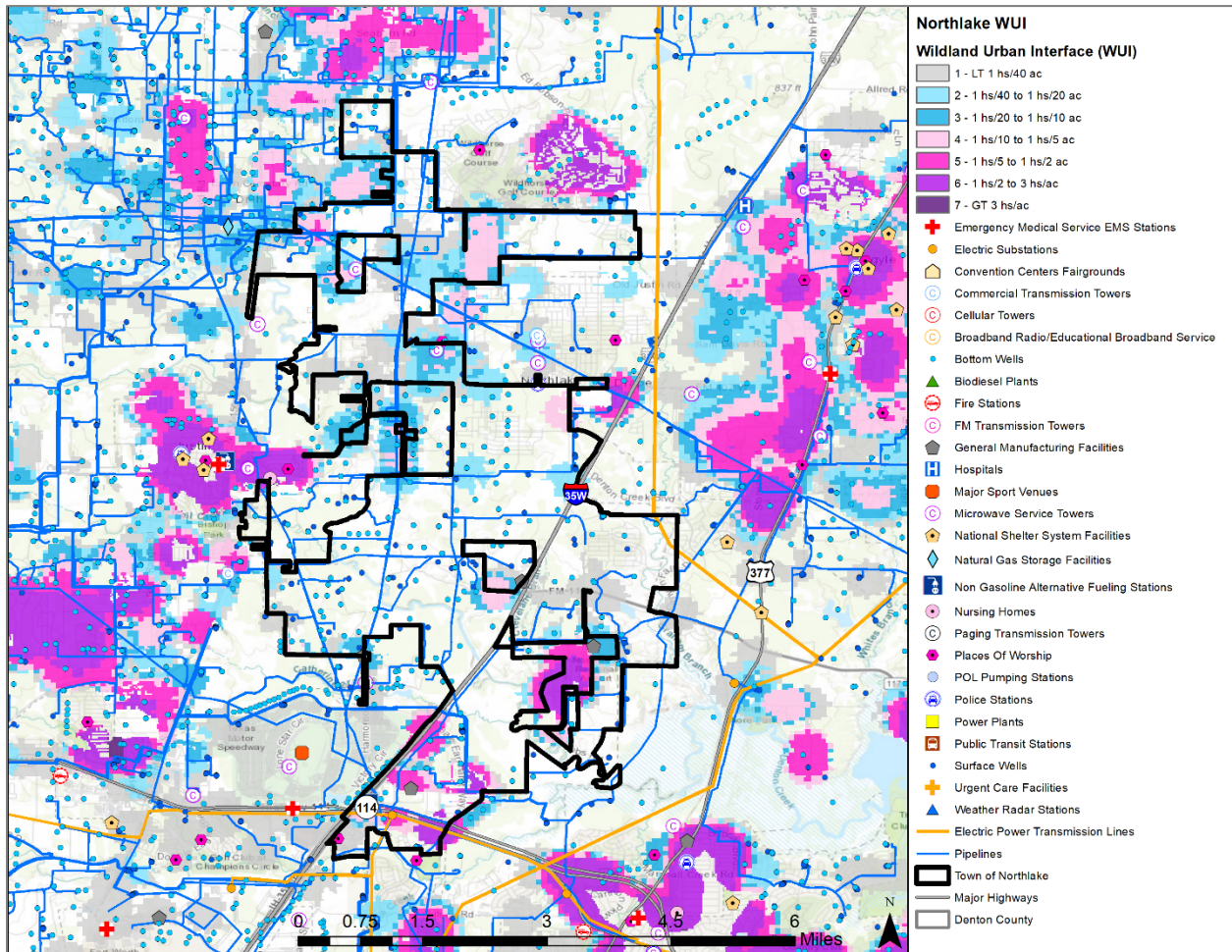
It is estimated that 25.8 percent of the total population in the City of Lewisville live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-22. Wildland Urban Interface Map – Town of Little Elm



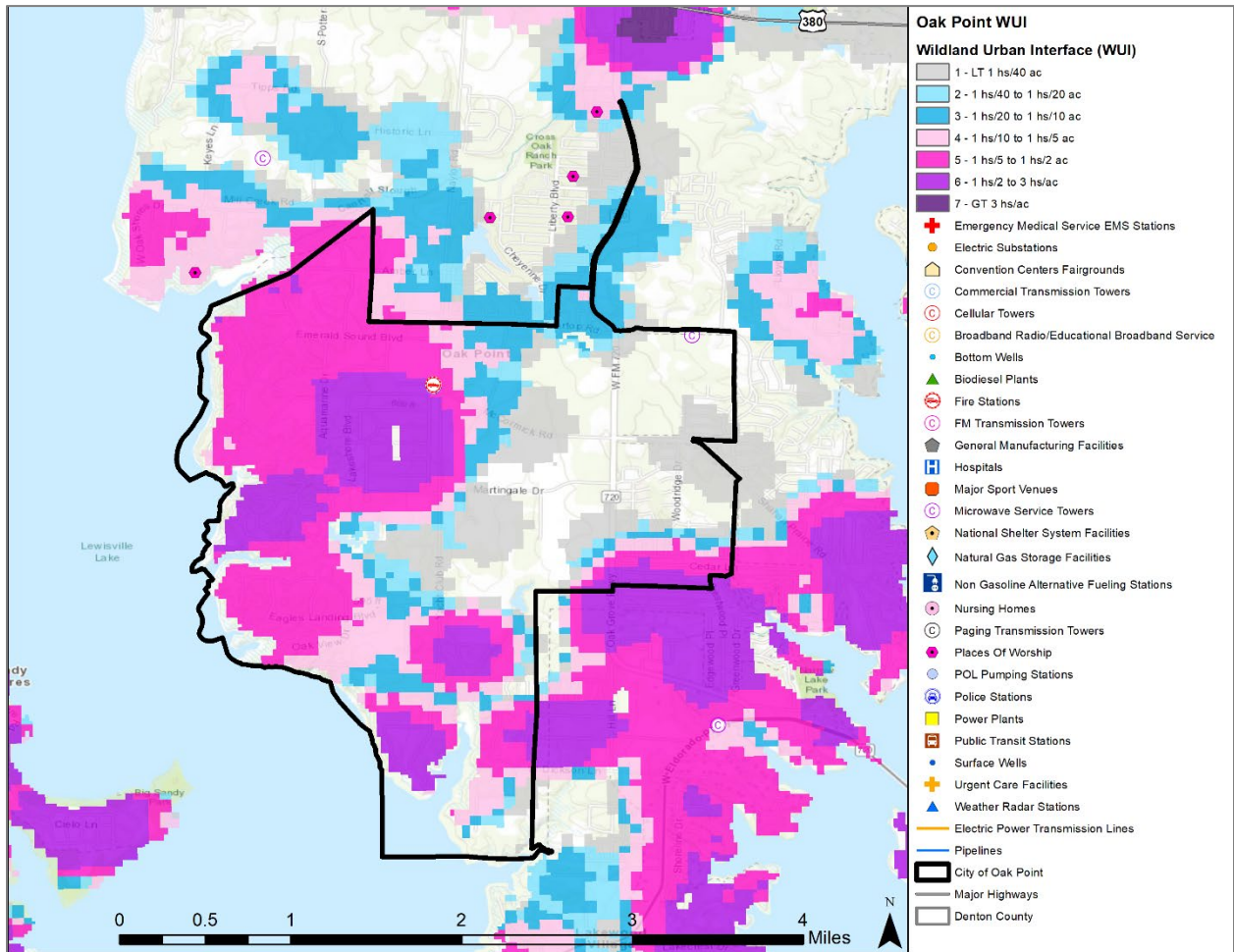
It is estimated that 81.9 percent of the total population in the Town of Little Elm live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-23. Wildland Urban Interface Map – Town of Northlake



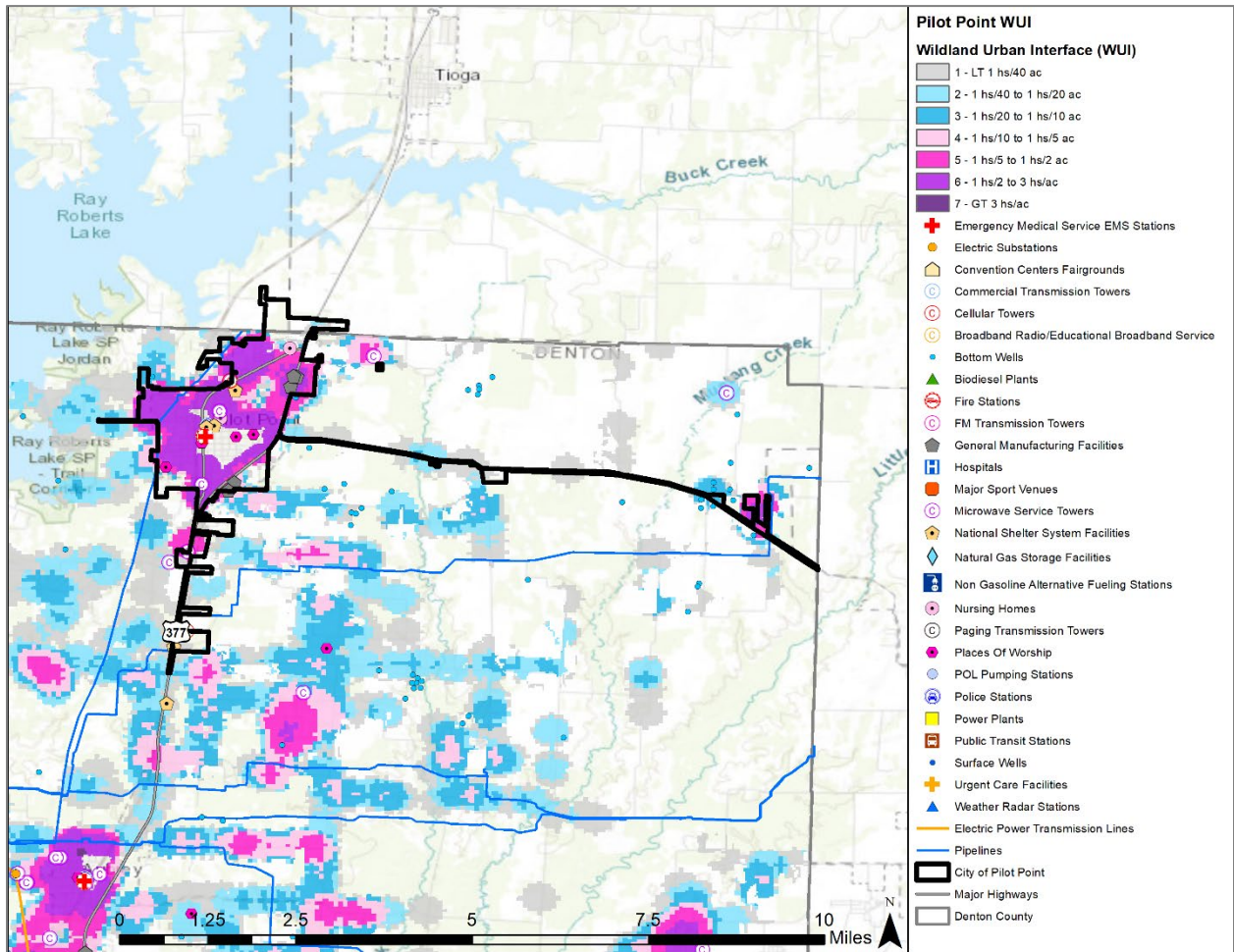
It is estimated that 88 percent of the total population in the Town of Northlake live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-24. Wildland Urban Interface Map – City of Oak Point



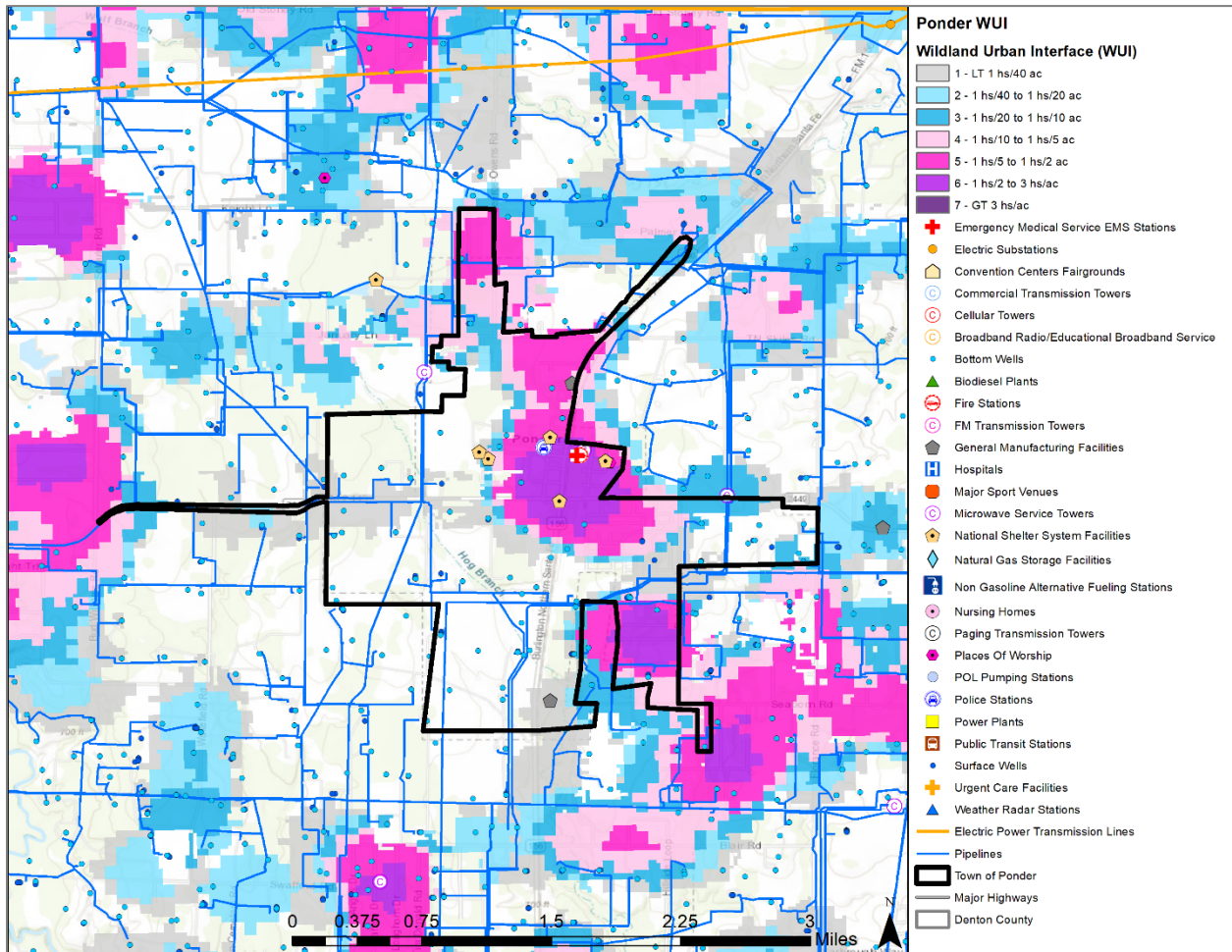
It is estimated that 95.8 percent of the total population in the City of Oak Point live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-25. Wildland Urban Interface Map – City of Pilot Point



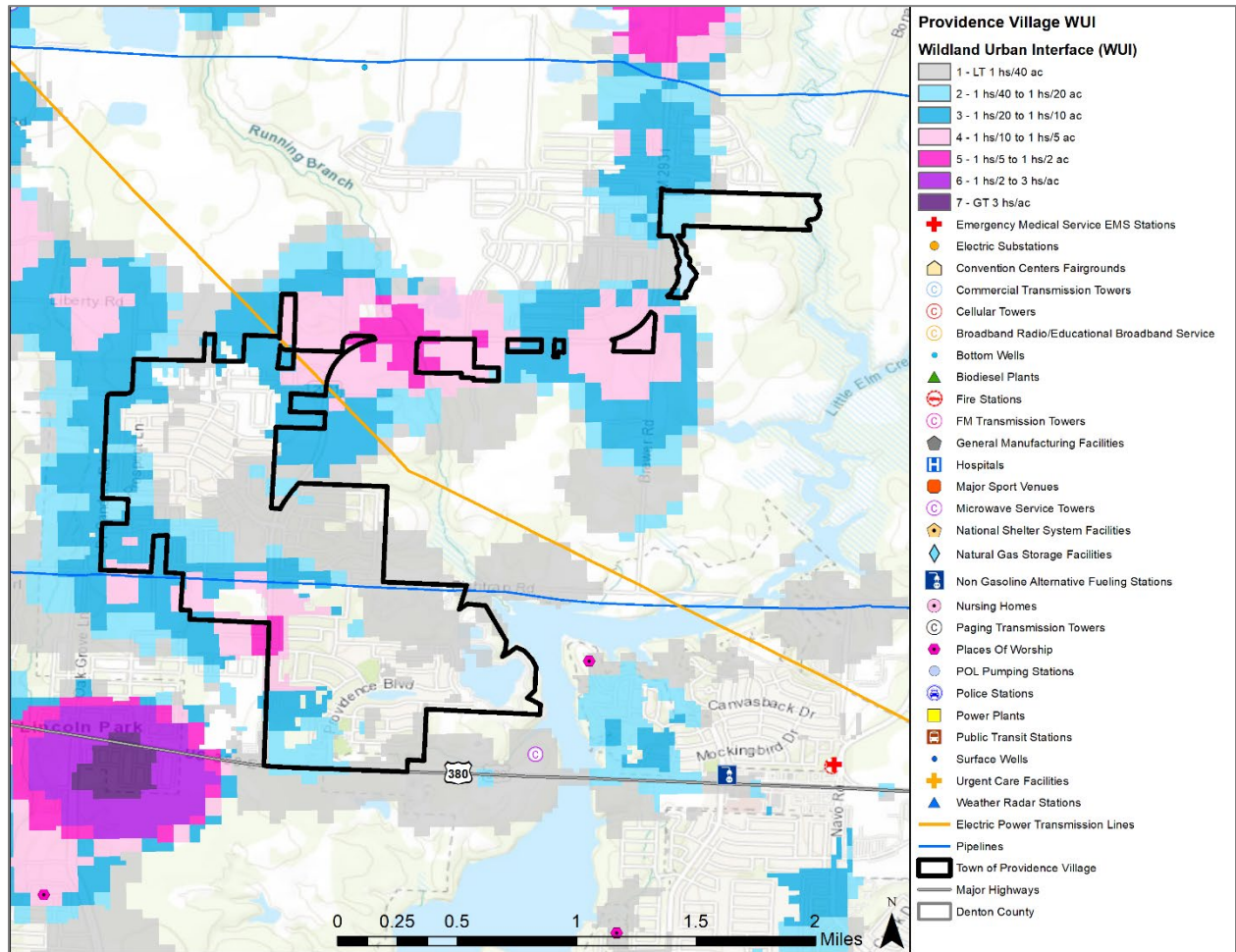
It is estimated that 77.6 percent of the total population in the City of Pilot Point live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-26. Wildland Urban Interface Map – Town of Ponder



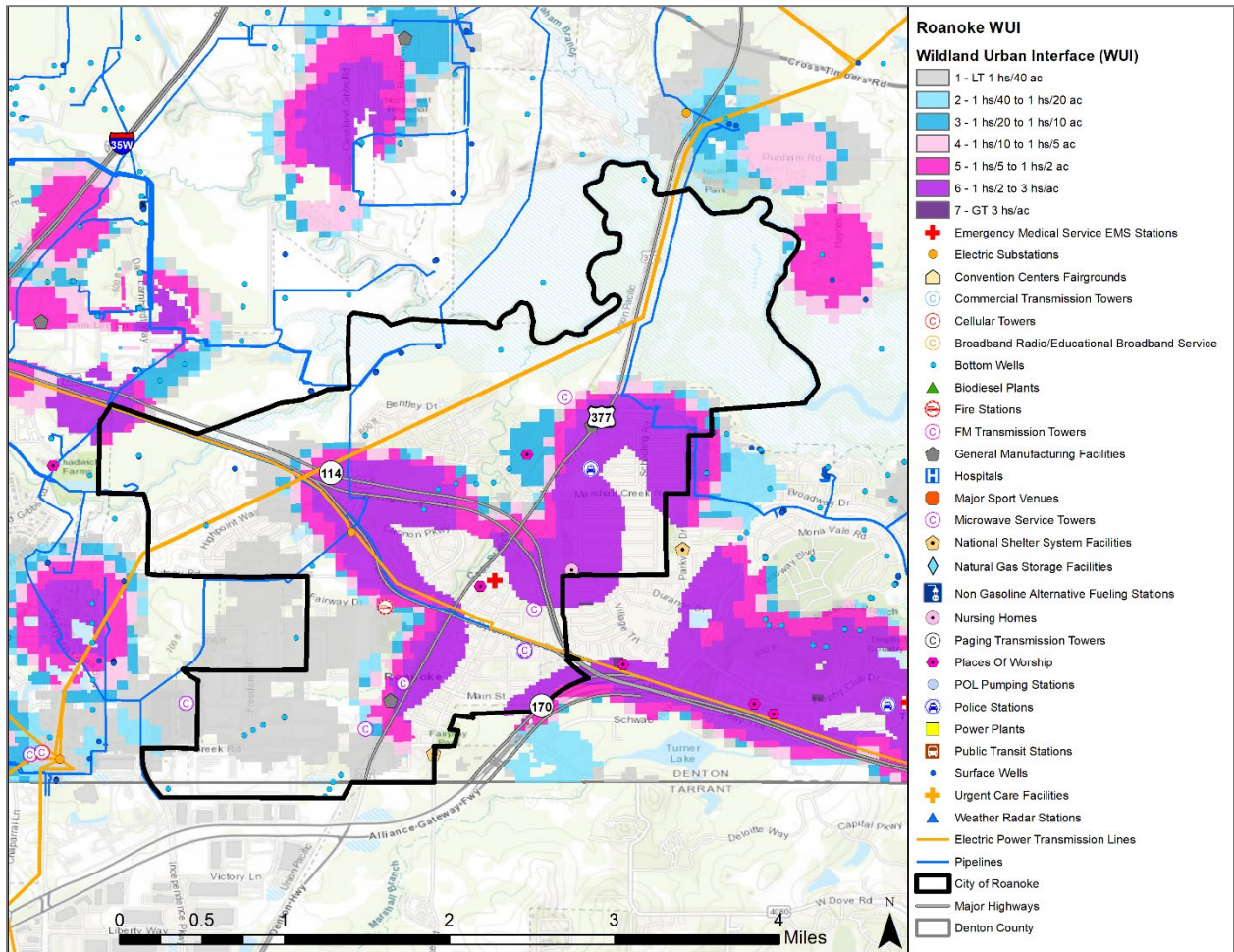
It is estimated that 100 percent of the total population in the Town of Ponder live within the WUI. However, the entire Town is at risk for wildfires.

Figure 13-27. Wildland Urban Interface Map – Town of Providence Village



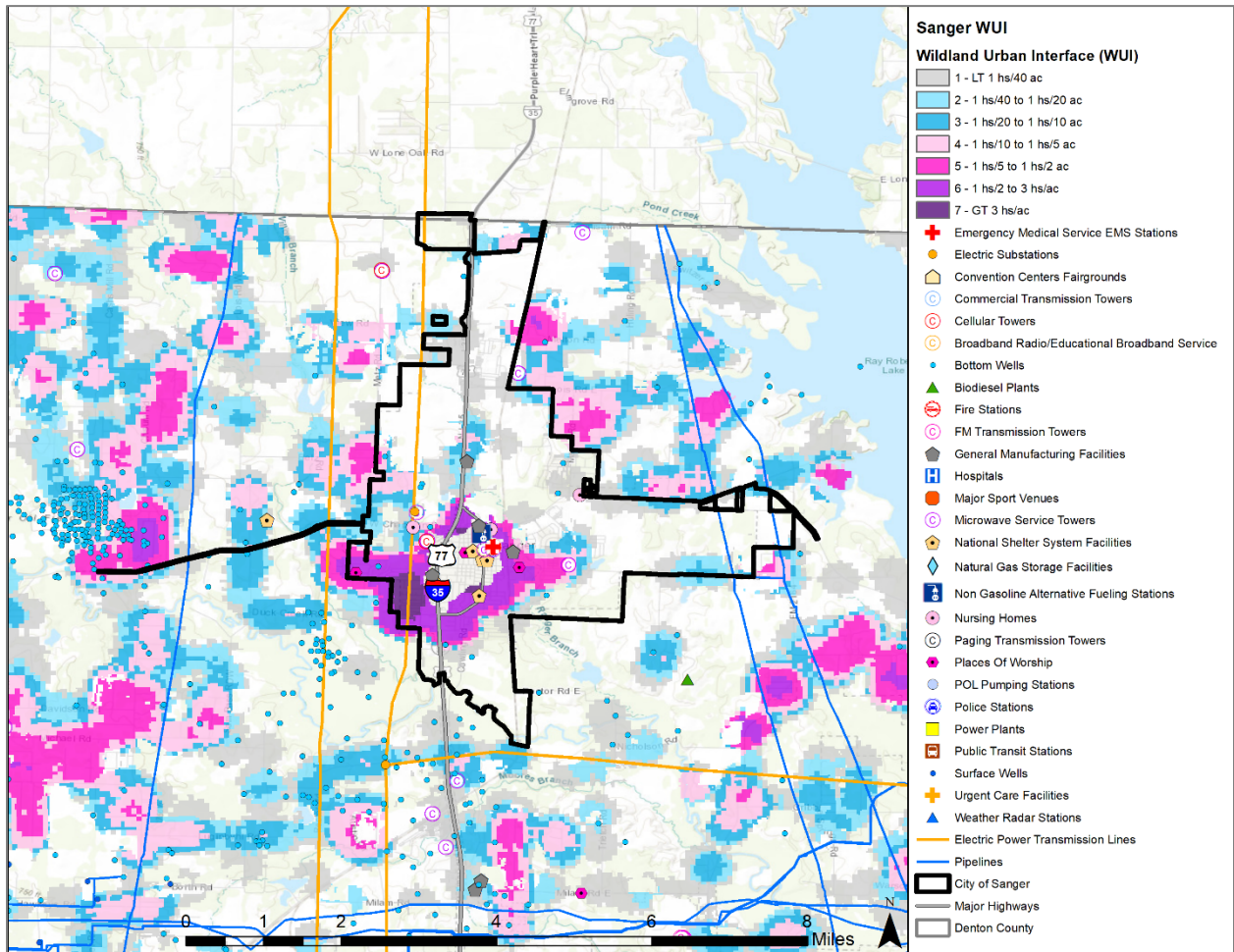
It is estimated that 88.4 percent of the total population in the Town of Providence Village live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-28. Wildland Urban Interface Map – City of Roanoke



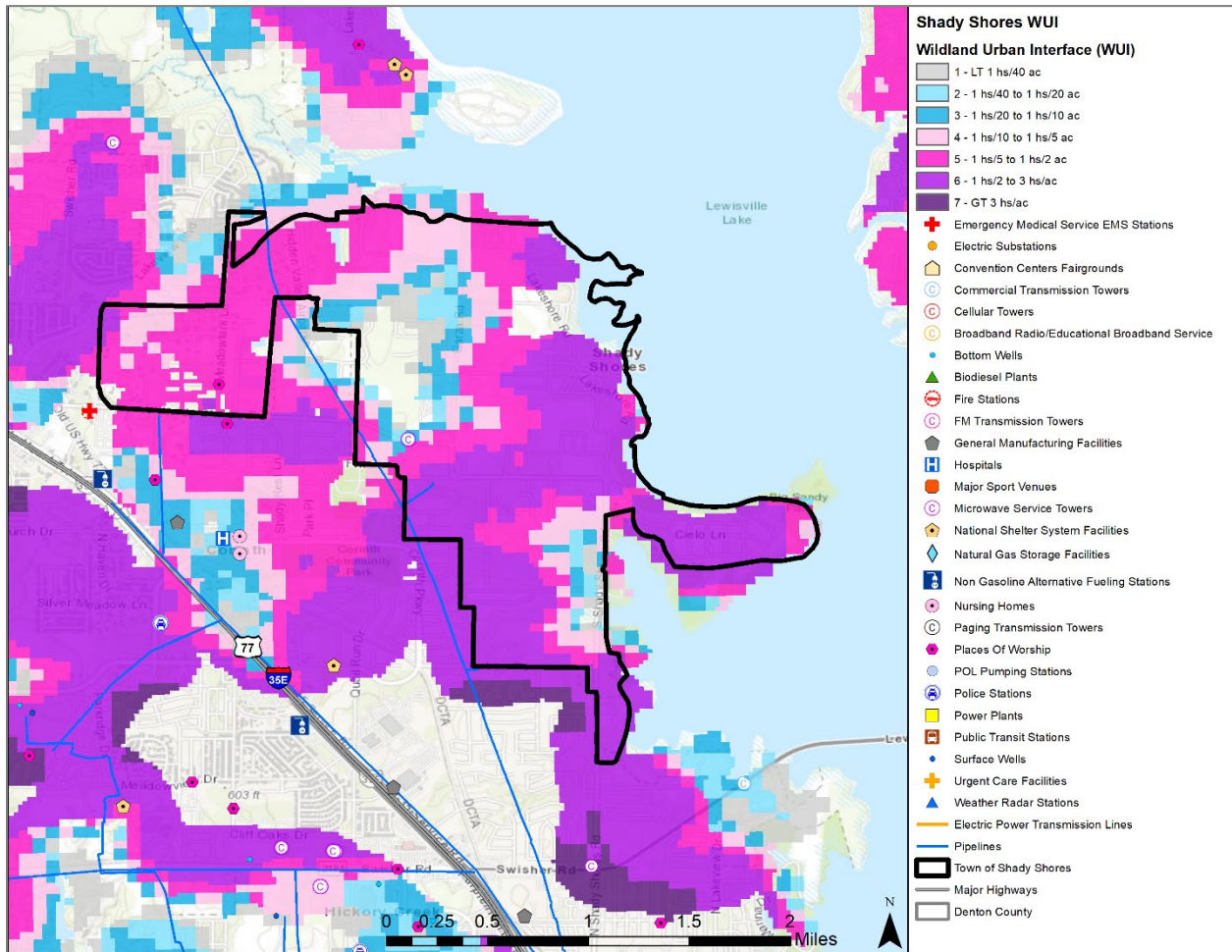
It is estimated that 58.2 percent of the total population in the City of Roanoke live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-29. Wildland Urban Interface Map – City of Sanger



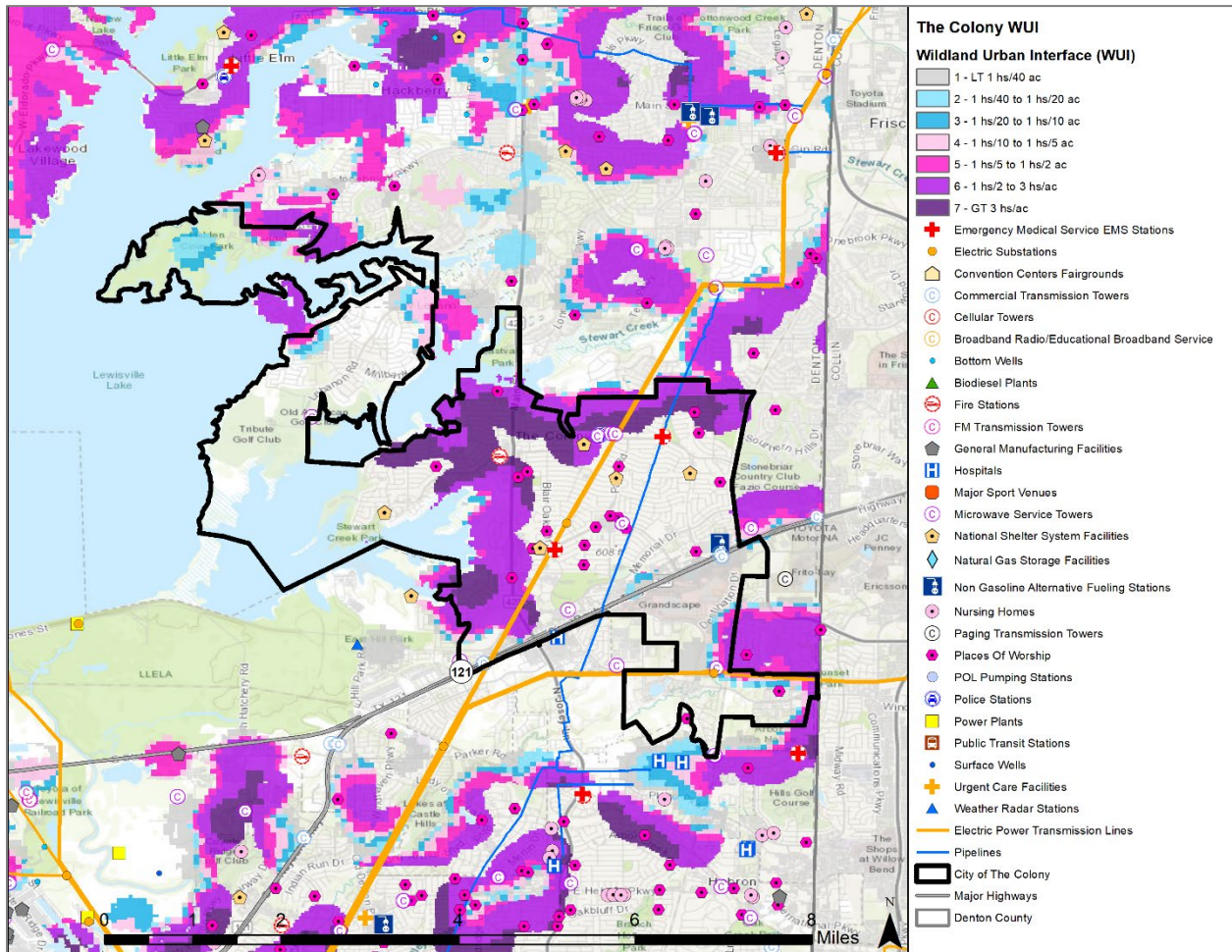
It is estimated that 57.5 percent of the total population in the City of Sanger live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-30. Wildland Urban Interface Map – Town of Shady Shores



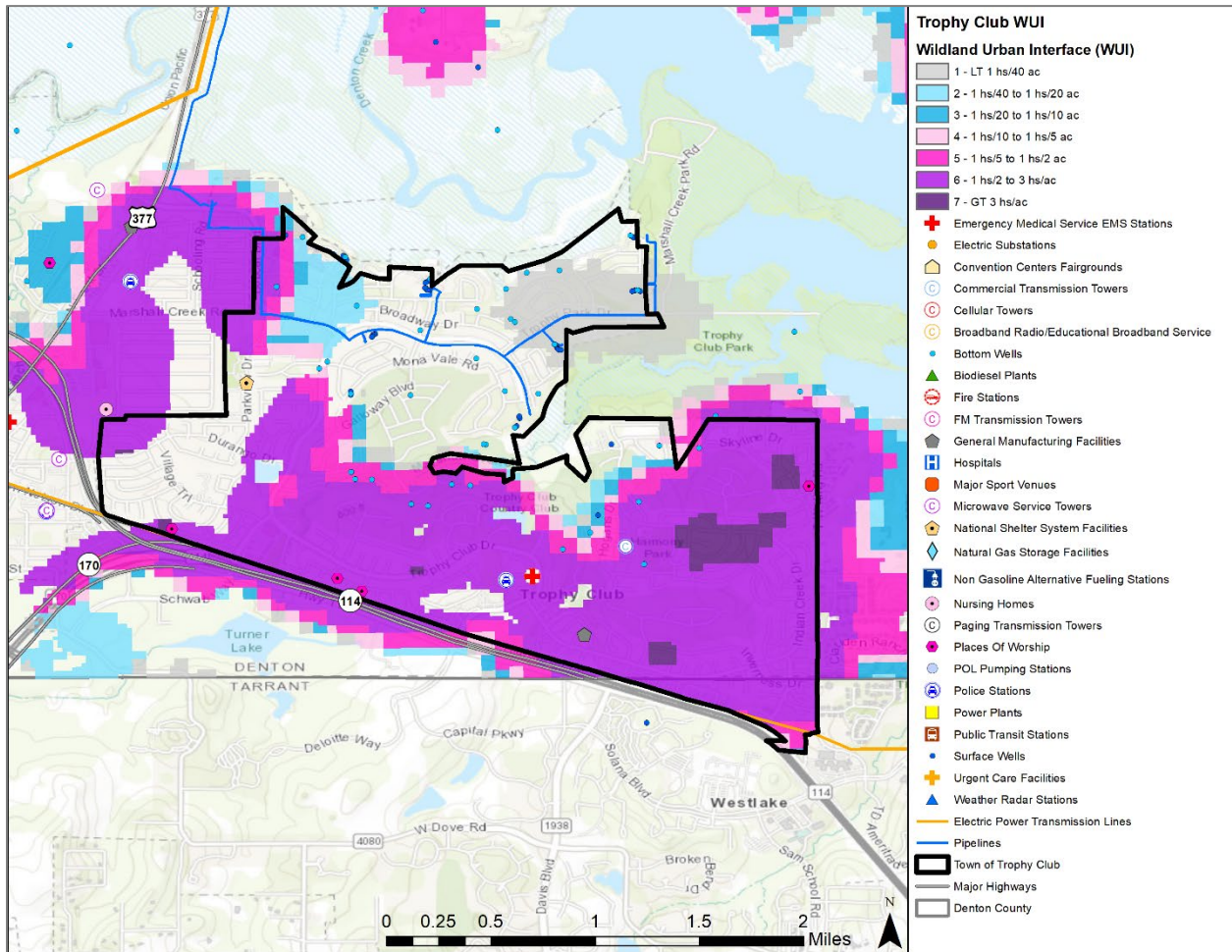
It is estimated that 97.6 percent of the total population in the Town of Shady Shores live within the WUI. However, the entire Town is at some risk for wildfires.

Figure 13-31. Wildland Urban Interface Map – City of The Colony



It is estimated that 41.5 percent of the total population in the City of The Colony live within the WUI. However, the entire City is at some risk for wildfires.

Figure 13-32. Wildland Urban Interface Map – Town of Trophy Club



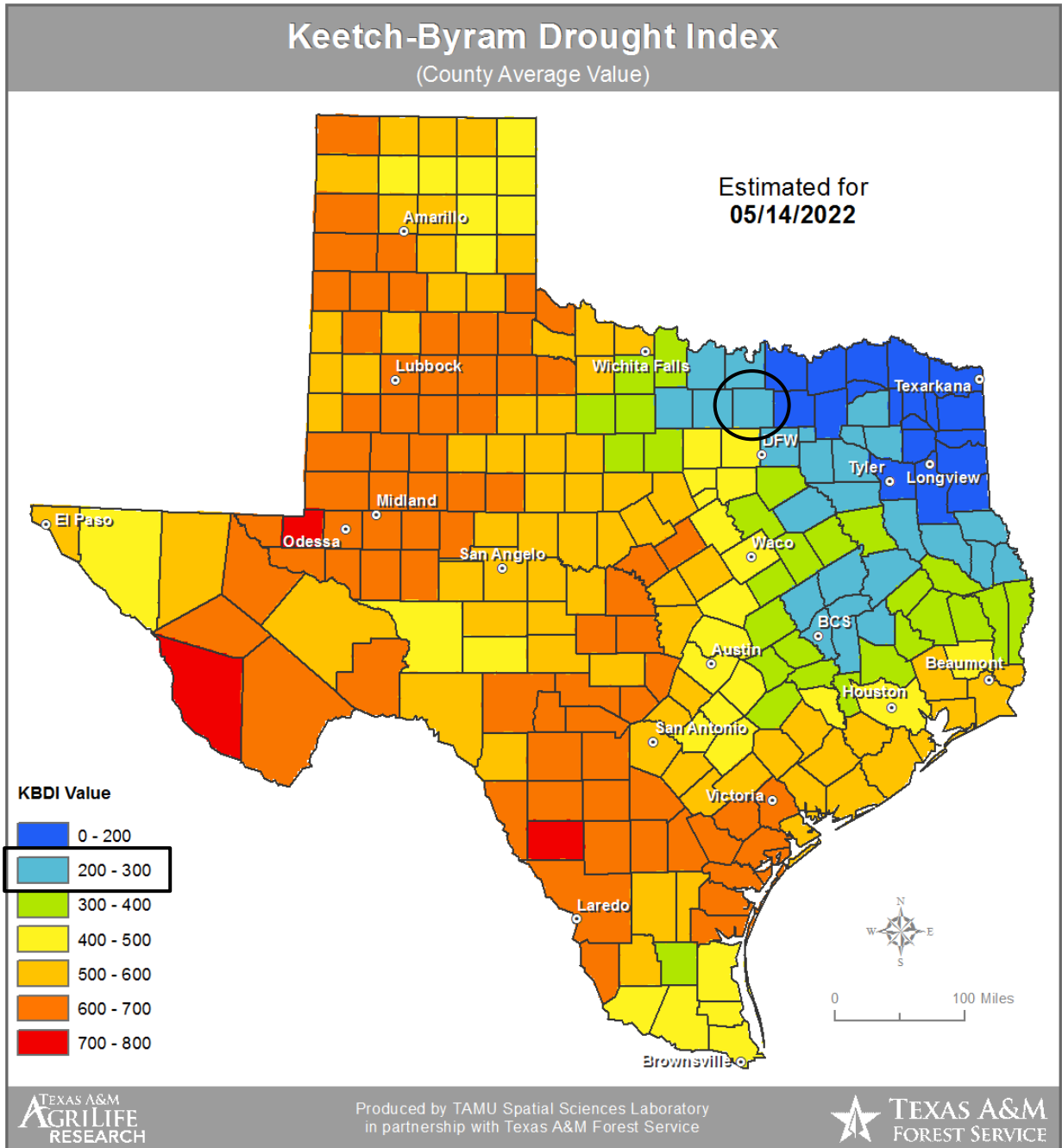
It is estimated that 81.1 percent of the total population in the Town of Trophy Club live within the WUI. However, the entire Town is at some risk for wildfires.

EXTENT



Risk for a wildfire event is measured in terms of magnitude and intensity using the Keetch Byram Drought Index (KBDI), a mathematical system for relating current and recent weather conditions to potential or expected fire behavior. The KBDI determines forest fire potential based on a daily water balance, derived by balancing a drought factor with precipitation and soil moisture (assumed to have a maximum storage capacity of eight inches), and is expressed in hundredths of an inch of soil moisture depletion.

Figure 13-33. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2022¹



¹ Denton County is located within the black circle.

Fire behavior can be categorized at four distinct levels on the KBDI:

- **0 -200:** Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
- **200 -400:** Fires more readily burn and will carry across an area with no gaps. Heavier fuels will not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.
- **400 -600:** Fires intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
- **600 -800:** Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

The KBDI is a good measure of the readiness of fuels for a wildfire event. It should be referenced as the area experiences changes in precipitation and soil moisture, while caution should be exercised in dryer, hotter conditions.

The range of intensity for the Denton County planning area in a wildfire event is within 161 to 766. The average extent to be mitigated for the Denton County planning area, including all participating jurisdictions, is a KBDI of 561. At this level fires intensity begins to significantly increase. Fire will readily burn in all directions exposing mineral soils in some locations. The worst the planning area can anticipate based on historical occurrences and readily available fuel is 200 to 600 as 561 falls within this range. At this level fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

The Texas Forest Service's Fire Intensity Scale identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on weighted average of four percentile weather categories. Denton County is between a potential limited to moderate wildfire intensities. Figures 13-34 through 13-65 identify the wildfire intensity for the Denton County planning area.

Figure 13-34. Fire Intensity Scale Map – Denton County

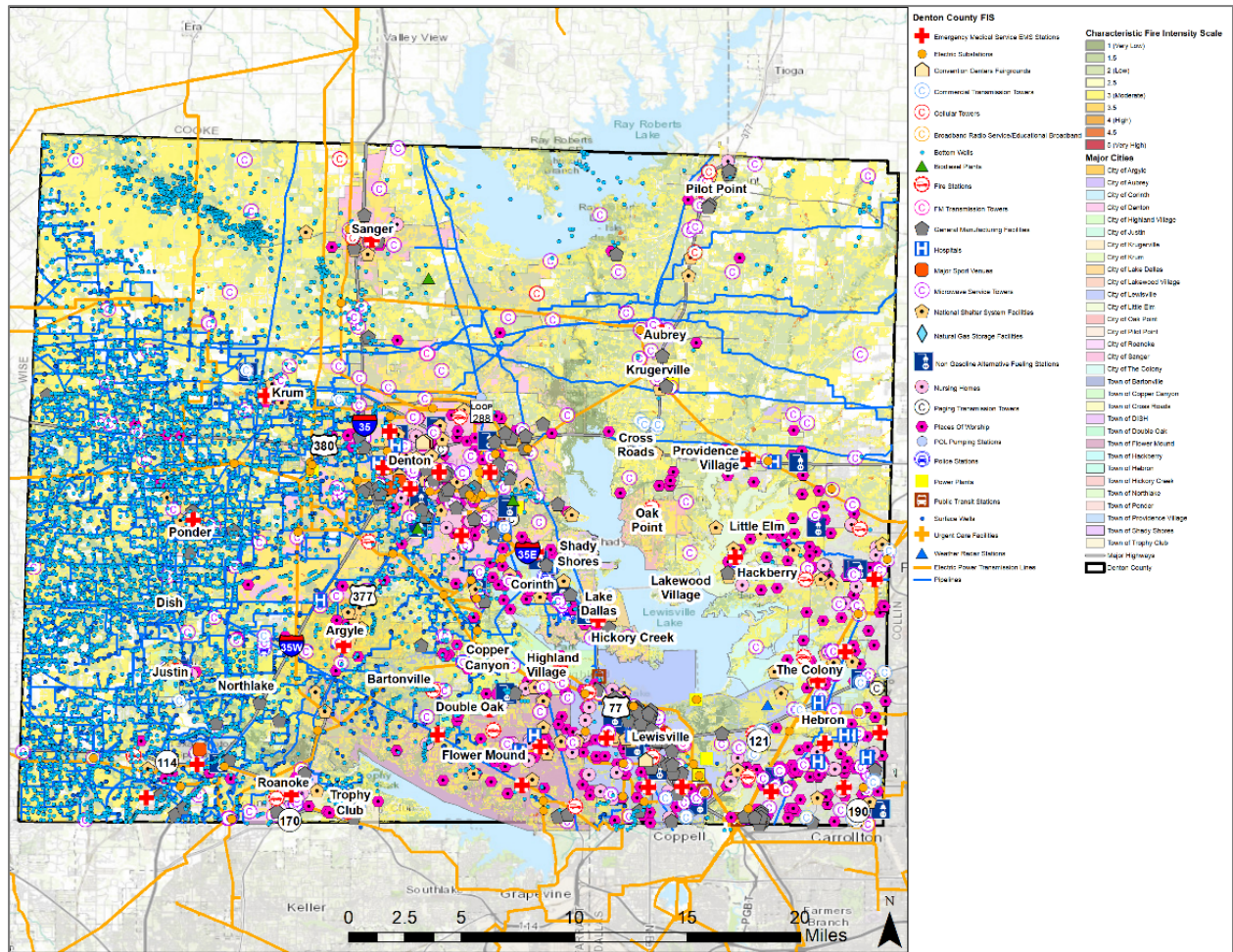


Figure 13-35. Fire Intensity Scale Map – Town of Argyle

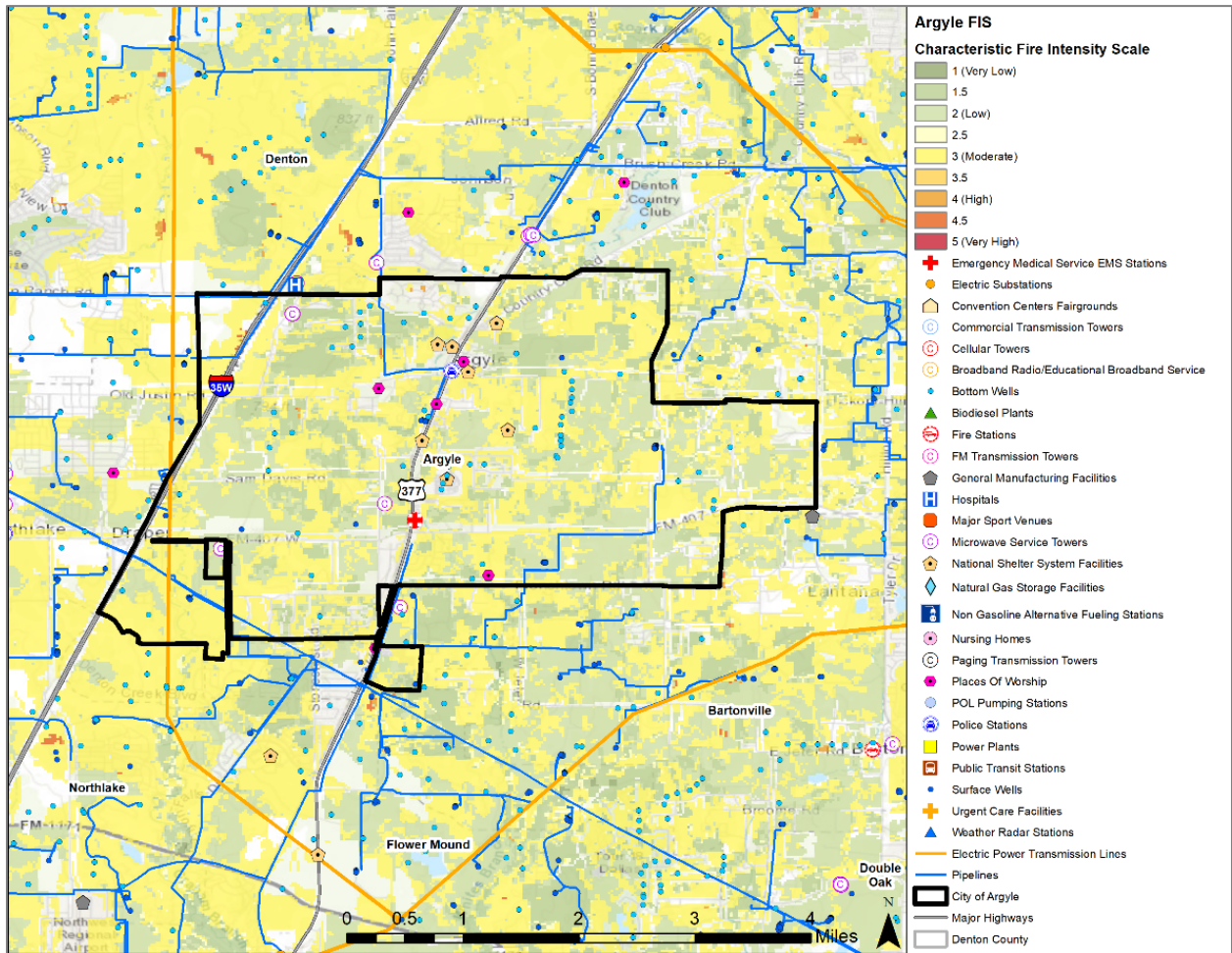


Figure 13-36. Fire Intensity Scale Map – City of Aubrey

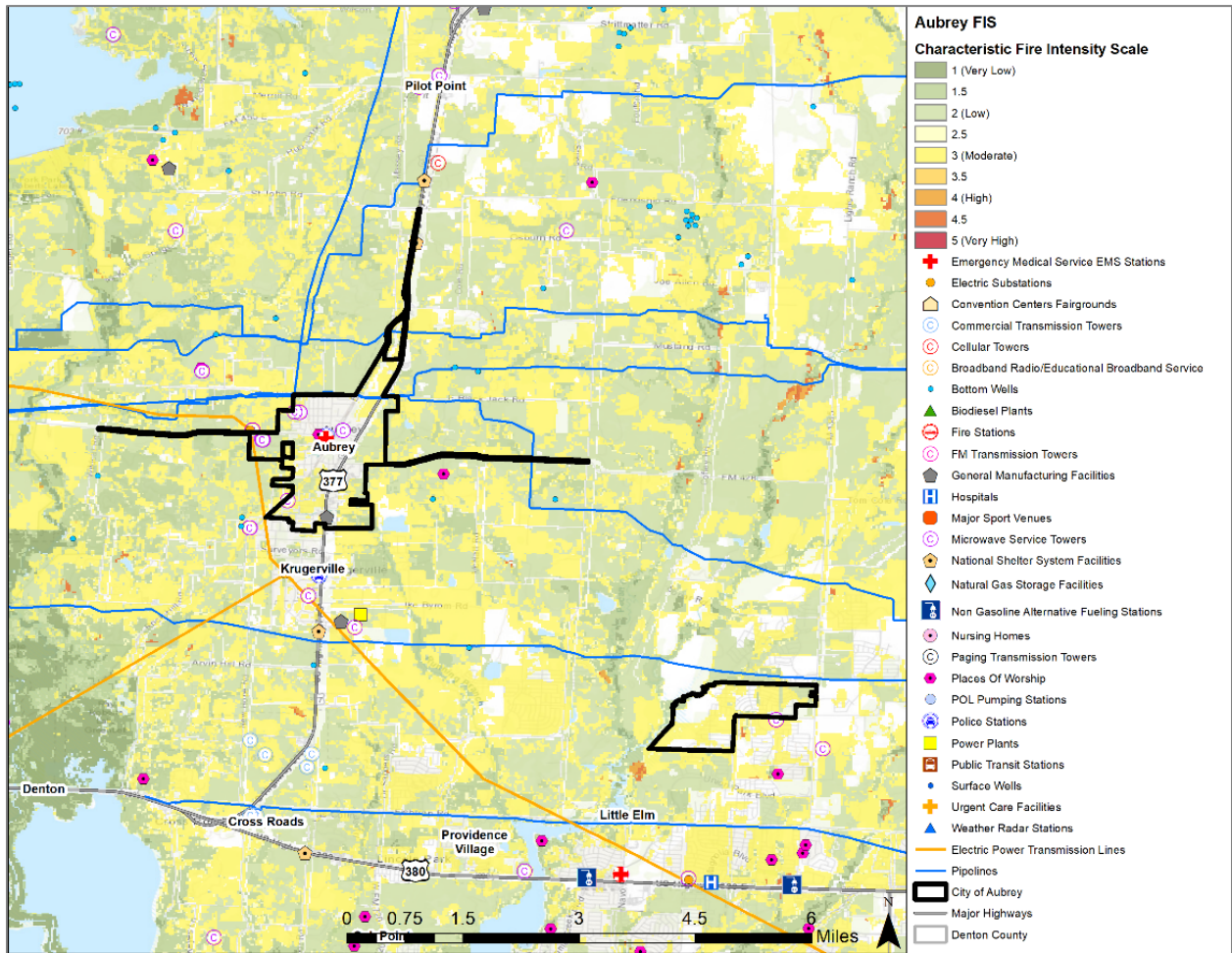


Figure 13-37. Fire Intensity Scale Map – Town of Bartonville

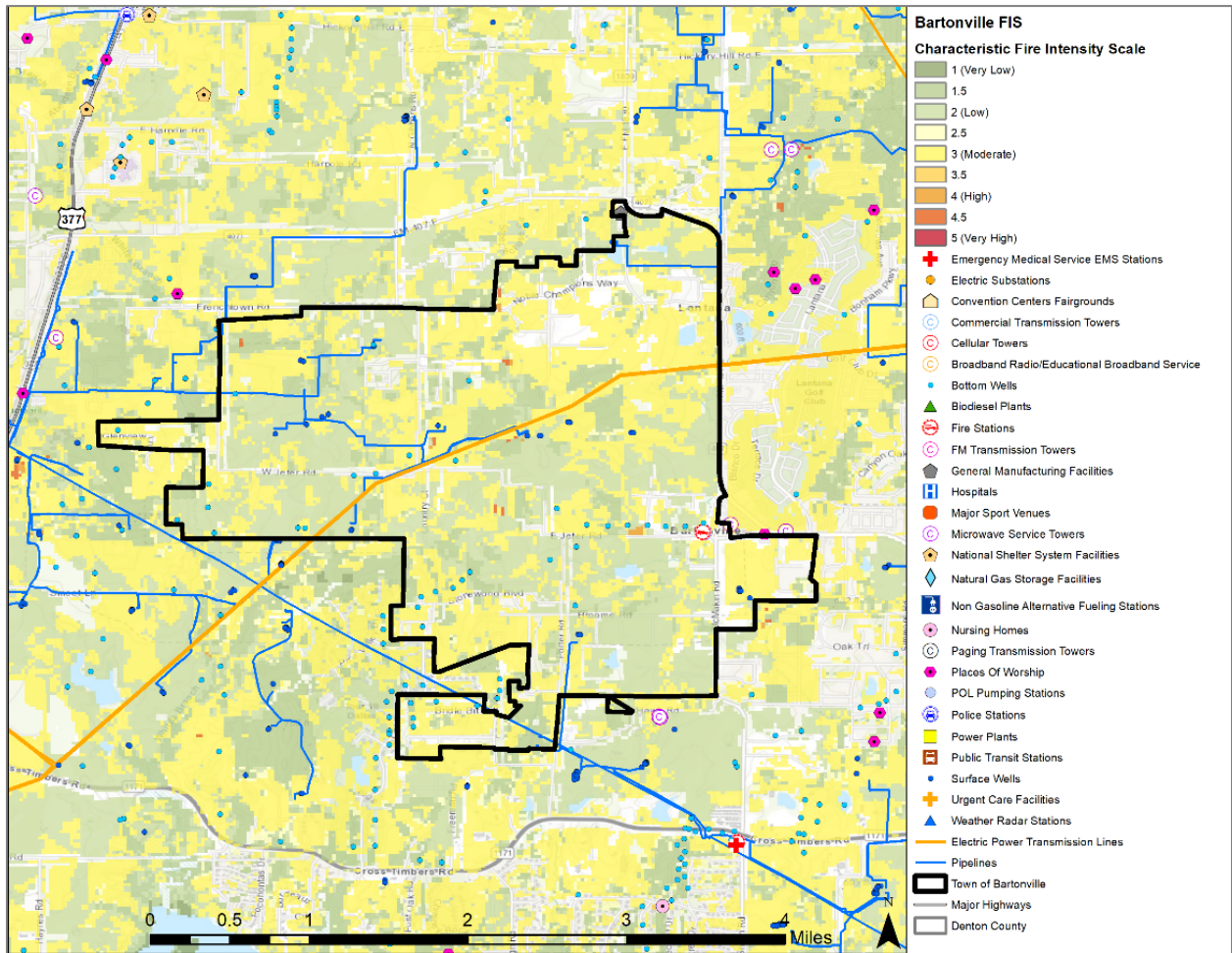


Figure 13-38. Fire Intensity Scale Map – Town of Copper Canyon

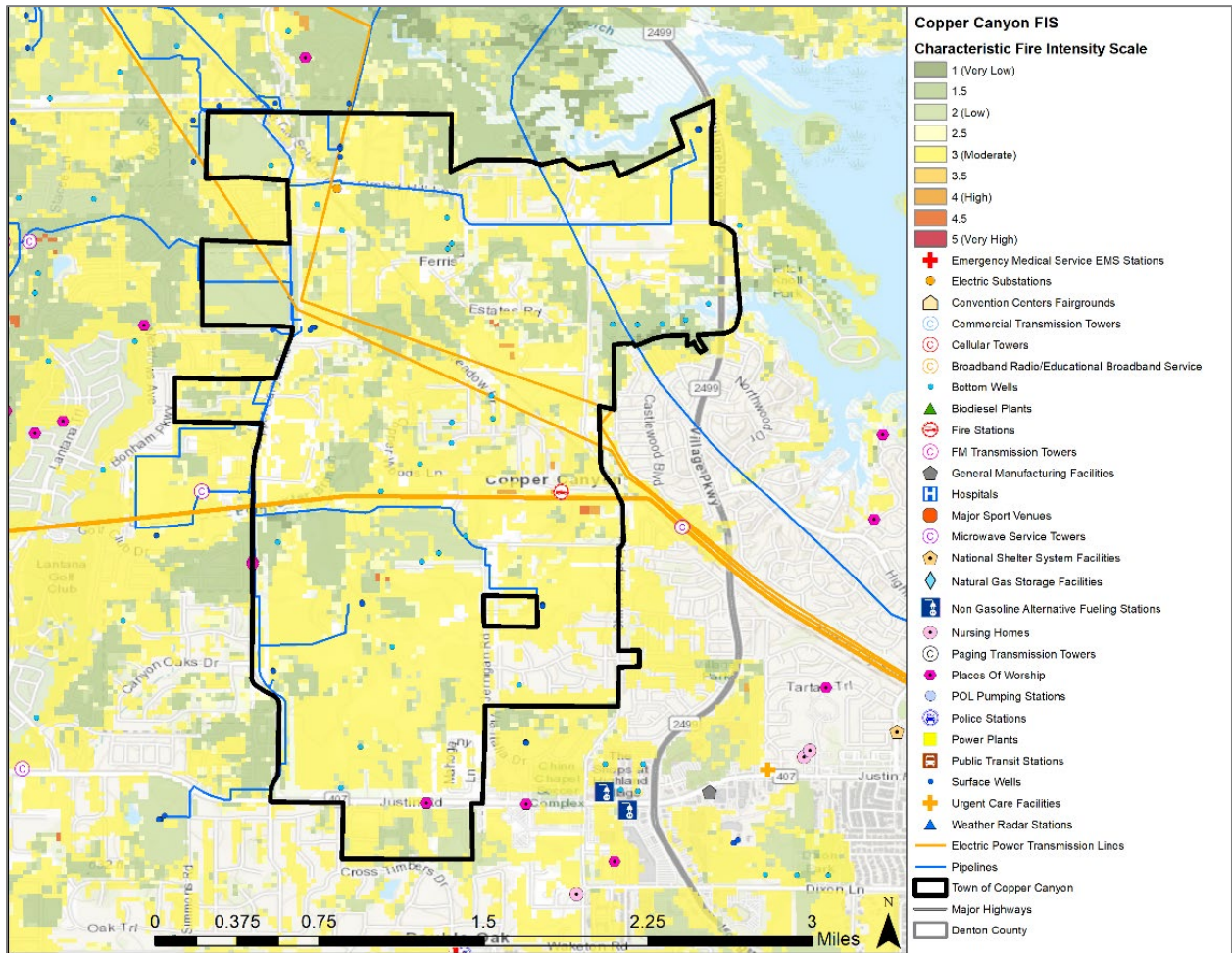


Figure 13-39. Fire Intensity Scale Map – City of Corinth

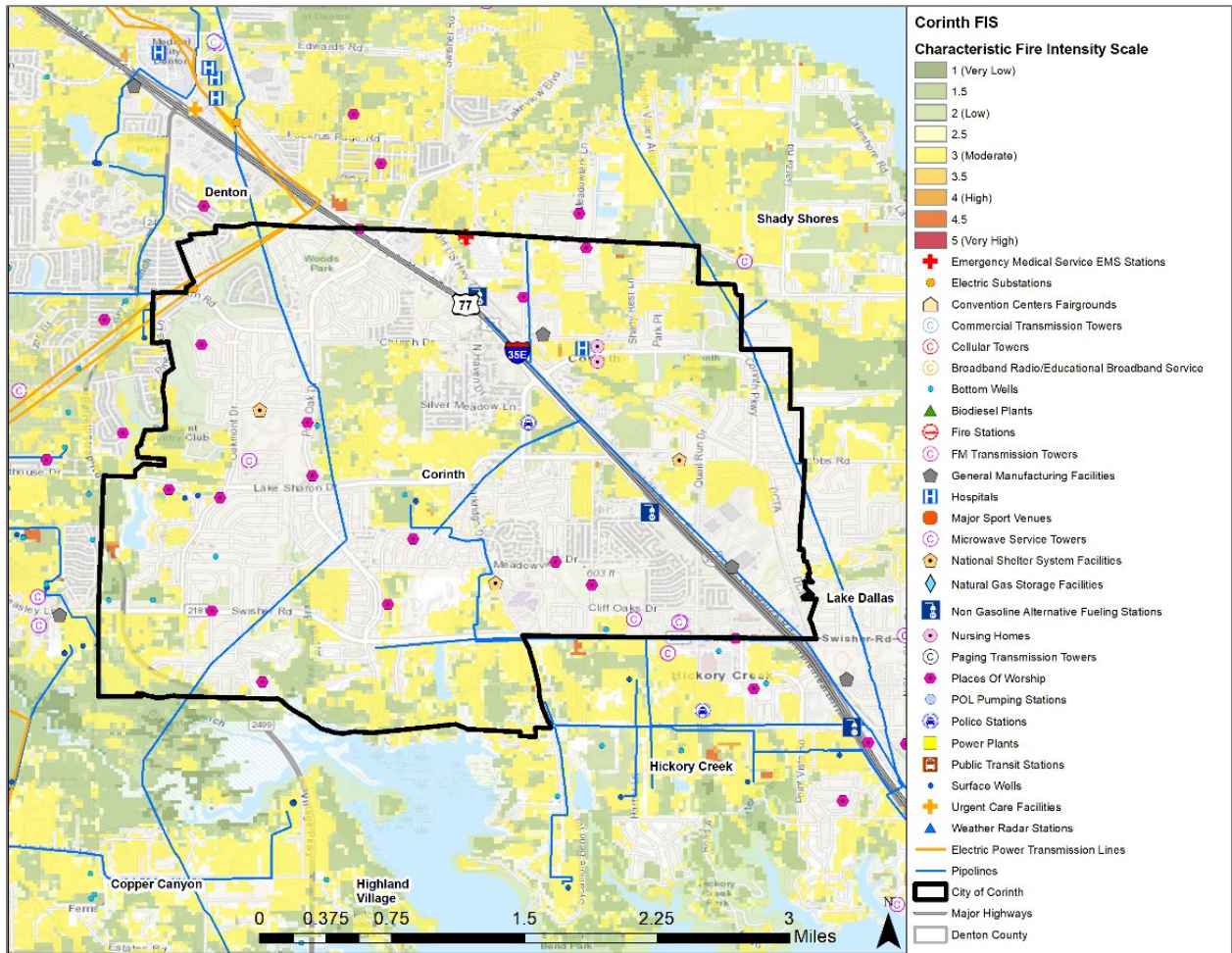


Figure 13-40. Fire Intensity Scale Map – Town of Cross Roads

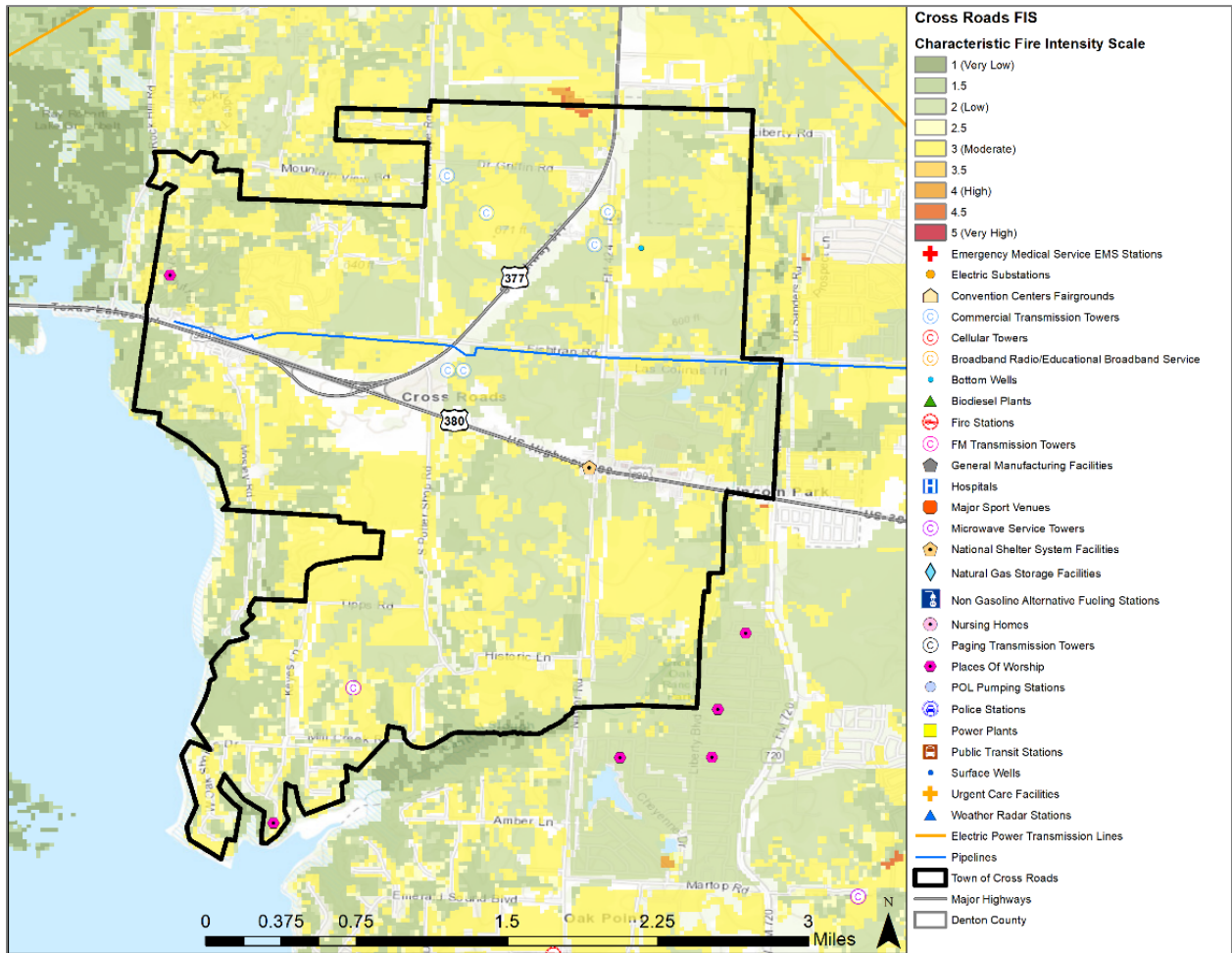


Figure 13-41. Fire Intensity Scale Map – City of Denton

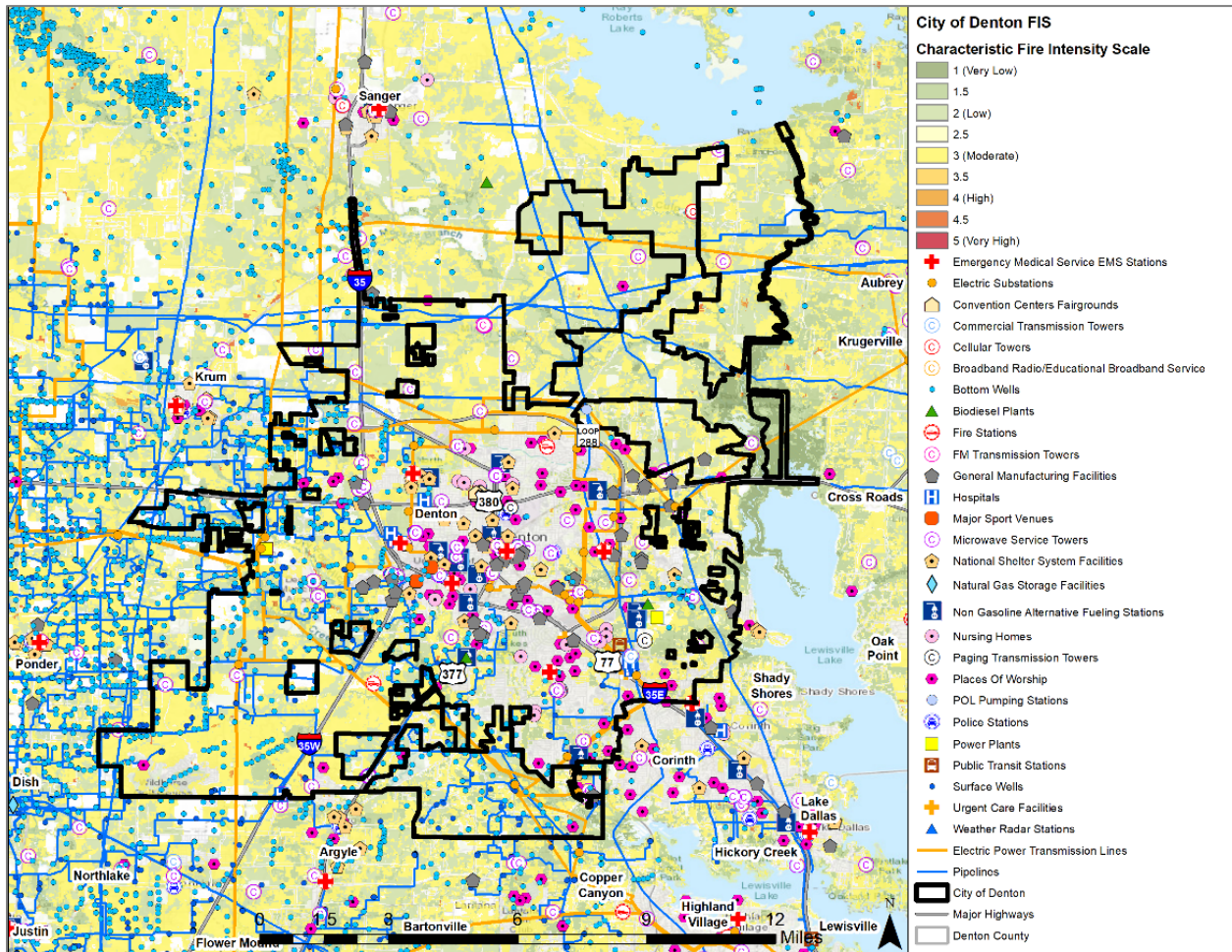


Figure 13-42. Fire Intensity Scale Map – Town of DISH

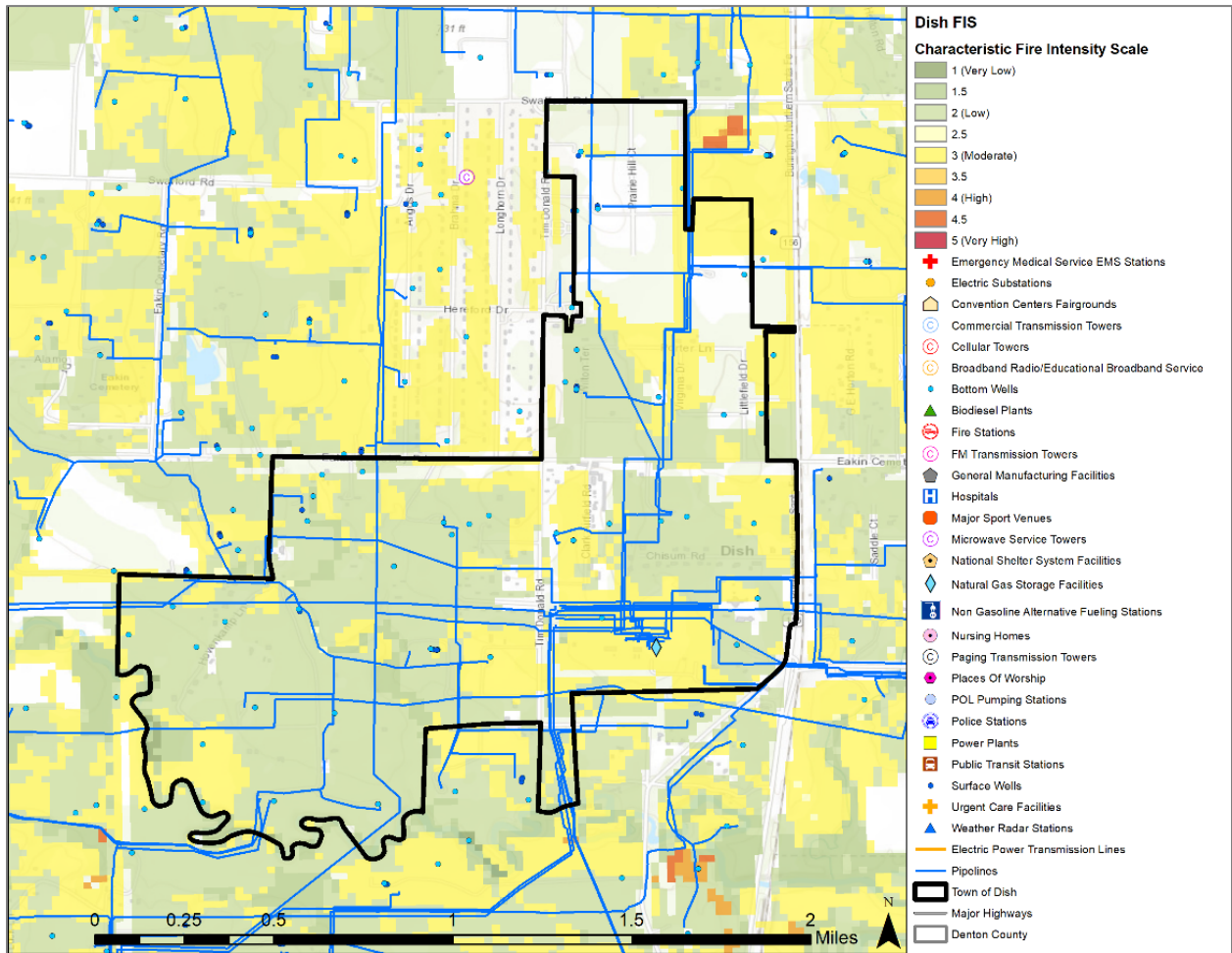


Figure 13-43. Fire Intensity Scale Map – Town of Double Oak

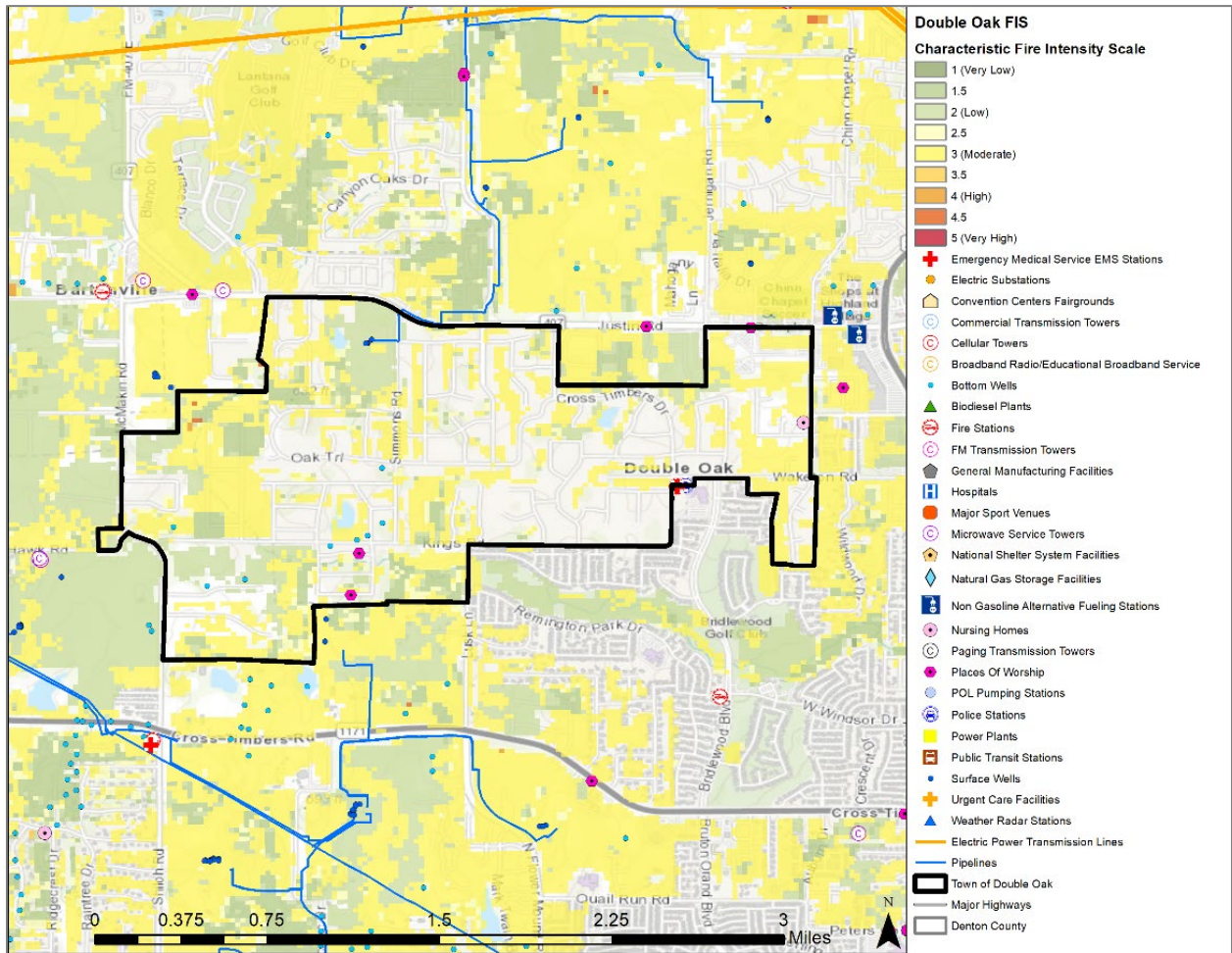


Figure 13-44. Fire Intensity Scale Map – Town of Flower Mound

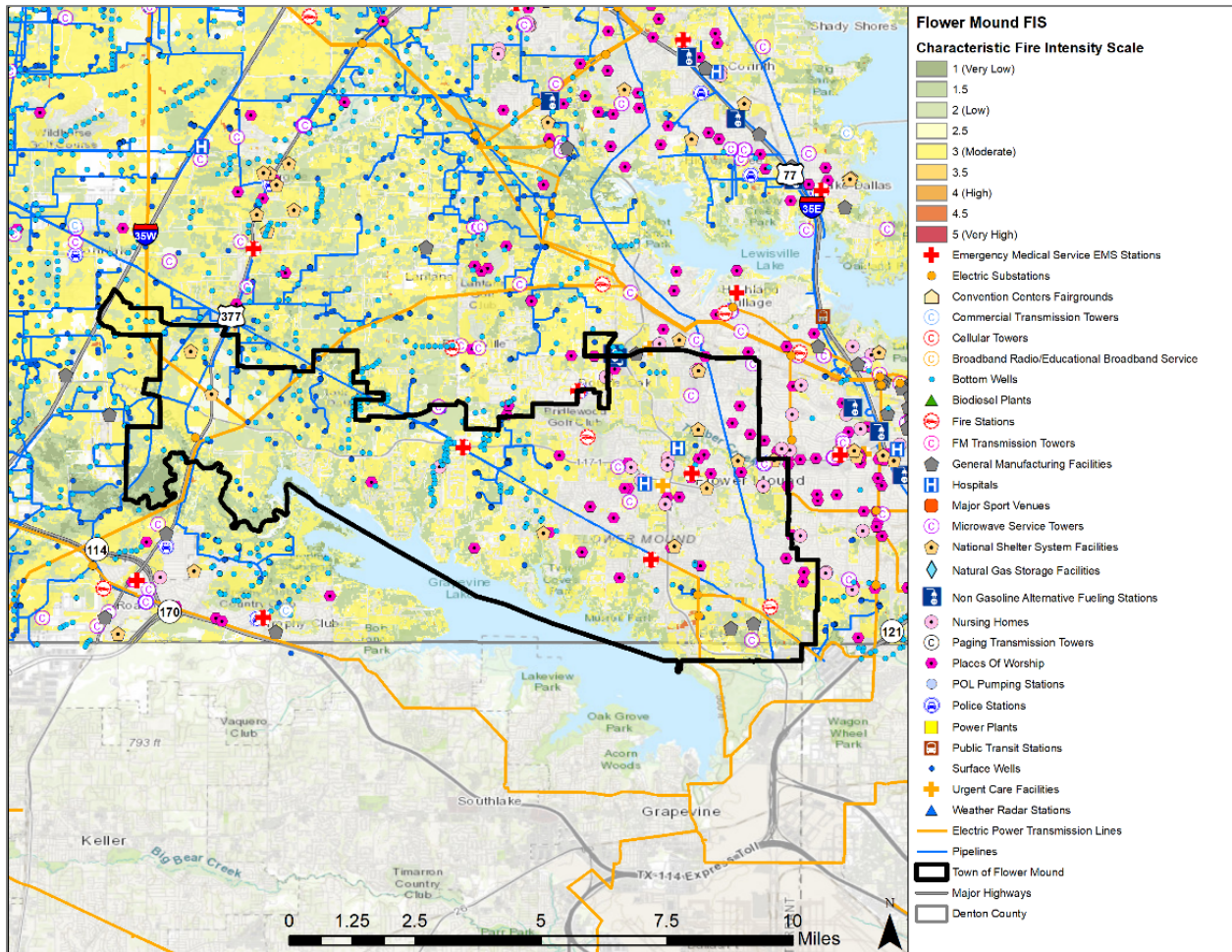


Figure 13-45. Fire Intensity Scale Map – City of Hackberry

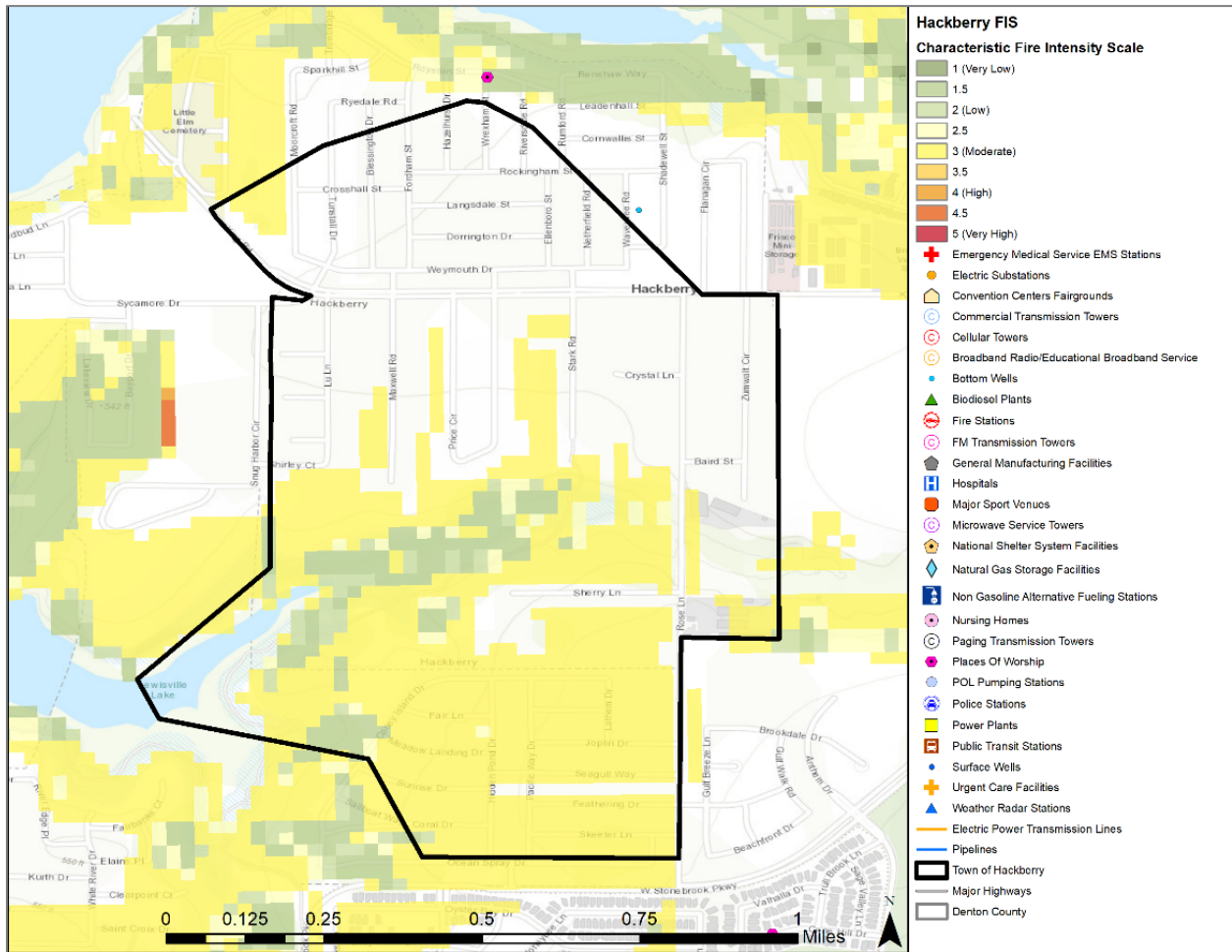


Figure 13-46. Fire Intensity Scale Map – Town of Hebron

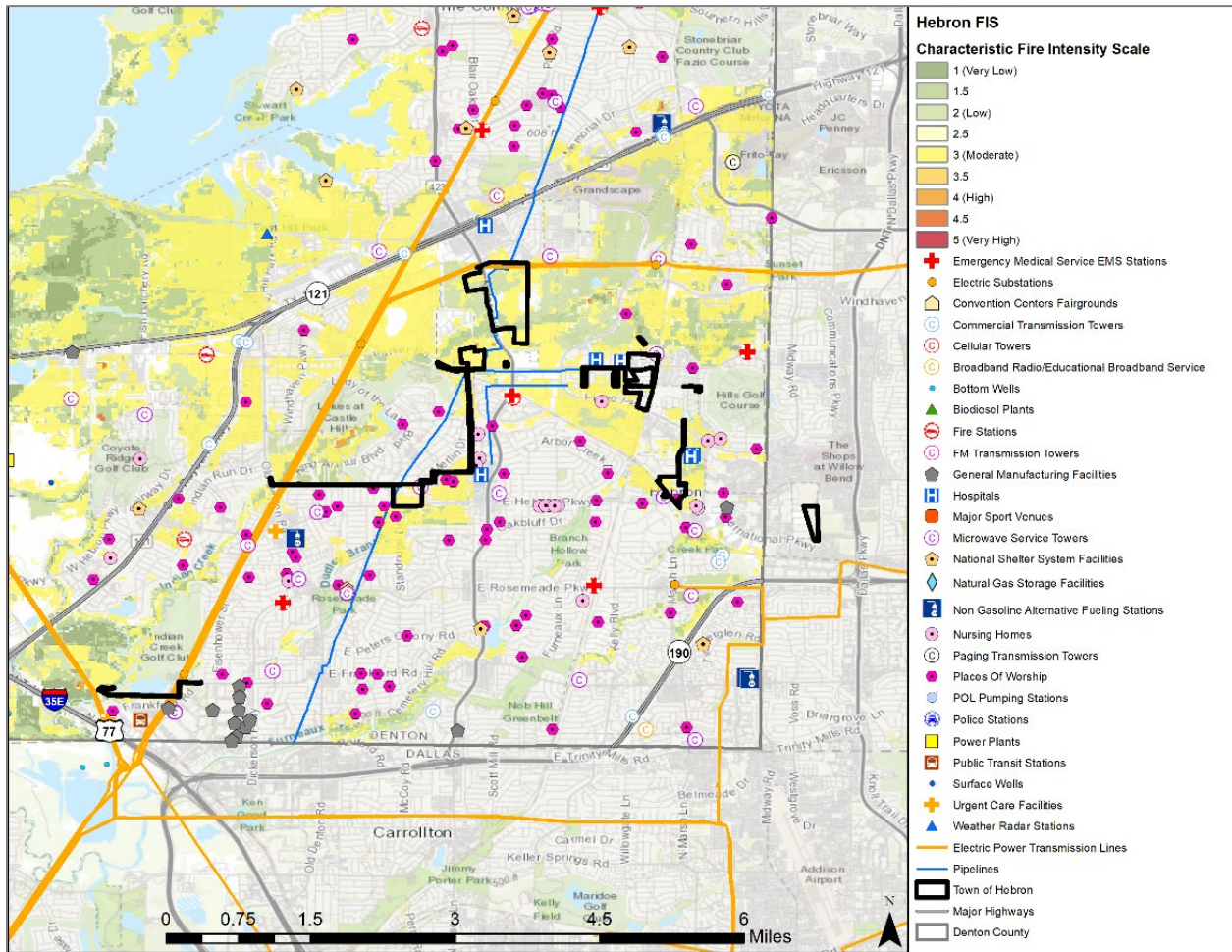


Figure 13-47. Fire Intensity Scale Map – Town of Hickory Creek

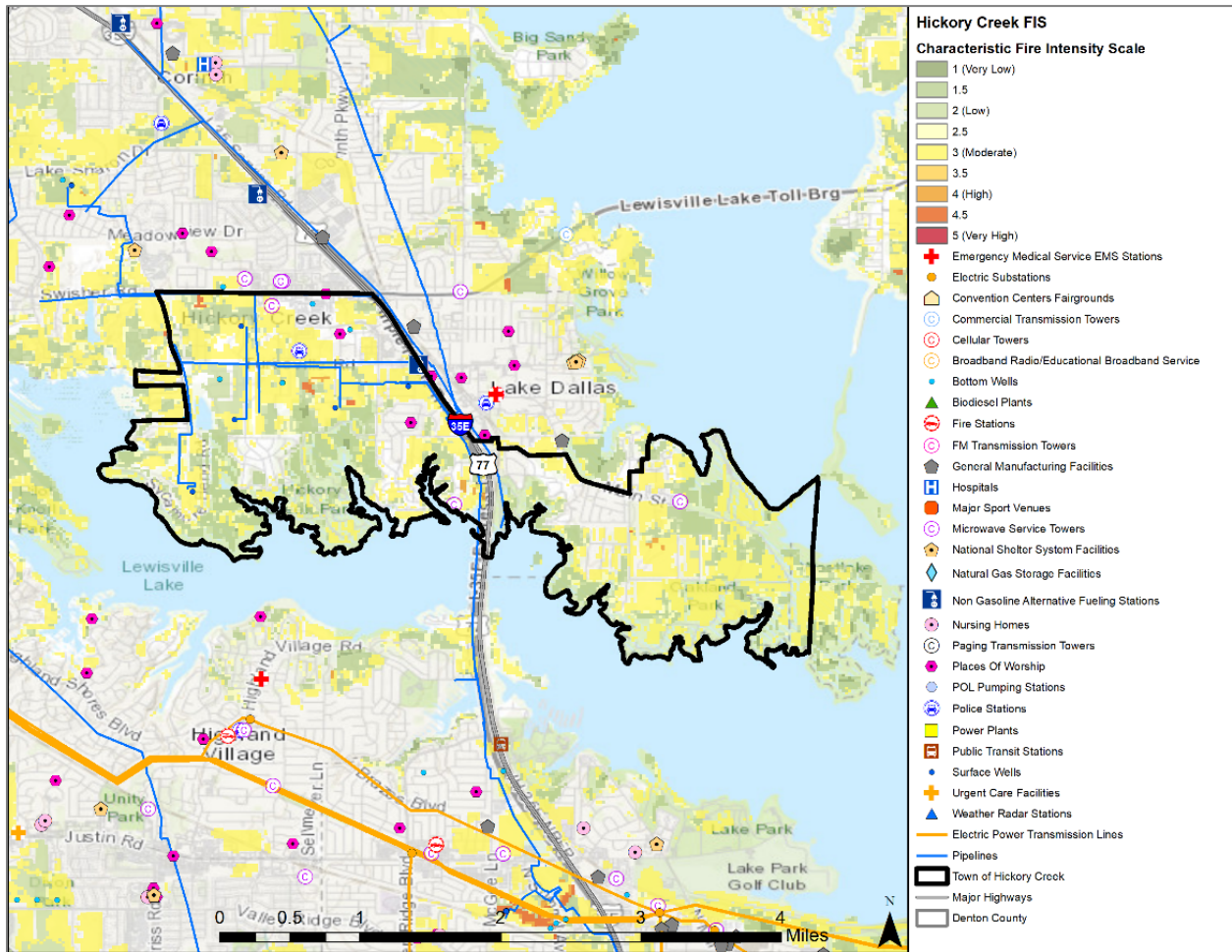


Figure 13-48. Fire Intensity Scale Map – City of Highland Village

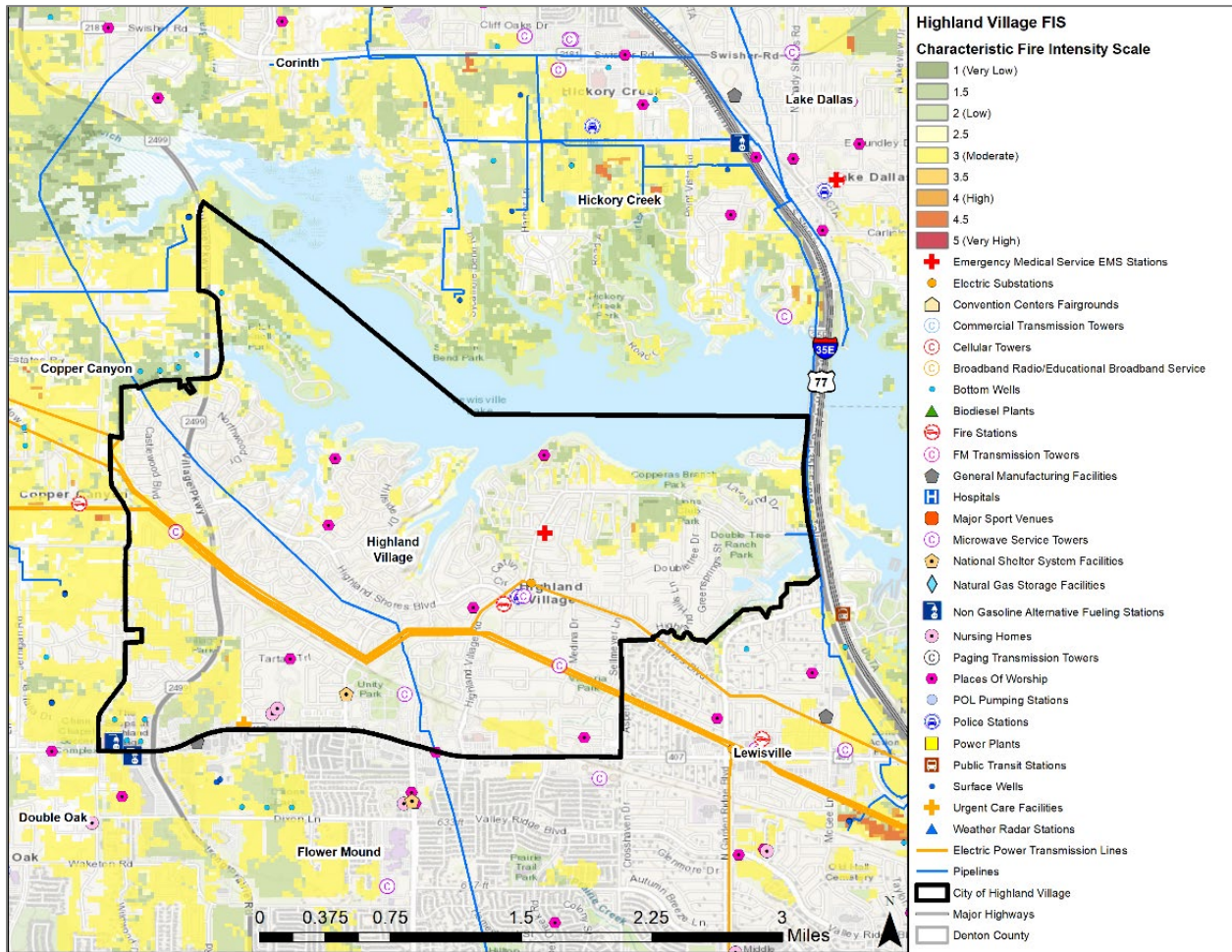


Figure 13-49. Fire Intensity Scale Map – City of Justin

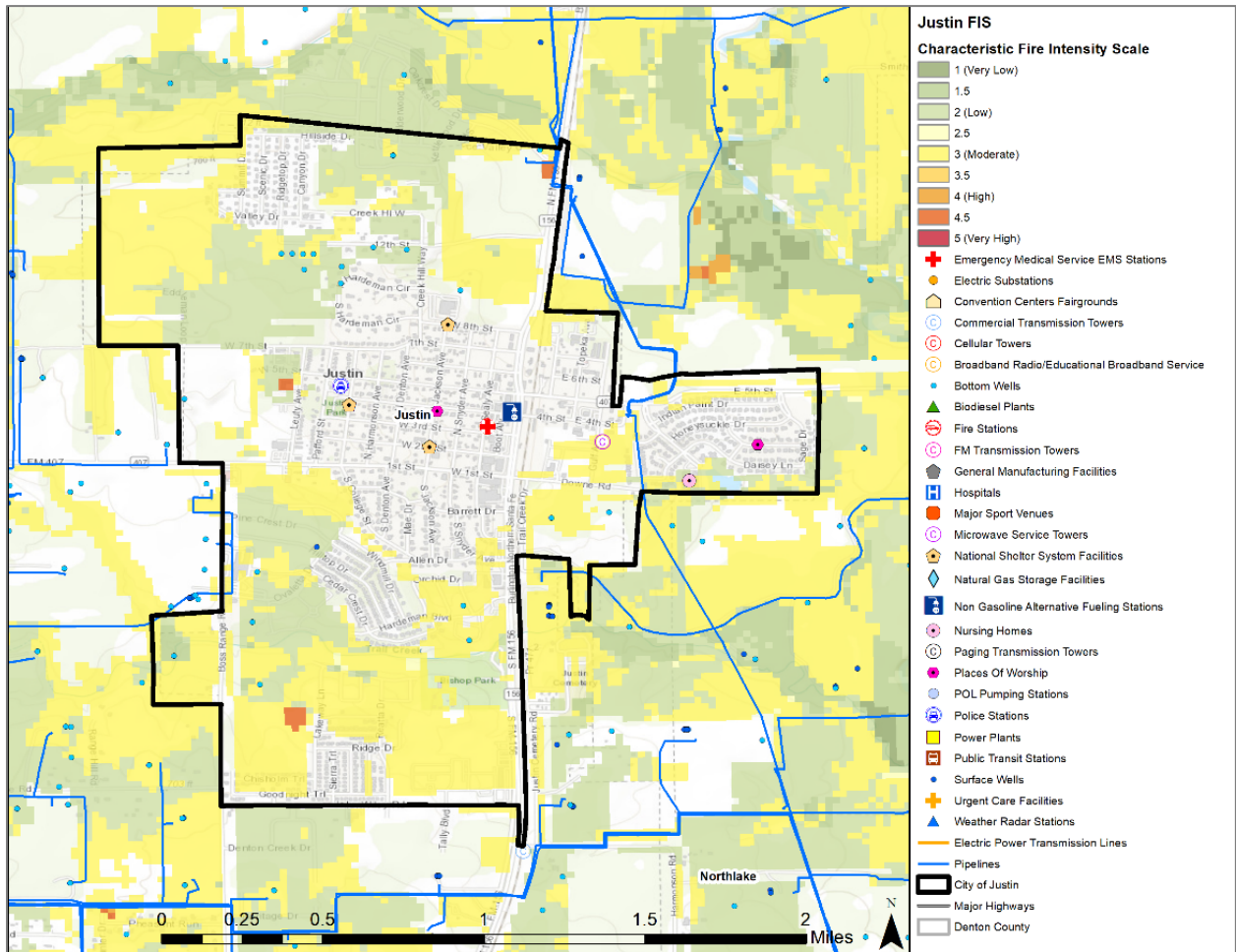


Figure 13-50. Fire Intensity Scale Map – City of Krugerville.

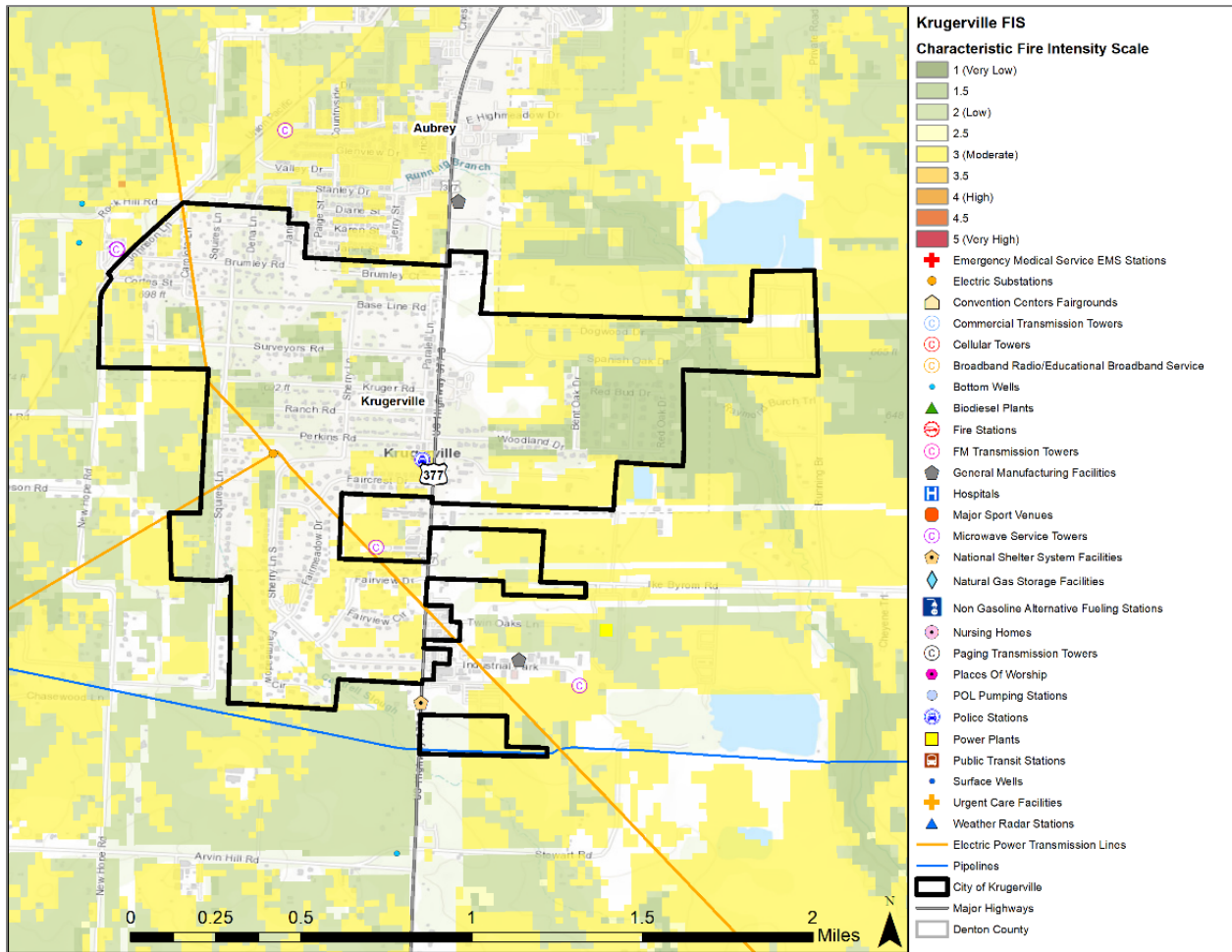


Figure 13-51. Fire Intensity Scale Map – City of Krum

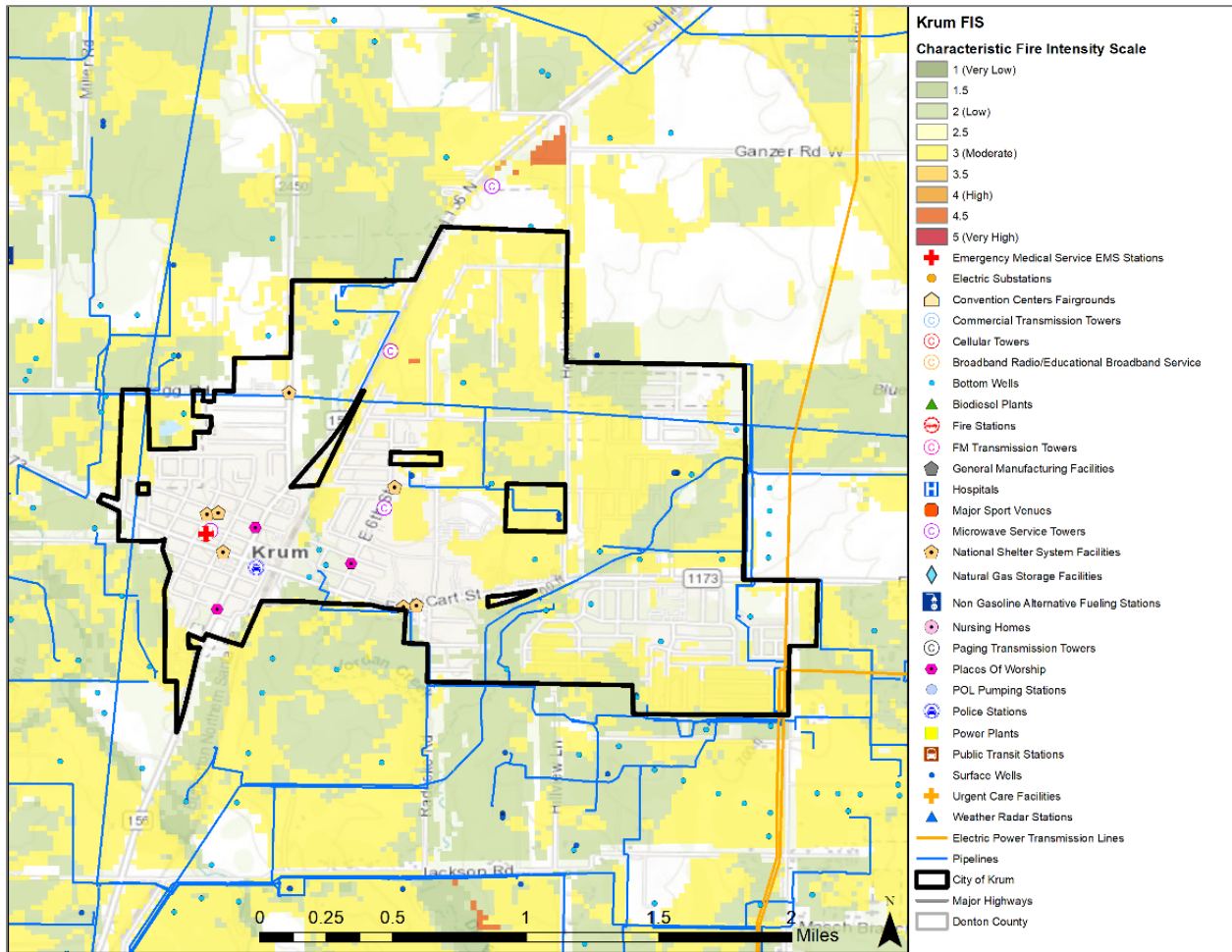


Figure 13-52. Fire Intensity Scale Map – City of Lake Dallas

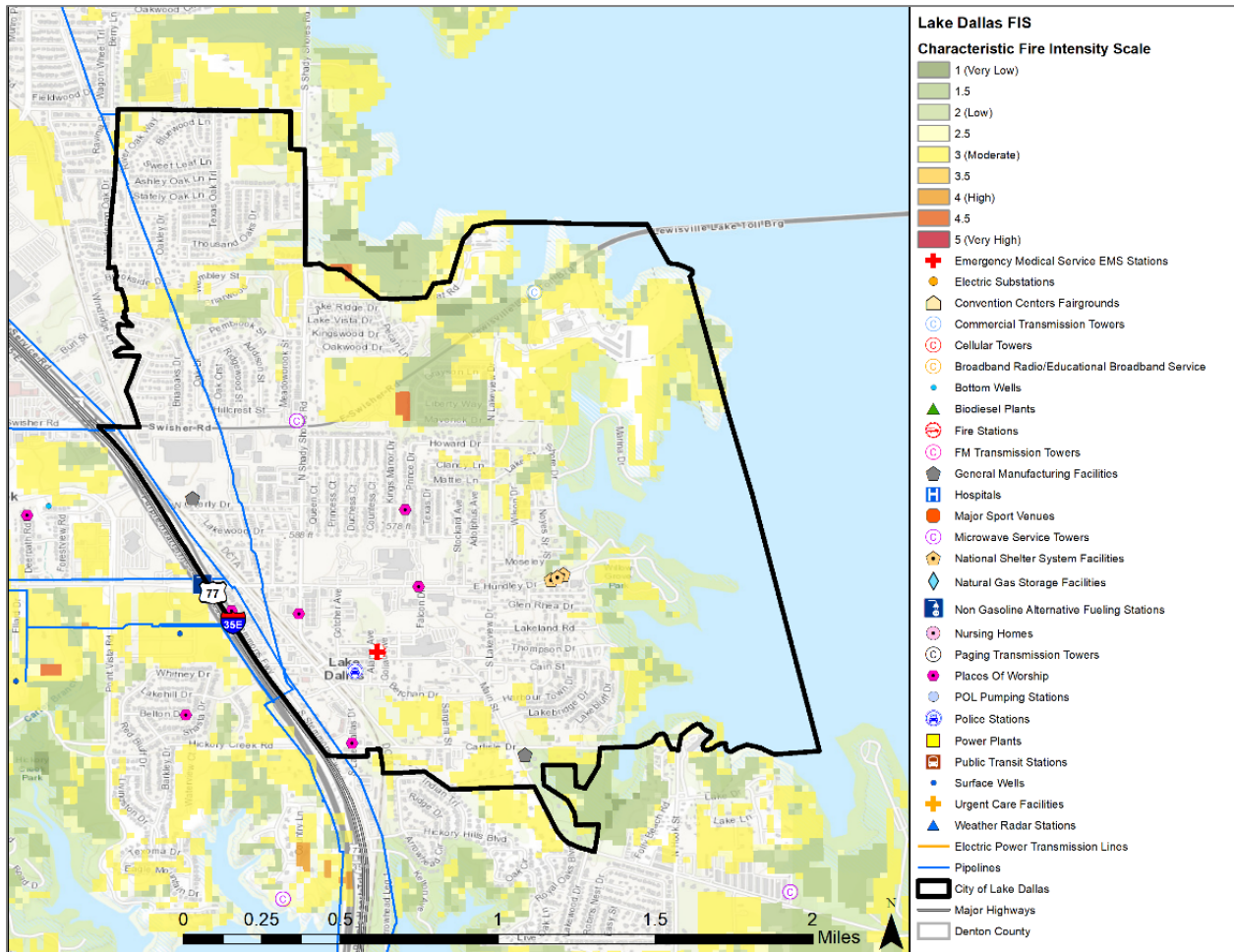


Figure 13-53. Fire Intensity Scale Map – Town of Lakewood Village

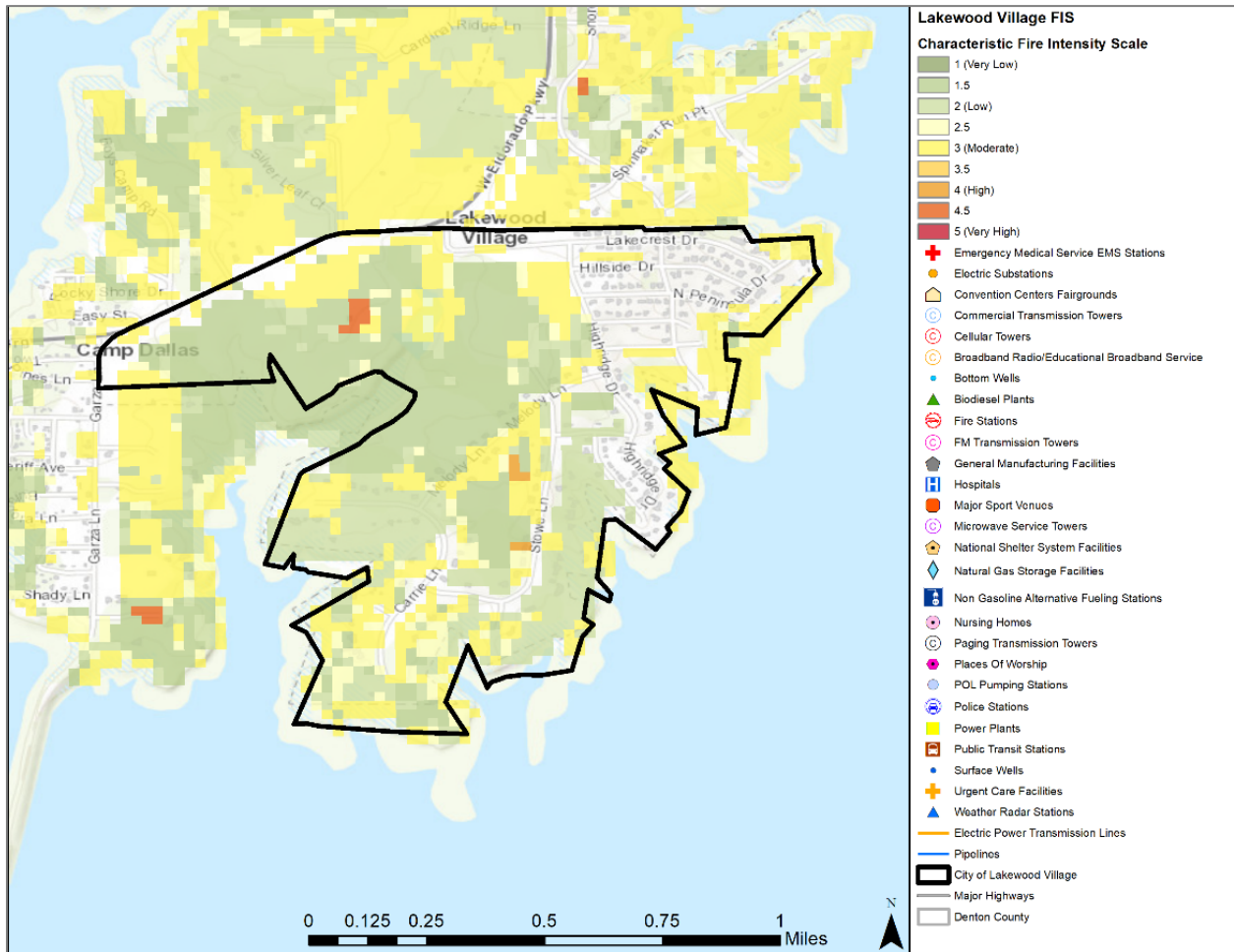


Figure 13-54. Fire Intensity Scale Map – City of Lewisville

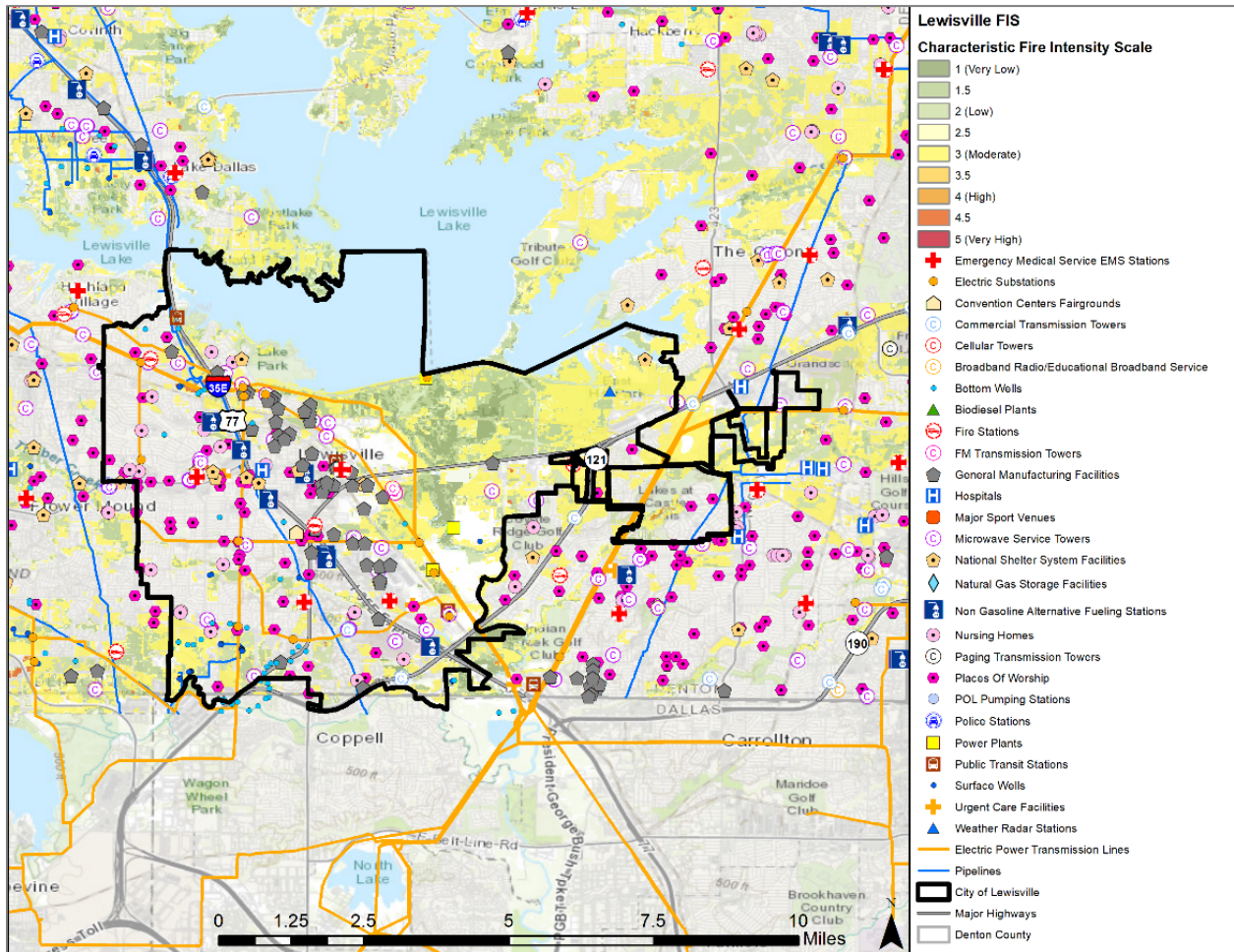


Figure 13-55. Fire Intensity Scale Map – Town of Little Elm

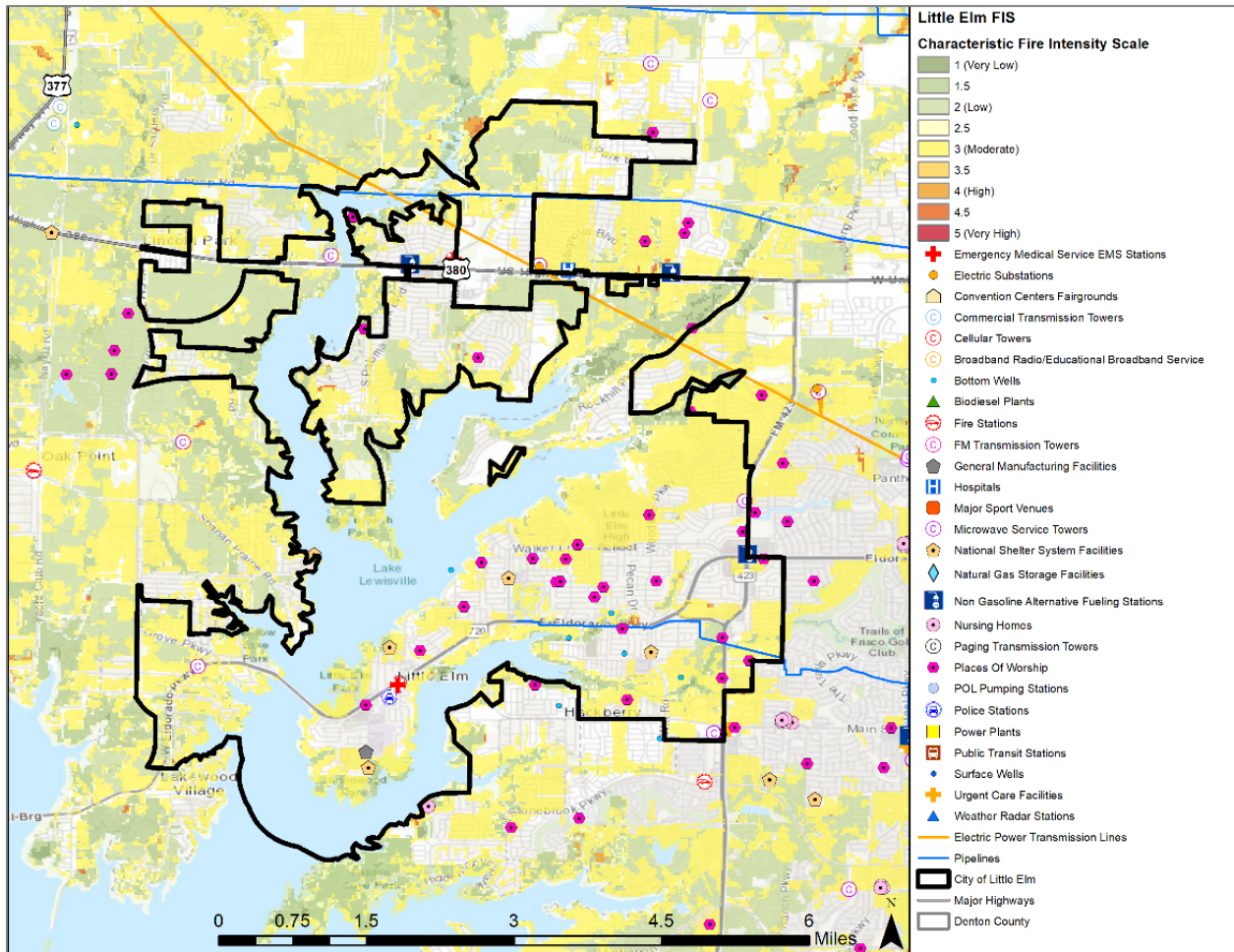


Figure 13-56. Fire Intensity Scale Map – Town of Northlake

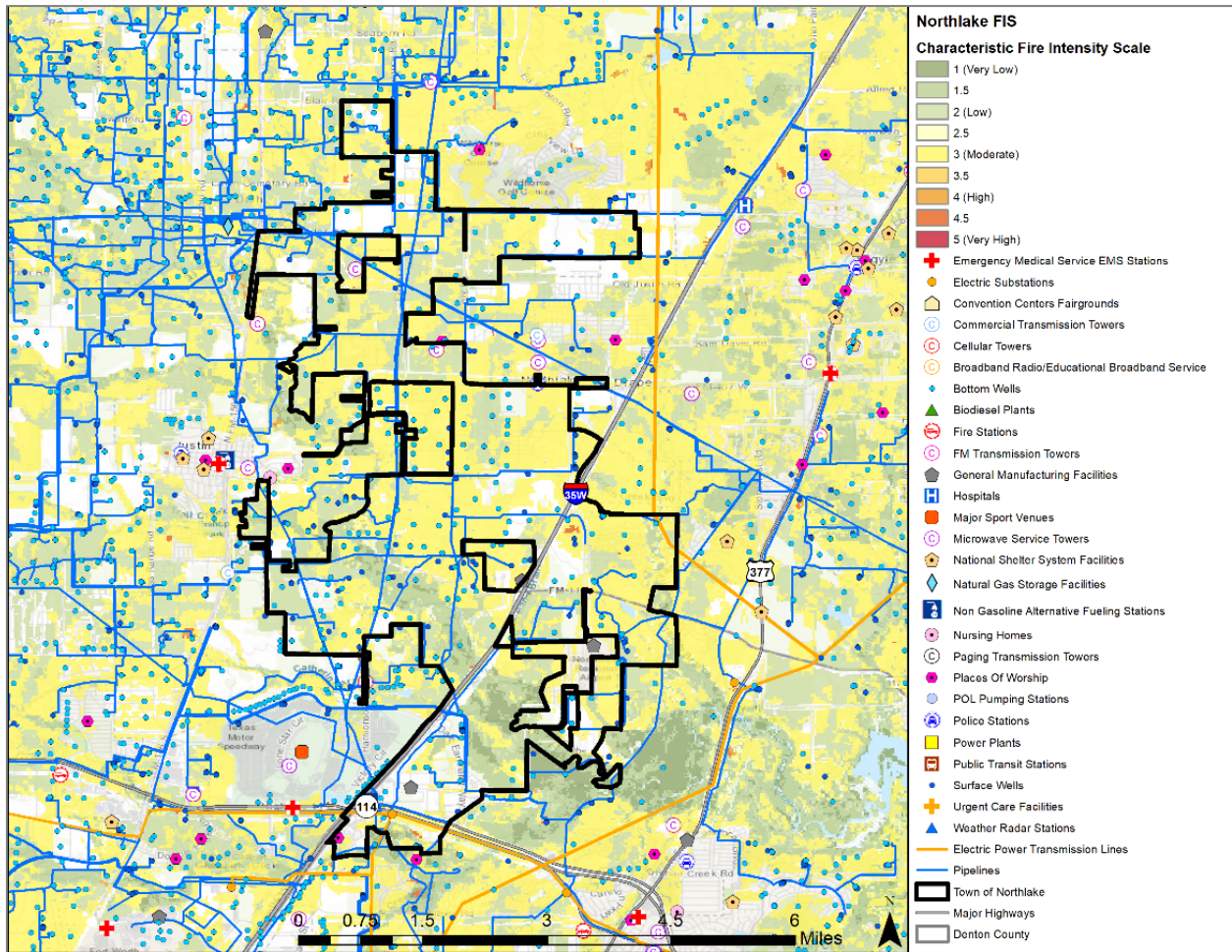


Figure 13-57. Fire Intensity Scale Map – City of Oak Point

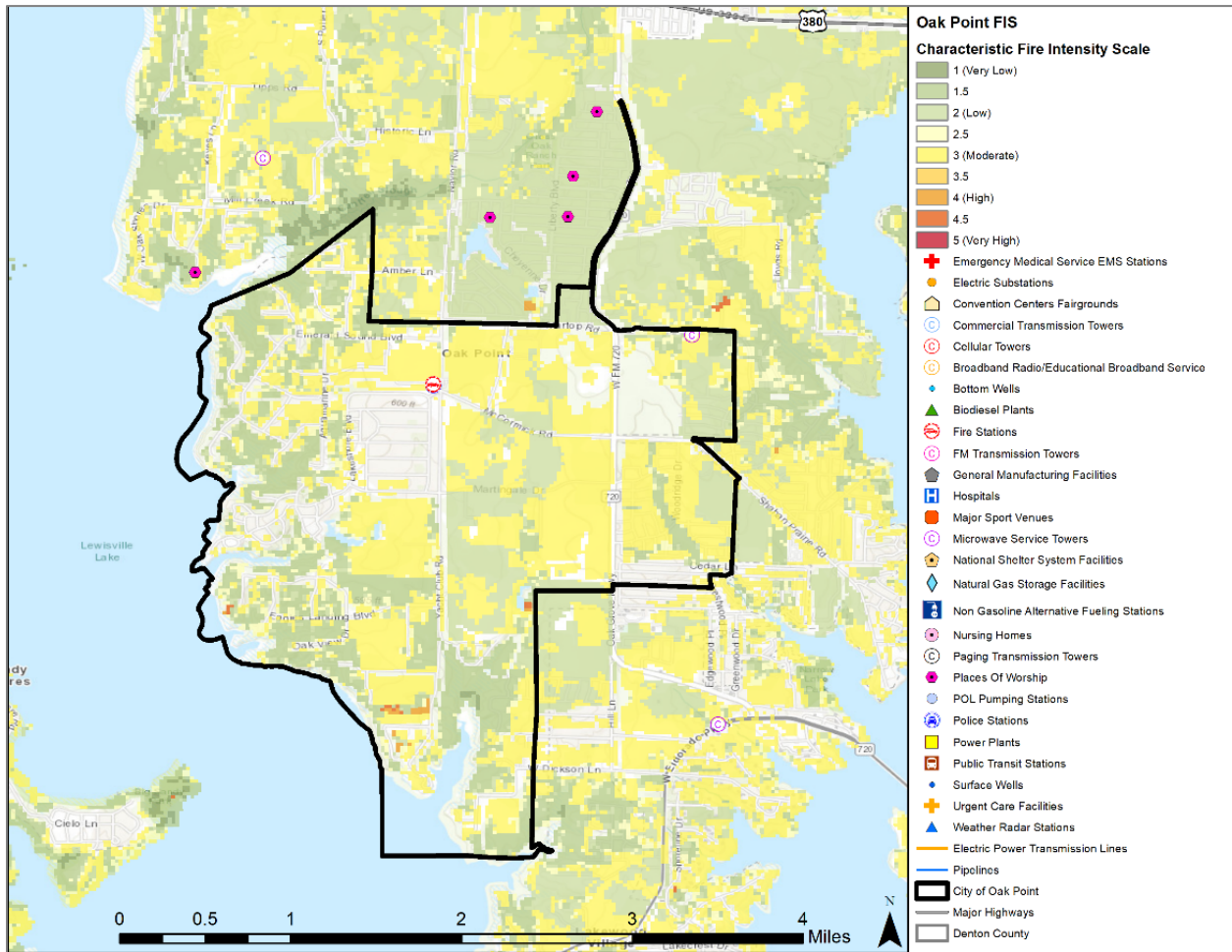


Figure 13-58. Fire Intensity Scale Map – City of Pilot Point

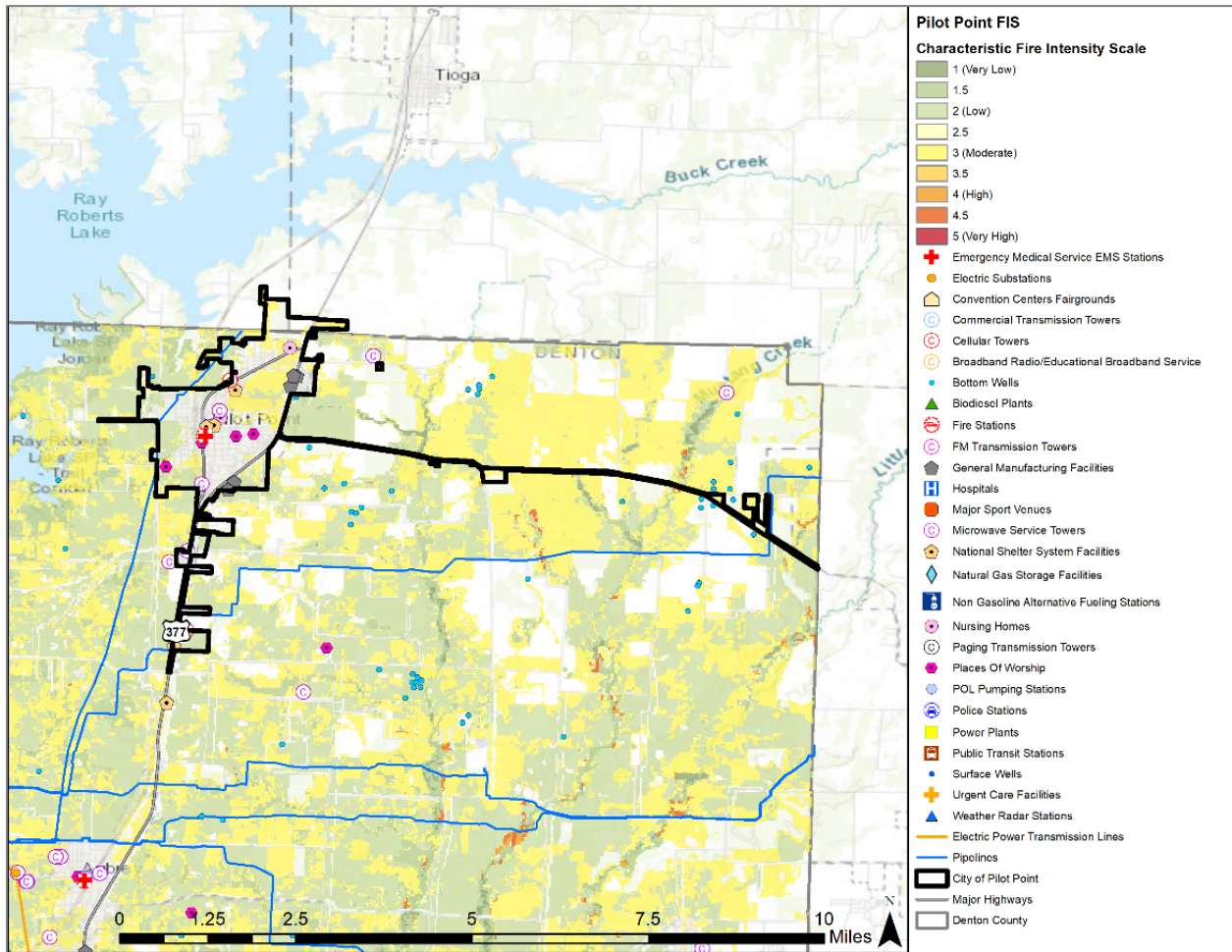


Figure 13-59. Fire Intensity Scale Map – Town of Ponder

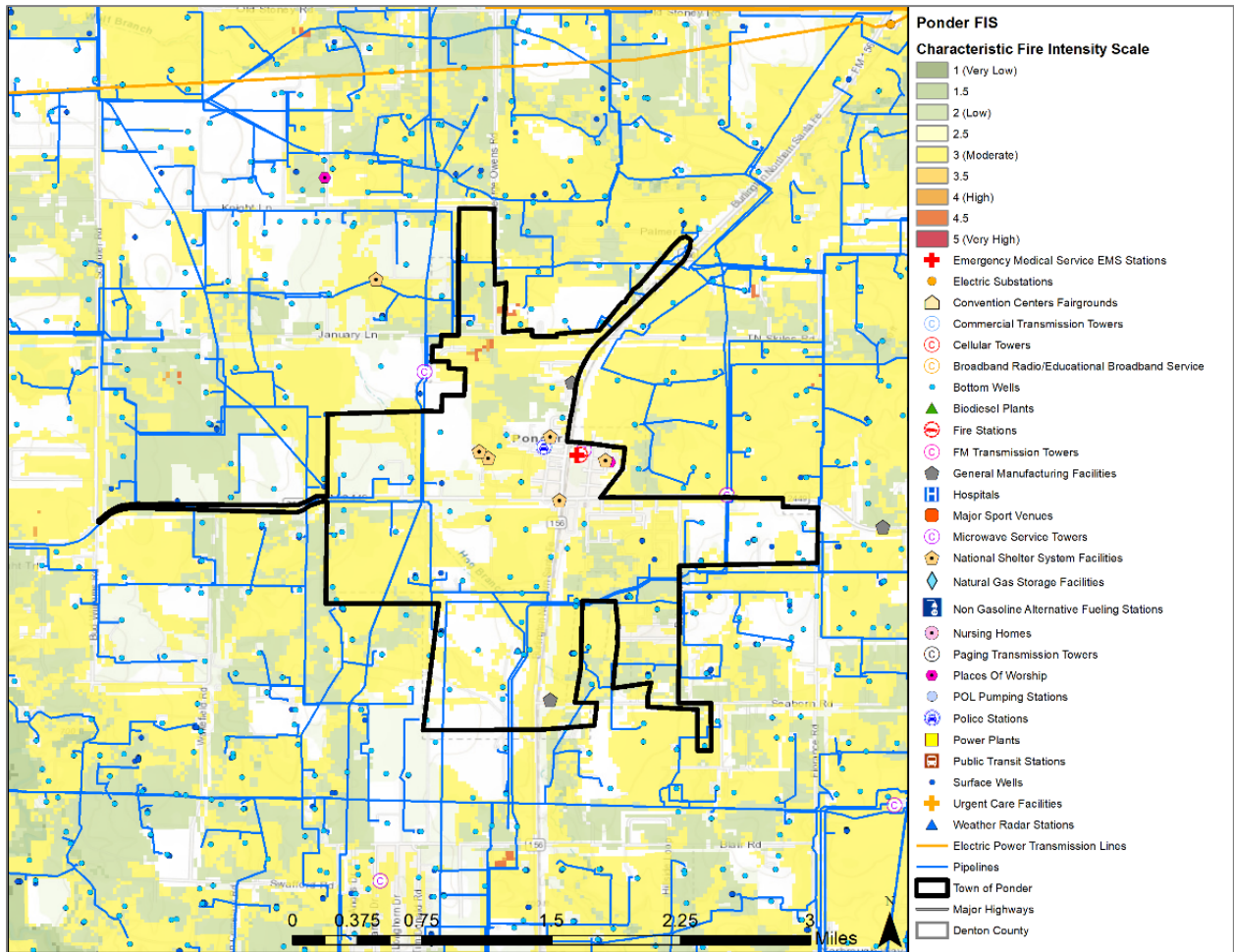


Figure 13-60. Fire Intensity Scale Map – Town of Providence Village

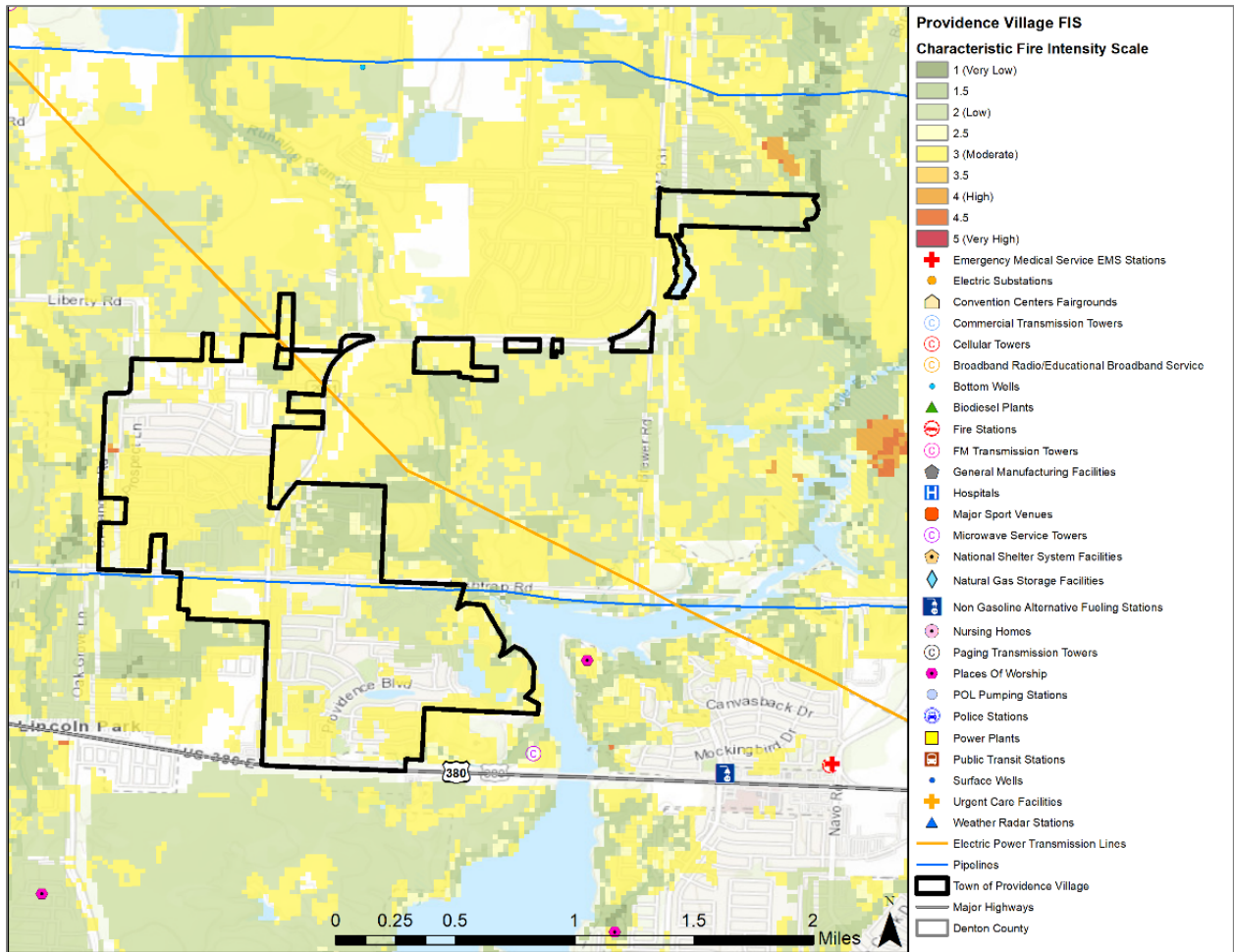


Figure 13-61. Fire Intensity Scale Map – City of Roanoke

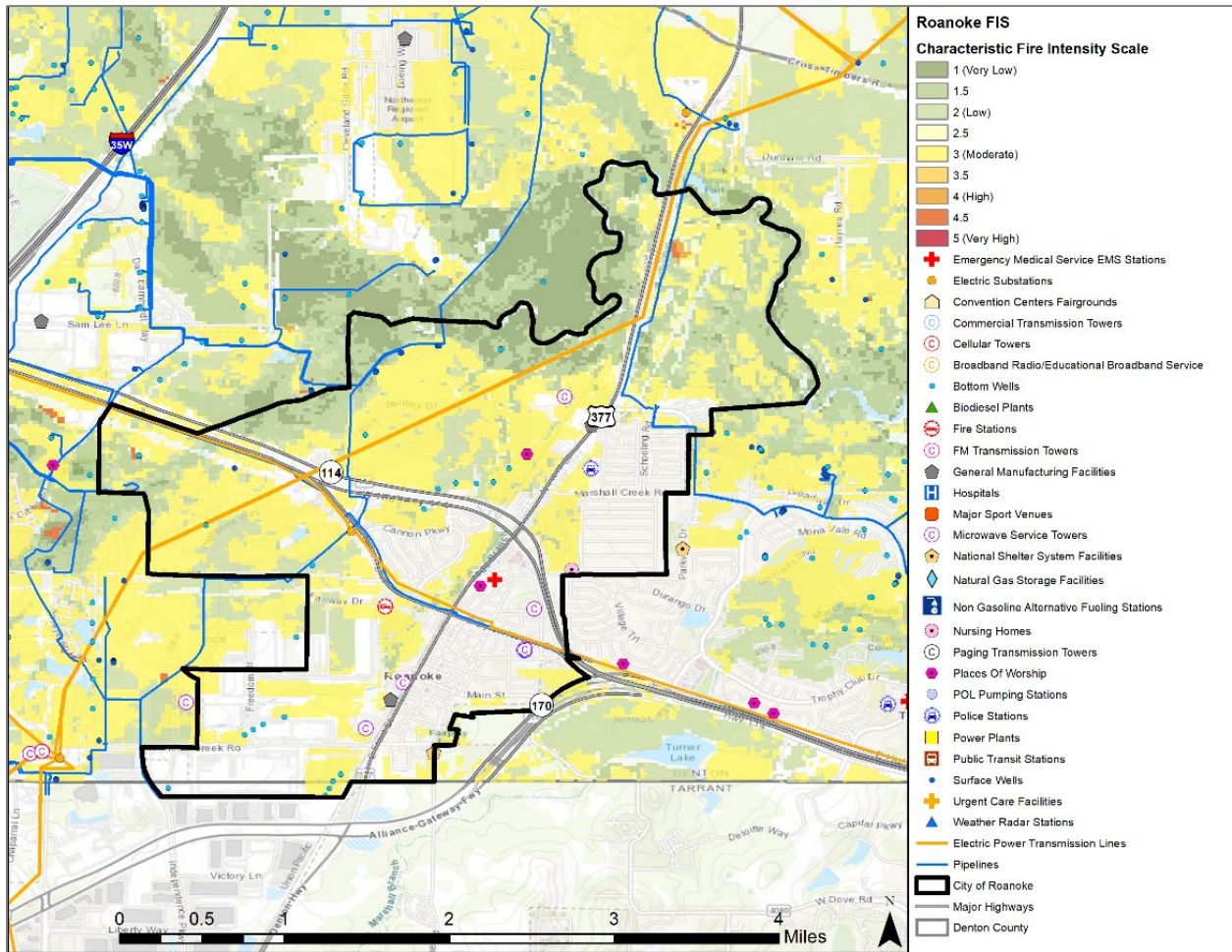


Figure 13-62. Fire Intensity Scale Map – City of Sanger

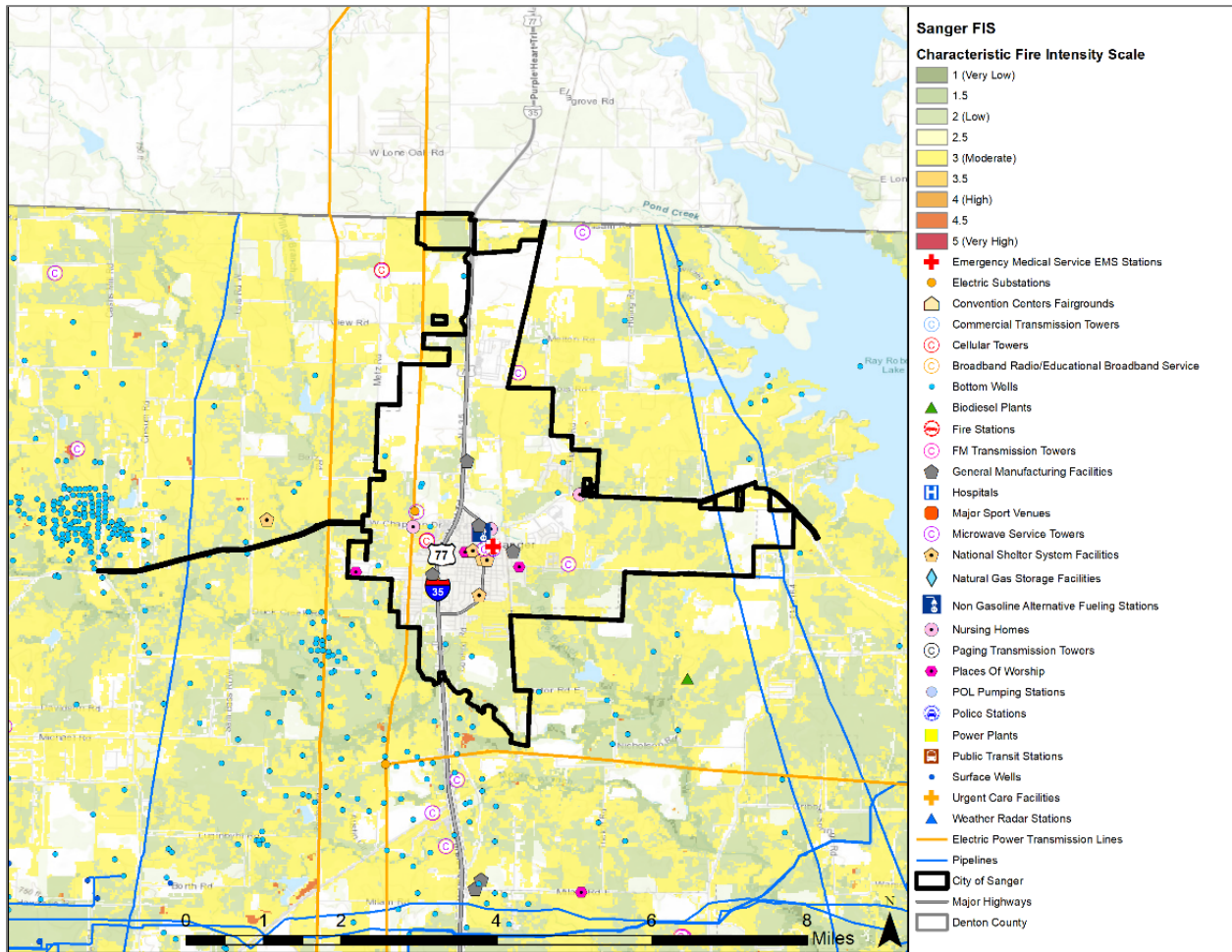


Figure 13-63. Fire Intensity Scale Map – Town of Shady Shores

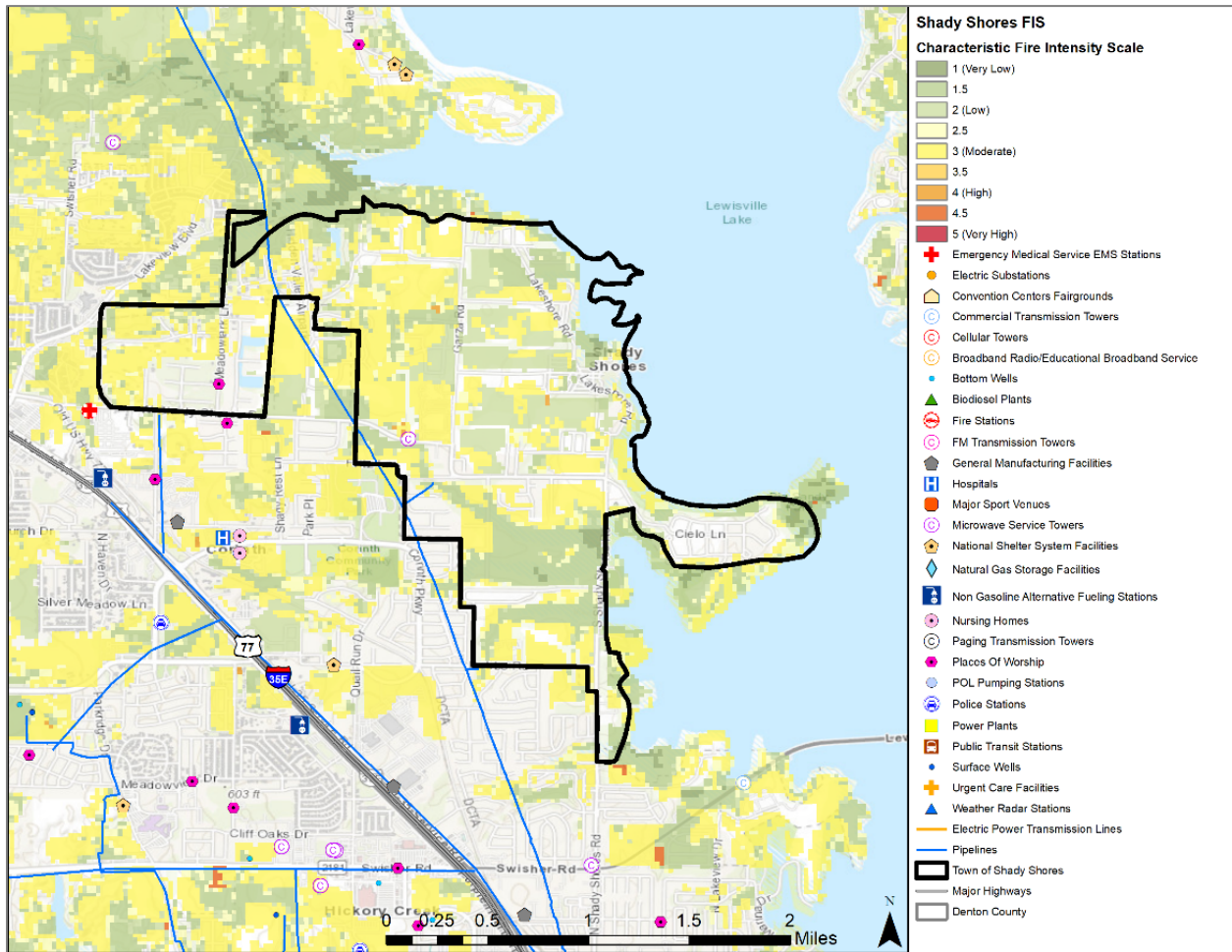


Figure 13-64. Fire Intensity Scale Map – City of The Colony

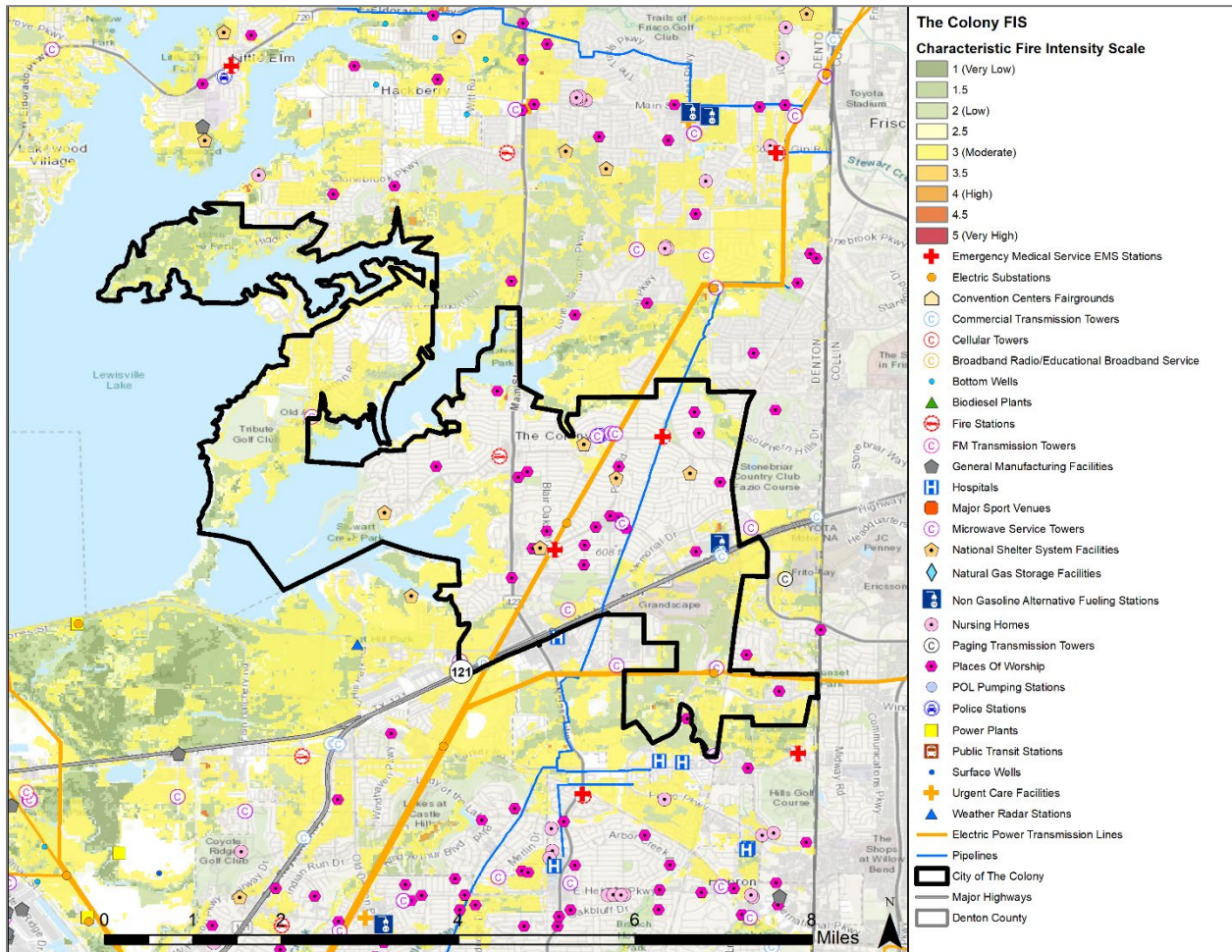
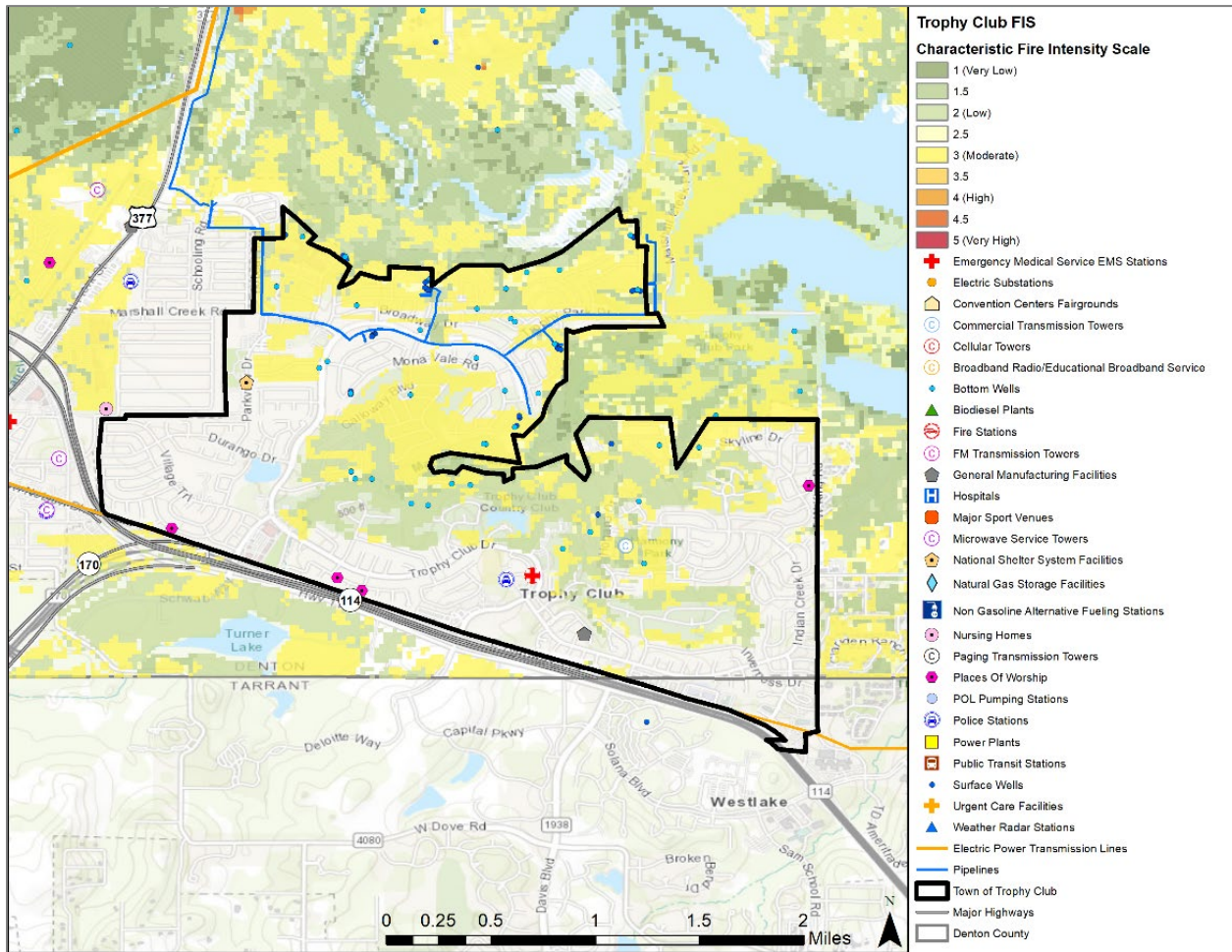


Figure 13-65. Fire Intensity Scale Map – Town of Trophy Club



HISTORICAL OCCURRENCES

The Texas Forest Service reported 2,457 wildfire events between 2005 and 2020. The National Center for Environmental Information (NCEI) reported four events from 1996 through September 2022, which have been accounted for in the event data below. Due to a lack of recorded data for wildfire events prior to 2005 and after 2020², frequency calculations are based on a sixteen-year period using only data from recorded years. The map below shows approximate locations of wildfires, which can be grass or brushfires of any size (Figure 13-66). Table 13-1 identifies the number of wildfires by jurisdiction and total acreage burned.

² The Texas Forest Service data was only available through 2020.

Figure 13-66. Location and Historic Wildfire Events for Denton County Planning Area

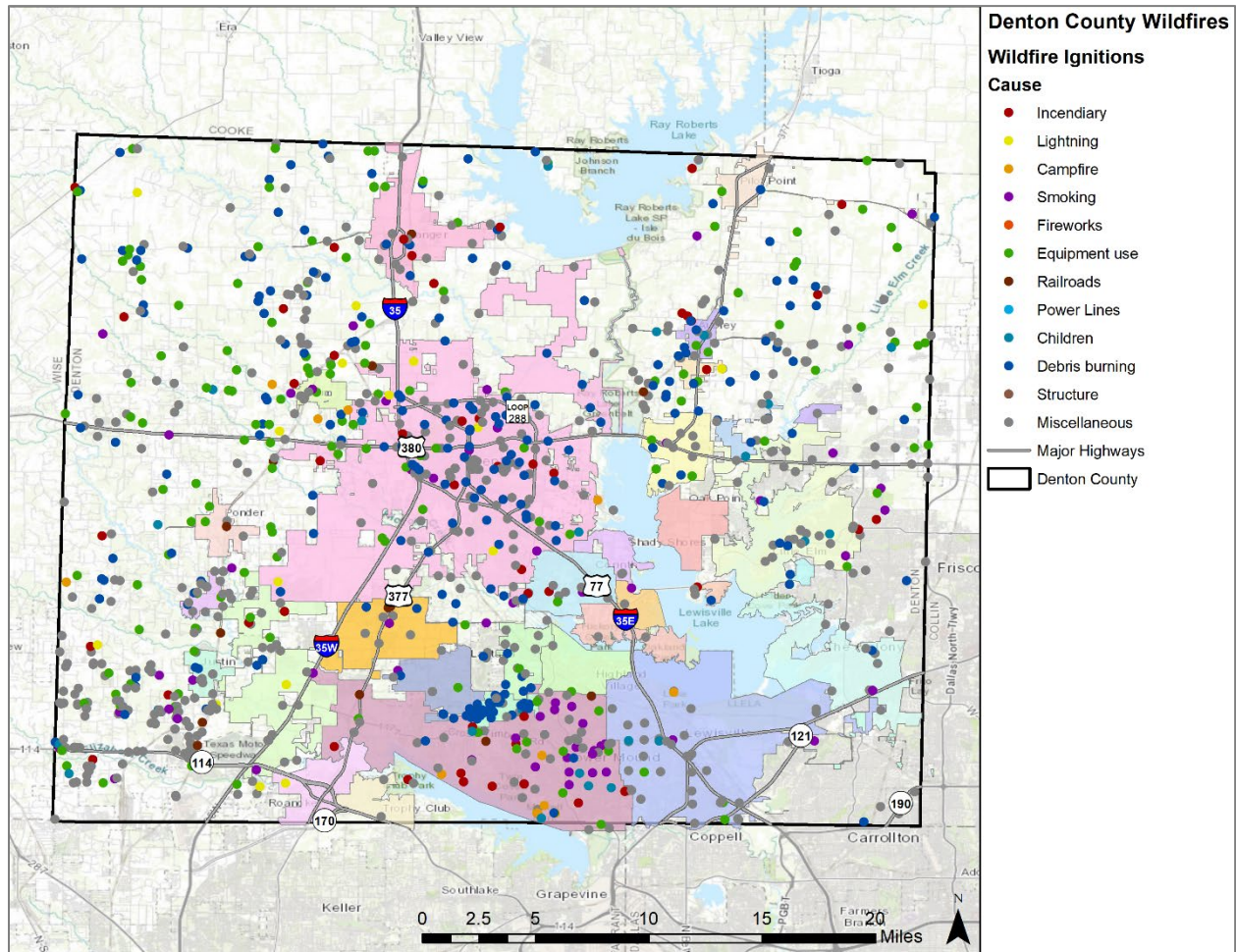


Table 13-1. Historical Wildfire Events Summary, 2005 - 2020

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Denton County	1,911	29,573
Town of Argyle	10	40
City of Aubrey	14	108
Town of Bartonville	9	50
Town of Copper Canyon	11	84
City of Corinth	9	7
Town of Cross Roads	20	59
City of Denton	164	2,625
Town of DISH	4	6

SECTION 13: WILDFIRE

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Town of Double Oak	38	43
Town of Flower Mound	92	407
City of Hackberry	0	0
Town of Hebron	0	0
Town of Hickory Creek	2	0
City of Highland Village	3	36
City of Justin	14	8
City of Krugerville	4	1
City of Krum	11	65
City of Lake Dallas	1	0
Town of Lakewood Village	1	0
City of Lewisville	37	48
Town of Little Elm	31	226
Town of Northlake	30	103
City of Oak Point	0	0
City of Pilot Point	3	6
Town of Ponder	3	5
Town of Providence Village	7	64
City of Roanoke	1	10
City of Sanger	13	24
Town of Shady Shores	2	1
City of The Colony	10	13
Town of Trophy Club	2	115

SECTION 13: WILDFIRE

Table 13-2. Acreage of Suppressed Wildfire by Year

JURISDICTIONS	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Denton County	14,669	1,446	633	1,691	3,705	184	527	922	150	352	199	588	1,532	2,944	1	0
Town of Argyle	0	38	0	1	0	0	0	0	0	0	0	0	1	0	0	0
City of Aubrey	5	0	0	0	0	0	0	1	100	0	0	0	0	2	0	0
Town of Bartonville	0	0	0	40	6	0	2	0	0	0	0	0	2	0	0	0
Town of Copper Canyon	0	6	0	39	39	0	0	0	0	0	0	0	0	0	0	0
City of Corinth	5	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Town of Cross Roads	0	46	0	1	2	1	0	0	0	3	0	0	1	0	5	0
City of Denton	1	78	284	1,581	162	129	37	158	7	42	0	0	76	70	0	0
Town of DISH	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0
Town of Double Oak	1	1	0	7	24	4	6	0	0	0	0	0	0	0	0	0
Town of Flower Mound	10	49	1	39	22	17	12	0	5	2	0	0	11	239	0	0
City of Hackberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Town of Hebron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Town of Hickory Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
City of Highland Village	0	1	0	0	0	0	0	0	0	30	0	0	5	0	0	0
City of Justin	0	0	0	6	0	0	0	0	1	1	0	0	0	0	0	0
City of Krugerville	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
City of Krum	0	4	24	25	0	10	0	2	0	0	0	0	0	0	0	0
City of Lake Dallas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Town of Lakewood Village	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
City of Lewisville	10	37	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Town of Little Elm	0	2	53	3	0	0	151	0	0	0	0	0	17	0	0	0
Town of Northlake	58	6	0	5	2	18	0	8	2	2	0	0	0	2	0	0
City of Oak Point	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
City of Pilot Point	0	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0

JURISDICTIONS	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Town of Ponder	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
Town of Providence Village	0	50	0	0	0	0	0	0	0	0	0	0	13	1	0	0
City of Roanoke	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0
City of Sanger	0	3	0	1	0	13	2	5	0	0	0	0	0	0	0	0
Town of Shady Shores	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
City of The Colony	0	4	0	0	0	0	4	0	2	0	0	0	3	0	0	0
Town of Trophy Club	0	0	0	0	0	5	0	0	0	110	0	0	0	0	0	0
Total	14,790	1,772	995	3,460	3,965	381	741	1,096	271	542	199	588	1,663	3,258	6	0

Based on the list of historical wildfire events for the Denton County planning area (listed above), including all participating jurisdictions, 914 events have occurred since the 2016 Plan.

PROBABILITY OF FUTURE EVENTS

Wildfires can occur at any time of the year. As the jurisdictions within the County move into wildland, the potential area of occurrence of wildfire increases. With 2,457 events in a 16-year period, an event within Denton County, including all participating jurisdictions, is highly likely, meaning an event is probable within the next year.

VULNERABILITY AND IMPACT

Periods of drought, dry conditions, high temperatures, and low humidity are factors that contribute to the occurrence of a wildfire event. Areas along railroads and people whose homes are in woodland settings have an increased risk of being affected by wildfire.

The heavily populated, urban areas of Denton County are not likely to experience large, sweeping fires. Areas in the unincorporated areas of Denton County are vulnerable, including rural areas. Unoccupied buildings and open spaces that have not been maintained have the greatest vulnerability to wildfire. The overall level of concern for wildfires is located mostly along the perimeter of the study area where wildland and urban areas interface.

The sparsely populated unincorporated areas of Denton County and the small communities such as Dish and Lakewood Village are capable of experiencing large sweeping fires, especially where areas of vegetation are not maintained. Areas along major highways throughout the planning area have an increased vulnerability where empty lots and unoccupied areas are located. Figures 13-1 through 13-32 illustrate the areas that are the most vulnerable to wildfire throughout the planning area.

The following critical facilities are located in the WUI and are more susceptible to wildfire in each participating jurisdiction:

Table 13-3. Critical Facilities Located in WUI by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Denton County	2 Biodiesel Plants, 2,152 Wells, 6 Cellular Towers, 36 Commercial Transmission Towers, 86 Power Transmission Lines, 30 Electrical Substations, 19 EMS Stations, 26 Fire Stations, 68 General Manufacturing Facilities, 14 Hospitals, 494 Microwave Transmission Towers, 53 Shelter Facilities, 1 Natural Gas Storage Facility, 13 Non-gasoline Alternative Fueling Stations, 54 Nursing Homes, 9 Paging Transmission Towers, 2,831 Pipelines, 246 Places of Worship, 1 Pumping Station, 18 Police Stations, 3 Power Plants, 1 Public Transit Station, 2,050 Surface Wells, 5 Urgent Care Facilities
Town of Argyle	1 Fire Station, 1 Police Station
City of Aubrey	1 Fire Station, 1 Police Station
Town of Bartonville	1 Government Building
Town of Copper Canyon	1 Government Building
City of Corinth	1 EOC Building
Town of Cross Roads	None reported
City of Denton	3 Fire Stations
Town of DISH	1 Government Facility
Town of Double Oak	1 Fire Station, 1 Police Station
Town of Flower Mound	5 Fire Stations, 1 Police/Government Building
City of Hackberry	None reported
Town of Hebron	None reported
Town of Hickory Creek	1 Town Hall
City of Highland Village	None reported
City of Justin	1 City Hall
City of Krugerville	1 Police Station, 1 Substation
City of Krum	1 Fire Station, 1 Police Station, 5 Churches
City of Lake Dallas	None reported

JURISDICTION	CRITICAL FACILITIES
Town of Lakewood Village	None reported
City of Lewisville	1 Fire Station
Town of Little Elm	1 Fire Station, 1 Public Safety Center
Town of Northlake	1 Transmission Line
City of Oak Point	1 Government Building
City of Pilot Point	None reported
Town of Ponder	1 Town Hall, 1 Fire Station, 4 Shelters/Churches, 6 Water Wells
Town of Providence Village	None reported
City of Roanoke	1 Fire Station, 1 Police Station
City of Sanger	None reported
Town of Shady Shores	None reported
City of The Colony	1 Fire Station, 1 Police Station
Town of Trophy Club	1 Police Station, 4 Churches

Within Denton County, a total of 2,457 fire events were reported from 2005 to 2020. All of these events were suspected wildfires. Historic loss and annualized estimates due to wildfires are presented in Table 13-4 below. The frequency is approximately 154 events every year.

Table 13-4. Potential Annualized Losses by Jurisdiction³

JURISDICTION	ACRES BURNED	ANNUAL ACRE LOSSES
Denton County	29,573	1,848.31
Town of Argyle	40	2.5
City of Aubrey	108	6.75
Town of Bartonville	50	3.13
Town of Copper Canyon	84	5.25
City of Corinth	7	0.44
Town of Cross Roads	59	3.69
City of Denton	2,625	164.06

³ Events divided by 16 years of data.

JURISDICTION	ACRES BURNED	ANNUAL ACRE LOSSES
Town of DISH	6	0.38
Town of Double Oak	43	2.69
Town of Flower Mound	407	25.44
City of Hackberry	0	0
Town of Hebron	0	0
Town of Hickory Creek	0	0
City of Highland Village	36	2.25
City of Justin	8	0.5
City of Krugerville	1	0.06
City of Krum	65	4.06
City of Lake Dallas	0	0
Town of Lakewood Village	0	0
City of Lewisville	48	3
Town of Little Elm	226	14.13
Town of Northlake	103	6.44
City of Oak Point	0	0
City of Pilot Point	6	0.38
Town of Ponder	5	0.31
Town of Providence Village	0	0
City of Roanoke	10	0.63
City of Sanger	24	1.5
Town of Shady Shores	1	0.06
City of The Colony	13	0.81
Town of Trophy Club	115	7.19
Planning Area	33,663	2,103.94

Figures 13-67 through 13-98 show Denton County and the threat of wildfire to the County and all participating jurisdictions.

Figure 13-67. Wildfire Ignition Density – Denton County

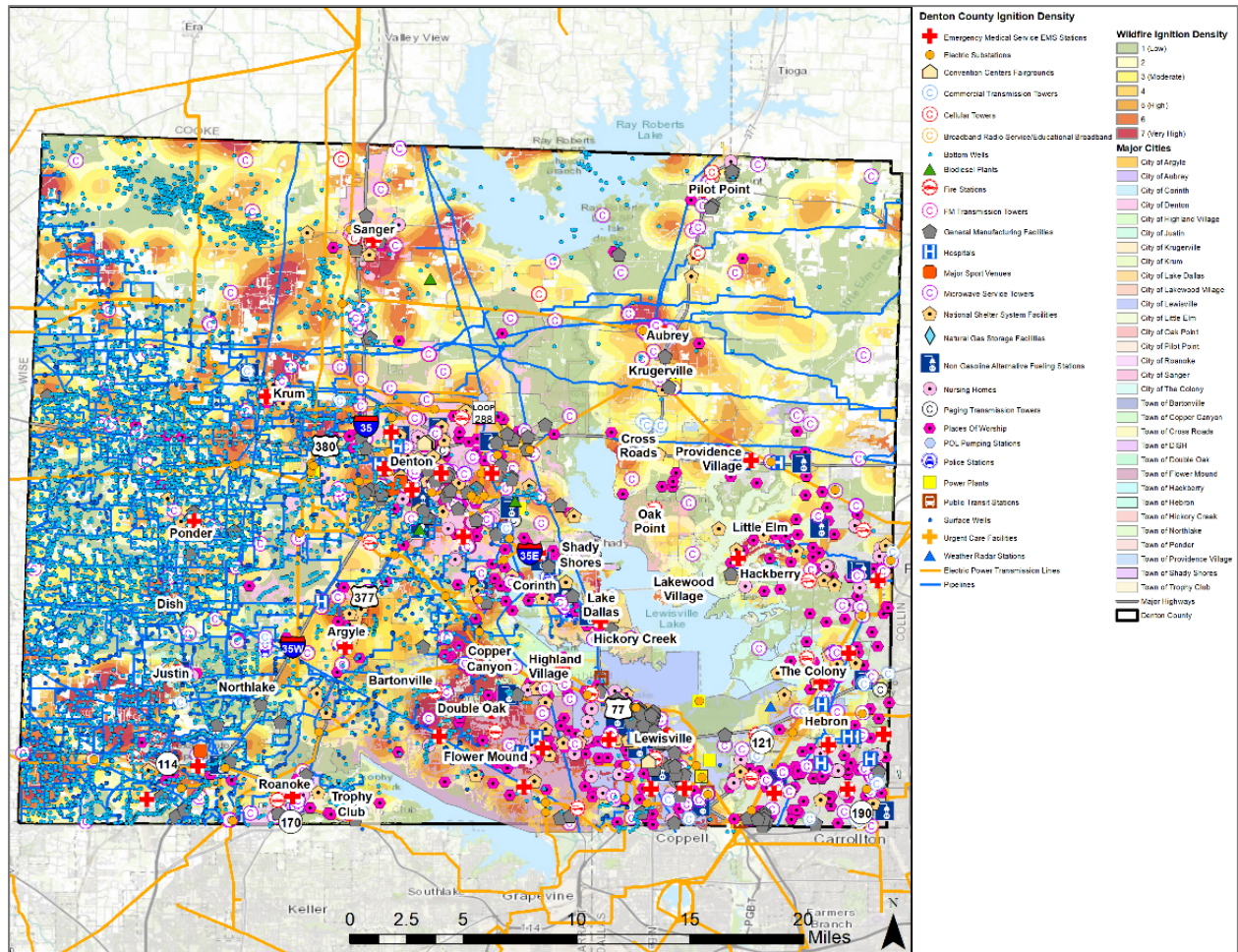


Figure 13-68. Wildfire Ignition Density – Town of Argyle

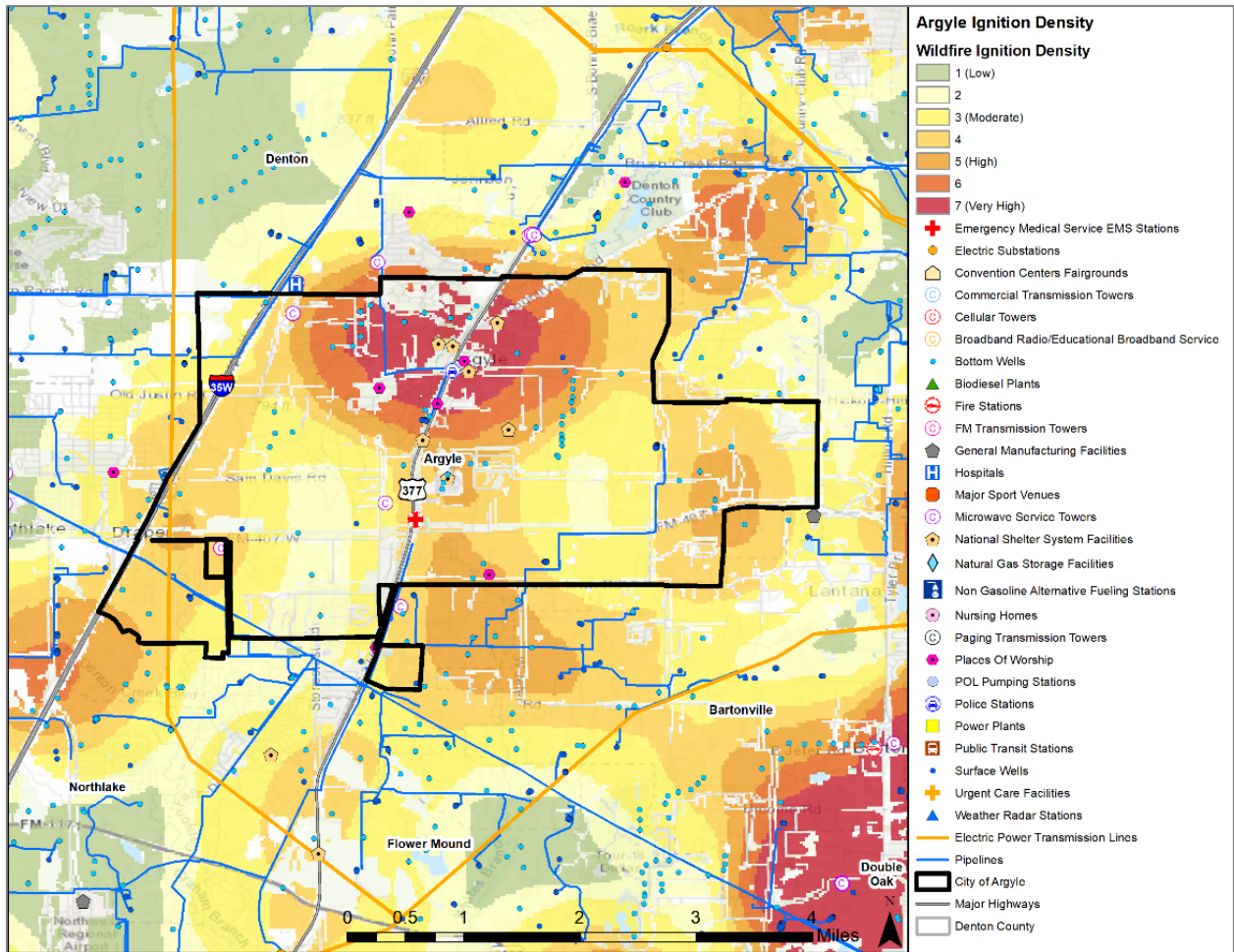


Figure 13-69. Wildfire Ignition Density – City of Aubrey

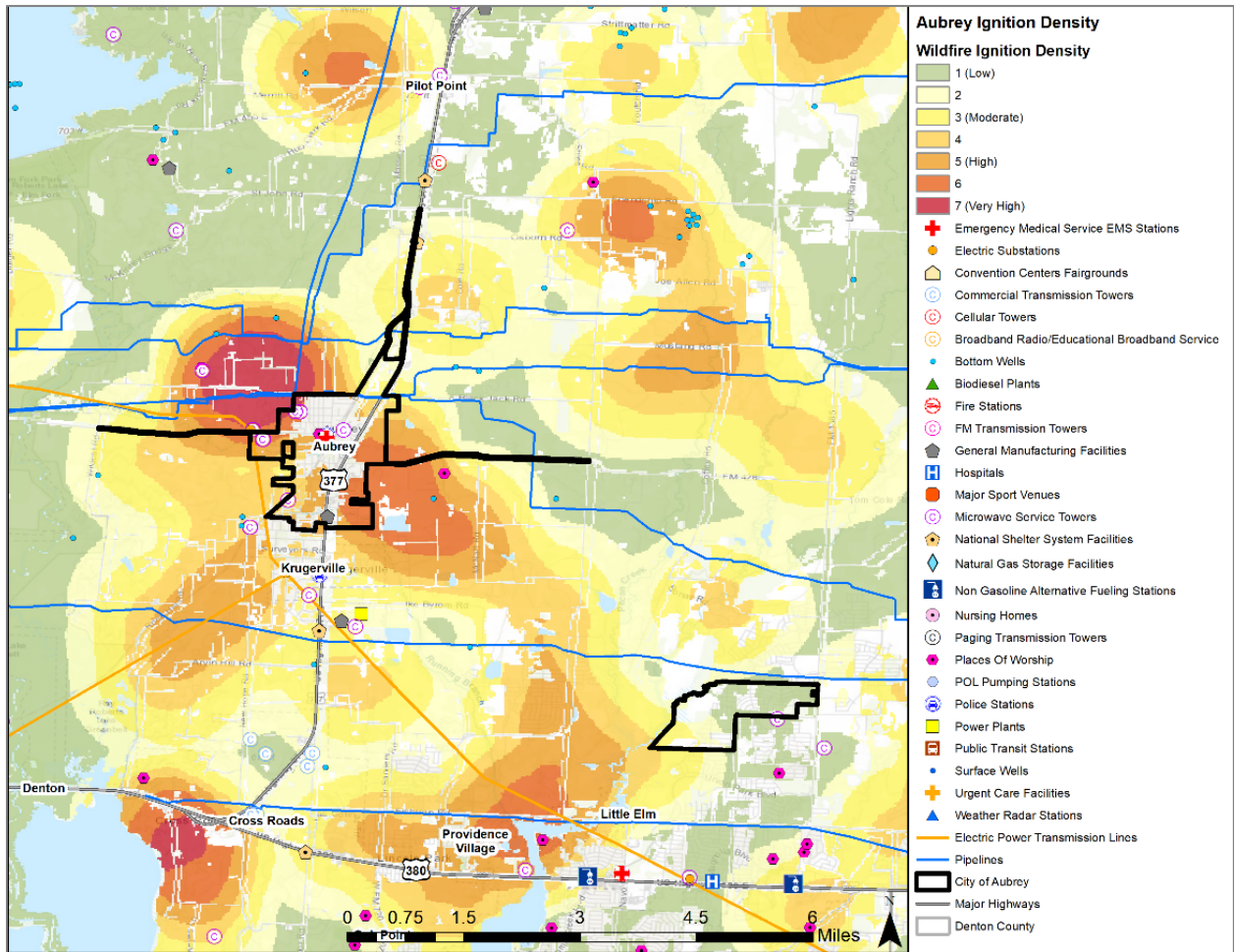


Figure 13-70. Wildfire Ignition Density – Town of Bartonville

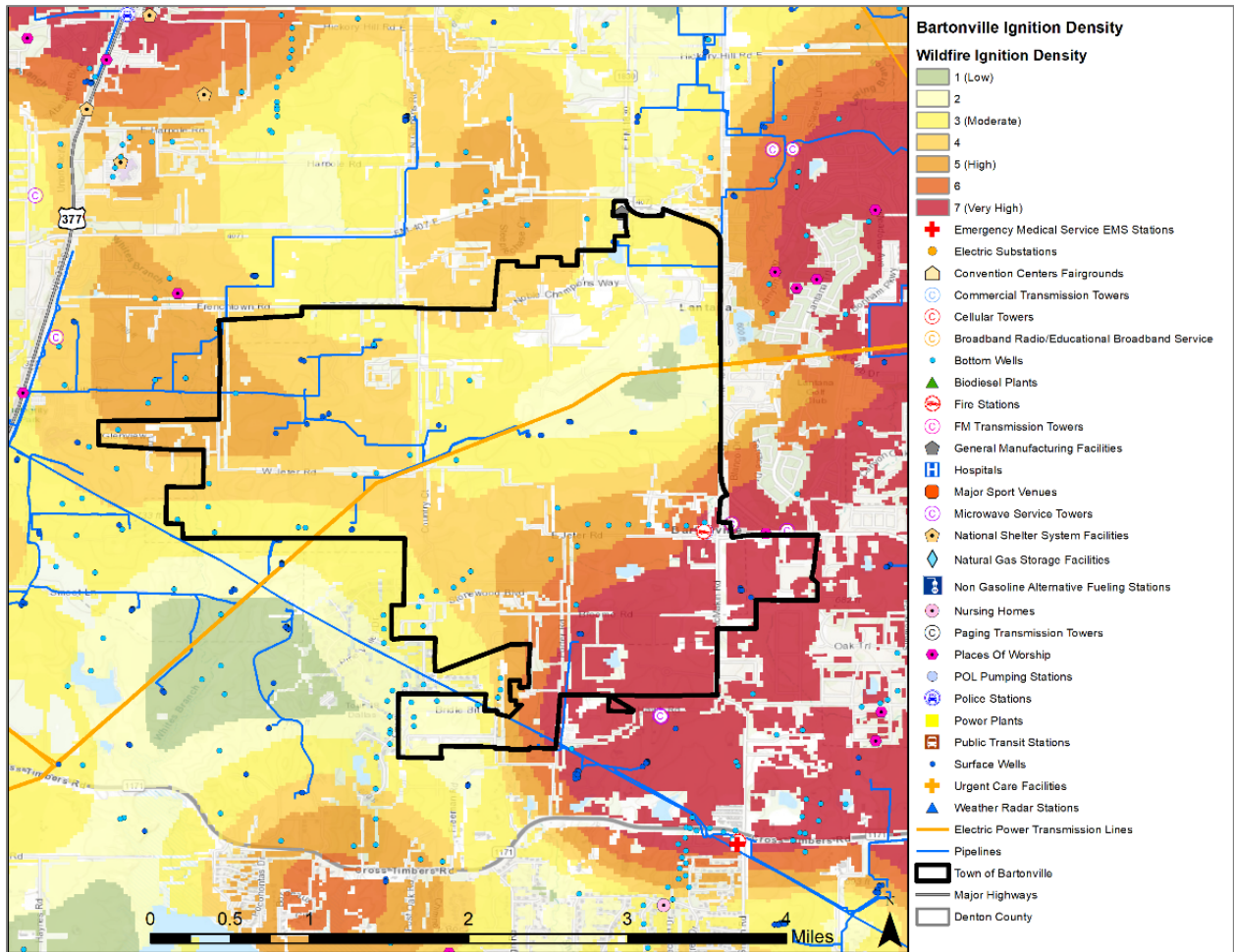


Figure 13-71. Wildfire Ignition Density – Town of Copper Canyon

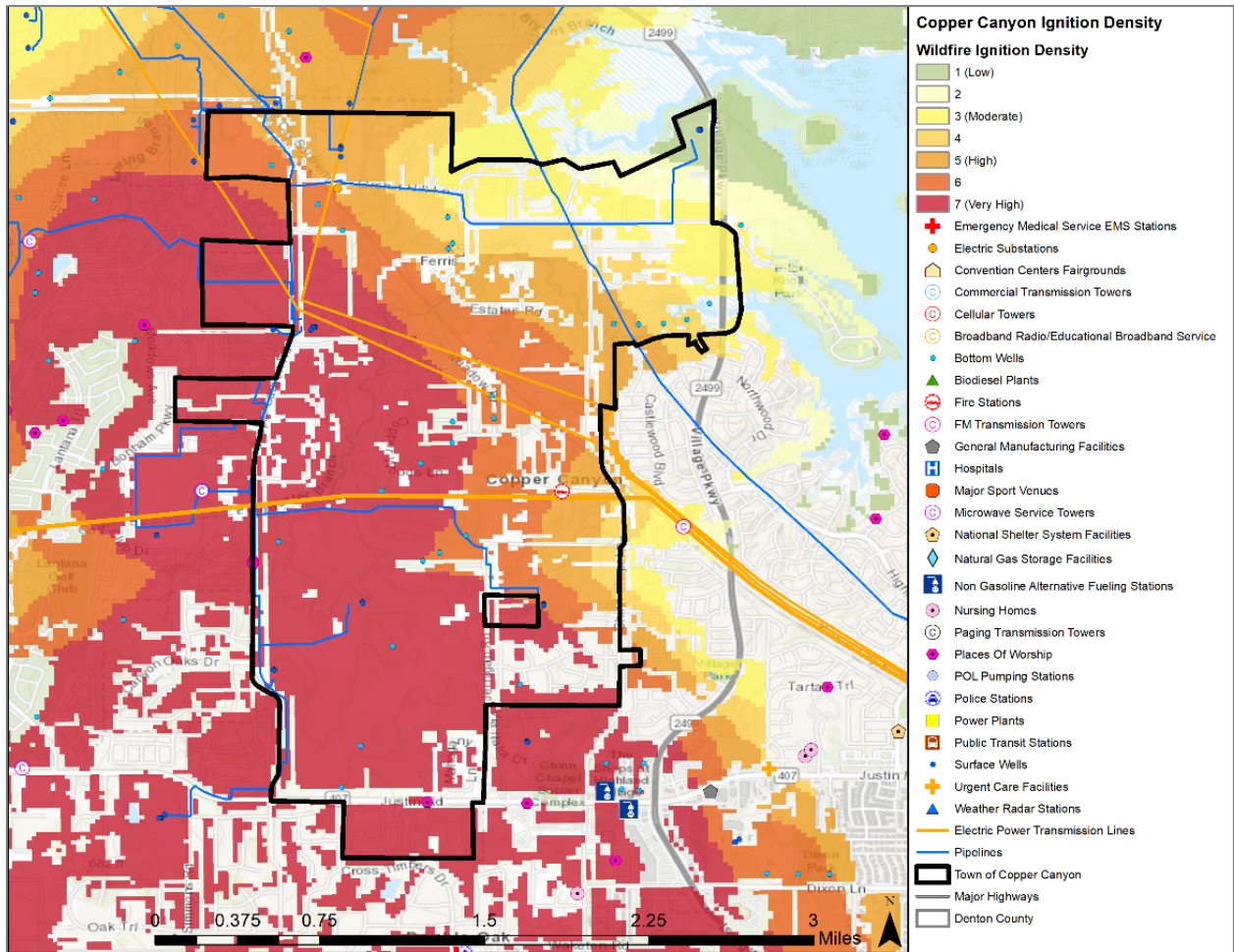


Figure 13-72. Wildfire Ignition Density – City of Corinth

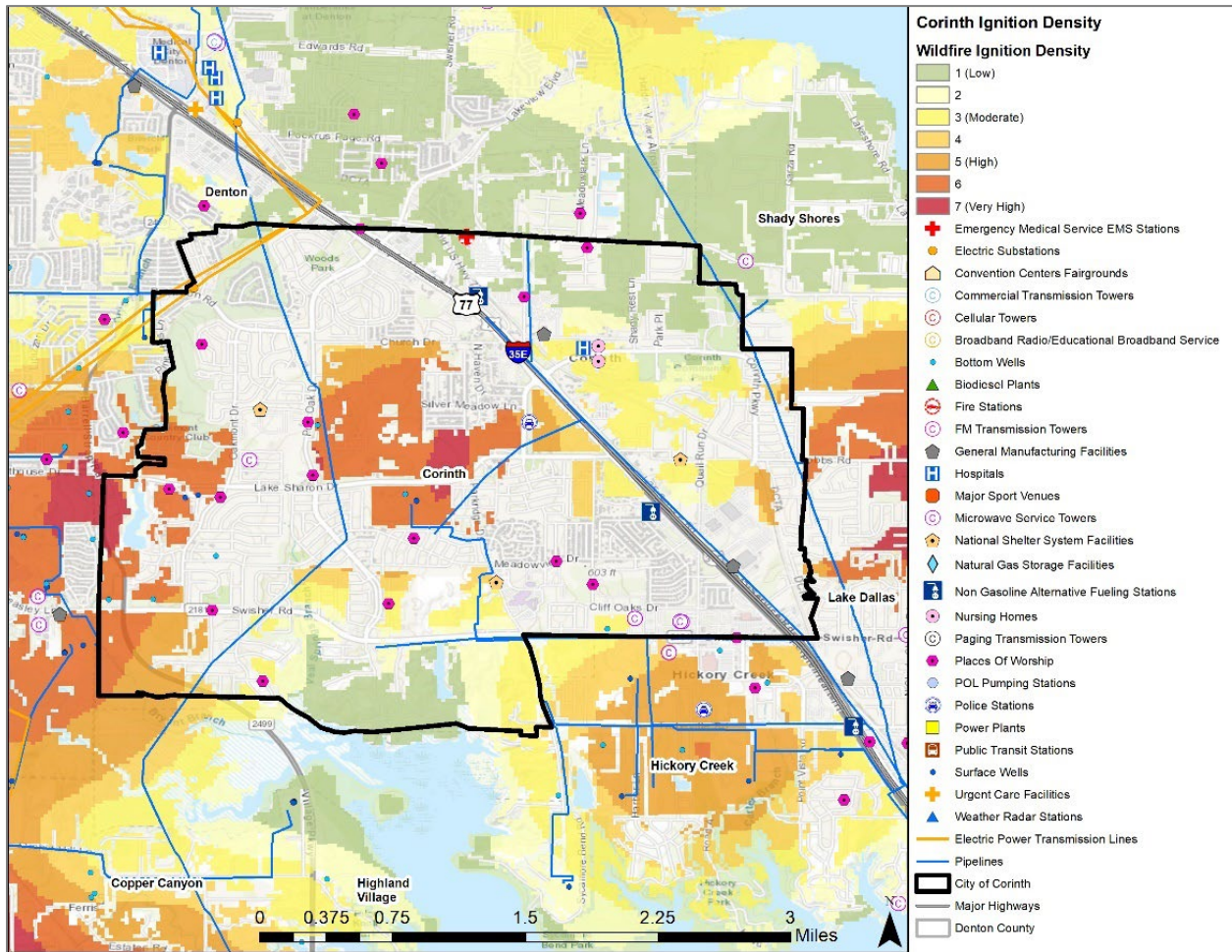


Figure 13-73. Wildfire Ignition Density – Town of Cross Roads

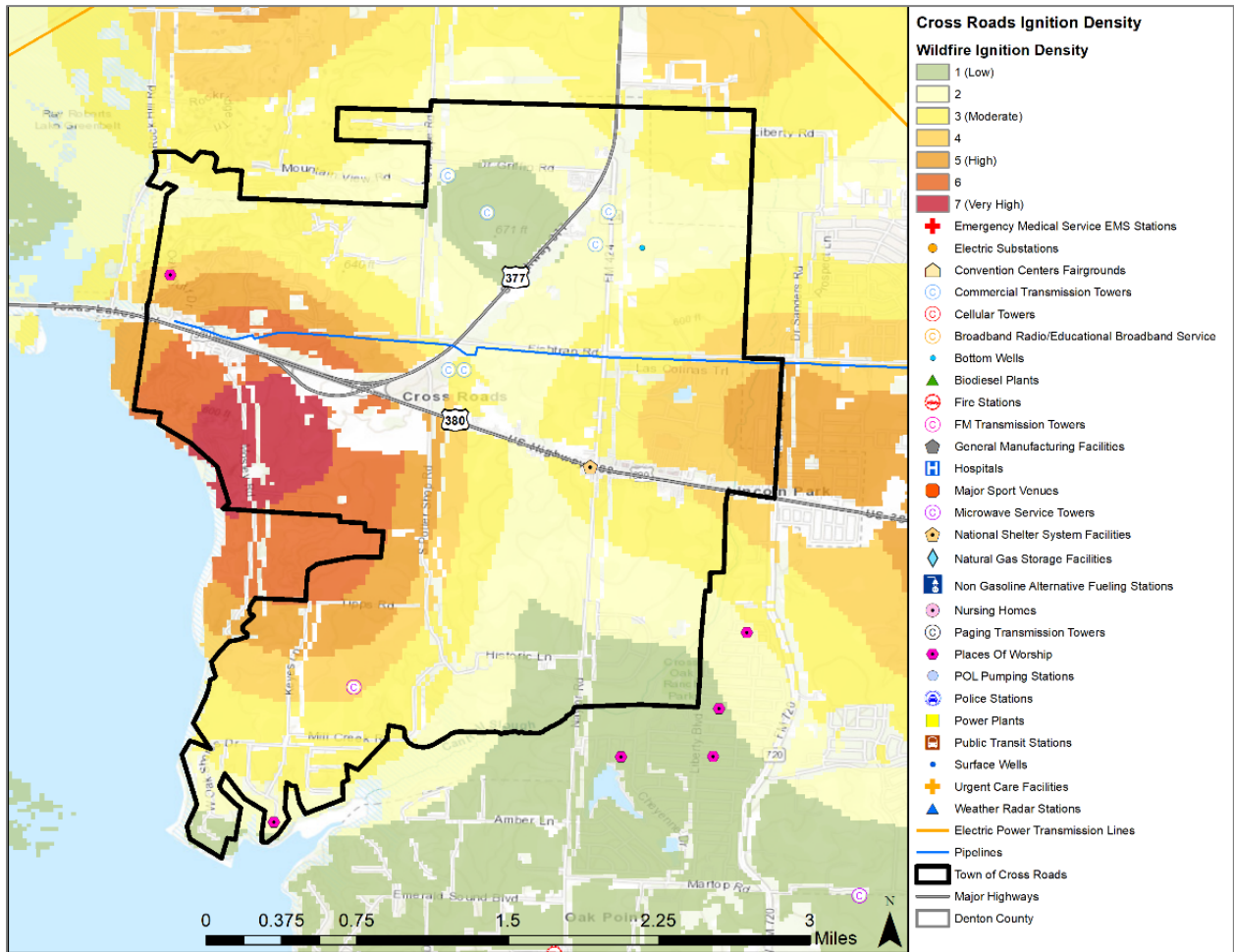


Figure 13-74. Wildfire Ignition Density – City of Denton

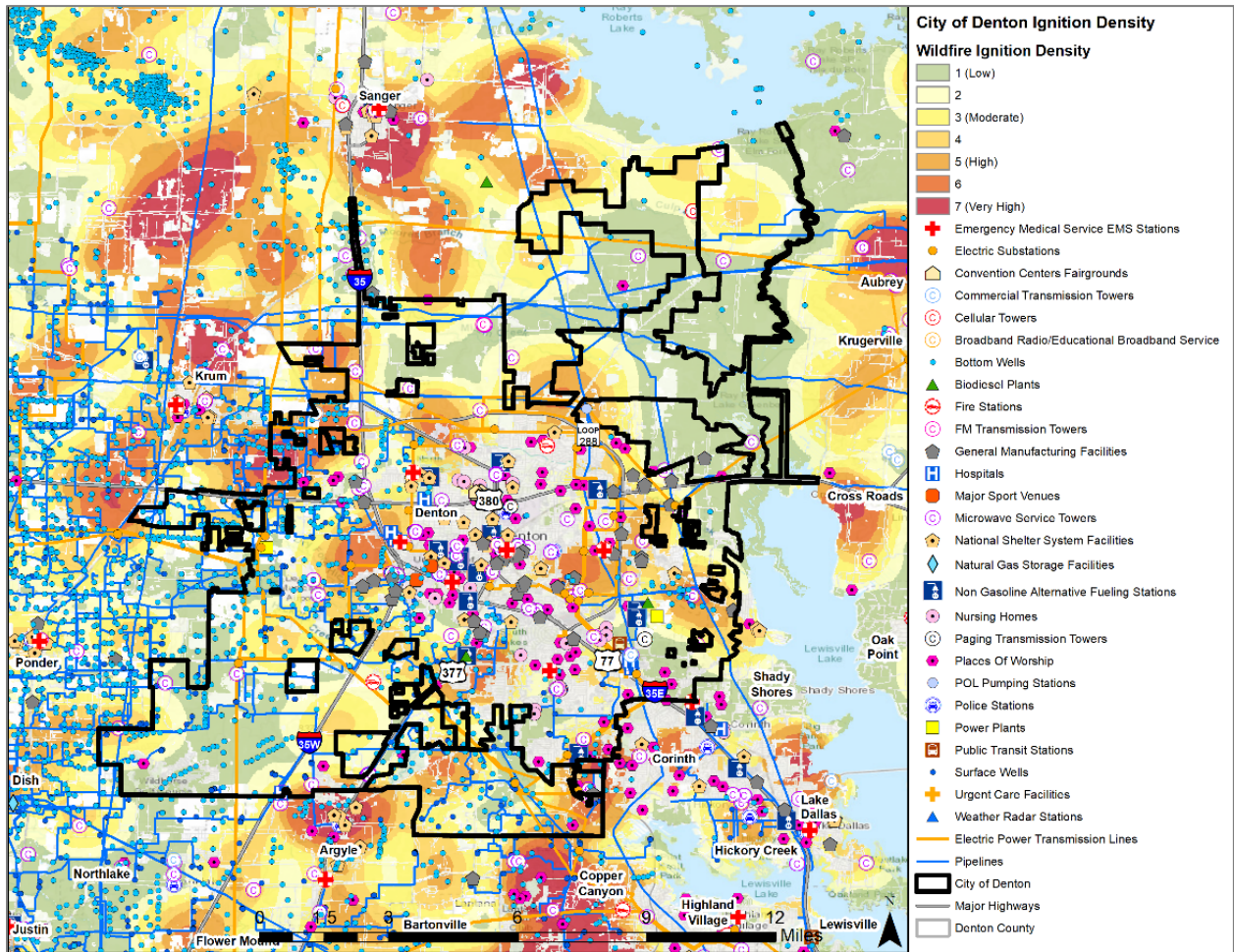


Figure 13-75. Wildfire Ignition Density – Town of DISH

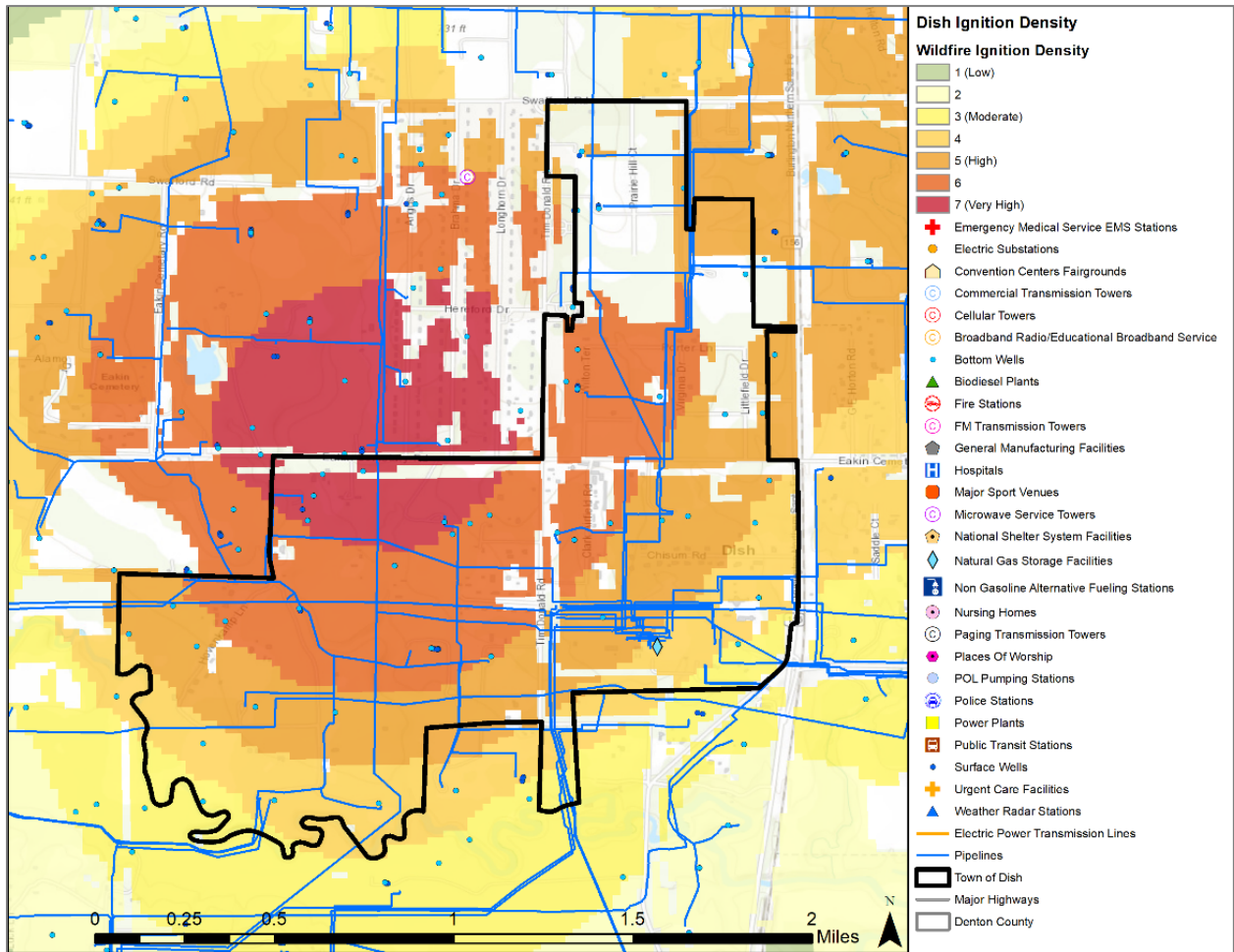


Figure 13-76. Wildfire Ignition Density – Town of Double Oak

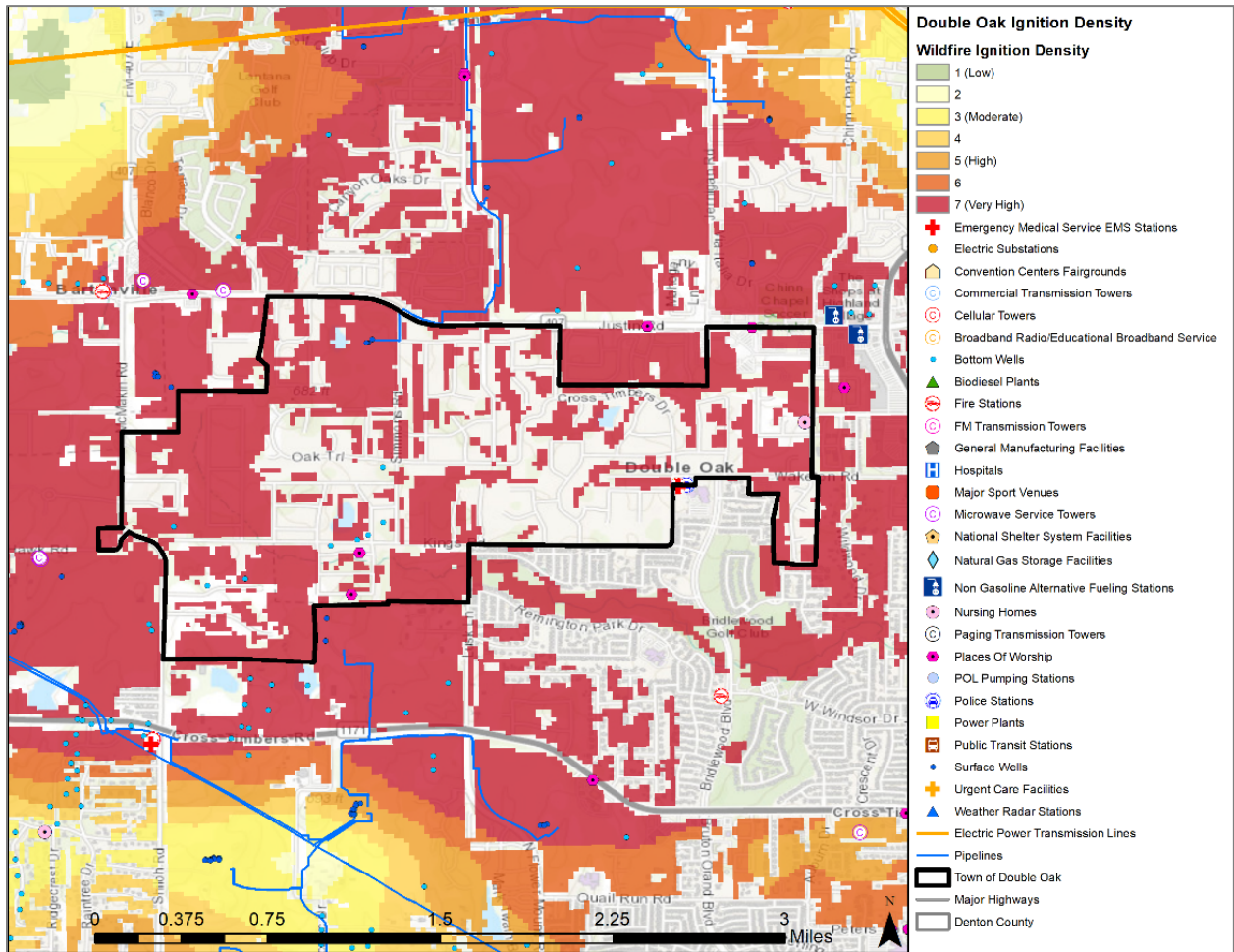


Figure 13-77. Wildfire Ignition Density – Town of Flower Mound

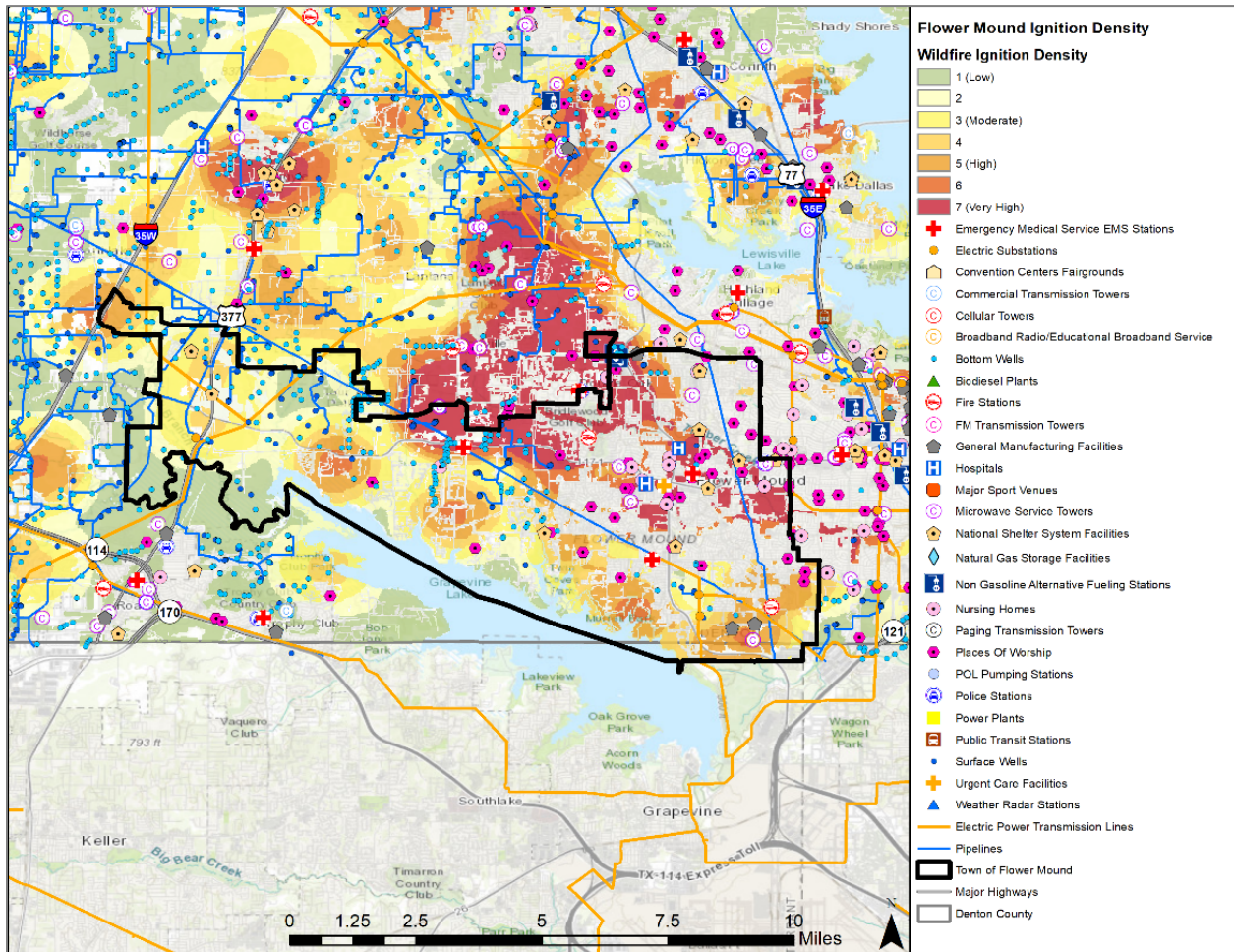


Figure 13-78. Wildfire Ignition Density – City of Hackberry

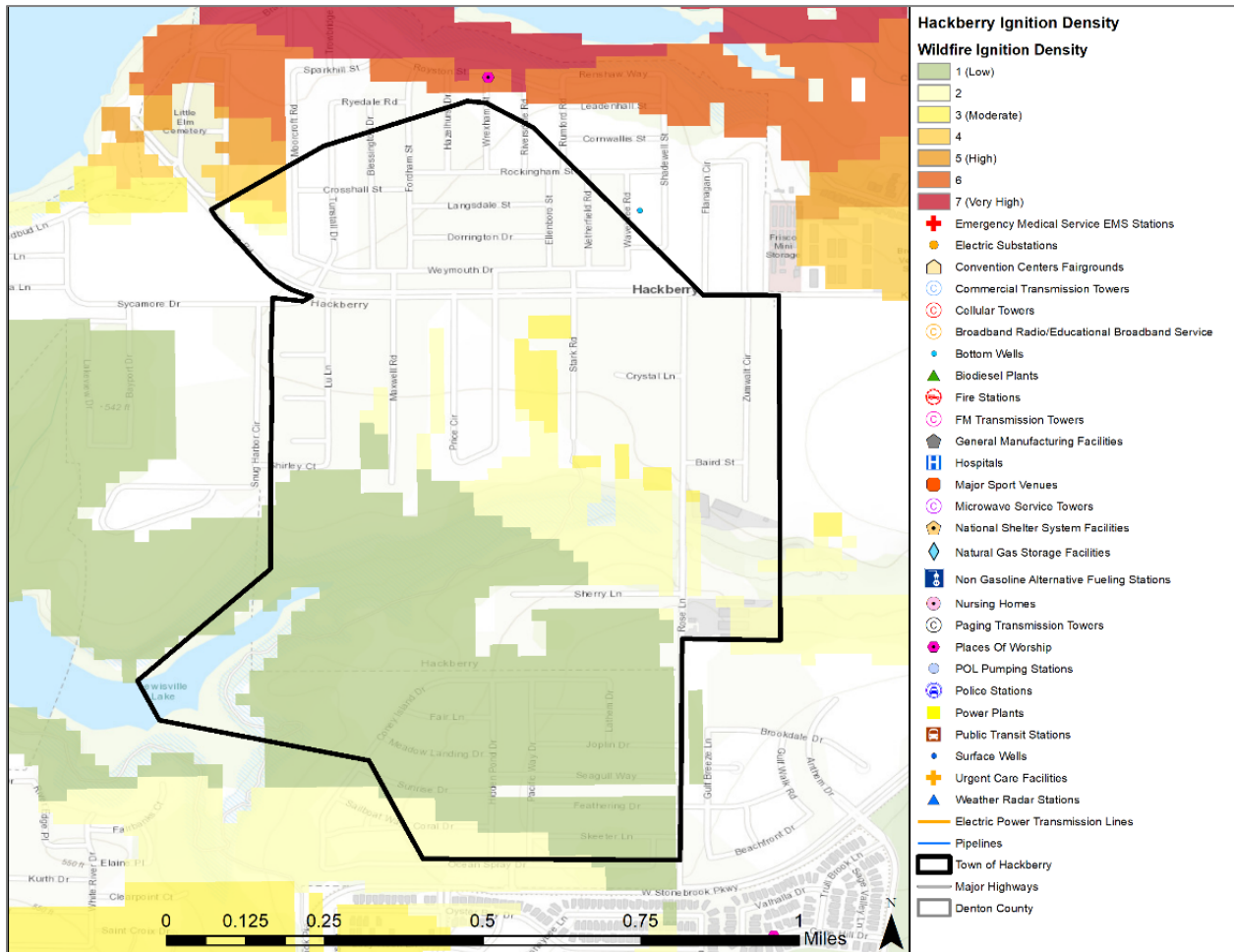


Figure 13-79. Wildfire Ignition Density – Town of Hebron

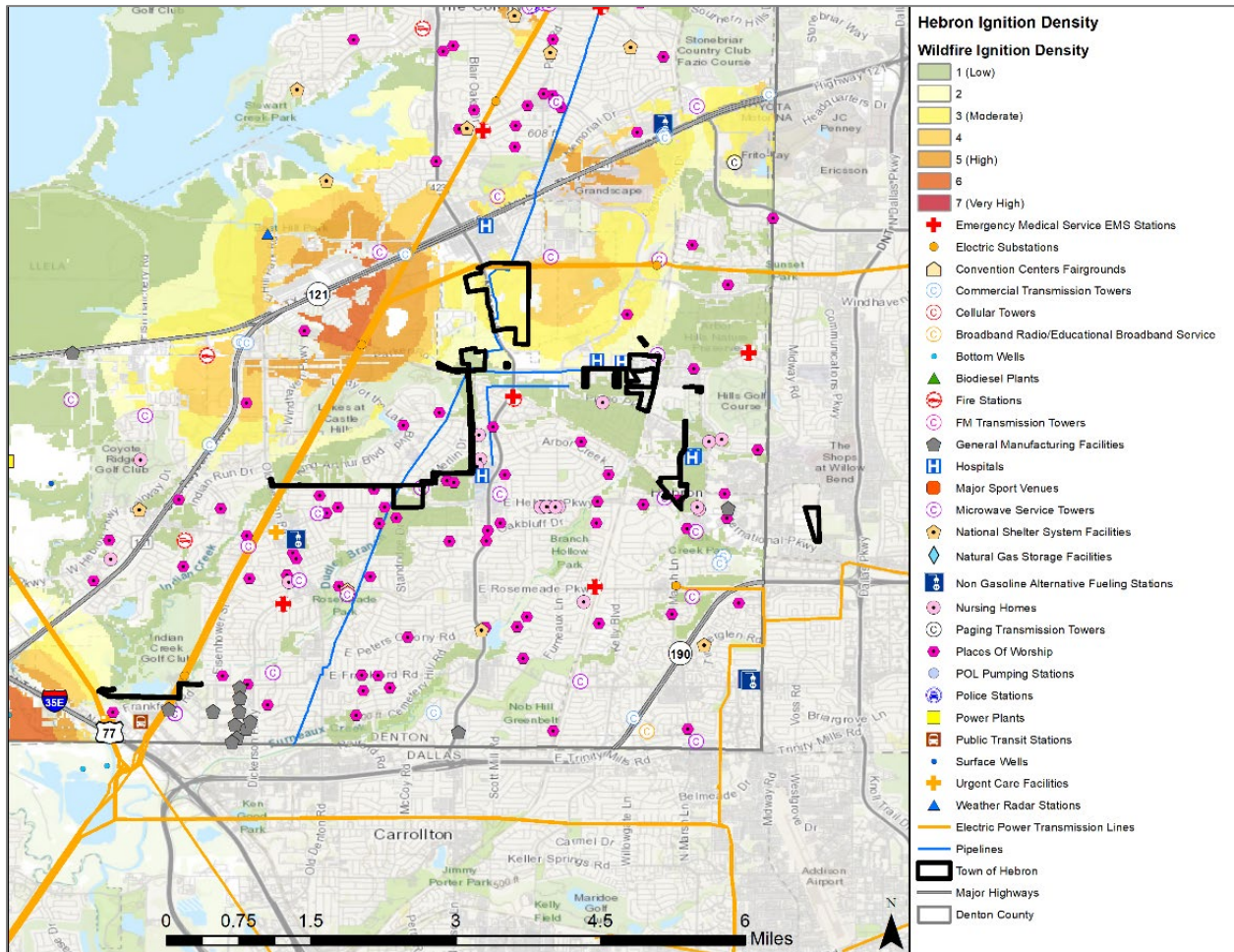


Figure 13-80. Wildfire Ignition Density – Town of Hickory Creek

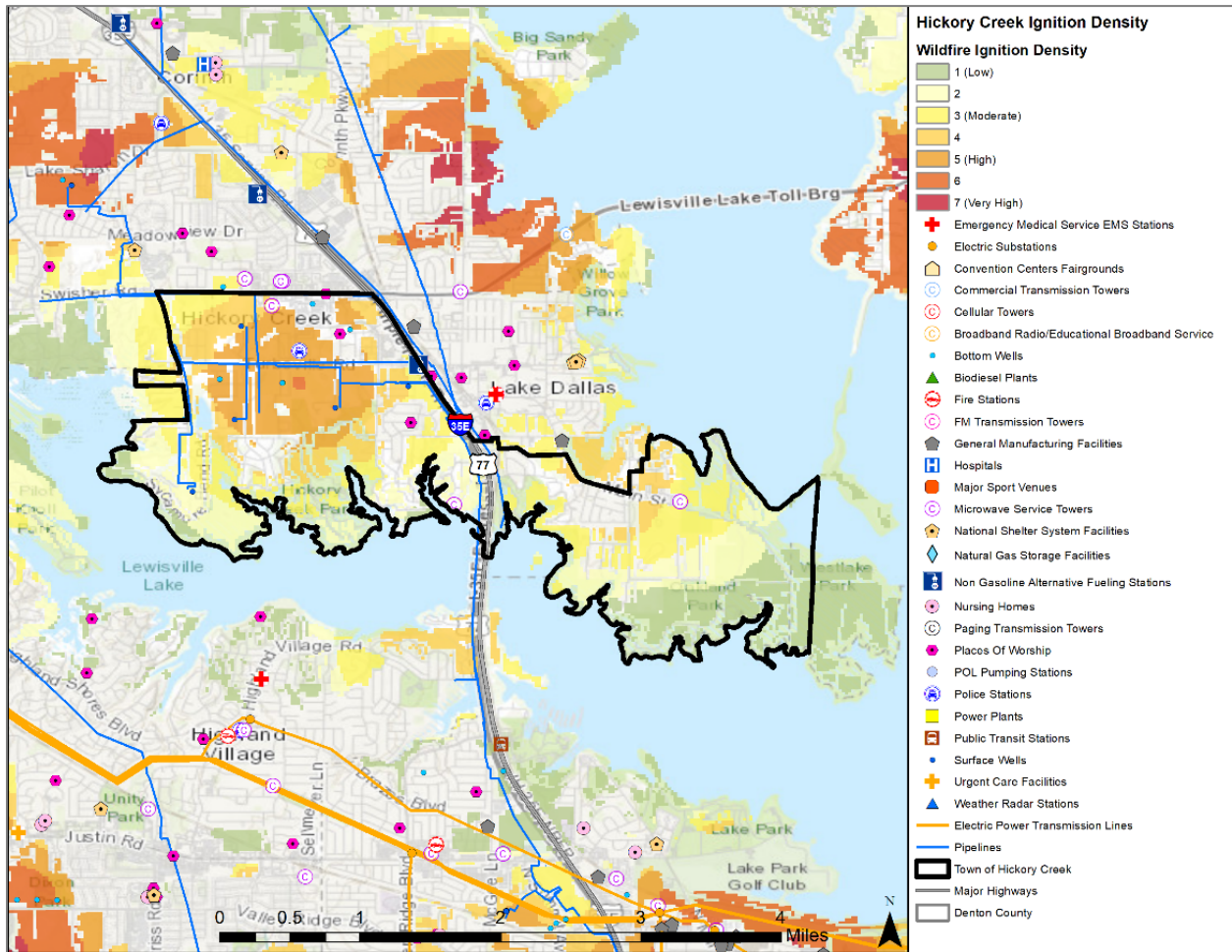


Figure 13-81. Wildfire Ignition Density – City of Highland Village

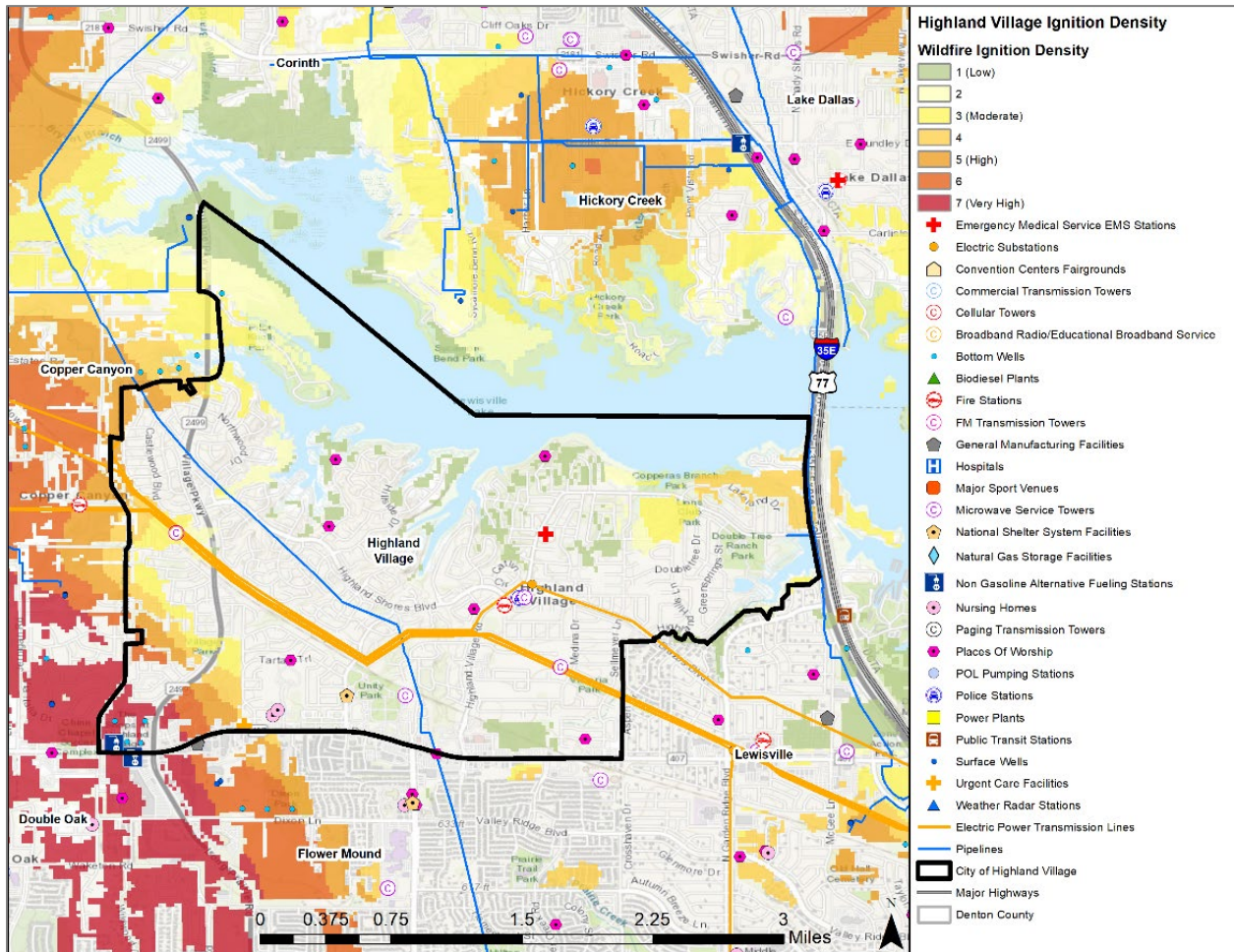


Figure 13-82. Wildfire Ignition Density – City of Justin

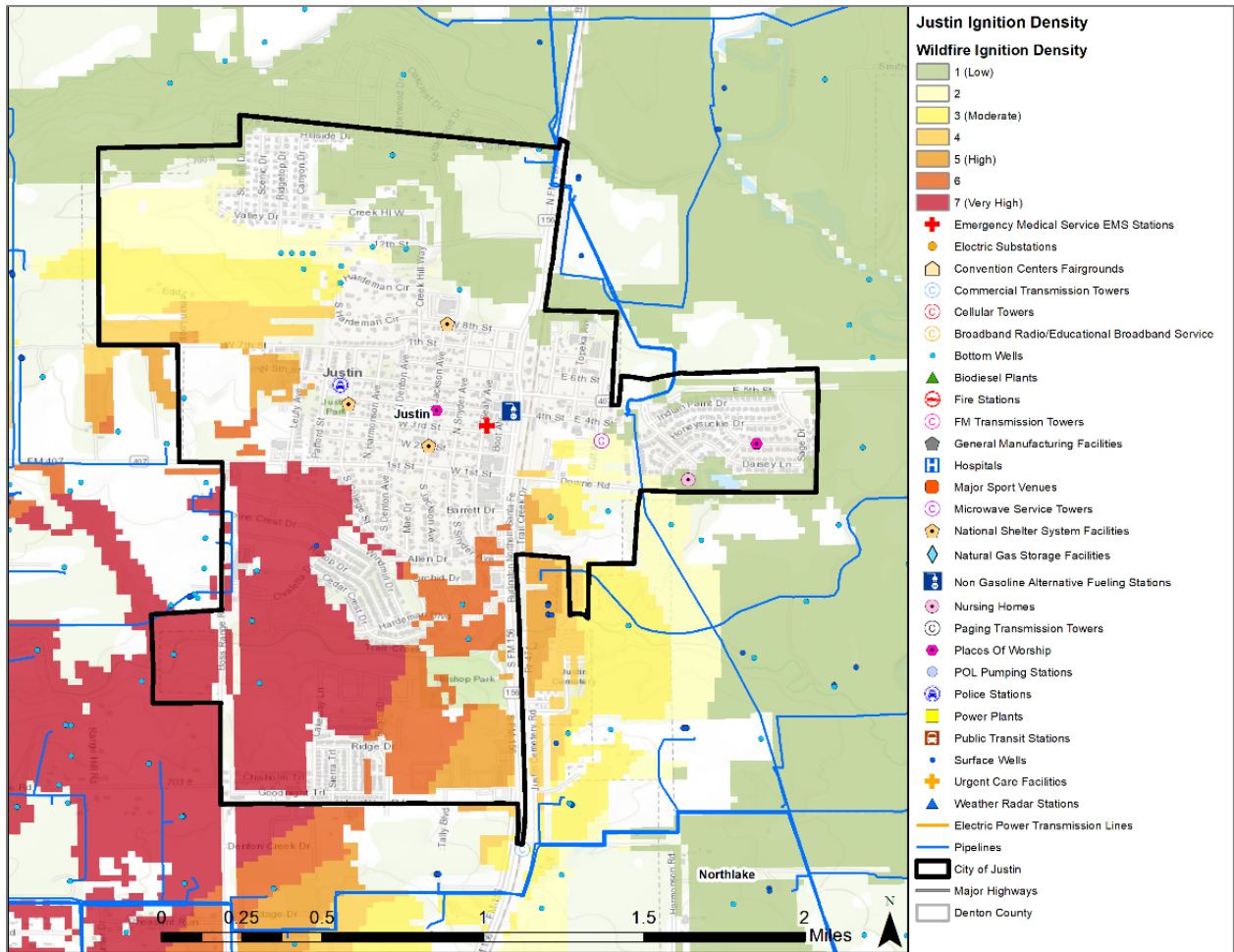


Figure 13-83. Wildfire Ignition Density – City of Krugerville

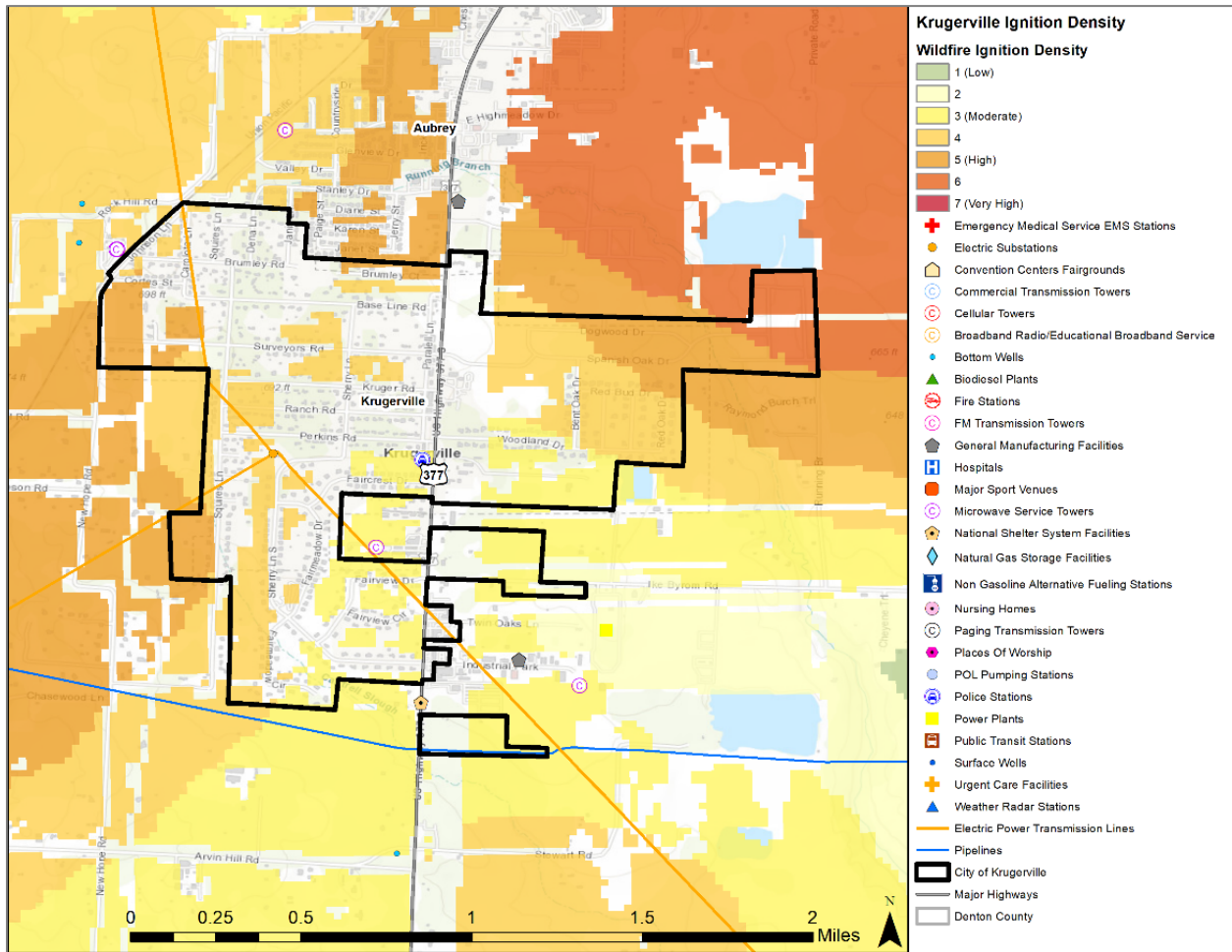


Figure 13-84. Wildfire Ignition Density – City of Krum

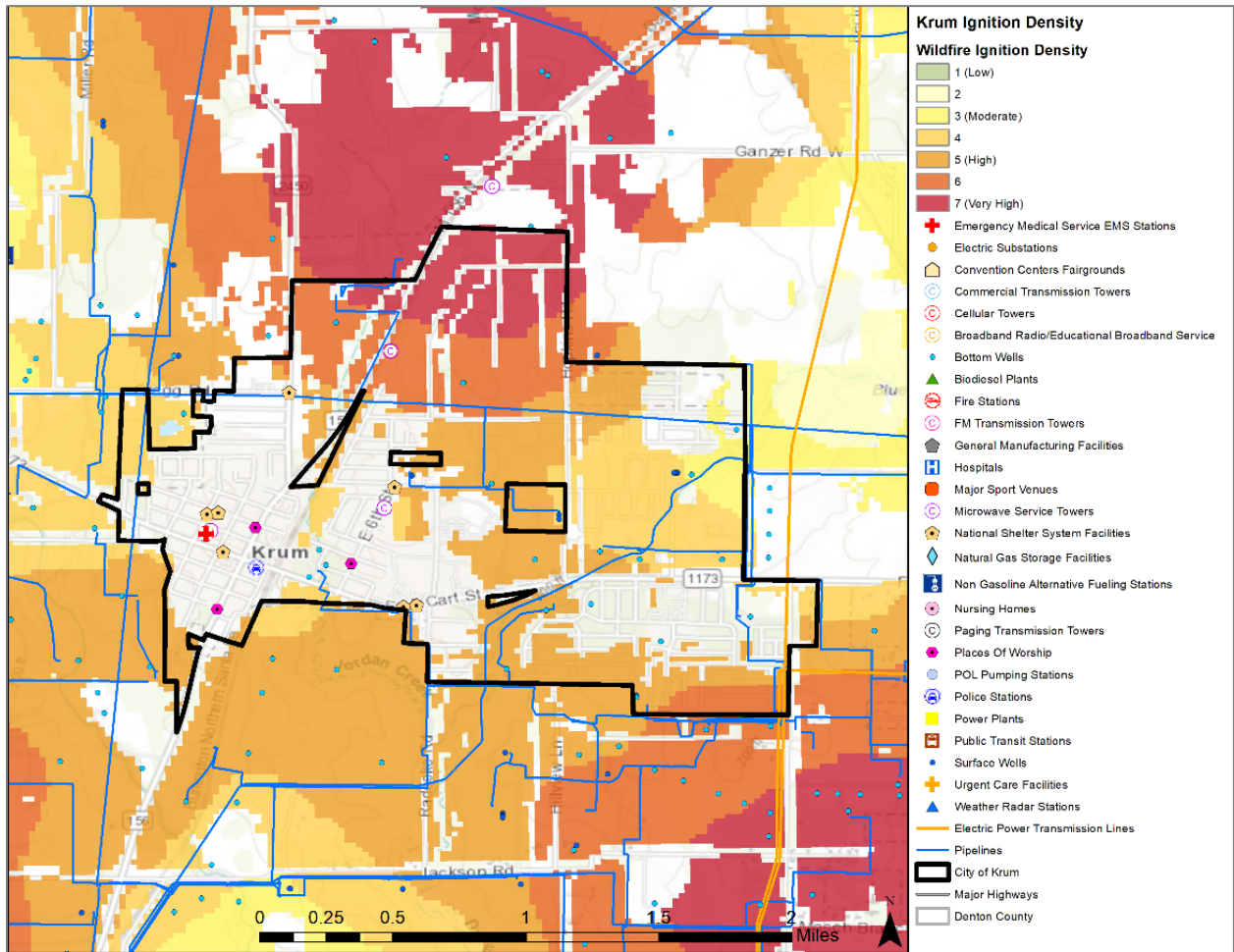


Figure 13-85. Wildfire Ignition Density – City of Lake Dallas

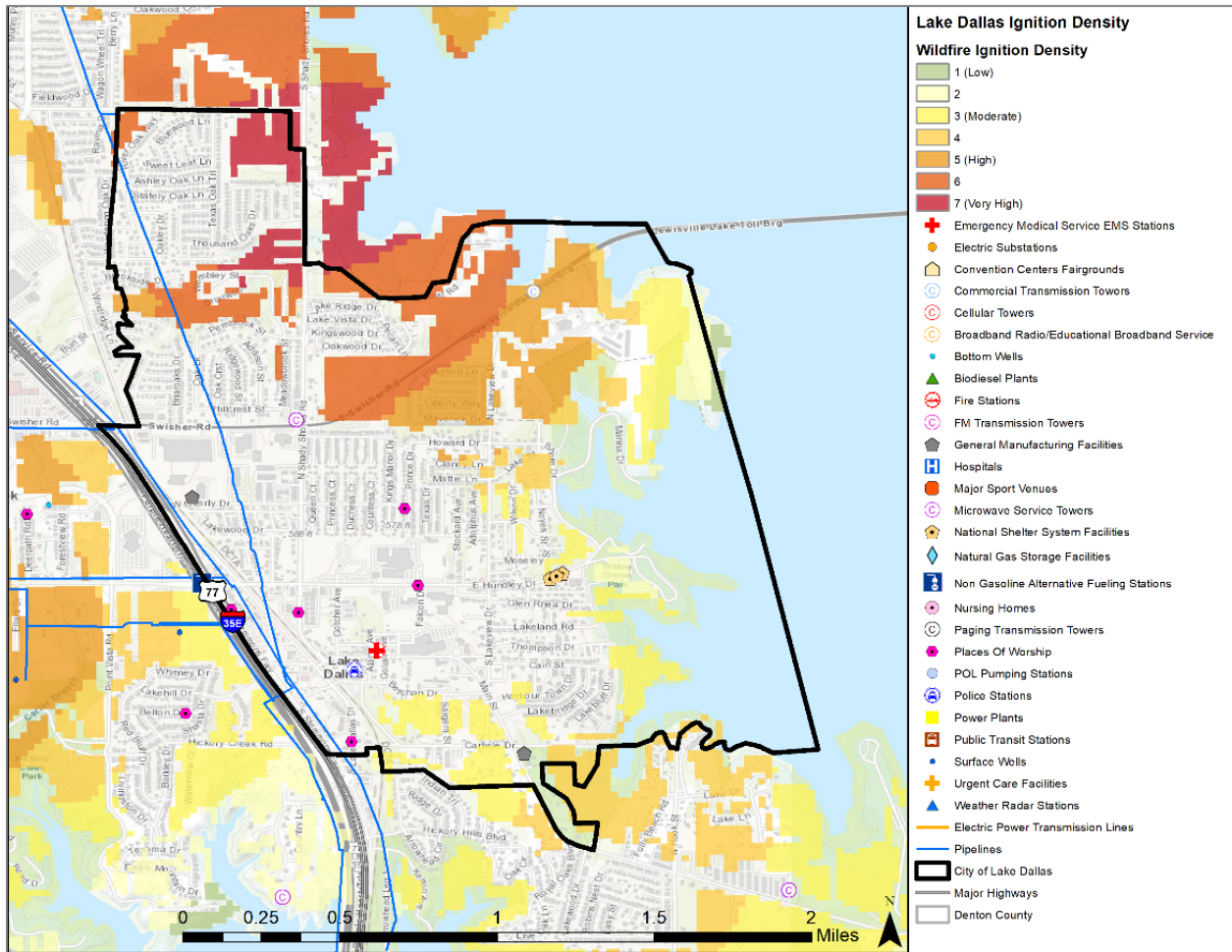


Figure 13-86. Wildfire Ignition Density – Town of Lakewood Village

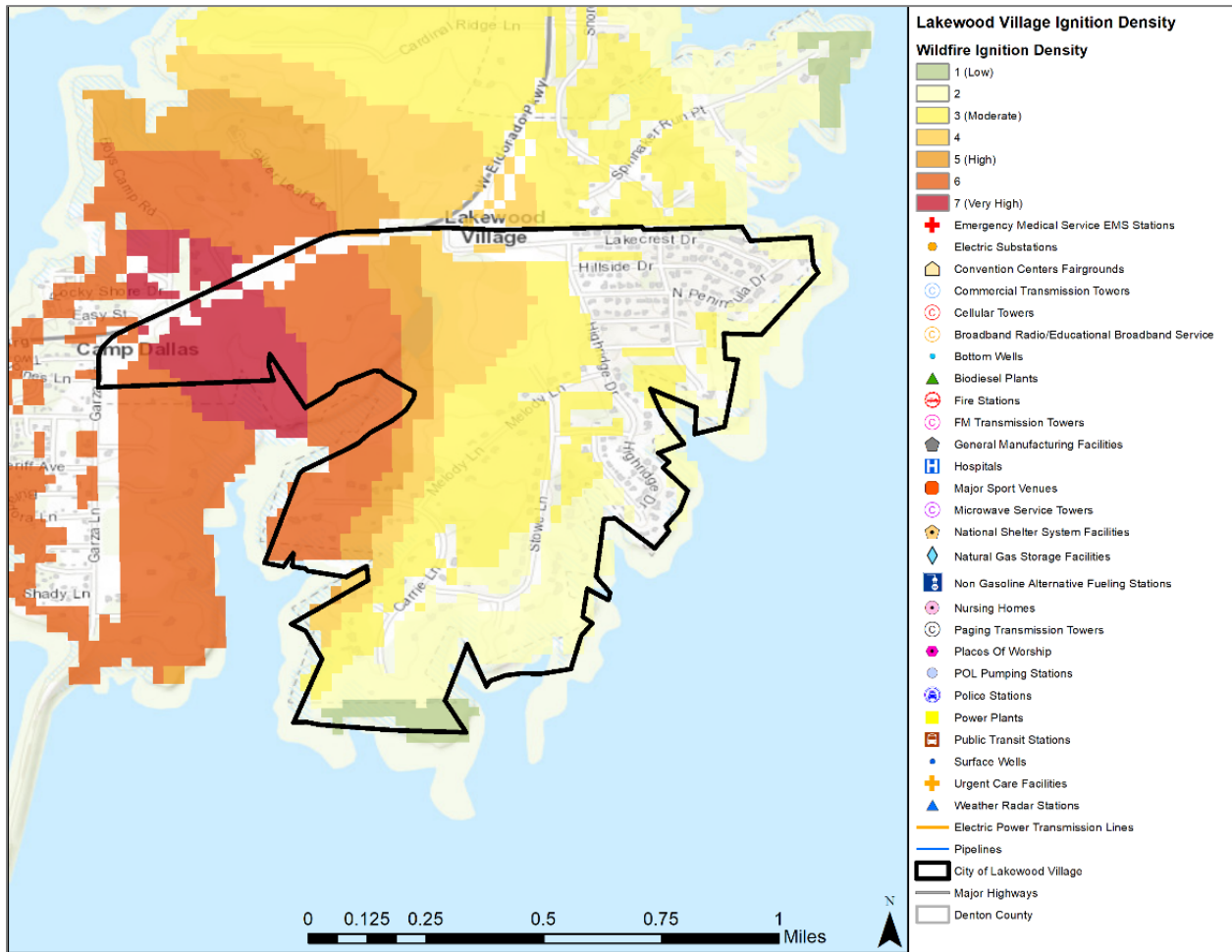


Figure 13-87. Wildfire Ignition Density – City of Lewisville

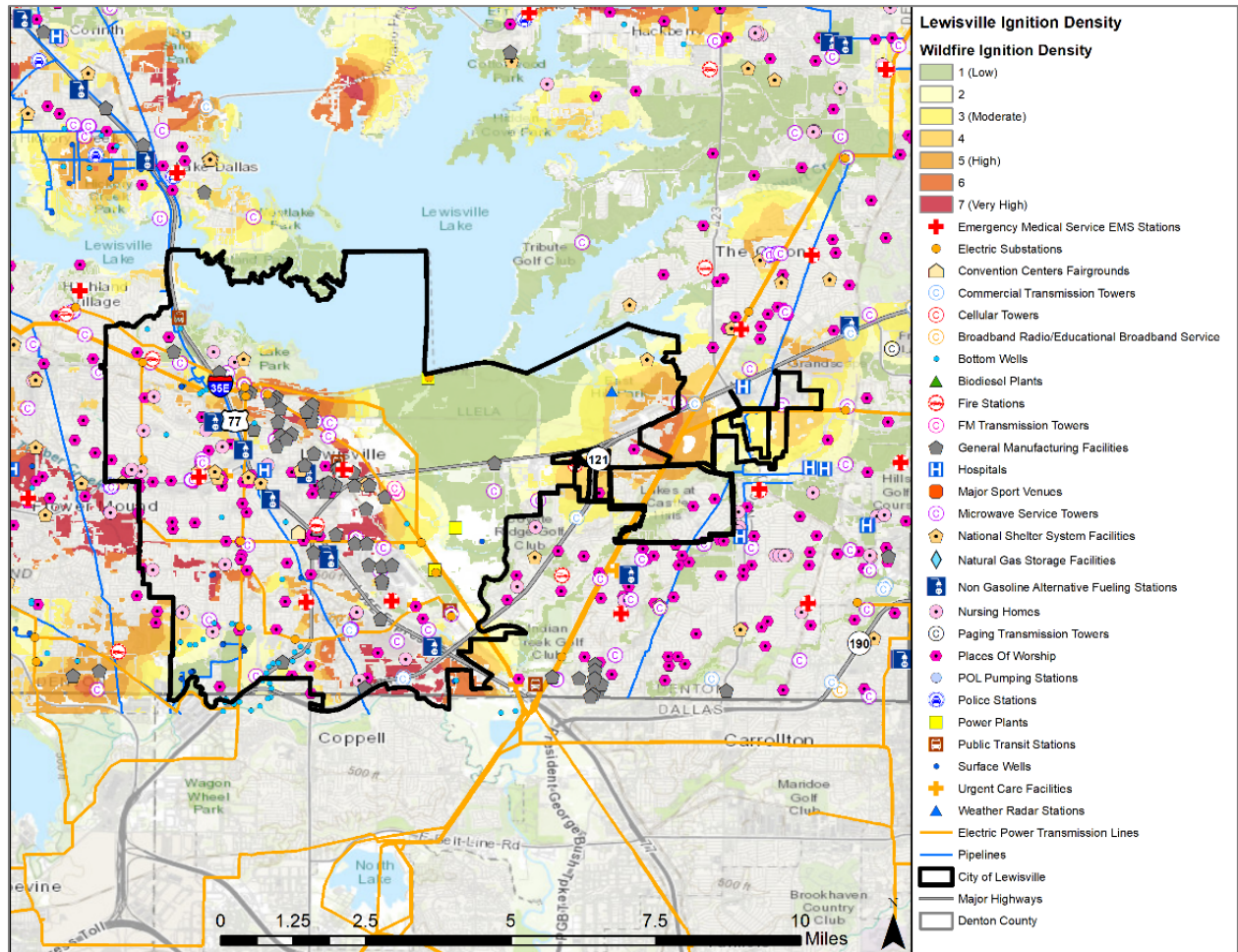


Figure 13-88. Wildfire Ignition Density – Town of Little Elm

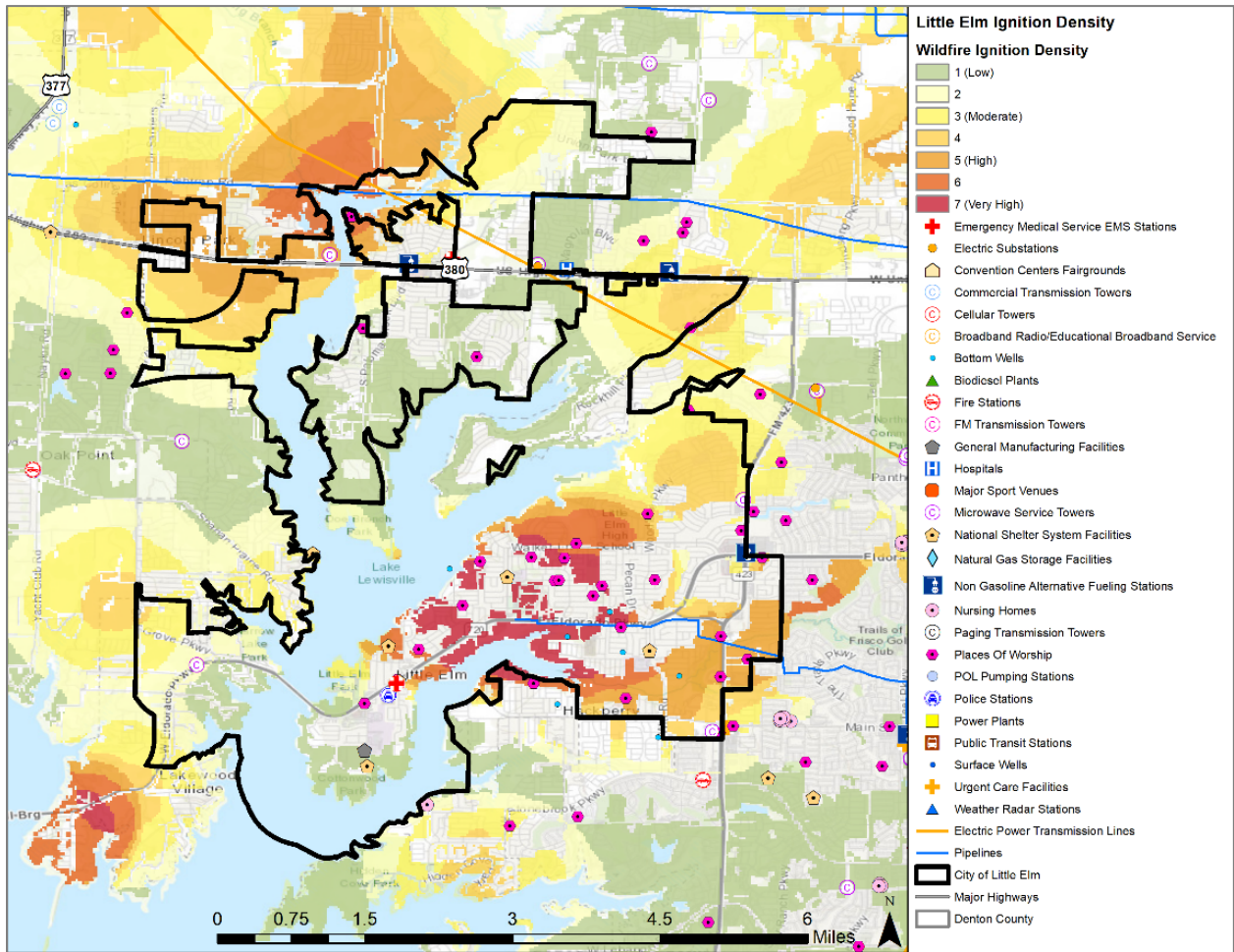


Figure 13-89. Wildfire Ignition Density – Town of Northlake

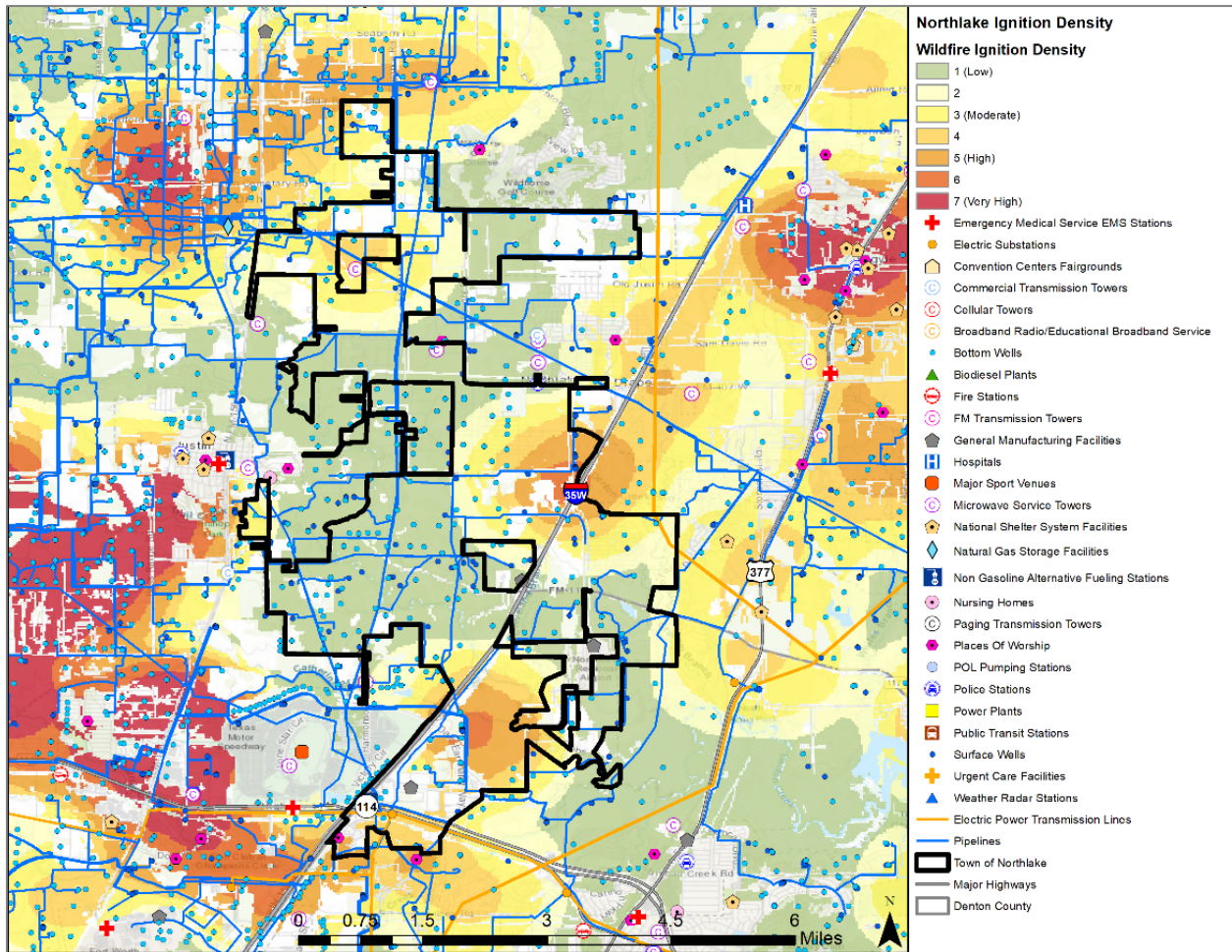


Figure 13-90. Wildfire Ignition Density – City of Oak Point

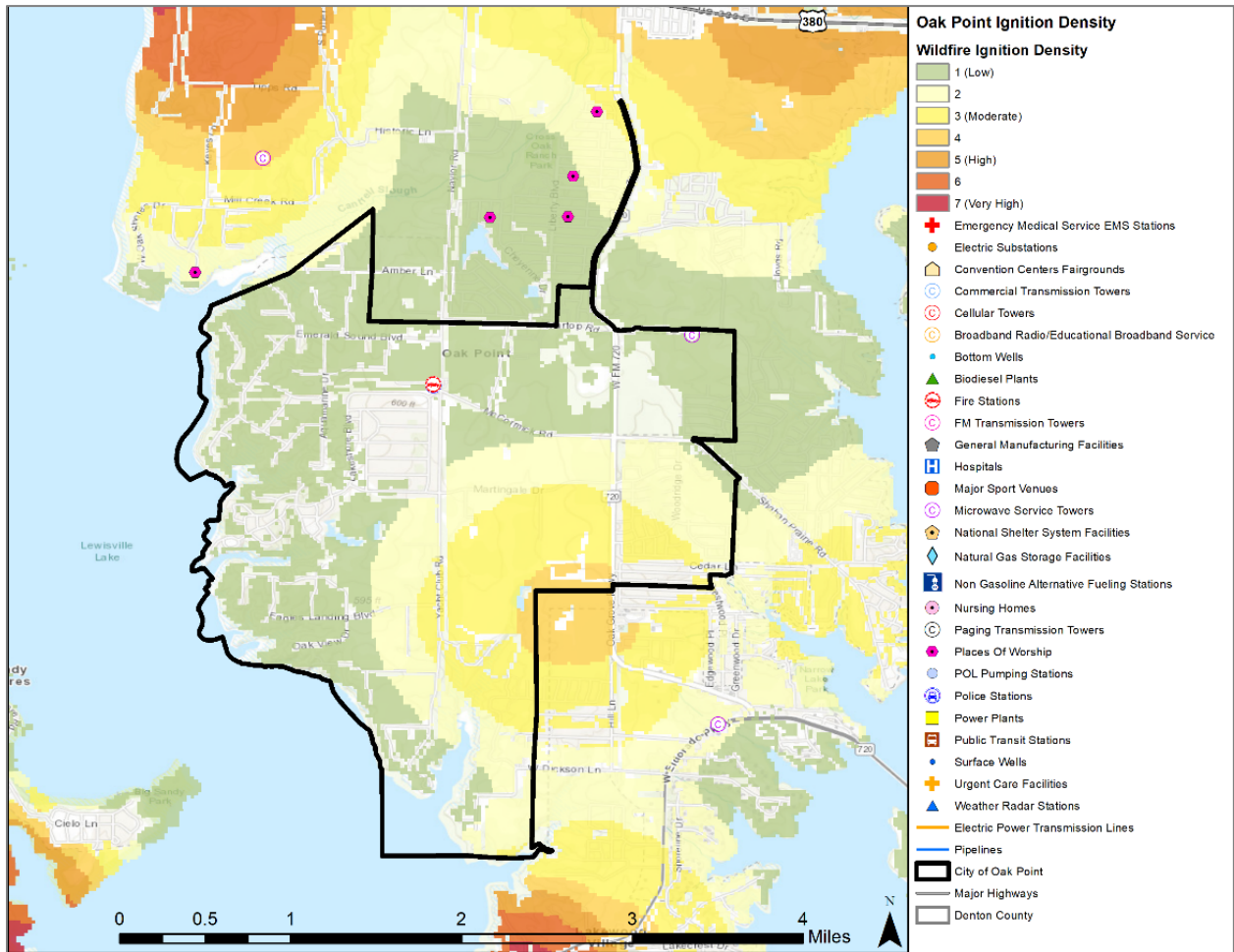


Figure 13-91. Wildfire Ignition Density – City of Pilot Point

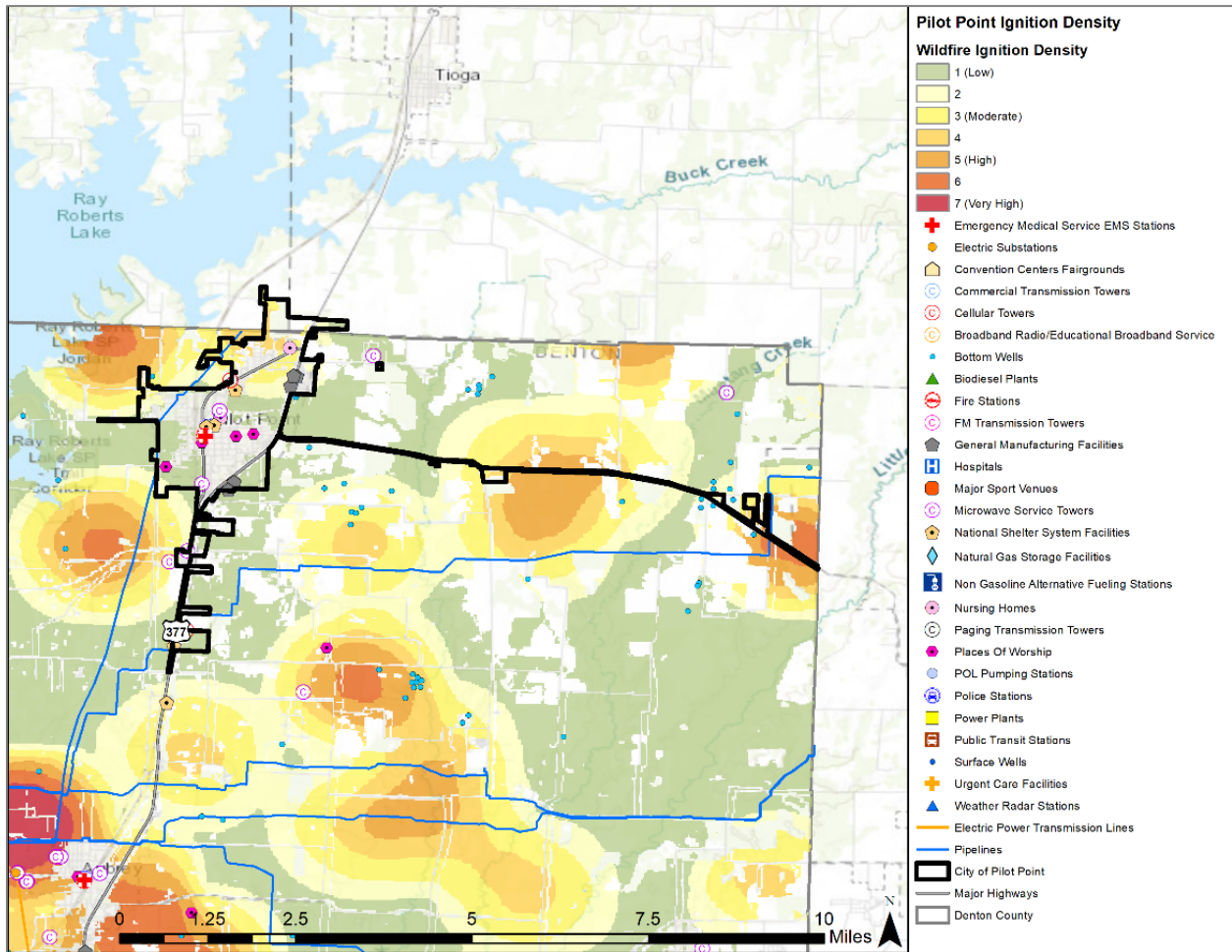


Figure 13-92. Wildfire Ignition Density – Town of Ponder

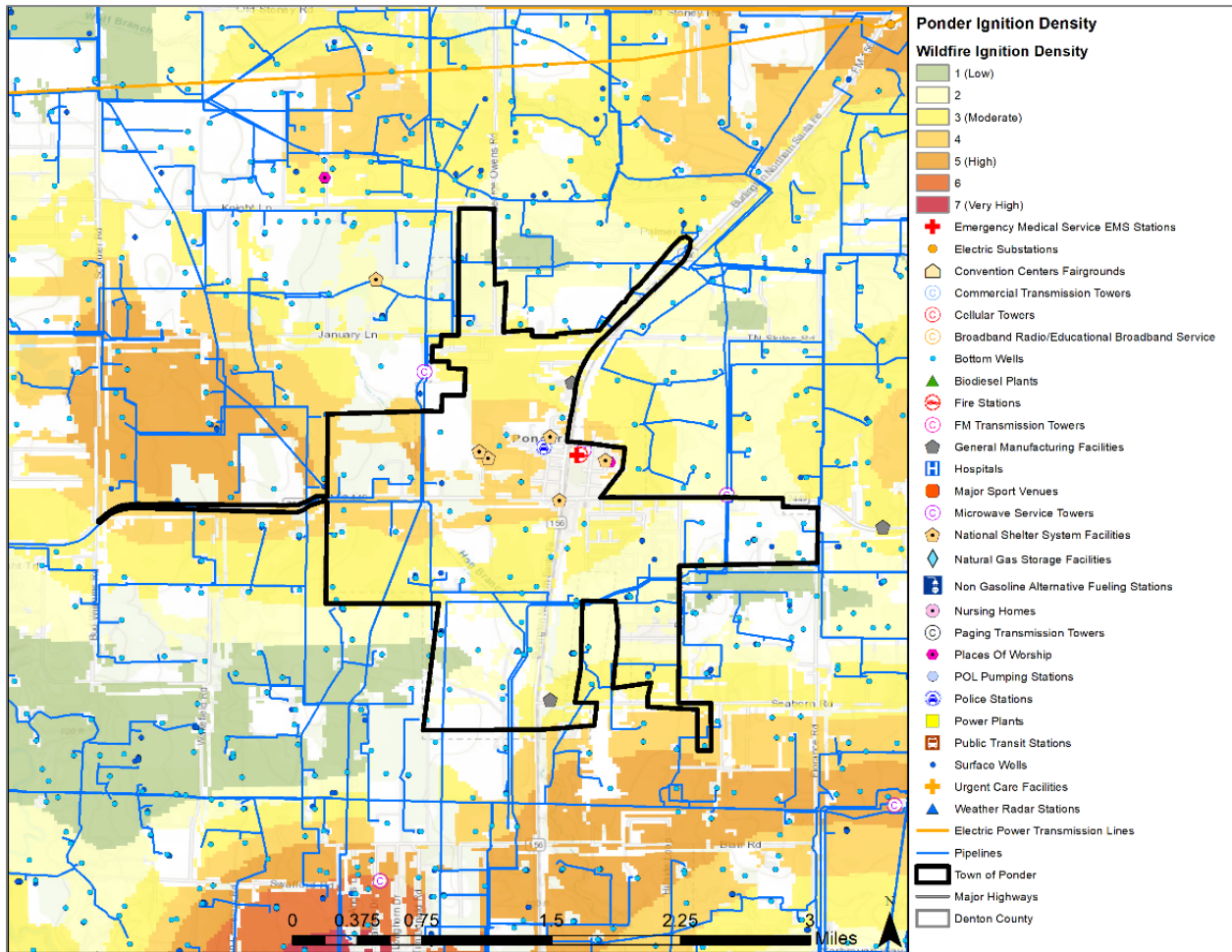


Figure 13-93. Wildfire Ignition Density – Town of Providence Village

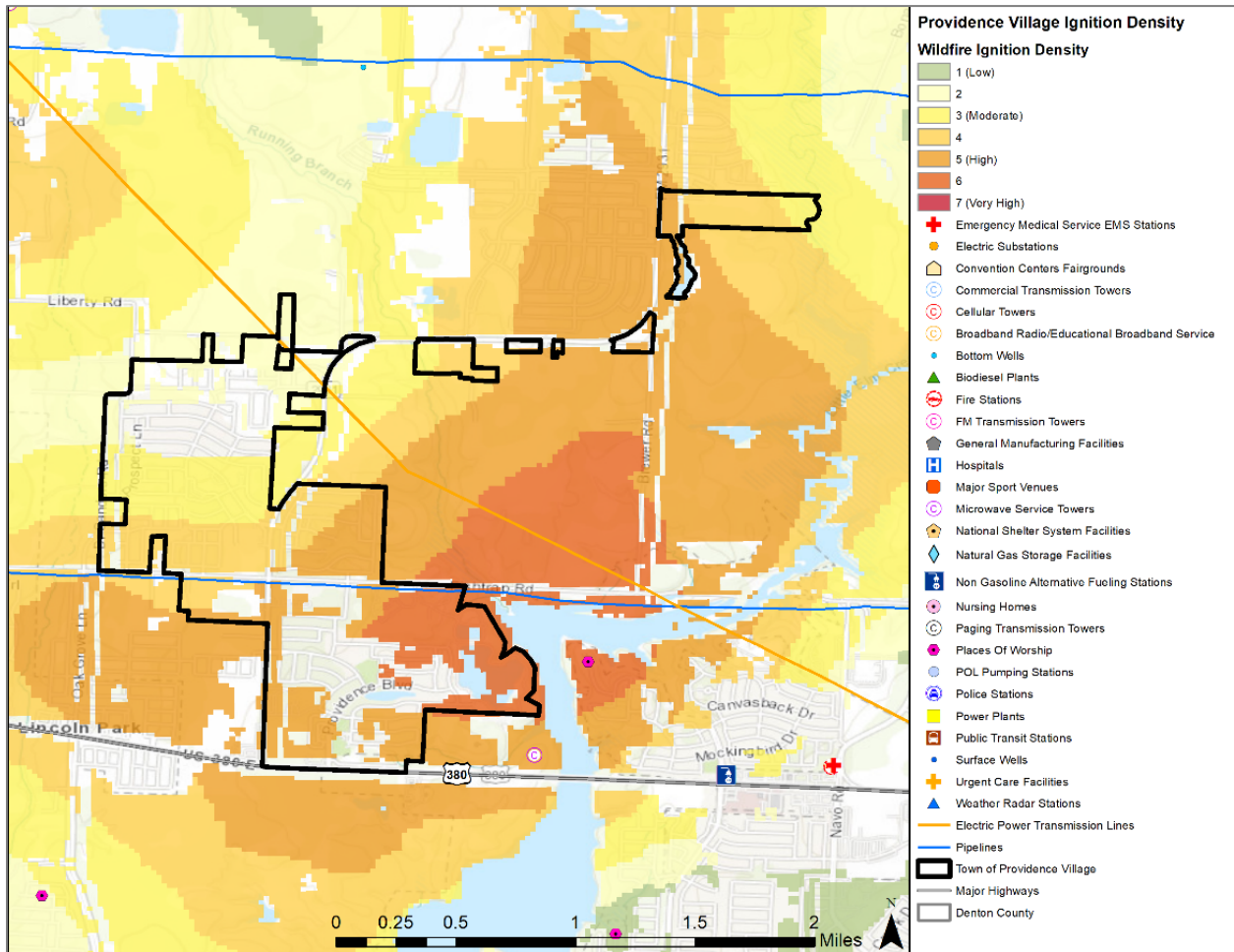


Figure 13-94. Wildfire Ignition Density – City of Roanoke

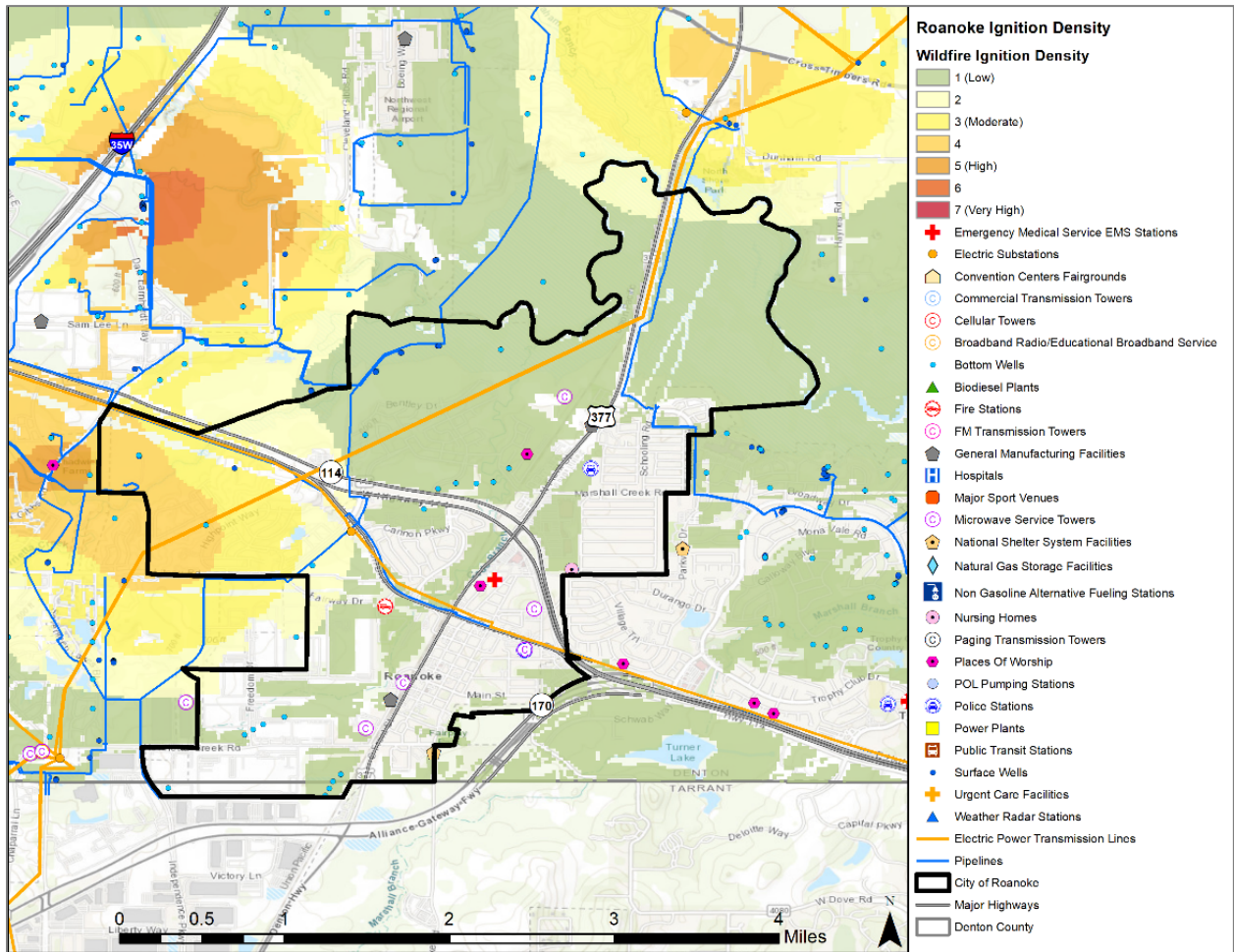


Figure 13-95. Wildfire Ignition Density – City of Sanger

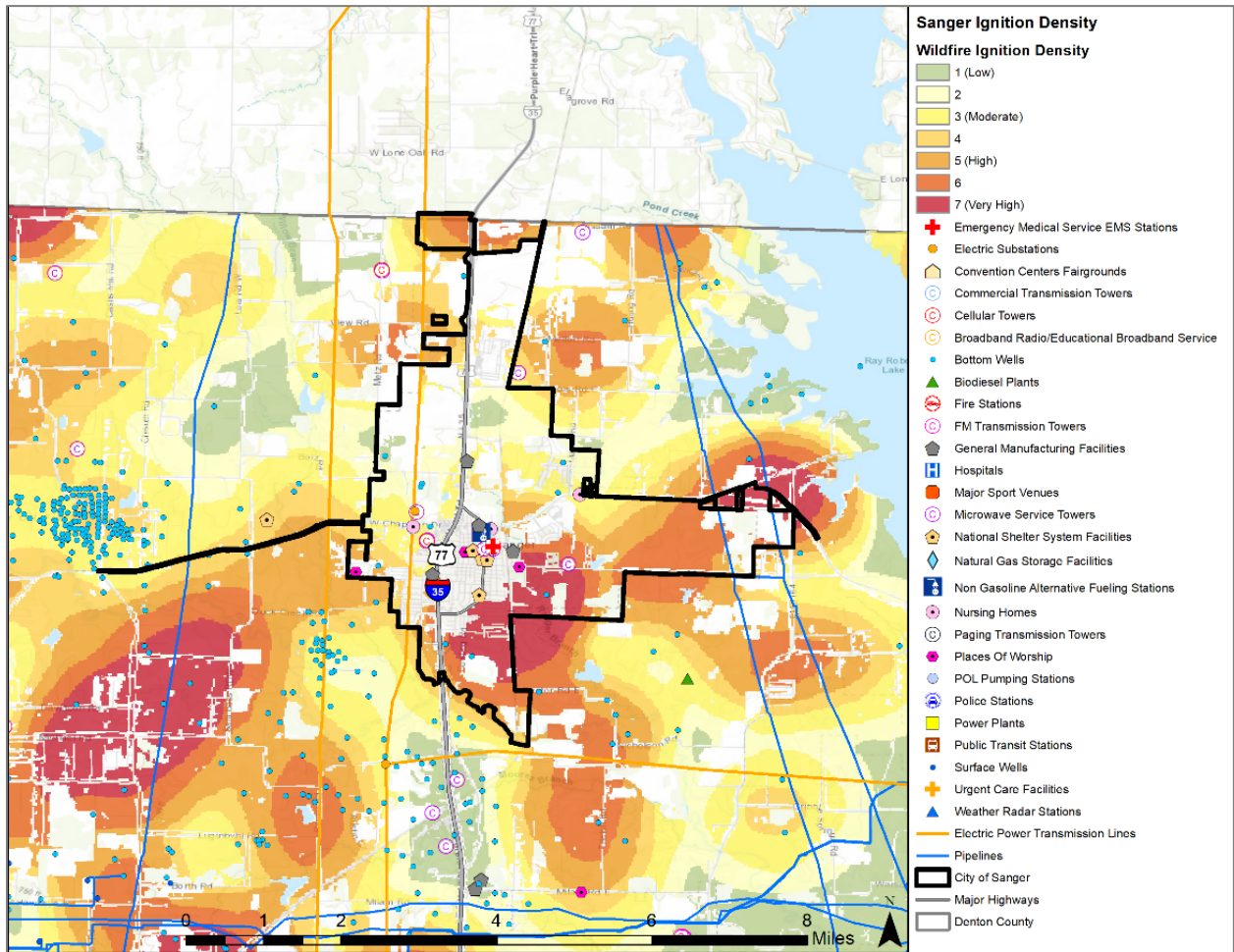


Figure 13-96. Wildfire Ignition Density – Town of Shady Shores

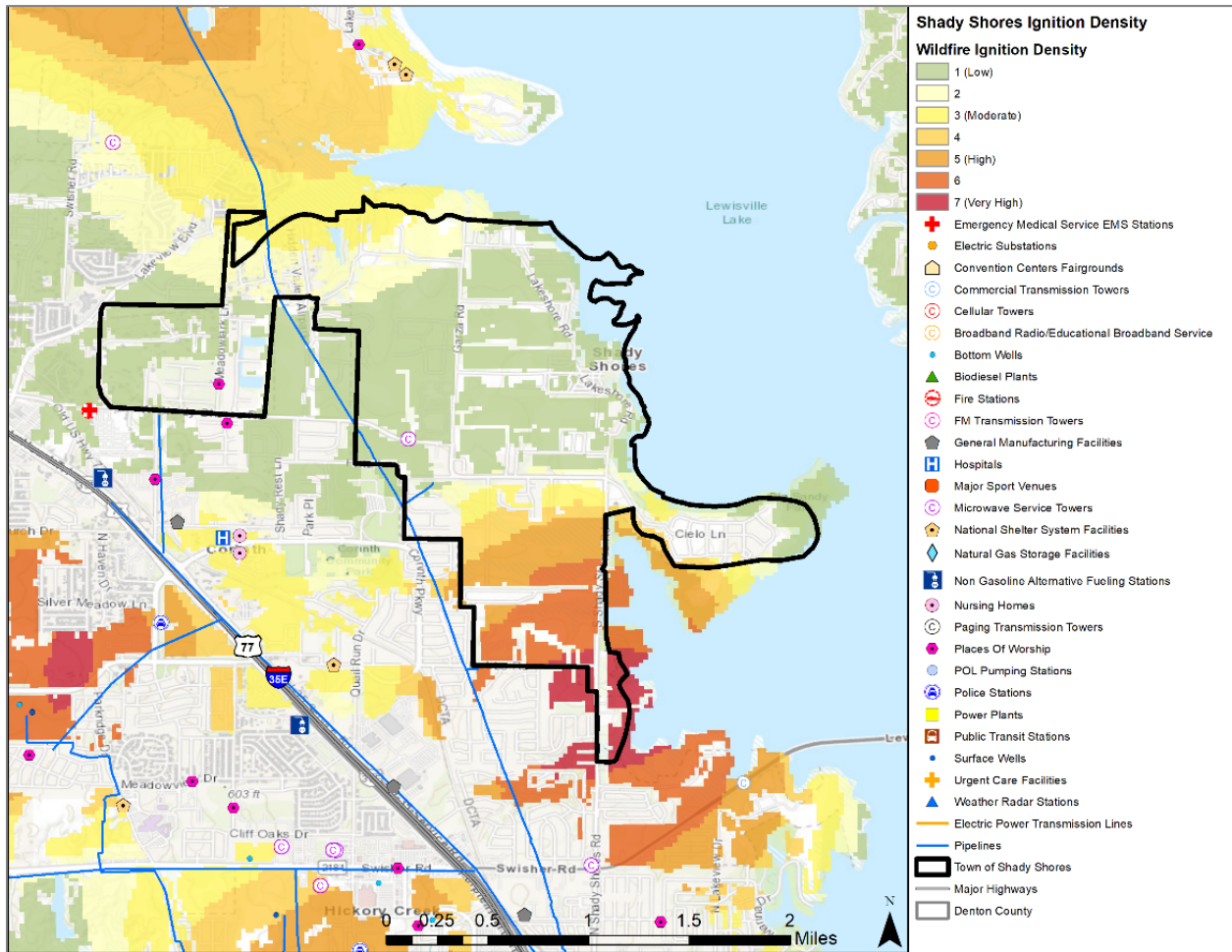


Figure 13-97. Wildfire Ignition Density – City of The Colony

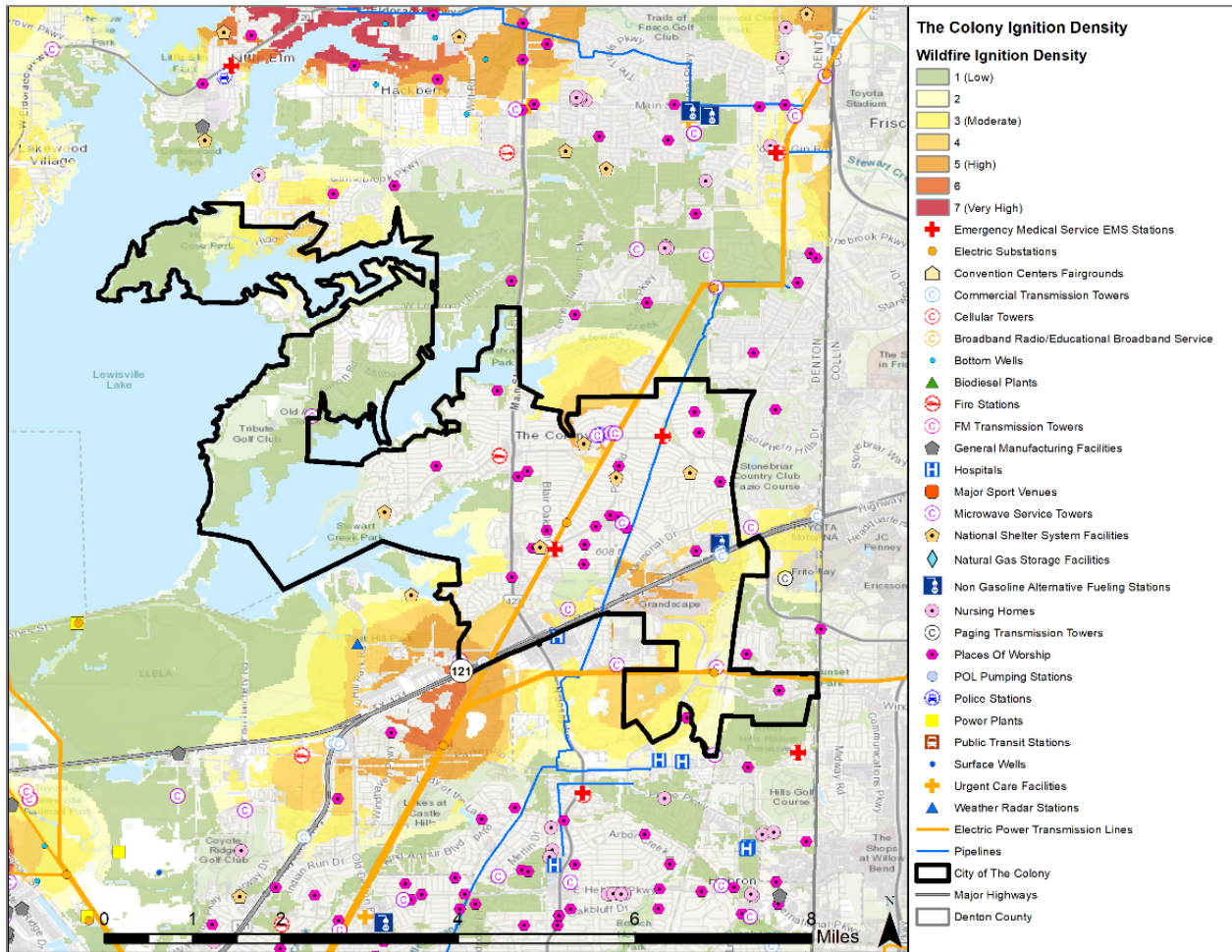
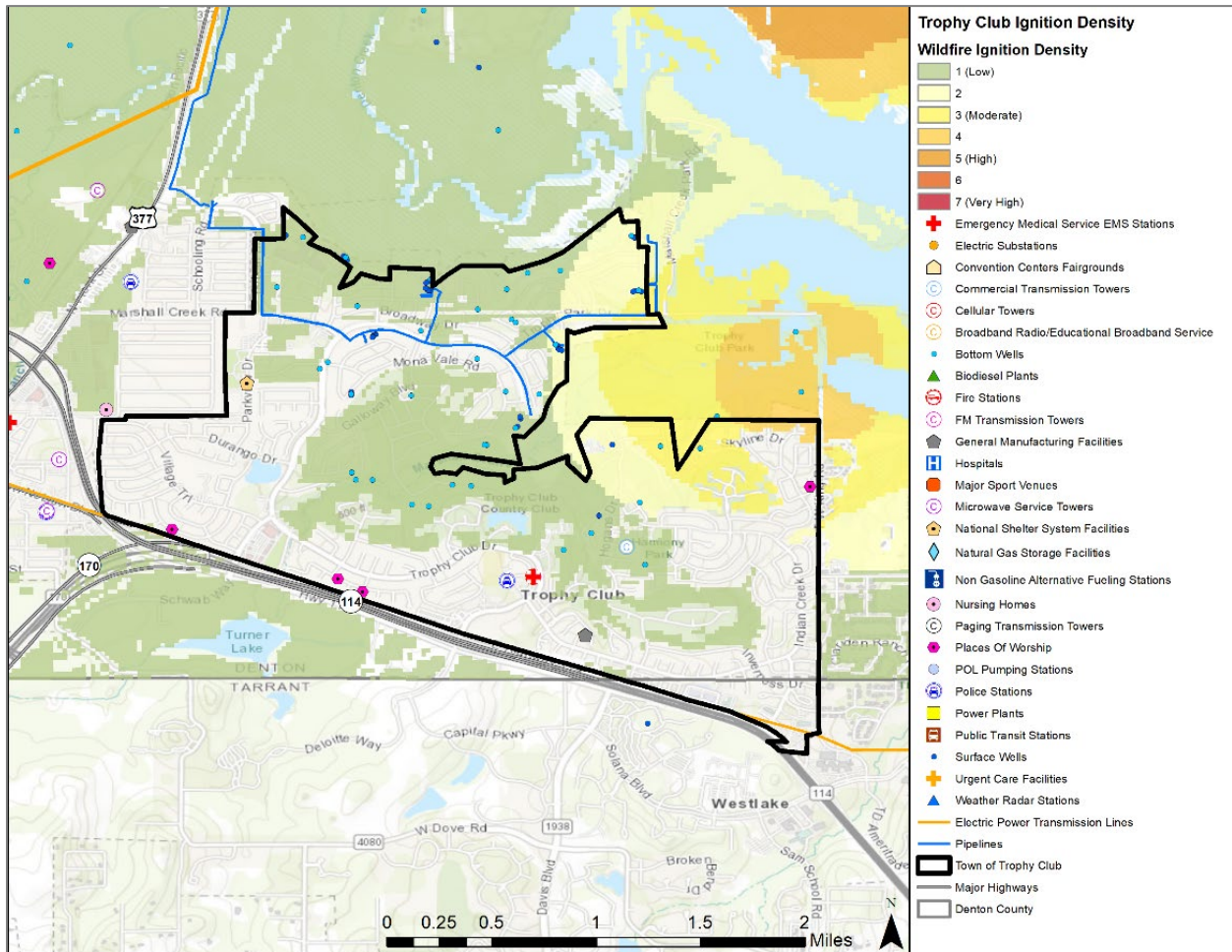


Figure 13-98. Wildfire Ignition Density – Town of Trophy Club



Diminished air quality is an environmental impact that can result from a wildfire event and pose a potential health risk. The smoke plumes from wildfires can contain potentially inhalable carcinogenic matter. Fine particles of invisible soot and ash that are too small for the respiratory system to filter can cause immediate and possibly long-term health effects. The elderly or those individuals with compromised respiratory systems may be more vulnerable to the effects of diminished air quality after a wildfire event.

Climatic conditions such as severe freezes and drought can significantly increase the intensity of wildfires since these conditions kill vegetation, creating a prime fuel source for wildfires. The intensity and rate at which wildfires spread are directly related to wind speed, temperature, and relative humidity.

The severity of impact from major wildfire events can be substantial. Such events can cause multiple deaths, shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. Severity of impact is gauged by acreage burned, homes and structures lost, and the number of resulting injuries and fatalities.

For the Denton County planning area, the impact from a wildfire event can be considered "Limited," meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10 percent of property is destroyed or with major

damage. Severity of impact is gauged by acreage burned, homes and structures lost, injuries and fatalities. Based on this, impact for each participating jurisdiction is listed below in Table 13-5.

Table 13-5. Impact by Jurisdiction

JURISDICTION	IMPACT	DESCRIPTION
Denton County	Limited	Denton County has an estimated 293,681 ⁴ people or 32.4% of the total population that live within the Wildland Urban Interface (WUI). Denton County, including citizens in unincorporated areas, may suffer minor injuries that can be treated with first aid. Critical facilities could be shut down for 24 hours or less, and less than 10 percent of total property could be damaged.
Town of Argyle	Minor	Argyle has an estimated 2,983 or 98.7% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
City of Aubrey	Minor	Aubrey has an estimated 2,122 or 93.9% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
Town of Bartonville	Minor	Bartonville has an estimated 1,586 or 100% of people that live in the WUI, where average housing density is most commonly 1 house per 2-5 acres. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result

⁴ Population for Denton County was adjusted to reflect the percent of 2020 census total populations due to an error in the TxWRAP database.

JURISDICTION	IMPACT	DESCRIPTION
		in permanent disability, and more than 10 percent of total property damaged or destroyed.
Town of Copper Canyon	Minor	Copper Canyon has an estimated 1,673 or 99.1% of people that live in the WUI, where average housing density is most commonly 1 house per 2.5 acres. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
City of Corinth	Limited	Corinth has an estimated 9,237 or 55.5% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
Town of Cross Roads	Minor	Cross Roads has an estimated 909 or 100% of people that live in the WUI, where average housing density is most commonly 1 house per 2.5 acres. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
City of Denton	Limited	Denton has an estimated 51,396 or 37.8% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.

JURISDICTION	IMPACT	DESCRIPTION
Town of DISH	Minor	DISH has an estimated 79 or 100% of people that live in the WUI, where average housing density is most commonly 1 house per 5-10 acres. The town has a moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
Town of Double Oak	Limited	Double Oak has an estimated 2,295 or 74.9% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
Town of Flower Mound	Limited	Flower Mound has an estimated 38,998 or 57.1% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
City of Hackberry	Minor	Hackberry has an estimated 794 or 98.5% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed. more than 10 percent of total property could be damaged.

JURISDICTION	IMPACT	DESCRIPTION
Town of Hebron	Limited	Hebron has an estimated 61 or 59.2% of people that live in the WUI, where average housing density is most commonly 1 house per 10 acres. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
Town of Hickory Creek	Minor	Hickory Creek has an estimated 2,928 or 95.9% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed. more than 10 percent of total property could be damaged.
City of Highland Village	Limited	Highland Village has an estimated 3,327 or 21.9% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
City of Justin	Minor	Justin has an estimated 2,016 or 79.2% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed. more than 10 percent of total property could be damaged.

JURISDICTION	IMPACT	DESCRIPTION
City of Krugerville	Minor	Krugerville has an estimated 1,021 or 84% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed. more than 10 percent of total property could be damaged.
City of Krum	Minor	Krum has an estimated 2,732 or 98.9% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed. more than 10 percent of total property could be damaged.
City of Lake Dallas	Limited	Lake Dallas has an estimated 2,860 or 36.4% of people that live in the WUI, where average housing density is most commonly 3 houses per 1 acre. The city has a low wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
Town of Lakewood Village	Minor	Lakewood Village has an estimated 430 or 99.3% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.

JURISDICTION	IMPACT	DESCRIPTION
City of Lewisville	Limited	Lewisville has an estimated 29,174 or 25.8% of people that live in the WUI, where average housing density is most commonly 3 houses per 1 acre. The city has a low wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
Town of Little Elm	Minor	Little Elm has an estimated 10,055 or 81.9% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
Town of Northlake	Minor	Northlake has an estimated 859 or 88% of people that live in the WUI, where average housing density is most commonly 1house per 2-5 acres. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
City of Oak Point	Minor	Oak Point has an estimated 2,157 or 95.8% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.

JURISDICTION	IMPACT	DESCRIPTION
City of Pilot Point	Minor	Pilot Point has an estimated 4,518 or 77.6% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
Town of Ponder	Minor	Ponder has an estimated 878 or 100% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
Town of Providence Village	Minor	Providence Village has an estimated 176 or 88.4% of people that live in the WUI, where average housing density is most commonly 1 house per 5-10 acres. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
City of Roanoke	Limited	Roanoke has an estimated 2,918 or 58.2% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.

JURISDICTION	IMPACT	DESCRIPTION
City of Sanger	Limited	Sanger has an estimated 4,105 or 57.5% of people that live in the WUI, where average housing density is most commonly 3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
Town of Shady Shores	Minor	Shady Shores has an estimated 2,366 or 97.6% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The city has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.
City of The Colony	Limited	The Colony has an estimated 14,778 or 41.5% of people that live in the WUI, where average housing density is most commonly 3 houses per 1 acre. The city has a low wildfire threat. The impact of wildfire to the community is considered “Limited”, with critical facilities shut down for 24-hours or less, less than 10 percent of total property damaged or destroyed and injuries treatable with first aid.
Town of Trophy Club	Minor	Trophy Club has an estimated 6,978 or 81.1% of people that live in the WUI, where average housing density is most commonly 1-3 houses per 1 acre. The town has a low to moderate wildfire threat. The impact of wildfire to the community is considered “Minor”, with critical facilities shut down for one week or more, injuries that do not result in permanent disability, and more than 10 percent of total property damaged or destroyed.

ASSESSMENT OF IMPACTS

A Wildfire event poses a potentially significant risk to public health and safety, particularly if the wildfire is initially unnoticed and spreads quickly. The impacts associated with a wildfire are not limited to the direct damages. The impact of climate change could produce larger, more wide-spread wildfire events, exacerbating the current wildfire impacts. More extreme wildfire conditions can be frequently associated with a variety of impacts, including:

- Persons in the area at the time of the fire are at risk for injury or death from burns and/or smoke inhalation.
- First responders are at greater risk of physical injury when in close proximity to the hazard while extinguishing flames, protecting property, or evacuating residents in the area.
- First responders can experience heart disease, respiratory problems, and other long-term related illnesses from prolonged exposure to smoke, chemicals, and heat.
- Emergency services may be disrupted during a wildfire if facilities are impacted, roadways are inaccessible, or personnel are unable to report for duty.
- Critical city and/or county departments may not be able to function and provide necessary services depending on the location of the fire and the structures or personnel impacted.
- Non-critical businesses may be directly damaged, suffer loss of utility services, or be otherwise inaccessible, delaying normal operations and slowing the recovery process.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Roadways in or near the WUI could be damaged or closed due to smoke and limited visibility.
- Older homes are generally exempt from modern building code requirements, which may require fire suppression equipment in the structure.
- Some high-density neighborhoods feature small lots with structures close together, increasing the potential for fire to spread rapidly.
- Air pollution from smoke may exacerbate respiratory problems of vulnerable residents.
- Charred ground after a wildfire cannot easily absorb rainwater, increasing the risk of flooding and potential mudflows.
- Wildlife may be displaced or destroyed.
- Historical or cultural resources may be damaged or destroyed.
- Tourism can be significantly disrupted, further delaying economic recovery for the area.
- Vegetated dunes can be stripped, significantly damaging the function of the dunes to protect inland areas from the destructive forces of wind and waves.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Fire suppression costs can be substantial, exhausting the financial resources of the community.
- Residential structures lost in a wildfire may not be rebuilt for years, reducing the tax base for the community.
- At places like Lake Ray Roberts and Lake Lewisville, recreation and tourism can be unappealing for years following a large wildfire, devastating directly related businesses.
- Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground delivery lines, and soil erosion or debris deposits into waterways after the fire.

The economic and financial impacts of a wildfire event on local government will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by government, businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a wildfire event.

SECTION 14: DAM AND LEVEE FAILURE

Portions of the Denton County Hazard Mitigation Plan are considered confidential and not for release to the public. The information in this section is covered under Privacy Act of 1974 (5 U.S.C. Section 552a).

SECTION 15: EARTHQUAKE

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

HAZARD DESCRIPTION

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

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

According to the U.S. Geological Society (USGS) Earthquake Hazards Program, an earthquake hazard is anything associated with an earthquake that may influence an individual’s normal activities. Table 15-1 describes definition of examples.

Table 15-1. Definitions of Earthquake Hazards¹

HAZARD	DESCRIPTION
Surface Faulting	Displacement that reaches the earth's surface during slip along a fault. Commonly occurs with shallow earthquakes, those with an epicenter less than 20 kilometers.
Ground Motion (shaking)	The movement of the earth's surface from earthquakes or explosions. Ground motion or shaking is produced by waves that are generated by sudden slip on a fault or sudden pressure at the explosive source and travel through the earth and along its surface.
Landslide	A movement of surface material down a slope.

¹ Source: USGS, 2012

HAZARD	DESCRIPTION
Liquefaction	A process by which water-saturated sediment temporarily loses strength and acts as a fluid, like when you wiggle your toes in the wet sand near the water at the beach. This effect can be caused by earthquake shaking.
Tectonic Deformation	A change in the original shape of a material due to stress and strain.
Tsunami	A sea wave of local or distant origin that results from large-scale seafloor displacements associated with large earthquakes, major submarine slides, or exploding volcanic islands.
Seiche	The sloshing of a closed body of water from earthquake shaking

LOCATION

Earthquake hazard areas are mapped by the US Geological Survey from lowest hazard to highest hazard areas. Figure 15-1 shows major earthquake hazard areas. An Earthquake Hazard Map, also known as a Percent Peak Ground Accelerations (%PGA) Map. The map shows the %PGA values with an 8% chance of being exceeded over 50 years. %PGA is an earthquake measurement that displays three things: the geographic area affected (all colored areas on the map), the probability of an earthquake of each given level of severity (2% chance in 50 years), and the strength of ground movement (severity) shown as percent of the acceleration force of gravity (%g) (the PGA is indicated by color). The Denton County planning area including all participating jurisdictions, as identified in Figure 15-1, is located in a low hazard area of 4-8%g peak ground acceleration.

Figure 15-1. U.S. Map of Peak Ground Acceleration

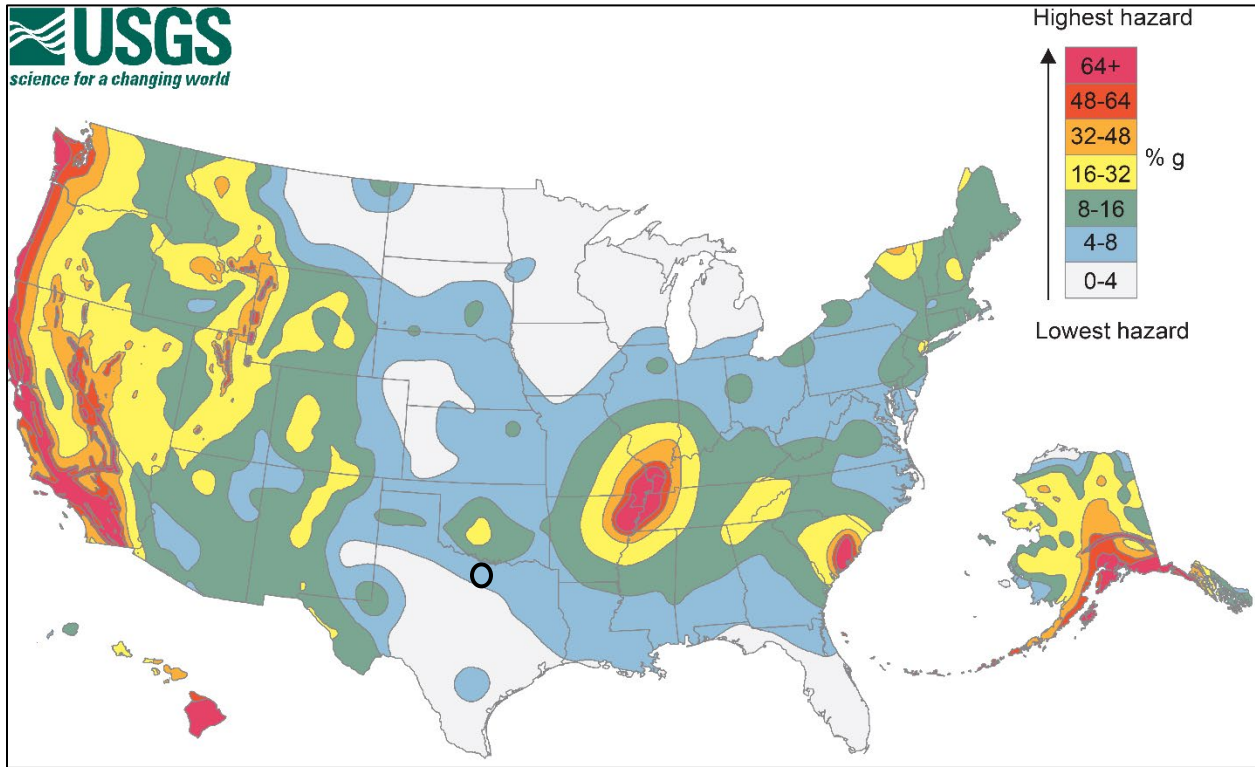
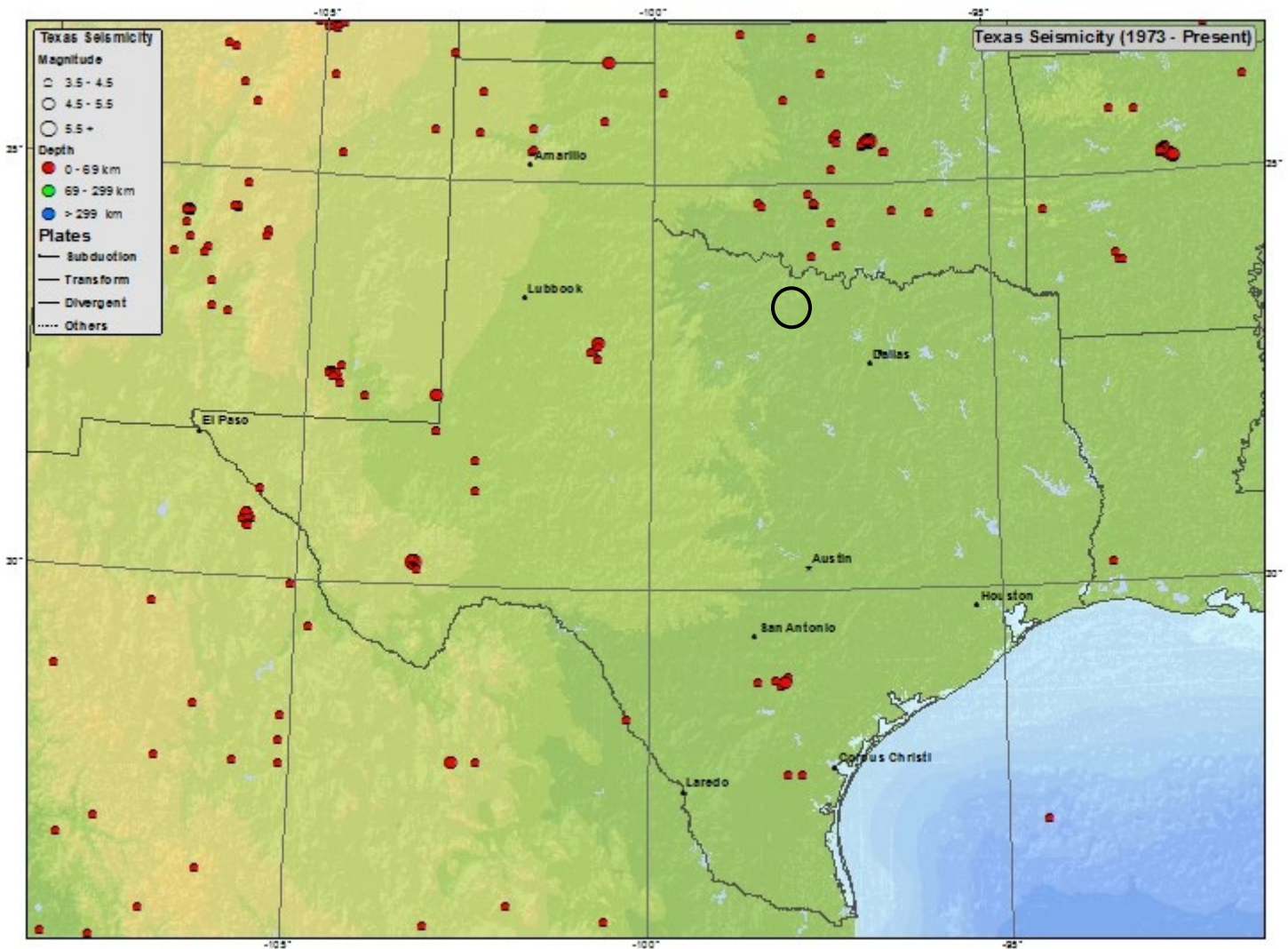


Figure 15-2 maps historic earthquake epicenters across Texas between 1973 and 2012.

Figure 15-2. Historic Earthquake Epicenters in Texas, 1973-2012



EXTENT

The magnitude, or intensity of an earthquake, is a recorded value of the amplitude of seismic waves. The Richter scale is the most commonly used scale that measures the magnitude of earthquakes. It has no upper limit and is not used to describe damage (Table 15-2).

Table 15-2. Richter Scale

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
2.5 or LESS	Usually not felt, but can be recorded by seismograph
2.5-5.4	Often felt, but only causes minor damage
5.5-6.0	Slight damage to buildings and other structures
6.1 TO 6.9	May cause a lot of damage in very populated areas

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
7.0 TO 7.9	Major earthquake; serious damage
8 OR GREATER	Great earthquake; can totally destroy communities near the epicenter

The intensity of an earthquake is expressed by the Modified Mercalli Scale, based on the effects of ground shaking on people, buildings, and natural features, and is location dependent. The Modified Mercalli Scale gives the intensity of the earthquake in values ranging from I to XII. Table 15-3 summarizes earthquake intensity as described by the Modified Mercalli Scale and provides a comparison between the Richter and Modified Mercalli Intensity Scales.

Table 15-3. Modified Mercalli Intensity (MMI) Scale

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER MAGNITUDE
I	INSTRUMENTAL	Not Felt except by a very few under especially favorable conditions	
II	FEEBLE	Felt only by a few persons at rest, especially on upper floors of buildings	< 4.2
III	SLIGHT	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	MODERATE	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	SLIGHTLY STRONG	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.	< 4.8
VI	STRONG	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.	< 5.4

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER MAGNITUDE
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	< 6.1
VIII	DESTRUCTIVE	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	RUINOUS	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.	< 6.9
X	DISASTROUS	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.	< 7.3
XI	VERY DISASTROUS	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.	< 8.1
XII	CATASTROPHIC	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.	> 8.1

Table 15-4 lists the Modified Mercalli Intensity (MMI) with the corresponding Acceleration (%g) (PGA), as well as the perceived shaking and potential damage expected.

Table 15-4. Modified Mercalli Intensity (MMI) and PGA Equivalents

MMI	ACCELERATION (%g) (PGA)	PERCEIVED SHAKING	POTENTIAL DAMAGE
I	<.17	Not Felt	None
II	.17-1.4	Weak	None
III	.17-1.4	Weak	None

MMI	ACCELERATION (%g) (PGA)	PERCEIVED SHAKING	POTENTIAL DAMAGE
IV	1.4-3.9	Light	None
V	3.9-9.2	Moderate	Very Light
VI	9.2-18	Strong	Light
VII	18-34	Very Strong	Moderate

Taking into consideration the possible extent of an earthquake for the area, by reviewing Tables 15-2 through 15-4 in conjunction with previous occurrences as depicted in Figure 15-2, Denton County planning area, including all participating jurisdictions, experience on average less than 4.2 Richter Scale or Level IV on the Modified Mercalli intensity scale. This is the greatest extent the entire planning area can anticipate in the future.

HISTORICAL OCCURRENCES

According to USGS, and the National Geophysical Data Center (NGDC), there are no “significant” earthquakes on record for the state of Texas and the entire Denton County planning area from 2150 B.C. to present. A significant earthquake, as defined by NGDC, is one that has caused at least moderate damage (approximately \$1 million or more), has resulted in 10 or more deaths, has registered as a magnitude 7.5 or greater, has registered as Modified Mercalli Intensity (MMI) Scale X or greater.

The USGS maintains a historical database for earthquakes with a magnitude of 2.5 or greater across the globe. A search of the area indicated 17 small earthquakes in neighboring or nearby counties since 1996 (8 in Palo Pinto, 3 in Cooke, and 6 in Parker County). However, no earthquakes were recorded in the USGS database for the Denton County planning area, including all participating jurisdictions.

PROBABILITY OF FUTURE EVENTS

Earthquake Hazard Maps show the distribution of earthquake shaking levels that have a certain probability of occurring over a given period. According to the USGS, the entire Denton County Planning Area has a PGA of 4-8%g for earthquakes with a 4-percent probability of occurring within 50 years. Based on historical records, the probability of an earthquake affecting the Denton County planning area, including all participating jurisdictions is unlikely, meaning that an event is possible in the next ten years.

VULNERABILITY AND IMPACT

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

Table 15-5 includes the critical facilities that would be vulnerable to earthquake events in each participating jurisdiction:

Table 15-5. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Denton County	3 Biodiesel Plants, 5,136 Wells, 4 Broadband Service Transmitters, 11 Cellular Towers, 51 Commercial Transmission Towers, 1 Convention Center, 4 Fairground Complexes, 93,047 Power Transmission Lines, 63 Electric Substations, 39 EMS Stations, 49 Fire Stations, 7 FM Transmission Towers, 141 General Manufacturing Facilities, 19 Hospitals, 3 Major Sport Venues, 792 Microwave Service Towers, 125 Shelter Facilities, 1 Natural Gas Storage Facility, 42 Non-gasoline Alternative Fueling Stations, 99 Nursing Homes, 14 Paging Transmission Towers, 4,879 Pipelines, 558 Places of Worship, 1 Pumping Station, 29 Police Stations, 7 Power Plants, 6 Public Transit Stations, 5,117 Surface Wells, 11 Urgent Care Facilities, 1 Weather Radar Station
Town of Argyle	1 Town Hall, 1 Fire Station, 1 Police Station, 5 Schools
City of Aubrey	1 City Hall, 2 Fire Station, 1 Police Station, 1 Public Works Facility, 1 Wastewater Plant, 11 Lift Stations, 2 Elevated Water Wells, 2 Ground Storage Water Wells
Town of Bartonville	1 Government Building, 1 Shelter/Church, 2 Water Supply Facilities
Town of Copper Canyon	1 Government Building
City of Corinth	1 EOC Building, 1 City Hall, 2 Fire Stations, 14 Schools, 1 Public Works Facility, 2 Pump Station 14 Lift Stations, 2 Elevated Water Tanks, 9 Warning Sirens
Town of Cross Roads	1 Town Hall, 1 Police Station, 1 Assisted Living Facility, 1 Residential Facility, 2 Places of Worship, 1 Water Tower, Transmission Lines
City of Denton	10 Government Buildings, 7 Federal Buildings, 7 Fire Stations, 2 Water Treatment Plants, 23 Schools, 3 Universities/Colleges, 2 Daycare Facilities, 3 Community Centers, 2 Traffic/Service Centers, 2 Airport/Field, 1 Fairground, 1 Landfill, 1 Natatorium
Town of DISH	1 Government Building
Town of Double Oak	1 Town Hall, 1 VFD, 1 Police Station, 1 School, 1 Shelter/Church, 1 Water Tower, 1 Warning Siren
Town of Flower Mound	1 Town Hall, 7 Fire Stations, 1 Police/Government Building, 2 Community Centers, 1 Library, 2 Public Works Facility, 1 Animal Shelter, 1 Wastewater Treatment Plant, 19 Lift Stations, 2 Water Storage Facility, 3 Water Towers, 4 Fueling Station, 1 RV Park
City of Hackberry	1 Wastewater Treatment Plant, 1 Water Plant, 2 Water Towers

SECTION 15: EARTHQUAKE

JURISDICTION	CRITICAL FACILITIES
Town of Hebron	None reported.
Town of Hickory Creek	1 Town Hall, 1 Public Works Facility
City of Highland Village	1 Government Building, 1 Fire Station, 4 Schools, 10 Lift Stations, 7 Pump Stations
City of Justin	1 City Hall, 1 Sewer Plant, 3 Lift Stations
City of Krugerville	1 City Hall, 1 Police Station, 1 Solar Station, 1 Substation, 1 Utility District, 1 Maintenance Building
City of Krum	1 City Hall, 1 Fire Station, 1 Police Station, 1 Federal Building, 1 Community Center, 8 Schools, 2 Childcare Facilities, 1 Public Works Facility, 1 Wastewater Plant, 3 Water Towers, 1 Medical Center, 5 Churches, 4 Warning Sirens
City of Lake Dallas	1 Government Building, 1 Fire Station, 2 Schools, 1 Library, 2 Water and Wastewater Facilities, 1 Wastewater Treatment Plant, 1 Airport
Town of Lakewood Village	1 Town Hall, 1 Wastewater Treatment Plant, 4 Lift Stations, 1 Water Plant, 1 Water Production Facility
City of Lewisville	3 EOC Facilities, 7 Fire Stations, 1 Police Station, 45 Government Facilities, 1 Dispatch, 17 Communication Facilities, 1 Jail, 17 Healthcare Facilities, 7 Chemical Facilities, 22 Commercial Facilities, 5 Critical Manufacturing Facilities, 4 Defense Industrial Facilities, 7 Energy Facilities, 8 Financial Institutions, 5 Food and Agriculture Facilities, 1 Information Technology Facility, 6 Transportation Systems, 34 Water and Wastewater Facilities, 1 Dam
Town of Little Elm	1 EOC, 1 Town Hall, 3 Fire Stations, 1 Public Safety Center, 1 Public Works Facility, 6 Bridges and Infrastructure, 23 Lift Stations, 3 Pump Stations, 3 Water Towers, 2 Water Tanks
Town of Northlake	1 Town Hall, 1 Government Building, 1 Police Department, 1 Public Works Facility, 1 Wastewater Treatment Plant, 3 Lift Stations, 3 Pump Stations, 6 Storage Tanks, 3 Meter Vaults, 1 Transmission Line
City of Oak Point	1 Government Building, 2 Shelter/Church, 2 Schools
City of Pilot Point	1 City Hall, 1 Fire Station, 1 Police Station, 5 Schools, 1 Wastewater Treatment Plant, 17 Lift Stations, 8 Pump Stations, 1 Library, 1 Senior Center
Town of Ponder	1 Town Hall, 1 VFD, 3 Schools, 4 Shelters/Churches, 1 Wastewater Plant, 3 Lift Stations, 6 Water Wells
Town of Providence Village	1 Town Hall, 1 Emergency Service Building, 2 Schools, 1 Medical Center, 2 Daycare Facilities, 1 Water Treatment Plant, 1 Storage Tank, 1 Grocery Store, 1 Fuel Station
City of Roanoke	1 EOC, 1 Fire Station, 1 Police Station, 1 Water and Wastewater Facility, 6 Lift Stations, 1 Pump Station, 1 Water Tower, 1 Alert System

JURISDICTION	CRITICAL FACILITIES
City of Sanger	1 City Hall, 1 Fire Station, 1 Police Station, 4 Schools, 3 City Department Buildings, 1 Community Center, 2 Shelters/Churches, 1 Wastewater Plant, 6 Lift Stations, 6 Pump Stations
Town of Shady Shores	1 Community Center, 3 Schools, 1 Tornado Siren
City of The Colony	6 Government Buildings, 5 Fire Station, 1 Police Station, 2 Community Centers, 1 Assisted Living Facility, 1 911 Annex, 1 Radio Tower, 1 Wastewater Treatment Plant, 5 Lift Stations, 9 Pump Stations, 1 Storage Tank, 2 Water Wells, 1 Water Control Room, 10 Outdoor Sirens
Town of Trophy Club	1 EOC, 1 Town Hall, 1 Fire Station, 1 Police Station, 4 Schools, 1 Hospital, 2 Community Facilities, 8 Churches, 4 Parks, 1 Maintenance Building, 1 Municipal Utility District, 1 Wastewater Treatment Plant, 8 Lift Stations, 5 Pump Stations, 4 Water Storage Tanks

With no historical events recorded, annualized loss-estimates for earthquakes are not available; neither is a breakdown of potential dollar losses of critical facilities and infrastructure. The potential severity of impact from an earthquake for the entire Denton County planning area, including all participating jurisdictions is classified as “Limited”, meaning that less than 10 percent of infrastructure would be damaged with critical facilities being shut down for less than 24 hours.

SECTION 16: EXPANSIVE SOILS

Hazard Description 1

Location 1

Extent..... 2

Historical Occurrences..... 3

Probability of Future Events..... 3

Vulnerability and Impact..... 4

HAZARD DESCRIPTION

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



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

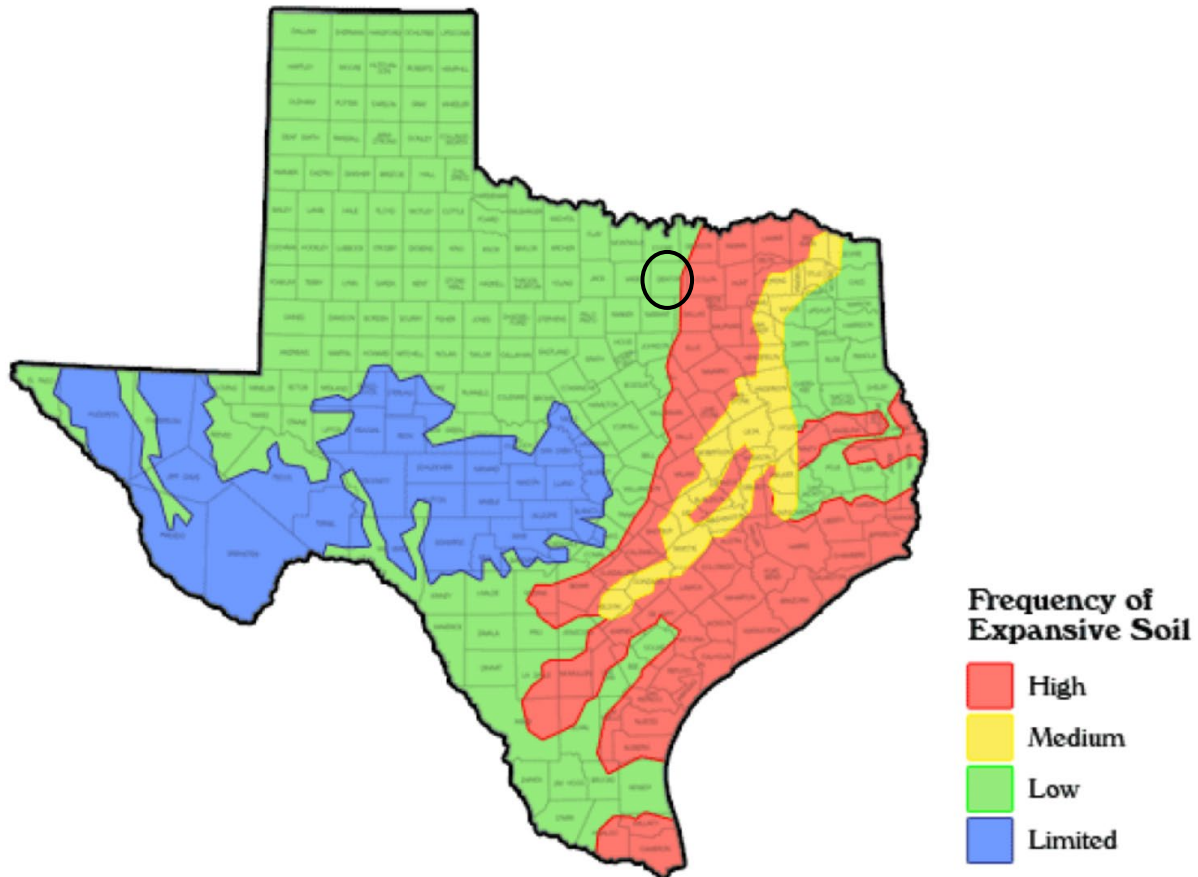
LOCATION

Damages from expansive soil is most prevalent when periods of moderate to high precipitation are followed by drought and then again by periods of heavy rainfall. Soils capable of changes in volume present a hazard to structures built on them and to the pipelines, sewer, and water lines buried within them. Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling clays than are multi-story buildings, which are usually heavy enough to counter swelling pressures. However, if constructed on wet clay, multi-story buildings may also be damaged by clay shrinkage when moisture levels are substantially reduced.

While all infrastructures in the eastern most portion of Denton County high-risk area (red portion of the county in Figure 16-1) are vulnerable, slab-on-grade structures are most likely to suffer damages from expansive soils. In addition, older structures built to less stringent building codes may be more susceptible to damages than new construction. Bridges, highways, streets, and parking lots are especially vulnerable when they are constructed when clays are dry, such as during a drought, and then subsequent soaking rains swell the clay. The green areas of the county in Figure 16-1 are far less subject to swelling and shrinking of soils but minimal risk in these areas

still exists, especially during cycles of extreme drought followed by extensive rain and soil saturation.

Figure 16-1. Expansive Soils: Location of Expansive Soils in Texas¹



EXTENT

Expansive soils risk is measured by the degree to which soils may shrink or swell. Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures.² Texas features the full range of expansive soil categories from low to very high. The planning area can experience low linear extensibility in the majority of the planning area with the eastern most portion of the county, along the Collin County line, can experience high linear extensibility.

¹ Source: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/16/nrcs143_019308.pdf

² (2009). *Soil Reports*. Natural Resources Conservation Service. chrome-extension://efaidnbnmnibpcjpcglclefindmkaj/https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_016186.pdf

Table 16-1. Expansive Soils: NRCS Soil Linear Extensibility Risk Categories

POTENTIAL CATEGORY	LINEAR EXTENSIBILITY %	CLAY %
Low	< 3%	< 25 %
Moderate	3 – 6%	25% – 35%
High	6 – 9%	35% - 45%
Very High	> 9%	> 45%

HISTORICAL OCCURRENCES

Structural foundation issues occur throughout the state, however, there is little documentation of site-specific past events from local, state, or national datasets. Expansive soil damages that are commonly found in residential structures are shouldered by homeowners and are not a matter of public record unless disclosed in real estate transactions. State universities have been studying the impacts of expansive soils for decades, however a system for tracking private or public damages resulting from expansive soils has not yet been developed. This makes it difficult to quantify damage on a statewide or local level.

Expansive soil is a condition that is native to Texas soil characteristics and cannot be documented as a time-specific event, except when it leads to structural and infrastructure damage. Extreme conditions can damage roads, structures, and infrastructure, including projects still under construction. Damages from expansive soils are typically associated with droughts. Expansive soil has been observed throughout the planning area, typically through cracked foundations. The limited reported data for historical expansive soil incidents is noted as a data deficiency for this planning cycle. An action has been created to enhance data collection for expansive soil incidents in future plan updates.

PROBABILITY OF FUTURE EVENTS

The Texas Department of Licensing and Regulation requires structures built after 2005 to include soil tests to be conducted for the likelihood of soil expansion, compression or shifting. In such cases, top or subsoils are required to be removed and remaining soils stabilized. Builders must assure that water drains away from the structure on all sides and building owners notified of the potential for damage if changes in drainage flow occur. These measures significantly reduce the probability of expansive soil impacts on newer and future development. It is considered “Likely” that the high risk areas in the Denton County planning area will experience some expansive soil impacts such as problems with foundations, roadways, sidewalks and other structures and infrastructure in the future. Older structures will be impacted with greater frequency due to the soil testing and stabilization requirements for newer structures.

VULNERABILITY AND IMPACT

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



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

While the number of slabs on grade structures is not available, the U.S. Census data indicates approximately 3,352³ of the residential structures in the planning area were built before 1980 (Table 16-2) and may be more susceptible to damages.

Table 16-2. Structures at Greater Risk by Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
Denton County	47,759
Town of Argyle	181
City of Aubrey	377
Town of Bartonville	121
Town of Copper Canyon	141
City of Corinth	194
Town of Cross Roads	48
City of Denton	16,567

³ Structures under the county include all incorporated and unincorporated areas of the county and includes all participating jurisdictions.

SECTION 16: EXPANSIVE SOILS

Town of DISH	3
Town of Double Oak	207
Town of Flower Mound	1,342
City of Hackberry	59
Town of Hebron	20
Town of Hickory Creek	269
City of Highland Village	1,016
City of Justin	272
City of Krugerville	155
City of Krum	233
City of Lake Dallas	529
Town of Lakewood Village	48
City of Lewisville	7,387
Town of Little Elm	343
Town of Northlake	30
City of Oak Point	108
City of Pilot Point	700
Town of Ponder	134
Town of Providence Village	56
City of Roanoke	287
City of Sanger	712
Town of Shady Shores	201
City of The Colony	4,706
Town of Trophy Club	600

The following critical facilities would be vulnerable to expansive soils in the planning area by jurisdiction.

Table 16-3. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Denton County	3 Biodiesel Plants, 5,136 Wells, 4 Broadband Service Transmitters, 11 Cellular Towers, 51 Commercial Transmission Towers, 1 Convention Center, 4 Fairground Complexes, 93,047 Power Transmission Lines, 63 Electric Substations, 39 EMS Stations, 49 Fire Stations, 7 FM Transmission Towers, 141 General Manufacturing Facilities, 19 Hospitals, 3 Major Sport Venues, 792 Microwave Service Towers, 125 Shelter Facilities, 1 Natural Gas Storage Facility, 42 Non-gasoline Alternative Fueling Stations, 99 Nursing Homes, 14 Paging Transmission Towers, 4,879 Pipelines, 558 Places of Worship, 1 Pumping Station, 29 Police Stations, 7 Power Plants, 6 Public Transit Stations, 5,117 Surface Wells, 11 Urgent Care Facilities, 1 Weather Radar Station
Town of Argyle	1 Town Hall, 1 Fire Station, 1 Police Station, 5 Schools
City of Aubrey	1 City Hall, 2 Fire Station, 1 Police Station, 1 Public Works Facility, 1 Wastewater Plant, 11 Lift Stations, 2 Elevated Water Wells, 2 Ground Storage Water Wells
Town of Bartonville	1 Government Building, 1 Shelter/Church, 2 Water Supply Facilities
Town of Copper Canyon	1 Government Building
City of Corinth	1 EOC Building, 1 City Hall, 2 Fire Stations, 14 Schools, 1 Public Works Facility, 2 Pump Station 14 Lift Stations, 2 Elevated Water Tanks, 9 Warning Sirens
Town of Cross Roads	1 Town Hall, 1 Police Station, 1 Assisted Living Facility, 1 Residential Facility, 2 Places of Worship, 1 Water Tower, Transmission Lines
City of Denton	10 Government Buildings, 7 Federal Buildings, 7 Fire Stations, 2 Water Treatment Plants, 23 Schools, 3 Universities/Colleges, 2 Daycare Facilities, 3 Community Centers, 2 Traffic/Service Centers, 2 Airport/Field, 1 Fairground, 1 Landfill, 1 Natatorium
Town of DISH	1 Government Building
Town of Double Oak	1 Town Hall, 1 VFD, 1 Police Station, 1 School, 1 Shelter/Church, 1 Water Tower, 1 Warning Siren
Town of Flower Mound	1 Town Hall, 7 Fire Stations, 1 Police/Government Building, 2 Community Centers, 1 Library, 2 Public Works Facility, 1 Animal Shelter, 1 Wastewater Treatment Plant, 19 Lift Stations, 2 Water Storage Facility, 3 Water Towers, 4 Fueling Station, 1 RV Park
City of Hackberry	1 Wastewater Treatment Plant, 1 Water Plant, 2 Water Towers
Town of Hebron	None reported
Town of Hickory Creek	1 Town Hall, 1 Public Works Facility

SECTION 16: EXPANSIVE SOILS

JURISDICTION	CRITICAL FACILITIES
City of Highland Village	1 Government Building, 1 Fire Station, 4 Schools, 10 Lift Stations, 7 Pump Stations
City of Justin	1 City Hall, 1 Sewer Plant, 3 Lift Stations
City of Krugerville	1 City Hall, 1 Police Station, 1 Solar Station, 1 Substation, 1 Utility District, 1 Maintenance Building
City of Krum	1 City Hall, 1 Fire Station, 1 Police Station, 1 Federal Building, 1 Community Center, 8 Schools, 2 Childcare Facilities, 1 Public Works Facility, 1 Wastewater Plant, 3 Water Towers, 1 Medical Center, 5 Churches, 4 Warning Sirens
City of Lake Dallas	1 Government Building, 1 Fire Station, 2 Schools, 1 Library, 2 Water and Wastewater Facilities, 1 Wastewater Treatment Plant, 1 Airport
Town of Lakewood Village	1 Town Hall, 1 Wastewater Treatment Plant, 4 Lift Stations, 1 Water Plant, 1 Water Production Facility
City of Lewisville	3 EOC Facilities, 7 Fire Stations, 1 Police Station, 45 Government Facilities, 1 Dispatch, 17 Communication Facilities, 1 Jail, 17 Healthcare Facilities, 7 Chemical Facilities, 22 Commercial Facilities, 5 Critical Manufacturing Facilities, 4 Defense Industrial Facilities, 7 Energy Facilities, 8 Financial Institutions, 5 Food and Agriculture Facilities, 1 Information Technology Facility, 6 Transportation Systems, 34 Water and Wastewater Facilities, 1 Dam
Town of Little Elm	1 EOC, 1 Town Hall, 3 Fire Stations, 1 Public Safety Center, 1 Public Works Facility, 6 Bridges and Infrastructure, 23 Lift Stations, 3 Pump Stations, 3 Water Towers, 2 Water Tanks
Town of Northlake	1 Town Hall, 1 Government Building, 1 Police Department, 1 Public Works Facility, 1 Wastewater Treatment Plant, 3 Lift Stations, 3 Pump Stations, 6 Storage Tanks, 3 Meter Vaults, 1 Transmission Line
City of Oak Point	1 Government Building, 2 Shelter/Church, 2 Schools
City of Pilot Point	1 City Hall, 1 Fire Station, 1 Police Station, 5 Schools, 1 Wastewater Treatment Plant, 17 Lift Stations, 8 Pump Stations, 1 Library, 1 Senior Center
Town of Ponder	1 Town Hall, 1 VFD, 3 Schools, 4 Shelters/Churches, 1 Wastewater Plant, 3 Lift Stations, 6 Water Wells
Town of Providence Village	1 Town Hall, 1 Emergency Service Building, 2 Schools, 1 Medical Center, 2 Daycare Facilities, 1 Water Treatment Plant, 1 Storage Tank, 1 Grocery Store, 1 Fuel Station
City of Roanoke	1 EOC, 1 Fire Station, 1 Police Station, 1 Water and Wastewater Facility, 6 Lift Stations, 1 Pump Station, 1 Water Tower, 1 Alert System
City of Sanger	1 City Hall, 1 Fire Station, 1 Police Station, 4 Schools, 3 City Department Buildings, 1 Community Center, 2 Shelters/Churches, 1 Wastewater Plant, 6 Lift Stations, 6 Pump Stations
Town of Shady Shores	1 Community Center, 3 Schools, 1 Tornado Siren

JURISDICTION	CRITICAL FACILITIES
City of The Colony	6 Government Buildings, 5 Fire Station, 1 Police Station, 2 Community Centers, 1 Assisted Living Facility, 1 911 Annex, 1 Radio Tower, 1 Wastewater Treatment Plant, 5 Lift Stations, 9 Pump Stations, 1 Storage Tank, 2 Water Wells, 1 Water Control Room, 10 Outdoor Sirens
Town of Trophy Club	1 EOC, 1 Town Hall, 1 Fire Station, 1 Police Station, 4 Schools, 1 Hospital, 2 Community Facilities, 8 Churches, 4 Parks, 1 Maintenance Building, 1 Municipal Utility District, 1 Wastewater Treatment Plant, 8 Lift Stations, 5 Pump Stations, 4 Water Storage Tanks

The impact of expansive soils ranges from cosmetic cracks in walls to substantial foundation and structural damage that can result in a need for building demolition. Infrastructure such as pipelines can be damaged, causing increased maintenance and repairs, replacement, or damage to the point of failure. Sewer and water lines are also affected by shrinking and swelling soils. The movement of the soils can snap water and sewer lines, producing a minimum of temporary discomfort, and a maximum of a serious health and welfare risk.

Homeowners and public agencies that assume they cannot afford preventative measures such as more costly foundations and floor systems, often incur the largest percentage of damage and costly repairs from expanding soil. No figures are available for the total damage to homes in the planning area from expansive clays. In the Denton County planning area the most extensive damage from expansive soils can occur to bridges, highways, streets, infrastructure, and parking lots. The greatest damage occurs when structures are constructed when clays are dry (such as during a drought) and then subsequent soaking rains swell the clay.

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

SECTION 17: MITIGATION STRATEGY

Mitigation Goals 1

 Goal 1 1

 Goal 2 1

 Goal 3 2

 Goal 4 2

 Goal 5 2

 Goal 6 2

MITIGATION GOALS

Based on the results of the risk and capability assessments, the Planning Team developed and prioritized the mitigation strategy. This involved utilizing the results of both assessments and reviewing the goals and objectives that were included in the previous 2016 Plan Update. At the Mitigation Workshop in August 2022, Planning Team members reviewed the mitigation strategy from the previous 2016 Plan Update. The consensus among all members present was that the strategy developed for the 2016 Plan did not require changes, as it identified overall improvements to be sought in the Plan Update. However, the order and priority of the goals and objectives were reorganized.

GOAL 1

Protect public health and safety.

OBJECTIVE 1.1

Advise the public about health and safety precautions to guard against injury and loss of life from hazards.

OBJECTIVE 1.2

Maximize utilization of the latest technology to provide adequate warning, communication, and mitigation of hazard events.

OBJECTIVE 1.3

Reduce the danger to, and enhance protection of, high risk areas during hazard events.

OBJECTIVE 1.4

Protect critical facilities and services.

GOAL 2

Build and support local capacity and commitment to continuously become less vulnerable to hazards.

OBJECTIVE 2.1

Build and support local partnerships to continuously become less vulnerable to hazards.

OBJECTIVE 2.2

Build a cadre of committed volunteers to safeguard the community before, during, and after a disaster.

SECTION 17: MITIGATION STRATEGY

OBJECTIVE 2.3

Build hazard mitigation concerns into county, city and town planning and budgeting processes.

GOAL 3

Increase public understanding, support, and demand for hazard mitigation.

OBJECTIVE 3.1

Heighten public awareness regarding the full range of natural and man-made hazards the public may face.

OBJECTIVE 3.2

Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards and increase individual efforts to respond to potential hazards.

OBJECTIVE 3.3

Publicize and encourage the adoption of appropriate hazard mitigation measures.

GOAL 4

Protect new and existing properties.

OBJECTIVE 4.1

Reduce repetitive losses to the National Flood Insurance Program (NFIP).

OBJECTIVE 4.2

Use the most cost-effective approach to protect existing buildings and public infrastructure from hazards.

OBJECTIVE 4.3

Enact and enforce regulatory measures to ensure that future development will not put people in harm's way or increase threats to existing properties.

GOAL 5

Maximize the resources for investment in hazard mitigation.

OBJECTIVE 5.1

Maximize the use of outside sources of funding.

OBJECTIVE 5.2

Maximize participation of property owners in protecting their properties.

OBJECTIVE 5.3

Maximize insurance coverage to provide financial protection against hazard events.

OBJECTIVE 5.4

Prioritize mitigation projects, based on cost-effectiveness and sites facing the greatest threat to life, health, and property.

GOAL 6

Promote growth in a sustainable manner.

OBJECTIVE 6.1

Incorporate hazard mitigation activities into long-range planning and development activities.



SECTION 17: MITIGATION STRATEGY

OBJECTIVE 6.2

Promote beneficial uses of hazardous areas while expanding open space and recreational opportunities.

OBJECTIVE 6.3

Utilize regulatory approaches to prevent the creation of future hazards to life and property.

SECTION 18: PREVIOUS ACTIONS

Summary.....	1
Denton County	2
Town of Argyle	15
City of Aubrey	24
City of Corinth	33
Town of Cross Roads	45
City of Denton	54
Town of Double Oak	63
Town of Flower Mound	72
Town of Hickory Creek.....	80
City of Highland Village.....	92
City of Justin	103
City of Krugerville.....	110
City of Krum	120
City of Lake Dallas	131
City of Lewisville	146
Town of Little Elm	165
City of Pilot Point.....	181
Town of Ponder.....	190
City of Roanoke	197
City of Sanger	205
Town of Shady Shores.....	214
City of The Colony	227

SUMMARY

Planning Team members were given copies of the previous mitigation actions submitted in the 2016 Plan at the mitigation workshop. Participating jurisdictions within Denton County reviewed the previous actions and provided an analysis as to whether the action had been completed, should be deferred as an ongoing activity, or be deleted from the Plan Update. The actions from the 2016 Plan are included in this section as they were written in 2016, with the exception of the “2022 Analysis” section. The following jurisdictions were not participants within the last plan, therefore there are no past actions for their review: Bartonville, Copper Canyon, DISH, Hackberry, Hebron, Lakewood Village, Northlake, Oak Point, Providence Village and Trophy Club.

DENTON COUNTY

Denton County– Action #1	
Proposed Action:	Standby generators for critical infrastructure facilities.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildland Fire, Extreme Heat, High Winds, Flooding, Winter Storms, Hail, Earthquake, Lightning, Dam Failure
Effect on new/existing buildings:	Power for critical infrastructure resources at existing and new facilities
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Mitigations Grants, Budget
Lead Agency/Department Responsible:	Facilities
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Denton County– Action #2	
Proposed Action:	Hardening of critical facilities.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildland Fire, Extreme Heat, High Winds, Flooding, Winter Storm, Hail, Earthquake, Lightning, Dam Failure, Drought, Expansive Soils
Effect on new/existing buildings:	Hardening of critical infrastructure facilities
Priority (High, Moderate, Low):	High
Estimated Cost:	\$15,000,000
Potential Funding Sources:	Mitigation Grants, Bonds
Lead Agency/Department Responsible:	Facilities
Implementation Schedule:	1-5 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Update action describe to expand on hardening.

SECTION 18: PREVIOUS ACTIONS

Denton County– Action #3	
Proposed Action:	Purchase and Distribution of NOAA All-Hazard S.A.M.E radios to disadvantaged citizens.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Develop and execute new programs which identify and reduce threats from natural hazards. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildland Fire, Extreme Heat, High Winds, Flooding, Winter Storm, Hail, Lightning, Dam Failure, Drought
Effect on new/existing buildings:	Provide effective notifications to persons in old/new building that may be more/less susceptible to damages
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Mitigation Grants, Business Donations
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Denton County– Action #4	
Proposed Action:	Develop and implement meteorological, stream and lake monitoring systems.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, High Winds, Extreme Heat, Drought
Effect on new/existing buildings:	Early warning for rising waters, damaging winds, and extreme heat
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Mitigation Grants, Budget
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-5 years
Incorporation into Existing Plans:	Not reflected in previous plan.

2022 ANALYSIS:
Defer to Plan Update. OEM wrote a PDM grant which was not approved, however still have the application.

Denton County– Action #5	
Proposed Action:	Develop and implement community wildfire protection program.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire, Extreme Heat, Drought, Lightning
Effect on new/existing buildings:	Provide for wildland fire protection to old/new buildings through a buffer zone
Priority (High, Moderate, Low):	High
Estimated Cost:	\$15,000,000
Potential Funding Sources:	Texas Forest Service, Hazard Mitigation Grants
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Denton County– Action #6	
Proposed Action:	Develop and implement public education resources on hazards affecting citizens, including actions for hazard mitigation.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildland Fire, Extreme Heat, High Winds, Flooding, Winter Storms, Hail, Earthquake, Lightning, Dam Failure, Drought, Expansive Soils
Effect on new/existing buildings:	This has no direct effect on structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$25,000
Potential Funding Sources:	Urban Area Security Initiative, Budget, Donations
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update.

Denton County– Action #7	
Proposed Action:	Acquire mobile CASA-Weather radios for large incidents and events.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds, Flooding, Hail, Lightning
Effect on new/existing buildings:	Greater warning to occupants of old structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$650,000
Potential Funding Sources:	Mitigation Grants, Budget
Lead Agency/Department Responsible:	Emergency Services, NCTCOG CASA-WX Committee
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
In progress, defer to Plan Update.

Denton County– Action #8	
Proposed Action:	Provide rebates for Denton County residents in a local Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Provides residents of existing building better access to safe shelters during severe weather. Provides safe shelter in new building during severe weather.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$9,000,000
Potential Funding Sources:	Mitigation Programs, Business donations
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	2-4 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Intend to complete in 2022 plan.

Denton County– Action #9	
Proposed Action:	Develop and implement Teen CERT at Denton County area Independent School Districts.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Wind, Flooding, Drought Winter Storm, Hail, Earthquake, Lightning, Expansive Soils
Effect on new/existing buildings:	Has no effect on structures
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$117,500
Potential Funding Sources:	Urban Area Security Initiative, Additional Grant Programs
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-5 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

Denton County– Action #10	
Proposed Action:	Develop specialized strike teams comprised of volunteers.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from effects of natural hazards. Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildland Fire, Extreme Heat, High Wind, Flooding, Drought, Winter Storm, Hail, Earthquake, Lightning, Expansive Soils
Effect on new/existing buildings:	This has no direct effect of structures
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$55,000
Potential Funding Sources:	Urban Area Security Initiative, Additional Grant Programs
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed by TMS Mass Vax Teams.

Denton County– Action #11	
Proposed Action:	USDA Dam Studies and rehabilitation.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Project existing and new properties from effects of natural hazards. Conduct a hazard/vulnerability assessment of personal properties and structures located in flood zones.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, Dam Failure
Effect on new/existing buildings:	Protection of structures by mitigation damaging flood waters
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$22,000,000
Potential Funding Sources:	Hazard Mitigation Grant Funds, USDA, NFIP
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. In progress, PDM Grant accepted. Vendor has been selected and budget approved. Estimated timeline 12/2022.

Denton County– Action #12	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Services, Public Works, Engineering
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Denton County– Action #13	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

TOWN OF ARGYLE

Town of Argyle– Action #1	
Proposed Action:	Provide rebates for Argyle residents in a local Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Provides residents of existing building better access to safe shelters during severe weather. Provides safe shelter in new building during severe weather.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$300,000
Potential Funding Sources:	Mitigation Programs, Business donations
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

Town of Argyle– Action #2	
Proposed Action:	Develop and implement public education resources on hazards affecting citizens, including actions for hazard mitigation.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildland Fire, Extreme Heat, High Winds, Flooding, Winter Storms, Hail, Earthquake, Lightning, Dam Failure, Drought, Expansive Soils
Effect on new/existing buildings:	This has no direct effect on structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Urban Area Security Initiative, Budget, Donations
Lead Agency/Department Responsible:	Police Department
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. The Argyle Police Department has an annual Child Safety Fair that could incorporate hazard public education resources for hazards affecting citizens.

Town of Argyle– Action #3	
Proposed Action:	Develop and implement community wildfire protection program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards. Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire
Effect on new/existing buildings:	Provide for wildland fire protection to old/new buildings through a buffer zone
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,500,000
Potential Funding Sources:	Texas Forest Service, Hazard Mitigation Grants
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

Town of Argyle– Action #4	
Proposed Action:	Implement drainage improvements for areas identified in our flood study.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effect of natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	Provides residents of existing building better protection from flooding during storm events. Provides safer shelter in new building during severe weather.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Mitigation Programs, Business Donations, Local Funds
Lead Agency/Department Responsible:	Development Services, North Central Texas Council of Governments
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. The Town has not dedicated resources for this in the past but is considering creating a Stormwater Utility Fund to fund projects related to drainage improvements and mitigating flooding in public spaces and rights-of-way in the Town.

Town of Argyle– Action #5	
Proposed Action:	Purchase and Distribution of NOAA All-Hazard radio program and provides rebates to citizen/businesses that purchase a SAME technology weather radio.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Develop and execute new programs which identify and reduce threats from natural hazards. Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildland Fire, Extreme Heat, High Winds, Flooding, Winter Storm, Hail, Lightning, Dam Failure, Drought
Effect on new/existing buildings:	Provide effective notifications to persons in old/new building that may be more/less susceptible to damages
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$65,000
Potential Funding Sources:	Mitigation Grants, Budget
Lead Agency/Department Responsible:	Police Department
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

Town of Argyle– Action #6	
Proposed Action:	Adopt and implement more stringent construction building codes.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Drought, Expansive Soils
Effect on new/existing buildings:	Existing infrastructure could be retrofitted to meet revised building codes. New infrastructure would be built to codes that reinforce mitigation against natural hazards.
Priority (High, Moderate, Low):	Low
Estimated Cost:	Staff time
Potential Funding Sources:	General Funds, Local Funds
Lead Agency/Department Responsible:	Development Services
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. The Town adopted the 2018 ICC code versions, and 2017 NEC, with NCTCOG local amendments. No other action is planned to retrofit existing infrastructure to meet revised building codes. If new permits are submitted for remodels or additions, it will need to comply with the 2018 ICC code and 2017 NEC.

Town of Argyle– Action #7	
Proposed Action:	Hire Consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-Kind
Lead Agency/Department Responsible:	Planning and Zone
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

Town of Argyle– Action #8	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

Town of Argyle– Action #9	
Proposed Action:	Conduct a soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

CITY OF AUBREY

City of Aubrey– Action #1	
Proposed Action:	Develop and implement individual Tornado Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Provides residents of existing building better access to safe shelters during severe weather. Provides safe shelter in new building during severe weather.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$350,000
Potential Funding Sources:	HMGP, PDM, Resident Match, Local Grant, FEMA
Lead Agency/Department Responsible:	DEM
Implementation Schedule:	12-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Will continue to monitor with population growth.

City of Aubrey– Action #2	
Proposed Action:	Protect citizens from extreme weather by building covered patios in public parks.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, High Winds. Lightning
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	PDM, General Budget, State and Federal Grants, citizen cost-share, Donations
Lead Agency/Department Responsible:	Public Works / Parks
Implementation Schedule:	6-9 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed Will continue to monitor with population growth.

City of Aubrey– Action #3	
Proposed Action:	Adopt and promote mitigation public education program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Earthquake, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$35,000
Potential Funding Sources:	General Funds, Grants, Local funds, in-kind
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. In progress.

City of Aubrey– Action #4	
Proposed Action:	Develop and implement drainage improvement program on creek waterways.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, Winter Storms
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	Current staffing time
Potential Funding Sources:	General Funds, Local funds, in-kind
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. In progress. Currently working with Trinity regional to produce a flood plan.

City of Aubrey– Action #5	
Proposed Action:	Develop and implement a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effects of all natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Earthquake, Expansive Soils
Effect on new/existing buildings:	Provide for wildfire protection to old/new buildings through a buffer zone
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$55,000
Potential Funding Sources:	Texas Forest Service, Hazard Mitigation Grants
Lead Agency/Department Responsible:	Emergency Services / Planning
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

City of Aubrey– Action #6	
Proposed Action:	Adopt and implement stricter building codes for new construction.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	Can be retrofit. Provide drought relief through lower water consumption
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000
Potential Funding Sources:	Local budget, Department budget
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	6-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Adopted IBC 2018.

City of Aubrey– Action #7	
Proposed Action:	Hire consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

City of Aubrey– Action #8	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Not a priority with City.

City of Aubrey– Action #9	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal grants, State grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

CITY OF CORINTH

City of Corinth– Action #1	
Proposed Action:	Develop and implement mitigation public education and awareness programs for each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding, Wildfires, Dam Failure, Earthquake, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500
Potential Funding Sources:	Fire Department
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Corinth– Action #2	
Proposed Action:	Develop and implement water conservation regulations.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Corinth– Action #3	
Proposed Action:	Enact landscaping and design measure ordinance.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Planning, Public Works
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Corinth– Action #4	
Proposed Action:	Design and implement a city flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards. Develop and implement a buyout program for those personal properties and structures located in high hazard flood zones starting with those that are most vulnerable to life and property loss.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Medium
Estimated Cost:	N/A
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Development Services / Engineering Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Will create secondary action noting the development and implementation of a buy-out program.

City of Corinth– Action #5	
Proposed Action:	Retrofit existing buildings to meet the requirements of the International Building Code.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Flooding, High Winds, Hail, Lightning
Effect on new/existing buildings:	New building codes would allow existing buildings to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General funds, Local funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Corinth– Action #6	
Proposed Action:	Adopt and implement International Building Code for new buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Flooding, High Winds, Hail, Lightning, Wildfire, Earthquake, Expansive Soils, Extreme Heat, Drought
Effect on new/existing buildings:	New building codes would allow for new buildings to be constructed to mitigate against structure-impacting
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General funds, Local funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Corinth– Action #7	
Proposed Action:	Adopt and implement Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards. Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards..
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$25,000
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	Fire Department, County Emergency Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Corinth– Action #8	
Proposed Action:	Community safe room
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$700,000
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	EDC, Planning
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Corinth– Action #9	
Proposed Action:	Build an emergency operations center.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Hail, Lightning, Wildfires, Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	?
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, grants
Lead Agency/Department Responsible:	Fire Department, Development Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Corinth– Action #10	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Corinth– Action #11	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Corinth– Action #12	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

TOWN OF CROSS ROADS

Town of Cross Roads– Action #1	
Proposed Action:	Develop and implement a comprehensive public education program that will inform the public on resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Expansive Soils, Earthquake
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Sources:	HMGP, General Fund, Local Grants, In-kind
Lead Agency/Department Responsible:	Planning
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Improved website, new contract with Little Elm FD for fire protection services.

Town of Cross Roads– Action #2	
Proposed Action:	Provide rebates for Crossroads residents in a local Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Provides residents of existing building better access to safe shelters during severe weather. Provides safe shelter in new building during severe weather.
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$135,000
Potential Funding Sources:	HMGP, Resident Match, Local Grants, FEMA
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	12-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Cross Roads– Action #3	
Proposed Action:	Develop and implement community wildfire protection program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards. Educate the public on risk, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire
Effect on new/existing buildings:	Provide for wildland fire protection to old/new buildings through a buffer zone
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Sources:	HMGP, General Fund, Texas Forest Services, Local Grants, in-kind
Lead Agency/Department Responsible:	Fire Marshal
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Cross Roads– Action #4	
Proposed Action:	Develop and implement a drought contingency program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards. Educate the public on risk, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Drought, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$5,000
Potential Funding Sources:	HMGP, General Fund, Local Grants, in-kind
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	24-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Cross Roads– Action #5	
Proposed Action:	Coordinate with USACE and County on Lake Ray Roberts Inundation maps and Dam Breach Emergency Action Plan.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effect of natural hazards. Conduct a hazard/vulnerability assessment of personal properties and structures located in flood zones. Educate the public on risk, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, Dam Failure
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$5,000
Potential Funding Sources:	USACE, HMGP, General Fund, Local Grants, FEMA, USDA, NFIP, in-kind
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	12-48 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Update department responsible as Town does not have Public Works Department.

Town of Cross Roads– Action #6	
Proposed Action:	Develop and implement program to purchase and distribute NOAA Hazard radio to citizens.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storm, Hail, Lightning, Dam Failure, Earthquake
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$15,000
Potential Funding Sources:	HMGP, General Fund, Partial payment by receiving party, Local Grants, in-kind
Lead Agency/Department Responsible:	Planning Department
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Need to look at Little Elm FD policy and incorporate.

Town of Cross Roads– Action #7	
Proposed Action:	Hire Consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-Kind
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. In-progress. Identified and working on engineering to reduce likelihood of flooding in Oak Shores neighborhood that can restrict access.

Town of Cross Roads– Action #8	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Cross Roads– Action #9	
Proposed Action:	Conduct a soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

CITY OF DENTON

City of Denton– Action #1	
Proposed Action:	Adopt and implement individual Texas Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Some buildings modified for shelter retrofit. Provide safe shelters for new buildings during severe weather.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,173,000
Potential Funding Sources:	Mitigation Grants, In-kind, Payment by receiving party, business or community donations
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

City of Denton– Action #2	
Proposed Action:	Maintenance of the CASA (WX) Weather Radio System.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Tornado, High Wind, Wildfire, Flooding, Lightning, Dam Failure
Effect on new/existing buildings:	Increase warning time to occupants of old / new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Mitigation Grants, Local budget
Lead Agency/Department Responsible:	Emergency Management, North Central Texas Council of Governments
Implementation Schedule:	2-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

City of Denton– Action #3	
Proposed Action:	Develop and implement community wildfire protection program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards. Reduce or eliminate loss of life and property damage resulting from severe weather events. Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire, Extreme Heat, Drought, Lightning
Effect on new/existing buildings:	Provide for wildland fire protection to old/new buildings through a buffer zone
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Texas Forest Service, Mitigation Grants, Fire Budget
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Denton– Action #4	
Proposed Action:	Develop and implement a comprehensive public education program that will inform the public on resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Expansive Soils, Earthquake
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Sources:	Mitigation Grants, HMGP, PDM, UASI, General Fund
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Denton– Action #5	
Proposed Action:	Relocate Emergency Operations Center (EOC) to a hardened existing facility out of the floodplain.
BACKGROUND INFORMATION	
Site and Location:	EOC
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Expansive Soils, Earthquake
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Mitigation Grants, Bonds
Lead Agency/Department Responsible:	Emergency Management, Fire
Implementation Schedule:	2-5 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Denton– Action #6	
Proposed Action:	Develop and implement a strategy to enforce water conservation regulations during periods of drought.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Sources:	Mitigation Grants, HMGP, PDM,UASI, General Fund, Local Budget/ Supplemental funds
Lead Agency/Department Responsible:	Emergency Management, Fire
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Denton– Action #7	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Denton– Action #8	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Denton– Action #9	
Proposed Action:	Conduct a soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

TOWN OF DOUBLE OAK

Town of Double Oak– Action #1	
Proposed Action:	Implement individual Tornado Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Some building modified for shelter retrofit
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$50,000
Potential Funding Sources:	Resident Match, Local Grants, FEMA
Lead Agency/Department Responsible:	OEM
Implementation Schedule:	12-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Council may not support. New action to identify a community safe room instead.

Town of Double Oak– Action #2	
Proposed Action:	Adopt and promote regional public education campaign focused on mitigation techniques for each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Expansive Soils, Earthquake
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$5,000
Potential Funding Sources:	State/Federal grants, Local Funds, citizen cost-share, donations
Lead Agency/Department Responsible:	OEM
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Have a website that send out email blast as well as residents can sign up for notifications. Will continue to improve website to incorporate hazard update and mitigation strategies.

Town of Double Oak– Action #3	
Proposed Action:	Mitigate storm water damage through adoption and implementation of TCEQ approved storm water pollution and prevention plan.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Conduct a hazard/vulnerability assessment of personal properties and structures located in flood zones.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	Current staff time, engineering, construction
Potential Funding Sources:	General Fund, Local Funds, In-kind
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Require codes and policies to correspond with TCEQ requirements. Town has an MS4 Plan that is being updated yearly.

Town of Double Oak– Action #4	
Proposed Action:	Expand outdoor warning system to cover new developments and population increases.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storms, Flooding, Tornado, Hail, High Winds, Wildfire, Lightning
Effect on new/existing buildings:	Existing structures outside existing sirens’ radius would be able to hear new sirens. Sirens could be installed in areas where development is planned.
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$1,000,000
Potential Funding Sources:	HMGP, PDM, Local Funds, public/private partnerships, donations, in-kind
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Ongoing project. Town has warning system in place and is looking to add an additional site near water tower. Will continue to expand with development.

Town of Double Oak– Action #5	
Proposed Action:	Harden municipally owned critical infrastructure.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effects of all natural hazards. Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storms, Flooding, Tornado, Expansive Soils, Hail, High Winds, Wildfire, Earthquake, Lightning
Effect on new/existing buildings:	Existing building would be hardened through improved material and backing up data. New facilities would be built to stricter standards.
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$150,000
Potential Funding Sources:	HMGP, PDM, SHSP, Local Funds, Donations, in-kind, public/private partnerships
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	1-4 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Would like to expand police department to be its on entity / EOC.

Town of Double Oak– Action #6	
Proposed Action:	Adopt and implement landscape ordinance with stronger water conservation regulations.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	None
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Neighborhood Services
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Currently no water conservation plan or ordinance. Water is outsourced and compiles with recommendations of contracted facility in water use during drought. Explore additional action to incorporate drought tolerate landscaping. Town council is also updating to include new ordinances and will look to include in Plan Update as new action.

Town of Double Oak– Action #7	
Proposed Action:	Hire Consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-Kind
Lead Agency/Department Responsible:	Planning and Zone
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete. Consulted with engineer to assess flood risk due to dam failure. Flood hazard is addressed in other actions.

Town of Double Oak– Action #8	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities. Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete action. Not a priority for Town.

Town of Double Oak– Action #9	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal grants, State grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete action. Not a priority for Town as all new development requires soil analysis to be completed.

TOWN OF FLOWER MOUND

Town of Flower Mound – Action #1	
Proposed Action:	Provide rebates for Flower Mound residents through the Texas Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Some building modified for shelter retrofit
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	HMGP, PDM, Resident Match, Local Grants, FEMA
Lead Agency/Department Responsible:	Flower Mound DEM
Implementation Schedule:	12-48 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. This action was part of a regional NCTCOG program that is no longer being pursued.

Town of Flower Mound – Action #2	
Proposed Action:	Expand the outdoor warning siren system.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds, Hail
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	HMPG, Local Funding
Lead Agency/Department Responsible:	Flower Mound DEM
Implementation Schedule:	1-4 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. The Town has been able to expand outdoor warning sirens since 2014 and only a couple areas of future development will remain.

Town of Flower Mound – Action #3	
Proposed Action:	Adopt and promote a public education program with resources to mitigate the impacts of each identified hazards.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Expansive Soils, Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Sources:	HMGP, PDM, other state/federal grants, Local funds, donations
Lead Agency/Department Responsible:	Flower Mound DEM
Implementation Schedule:	12-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Flower Mound – Action #4	
Proposed Action:	Provide weather radios to residents of Flower Mound through a citizen cost-share program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$75,000
Potential Funding Sources:	Grant Funds, HMPG, PDM, Citizen cost-share, donations
Lead Agency/Department Responsible:	Flower Mound DEM
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town would like to promote to use of other technologies.

Town of Flower Mound – Action #5	
Proposed Action:	Targeted wildland/urban interface mitigation projects based on neighborhoods identified in CWPP.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Conduct a hazard/vulnerability assessment of personal properties and structures located in high hazard zones.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought, Lightning, Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$100,000
Potential Funding Sources:	Texas A&M Forest Service
Lead Agency/Department Responsible:	Flower Mound Fire Department
Implementation Schedule:	6-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update

Town of Flower Mound – Action #6	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal grants, State grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works, Engineering
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. This is not a widespread hazard and is property owner-specific as development occurs.

Town of Flower Mound – Action #7	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Seismic activities in our area has decreased and those that did occur were minor on the Richter scale.

Town of Flower Mound – Action #8	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. There are a limited number of dams in the Town and inundation mapping has already been provided.

TOWN OF HICKORY CREEK

Town of Hickory Creek – Action #1	
Proposed Action:	Promote mitigation public education and awareness programs for resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards. Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding, Wildfires, Dam Failure, Earthquake, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500
Potential Funding Sources:	Fire Department
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Hickory Creek – Action #2	
Proposed Action:	Develop and implement a strategy to enforce water conservation regulations
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Hickory Creek – Action #3	
Proposed Action:	Enhance landscaping and design measures ordinance.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Planning, Public Works
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Hickory Creek – Action #4	
Proposed Action:	Develop and implement a town flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards. Develop and implement a buy-out program for those personal properties and structures located in high hazard flood zones.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Medium
Estimated Cost:	N/A
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Development Services / Engineering Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Hickory Creek – Action #5	
Proposed Action:	Retrofit existing buildings to meet the requirements of the International Building Code.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Flooding, High Winds
Effect on new/existing buildings:	New building codes would allow existing buildings to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General funds, Local funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Hickory Creek – Action #6	
Proposed Action:	Adopt and implement International Building Code framework.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Flooding, High Winds, Extreme Heat, Hail, Lightning
Effect on new/existing buildings:	New building codes would allow existing buildings to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General funds, Local funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Hickory Creek – Action #7	
Proposed Action:	Adopt and implement Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$25,000
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	Fire Department, County Emergency Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Hickory Creek – Action #8	
Proposed Action:	Community safe room.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	EDC, Planning
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. This could be the AMC theatre which is now a church.

Town of Hickory Creek – Action #9	
Proposed Action:	Build an Emergency Operations Center.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storm, Hail, Lightning, Wildfire, Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	?
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, grants
Lead Agency/Department Responsible:	EDC, Planning
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. The City of Corinth has done this and shares with the Lake Cities.

Town of Hickory Creek – Action #10	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. This should be done by the Corp of Engineers.

Town of Hickory Creek – Action #11	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Hickory Creek – Action #12	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risk, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal grants, State grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

CITY OF HIGHLAND VILLAGE

City of Highland Village – Action #1	
Proposed Action:	Public education on existing hazard with resource to mitigate the impacts of each.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop public education campaigns to educate the public on what actions they can take to mitigate the effects of loss of life or property damage resulting from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding, Wildfires, Dam Failure, Earthquake, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,500
Potential Funding Sources:	Existing Budget, Texas Forest Service, National Fire Protection Association, NOAA
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. On-going project.

City of Highland Village – Action #2	
Proposed Action:	Develop and implement a Water Conservation / Drought Contingency Plan.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Water
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Updated and revisions made in 2019.

City of Highland Village – Action #3	
Proposed Action:	Install lightning detection system for use at city events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	General Fund
Lead Agency/Department Responsible:	Parks
Implementation Schedule:	6-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

City of Highland Village – Action #4	
Proposed Action:	Install Electronic Water Meters to track water usage and more accurately limit water use during times of drought.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1.2 million
Potential Funding Sources:	Enterprise Fund
Lead Agency/Department Responsible:	Water
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. System is reaching life expectancy. City is currently researching systems.

City of Highland Village – Action #5	
Proposed Action:	Adopt and implement the 2009 ICC Building Codes.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Enact and enforce regulatory measures that enforce hazard mitigation measures.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Hail, High Winds, Lightning, Tornados, Wildfire, Winter Storms
Effect on new/existing buildings:	Only applies to remodeling. Improves the performance of the building under the new code.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,300
Potential Funding Sources:	General Fund
Lead Agency/Department Responsible:	Building Inspection
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Will adopt new code when it is published. N

City of Highland Village – Action #6	
Proposed Action:	Raise Highland Village Road and improve drainage under.
BACKGROUND INFORMATION	
Site and Location:	Highland Village Road
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage during catastrophic events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$7 million
Potential Funding Sources:	General Fund, FEMA Grant
Lead Agency/Department Responsible:	Street / Utilities
Implementation Schedule:	Completed
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. 2011 Project addressed issues. The entire road is now above the 100-year flood plain.

City of Highland Village – Action #7	
Proposed Action:	Develop and implement drainage improvement program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on new/existing buildings:	Reduces damage to foundations, loss from surface flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2 million annually
Potential Funding Sources:	Enterprise Fund, General Fund
Lead Agency/Department Responsible:	Water
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Once study has been performed and completed it will identify project that the City will need to perform to reduce threat.

City of Highland Village – Action #8	
Proposed Action:	Implement CASA WX radar system into dispatch and EOC.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Place the system online with pertinent actionable policies for each weather event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Winter Storm, Lightning
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000 per year subscription
Potential Funding Sources:	Existing Budget
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. After research into the CASA system City found a system that provided great abilities that identified system.

City of Highland Village – Action #9	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City is no in an area that is subjective to earthquakes.

City of Highland Village – Action #10	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City is not responsible for any dams.

City of Highland Village – Action #11	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. There is very little undeveloped land in the City. Studies are being done on individual sites where development is occurring and will continue.

CITY OF JUSTIN

City of Justin – Action #1	
Proposed Action:	Provide rebates for the City of Justin through local Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from effects of natural hazards. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Provides residents and business owners of existing building better access to safe shelters during severe weather. Provides safe shelter in new building during severe weather.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,430,000
Potential Funding Sources:	Mitigation Programs, Business donations
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Justin – Action #2	
Proposed Action:	Develop and implement community wildfire protection program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards. Reduce or eliminate loss of life and property damage resulting from severe weather events. Conduct a hazard/vulnerability assessment of personal properties and structures located in high hazard zone. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire, Extreme Heat, Drought, Lightning
Effect on new/existing buildings:	Provide for wildland fire protection to old/new buildings through a buffer zone
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,875,000
Potential Funding Sources:	Hazard Mitigation Grants, Emergency Services
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

City of Justin – Action #3	
Proposed Action:	Public education on hazards, resources, and mitigation projects.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Expansive Soils, Drought, Winter Storm Wildfire, Hail, Lightning, High Wind, Flood, Earthquake, Dam Failure
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Urban Security Initiative, Budget, Donations
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1 year
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Justin – Action #4	
Proposed Action:	Harden existing facility against natural hazards to serve as Emergency Operations Center.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Expansive Soils, Drought, Winter Storm Wildfire, Hail, Lightning, High Wind, Flood, Earthquake, Dam Failure
Effect on new/existing buildings:	Existing infrastructure would be hardened against natural hazards. New structures would be built based on these standards.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$32,350,000
Potential Funding Sources:	Mitigation Grants, Bonds
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	2-5 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Partial implementation by City. Cost can be updated to \$30,000,000.

City of Justin – Action #5	
Proposed Action:	Hire consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

SECTION 18: PREVIOUS ACTIONS

City of Justin – Action #6	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. There is signification reduction in energy drilling activities that would cause an increase risk to earthquakes.

City of Justin – Action #7	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Developers are required to conduct soil analysis prior to construction to mitigation damage to structures.

CITY OF KRUGERVILLE

City of Krugerville – Action #1	
Proposed Action:	Develop and implement local individual Tornado Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Some buildings modified for shelter retrofit
Priority (High, Moderate, Low):	High
Estimated Cost:	\$350,000
Potential Funding Sources:	HMGP, PDM, Resident Match, Local Grants, FEMA
Lead Agency/Department Responsible:	DEM
Implementation Schedule:	12-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Update action to a local program that would benefit residents directly. A region wide program through NCTCOG was discussed but limited funding provided.

City of Krugerville – Action #2	
Proposed Action:	Adopt and promote public education program for natural hazard mitigation.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, High Wind, Lightning, Wildfire, Tornado, Hail, Extreme Heat, Drought, Winter Storms, Earthquake, Expansive Soils, Dam Failure
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$35,000
Potential Funding Sources:	General Fund, Other state/federal grants, Local Funds, In-kind
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. The City has made post on social media regarding debris removal and maintenance in ditches to prevent flooding, but no other campaigns have been pursued due to limited funding and staff availability.

City of Krugerville – Action #3	
Proposed Action:	Develop and implement waterways stabilization program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and implement a buy-out program for those personal properties and structure located in high hazard flood zones starting with those that are most vulnerable to life and property loss.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	Could prevent flooding and disruption to homes
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$850,000
Potential Funding Sources:	General Fund, Grants, Local Funds, In-kind
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. The city through a Tax Note has been working to improve waterways. Through a quick search we have not discovered any homes or properties that are within a “Floodway” that would necessitate a buy-out. However, there are significant drainage easements within the City that are on residential properties. The maintenance of these is best served at a city-wide level rather than allowing individuals to maintain, however, the City resources are extremely limited.

City of Krugerville – Action #4	
Proposed Action:	Purchase and Distribution of NOAA All-Hazard radios to vulnerable households and businesses in the City.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, High Wind, Lightning, Wildfire, Tornado, Hail, Extreme Heat, Drought, Winter Storm, Dam Failure
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$200,000
Potential Funding Sources:	Grant funds, HMGP, PDM, partial payment by receiving party, Local funds, in-kind, donations, citizen cost-share
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. The City promotes the Denton County ALERT and emergency notification system that calls, texts, and E-Mails residents that sign up for weather alerts.

City of Krugerville – Action #5	
Proposed Action:	Protect citizens from extreme weather by building covered patios in public parks.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, High Winds, Lightning
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$7,500 per covered patio
Potential Funding Sources:	HMGP, PDM, Grants, City Budget, General Fund
Lead Agency/Department Responsible:	Parks / Public Works
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. The City has constructed a covered patio in the new Woodlands Park and has an existing Gazebo in the park within the Fairview Farms addition. Additional structures may be beneficial with future funding opportunities and master design concepts.

City of Krugerville – Action #6	
Proposed Action:	Develop and implement a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events..
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$55,000
Potential Funding Sources:	HMGP, PDM, General Fund, Local funds, donations, in-kind
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. The City has not implemented a CWPP at the local level. Denton County has a Wildland Urban Interface Plan that was completed.

City of Krugerville – Action #7	
Proposed Action:	Develop and implement water conservation guidelines to use in period of drought.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds, private donations, user fees, in-kind
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Krugerville – Action #8	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City does not have any high or significant hazard dams.

City of Krugerville – Action #9	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Krugerville – Action #10	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal grants, State grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. All new construction has been approved by the City's Contracted Engineer as part of our permitting process.

CITY OF KRUM

City of Krum – Action #1	
Proposed Action:	Adopt and promote public education program pertaining to hazard mitigation around the community.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Tornado, Flooding, Drought, Earthquake, Hail, Lightning, Winter Storm, Wildfire, High Wind, Expansive Soils, Dam Failure
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$15,000
Potential Funding Sources:	General fun, HMGP, PDM, other state/federal grants, Local funds, citizen cost-share, donations
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Ongoing action.

City of Krum – Action #2	
Proposed Action:	Implement local individual Tornado Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Some buildings modified for shelter retrofit
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	HMGP, PDM, Resident Match, Local grants, FEMA
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

City of Krum – Action #3	
Proposed Action:	Provide early warning from Nation Weather Service to vulnerable residents and businesses. This would be accomplished by offering an in-kind match program or give away through county schools, hospital, and public safety agencies. With the local NOAA all hazard radio station in Muenster providing excellent cover, participation would likely be high in this program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, High Wind, Lightning, Wildfire, Tornado, Hail, Extreme Heat, Drought, Winter Storm
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$60,000
Potential Funding Sources:	Grant funds, HMGP, PDM, partial payment by receiving party, Local funds, in-kind, donations, citizen cost-share
Lead Agency/Department Responsible:	Fire Department, Law Enforcement
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City will no longer pursue this action.

City of Krum – Action #4	
Proposed Action:	Develop and implement a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$65,000
Potential Funding Sources:	HMGP, PDM, General fund, Local fund, donations, in-kind, grants
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Ongoing action to be updated to include working with local agencies to implement fuel reduction.

City of Krum – Action #5	
Proposed Action:	Hire consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	City of Krum Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City will no longer pursue this action; will rely on County for information as necessary.

City of Krum – Action #6	
Proposed Action:	Develop and implement an extreme temperature program that establishes locations for vulnerable residents to go to during periods of extreme temperatures.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	Current staffing project time / resources
Potential Funding Sources:	HMGP, PDM, General fund, Local funds, donations, in-kind
Lead Agency/Department Responsible:	Fire Department / CERT
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

City of Krum – Action #7	
Proposed Action:	Develop and implement building codes that would mitigate hazard-related damage on structures and their occupants.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Tornado, Flooding, Drought, Earthquake, Hail, Lightning, Winter Storm, Wildfire, High Wind, Expansive Soil, Dam Failure
Effect on new/existing buildings:	New building codes would allow for existing / new structures to be retrofitted/constructed to mitigate against structure-impacting hazards.
Priority (High, Moderate, Low):	Low
Estimated Cost:	Current staff time
Potential Funding Sources:	General fund, Local funds, donations, in-kind
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Ongoing action with code enforcement.

City of Krum – Action #8	
Proposed Action:	Develop and implement mandatory water conservation measures during periods of drought.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$1,000
Potential Funding Sources:	HMGP, PDM, General Fund, Local funds, donations, in-kind
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Ongoing action that is continually evaluated.

City of Krum – Action #9	
Proposed Action:	Implement “Turn around Don’t Drown” campaign.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Not identified in action.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$0.00
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Update action description to be included with public education program.

City of Krum – Action #10	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City will no longer pursue this action.

City of Krum – Action #11	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City will no longer pursue this action.

CITY OF LAKE DALLAS

City of Lake Dallas – Action #1	
Proposed Action:	Promote Prevention / Mitigation Public Education and Awareness Program with resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding, Wildfire, Earthquake, Dam Failure, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500
Potential Funding Sources:	Fire Department
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #2	
Proposed Action:	Develop and implement a strategy to enforce water conservation regulations.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #3	
Proposed Action:	Enact landscaping and design measure ordinance.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Planning, Public Works
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #4	
Proposed Action:	Design and implement a city flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Medium
Estimated Cost:	N/A
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Development Services / Engineering Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #5	
Proposed Action:	Retrofit existing buildings to meet the requirements of the International Building Code.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Flooding, High Winds
Effect on new/existing buildings:	New building codes would allow existing buildings to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General funds, Local funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #6	
Proposed Action:	Adopt and implement International Building Code for new buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Flooding, High Winds
Effect on new/existing buildings:	New building codes would allow for new buildings to be constructed to mitigate against structure-impacting
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General funds, Local funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #7	
Proposed Action:	Increase the ability of residents and business to receive severe weather and emergency notification through Black Board Connect communications notification system.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Hail, Lightning, Winter Storms, Flooding, Wildfire, High Winds, Dam Failure, Extreme Heat
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$6,300
Potential Funding Sources:	General funds
Lead Agency/Department Responsible:	Police Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #8	
Proposed Action:	Install additional warning sirens to alert the public of severe weather.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Hail, Lightning, Flooding, Wildfire, High Winds
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$30,000
Potential Funding Sources:	HMGP, PDM, General Fund, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #9	
Proposed Action:	Adopt and implement Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$25,000
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	Fire Department, County Emergency Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #10	
Proposed Action:	Community safe room.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	?
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	EDC, Planning
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #11	
Proposed Action:	Build an emergency operations center.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Hail, Lightning, Wildfires, Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	?
Potential Funding Sources:	HMPG, PDM, General Funds, Local funds, grants
Lead Agency/Department Responsible:	Fire Department, Development Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #12	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

City of Lake Dallas – Action #13	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #14	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lake Dallas – Action #15	
Proposed Action:	Elevate Shady Shore Road to reduce future loss due to flooding.
BACKGROUND INFORMATION	
Site and Location:	Shady Shore Road
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	HMGP, General Fund, Local funds, donations, in-kind
Lead Agency/Department Responsible:	Public Works, EDC, Floodplain Manager
Implementation Schedule:	18-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

CITY OF LEWISVILLE

City of Lewisville – Action #1	
Proposed Action:	All hazard public education for each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storms, Flooding, Drought, Tornado, Dam Failure, Expansive Soils, Hail, High Winds, Lightning, Earthquake, Wildfire
Effect on new/existing buildings:	Assist with identification of storm shelter areas. Identify construction methods for safe rooms and storm shelters.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$12,000
Potential Funding Sources:	Grants and traditional funding sources, UASI, EMPG
Lead Agency/Department Responsible:	Lewisville Office of Emergency Management
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. There has not been a study conducted to identify storm shelter areas in the City. Lewisville Independent School District has storm shelters in two newly built schools, Mill Street Elementary on Mill St and Memorial Elementary on Josie Ln.

City of Lewisville – Action #2	
Proposed Action:	Purchase Igloo water coolers and cooling apparel for city employees who work outdoors to mitigate extreme heat.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	Emergency Management, City Management
Implementation Schedule:	3-6 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Coolers and cooling were purchased by PARD and continue to purchase items that become broken or torn. Coolers are also utilized at all City sponsored outdoor events.

City of Lewisville – Action #3	
Proposed Action:	Change florescent lightning in municipal facilities to LED bulbs.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$75,000
Potential Funding Sources:	Local funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

City of Lewisville – Action #4	
Proposed Action:	Construct a living fence along exposed portions of highways 121.
BACKGROUND INFORMATION	
Site and Location:	Highway 121
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storms, High Winds
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$500,000
Potential Funding Sources:	HMGP, PDM, Local Funds, Private donations, Public/Private partnerships, local funds, donations, in-kind
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. No action taken by City, does not wish to pursue.

City of Lewisville – Action #5	
Proposed Action:	Purchase Yak Traks boots/show covers for first responders, city employees, and residents for winter weather.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storms
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Yak Traks boots were purchased by the City for first responders and some city employees. The Yak Traks for first responders are still available.

City of Lewisville – Action #6	
Proposed Action:	Develop and implement a comprehensive water conservation education program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$2,500
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. The Water Conservation and Management Plan maintained by Sustainability.

City of Lewisville – Action #7	
Proposed Action:	Adopt landscape ordinance with stronger water conservation regulations.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$2,500
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Neighborhood Services
Implementation Schedule:	6-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Water Conservation and Management Plan Ordinance 4059-04-2014, Residential Water Conservation Credit Program, Outdoor Water Restrictions.

City of Lewisville – Action #8	
Proposed Action:	Drought Contingency Plan.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lewisville – Action #9	
Proposed Action:	Purchase and install flood warning systems in key areas along Timber Creek.
BACKGROUND INFORMATION	
Site and Location:	Timber Creek
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$50,000
Potential Funding Sources:	HMGP, PDM, Local Funds, donations, in-kind, public/private partnerships
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Flood Warning Systems were not purchased in key areas around Timber Creek.

City of Lewisville – Action #10	
Proposed Action:	Levy a storm water fee for developers to fund developments to the storm water drainage systems.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	Will reduce flooding in current structures. Developers would be required to pay a fee for increase demand on storm water system.
Priority (High, Moderate, Low):	Medium
Estimated Cost:	None
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Neighborhood Services, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. The Stormwater Utility Fee is based on the amount of impervious surface present on a property. Single-family properties are assessed a flat fee of \$4 and non-single-family properties are assessed a fee at the rate of \$1.43 per 1,000 square feet of impervious area (roofs, parking lots, driveways, etc.). The fee is assessed monthly on the utility bill.

City of Lewisville – Action #11	
Proposed Action:	Buy-out properties in the Timber Creek Subdivision.
BACKGROUND INFORMATION	
Site and Location:	Timber Creek Subdivision
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	Existing buildings in the buyout zones would be purchased and demolished. New construction would be restricted in the area bought out by the city
Priority (High, Moderate, Low):	Low
Estimated Cost:	Market price per property
Potential Funding Sources:	HMA, Local Funds, Public/Private partnerships, donations, in kind
Lead Agency/Department Responsible:	Emergency Management, Public Works, Land Use
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Three homes, in the Timber Creek Subdivision, were bought out and demolished through the FMA grant funding, managed by OEM. Two lots adjacent to two of the homes were purchased through the city. New construction is restricted in the area.

City of Lewisville – Action #12	
Proposed Action:	Provide funds for storm shelters to mitigate loss of life and property.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$4 million
Potential Funding Sources:	HMGP, PDM, Local Funds, Public/Private partnerships, donations, in kind
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. The city promoted the North Central Texas Safe Room Rebate Program since 2013. There were residents from Lewisville who have applied and were on a waitlist until the program was discontinued in 2020 and all applicants were notified.

City of Lewisville – Action #13	
Proposed Action:	Purchase and install CASA-WX weather radio system.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm, Flooding, Tornado, Dam Failure, Hail, High Wind, Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2.5 million
Potential Funding Sources:	HMGP, PDM, Local Funds, Public/Private partnerships, donations ,in kind
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. The CASA Weather system program dues at \$10,000 per year was discontinued to departmental budget reductions in 2017. The NWS Chat Live system provides the same weather information for free.

City of Lewisville – Action #14	
Proposed Action:	Expand outdoor warning system to cover new developments and population increases.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm, Flooding, Tornado, Dam Failure, Hail, High Wind, Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$1,000,000
Potential Funding Sources:	HMGP, PDM, Local Funds, Public/Private partnerships, donations ,in kind
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. In FY16, two new sirens were installed to add coverage to the City. In FY17, one new siren was installed at East Hill Park. In FY19, one new siren was added at Austin Ranch (Lakewood Hills). In FY20, one new siren was installed at southeast Castle Hills. Funding was through OEM Department action steps through the risk fund.

City of Lewisville – Action #15	
Proposed Action:	Hardening of critical infrastructure facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildland Fire, Extreme Heat, High Winds, Flooding, Winter Storms, Hail, Earthquake, Lightning, Dam Failure, Drought, Expansive Soils
Effect on new/existing buildings:	Hardening of critical infrastructure facilities
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$150,000
Potential Funding Sources:	HMGP, PDM, SHSP, UASI, Local Funds, Public/Private partnerships, donations ,in kind
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	1-4 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lewisville – Action #16	
Proposed Action:	Install more cameras at Lewisville Dam to monitor for structural issues and security and mitigate the Trinity River Basin flooding effects on life and property.
BACKGROUND INFORMATION	
Site and Location:	Lewisville Dam
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	Lewisville Dam would have cameras installed at critical points
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,500,000
Potential Funding Sources:	SHSP, UASI, Local Funds, Public/Private partnerships, donations ,in kind
Lead Agency/Department Responsible:	Emergency Management, Police Department, Public Works
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Cameras were not installed at Lewisville Dam to monitor for structural issues and security. The U.S. Army Corp of Engineers began Dam Safety Modifications in 2020. It is a \$150 million dollar project split into three phases. The modifications are expected to be completed by 2026 to 2028

City of Lewisville – Action #17	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. In FY16, a consultant was hired to conduct LiDAR data services utilizing FY16 UASI grant funding. In FY17, a consultant was hired to complete a dam flood inundation plan and conduct a tabletop exercise for the City as part of phase II of the FY17 UASI grant funding.

SECTION 18: PREVIOUS ACTIONS

City of Lewisville – Action #18	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Lewisville – Action #19	
Proposed Action:	Conduct a soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risk, threats and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

TOWN OF LITTLE ELM

Town of Little Elm – Action #1	
Proposed Action:	CASA (WX) Weather Radio System.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Tornado, High Wind, Wildfire, Flooding, Lightning, Winter Storm
Effect on new/existing buildings:	Increase response decision by 100%.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000 annually
Potential Funding Sources:	Local funding, Local grants, Federal funding, HMGP
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	12-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Little Elm – Action #2	
Proposed Action:	Promote mitigation public education and awareness program with resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding, Wildfire, Dam Failure, Earthquake, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500
Potential Funding Sources:	Fire Department
Lead Agency/Department Responsible:	Little Elm Emergency Management
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Little Elm – Action #3	
Proposed Action:	Develop and implement a strategy to enforce water conservation regulations.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Update action to reflect public education.

Town of Little Elm – Action #4	
Proposed Action:	Enhance landscaping and design measure ordinance.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Planning, Public Works
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Our landscaping ordinance was updated in 2017 to include xeriscaping, using native plants to reduce water usage, etc.

Town of Little Elm – Action #5	
Proposed Action:	Develop and implement a town flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Development Services / Engineering Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

Town of Little Elm – Action #6	
Proposed Action:	Retrofit existing buildings to meet the requirement of the International Building Code.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storm, Flooding, High Winds
Effect on new/existing buildings:	New building codes would allow existing buildings to be retrofitted to mitigate against structure-impacting haards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General Funds, Local Funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

Town of Little Elm – Action #7	
Proposed Action:	Adopt and implement the International Building Code for new buildings.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storm, Flooding, High Winds
Effect on new/existing buildings:	New building codes would allow existing buildings to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General Funds, Local Funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Little Elm – Action #8	
Proposed Action:	Increase the ability of residents and business to receive severe weather and emergency notification through the Little Elm Alert public communications notification system.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Hail, Lightning, Winter Storm, Flooding, Wildfire
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$13,900
Potential Funding Sources:	Fire Department Budget
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Little Elm – Action #9	
Proposed Action:	Improvement of the town’s 2008 Comprehensive Plan (updated 2013).
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Planning Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Updated in 2017.

Town of Little Elm – Action #10	
Proposed Action:	Develop and implement a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$25,000
Potential Funding Sources:	HMGP, PDM, General Fund, Local Fund, donations, in-kind
Lead Agency/Department Responsible:	Little Elm Fire Department, County Emergency Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

Town of Little Elm – Action #11	
Proposed Action:	Provide opportunities throughout the community for citizens to escape extreme heat.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerabilities from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	Current staffing project time / resources
Potential Funding Sources:	HMGP, PDM, General Fund, Local Fund, donations, in-kind
Lead Agency/Department Responsible:	EDC, Planning
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Town explore the following areas: The Cove, splash pad, improvements to little elm park, and planned improvements to cottonwood park.

Town of Little Elm – Action #12	
Proposed Action:	Hire consultant to complete new inundation studies for all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

Town of Little Elm – Action #13	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

Town of Little Elm – Action #14	
Proposed Action:	Conduct a soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risk, threats and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. Town no longer wishes to pursue.

Town of Little Elm – Action #15	
Proposed Action:	Expand and upgrade current warning sirens to reach new property acquired in Little Elm.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds, Hail
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	HMGP, General Fund, Local funds, donations, in-kind
Lead Agency/Department Responsible:	EDC, Emergency Management, Public Works
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Town has been refurbishing the older sirens with updated equipment and will continue to add new sirens to new locations.

Town of Little Elm – Action #16	
Proposed Action:	Drainage improvements to mitigate future flash and lake flooding problems reducing the loss of life and property.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds, Hail
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1 million
Potential Funding Sources:	HMGP, General Fund, Local funds, donations, in-kind
Lead Agency/Department Responsible:	EDC, Floodplain Manager, Public Works
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Developing a new stormwater ordinance. No timeline yet as to when it will be completed.

CITY OF PILOT POINT

City of Pilot Point – Action #1	
Proposed Action:	Develop and implement a comprehensive public education program that will inform the public on resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storms, Hail, Lightning, Dam Failure, Expansive Soils, Earthquake
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Sources:	HMGP, General Fund, Local Grants, In-kind
Lead Agency/Department Responsible:	Development Services
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Currently multiple platforms are utilized to educate citizens such as social media, water smart, and code red platforms. We would like to enhance these opportunities through other means. Currently our City Manager, Police Chief, and Fire Chief are speakers on an annual basis at a community event called Point Breakfast.

City of Pilot Point – Action #2	
Proposed Action:	Coordinate and participate with Denton County in the development of a CASA (WX) Weather Radar System.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Tornado, High Wind, Wildfire, Flooding, Lightning, Dam Failure, Winter Storm
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$100,000
Potential Funding Sources:	City general funds, CDBG grant funds
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Pilot Point – Action #3	
Proposed Action:	Develop and implement a water conservation program through efficient irrigation systems and drought resistant landscaping.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Drought, Expansive Soils
Effect on new/existing buildings:	The foundation of existing building can be protected from shifting. Foundations for new buildings can be protected from sifting and expanding soils.
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Sources:	City General fund
Lead Agency/Department Responsible:	Development Services
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Pilot Point – Action #4	
Proposed Action:	Adopt and implement Texas Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Some building modified for shelter retrofit. Provides safe shelter for new building during severe weather.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Mitigation Grants, in-kind, payment by receiving party, business or community donations
Lead Agency/Department Responsible:	Development Services
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Current administration is unaware of action taken to secure moneys to distribute rebates to homeowners. A tornado shelter was included in the construction of our new fire station.

City of Pilot Point – Action #5	
Proposed Action:	Develop and implement community wildfire protection program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Protect existing and new properties from the effect of natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought, Extreme Heat, Lightning
Effect on new/existing buildings:	Provide for wildland fire protection to old/new buildings through a buffer zone
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Texas Forest Service, Hazard Mitigation Grants
Lead Agency/Department Responsible:	Development Services, Police Department, Fire Department
Implementation Schedule:	1-3 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. The city has installed lightning protection on wells and pump stations, purchased a brush truck, and has taken a proactive stance on enforcement of high grass code infractions.

City of Pilot Point – Action #6	
Proposed Action:	Develop and implement program to provide early warning system to citizens.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wildfire, Extreme Heat, High Winds, Flooding, Drought, Winter Storm, Hail, Lightning, Dam Failure
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$15,000
Potential Funding Sources:	HMGP. General Fund, Partial payment by receiving party, local grants, in-kind
Lead Agency/Department Responsible:	Planning Department
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. The city has implemented Code Red which allows us to deliver geo-targeted, time-sensitive information to individuals who have register to receive alerts.

City of Pilot Point – Action #7	
Proposed Action:	Hire Consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-Kind
Lead Agency/Department Responsible:	Planning and Zone
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. We do not have any dams in our corporate boundaries. The city of Pilot Point passed a bond to do a drainage study, implemented drainage fee and department, and added a line item in the budget for drainage repair.

City of Pilot Point – Action #8	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Pilot Point – Action #9	
Proposed Action:	Conduct a soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

TOWN OF PONDER

Town of Ponder – Action #1	
Proposed Action:	Public education on hazards, resources and mitigation projects.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding, Wildfires, Dam Failure, Earthquake, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Urban Security Initiative, Budget, Donations
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Ongoing.

Town of Ponder – Action #2	
Proposed Action:	Harden existing critical infrastructure against natural hazards.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding, Wildfires, Dam Failure, Earthquake, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$32,350,000
Potential Funding Sources:	Mitigation Grants, Bonds
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	2-5 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Currently looking to harden sewage and water.

Town of Ponder – Action #3	
Proposed Action:	Adopt and implement Texas Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Some buildings modified for shelter retrofit. Provides safe shelter for new building during severe weather.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Mitigation Grants, in-kind, payment by receiving party, business, or community donations
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-4 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Ponder – Action #4	
Proposed Action:	Develop and implement Community Wildfire Protection Program.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildland Fire, Extreme Heat, Drought, Lightning
Effect on new/existing buildings:	Provide for wildland fire protection through a buffer zone.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,875,000
Potential Funding Sources:	Hazard Mitigation Grants
Lead Agency/Department Responsible:	Emergency Services
Implementation Schedule:	1-2 years
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Ponder – Action #5	
Proposed Action:	Hire Consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-Kind
Lead Agency/Department Responsible:	Planning and Zone
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

Town of Ponder – Action #6	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Ponder – Action #7	
Proposed Action:	Conduct a soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

CITY OF ROANOKE

City of Roanoke – Action #1	
Proposed Action:	Create and implement master utility/storm water plan.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds, Earthquake, Flooding, Drought, Extreme Heat, Expansive Soils
Effect on new/existing buildings:	New building would be built to new standards to decrease impact of hazards.
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	Current personnel salaries, HMGP
Lead Agency/Department Responsible:	Development Services
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. In-progress.

City of Roanoke – Action #2	
Proposed Action:	Develop public education on hazards and resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Wildfire, Flooding, Tornado, Drought, Hail, Lightning, Dam Failure, High Wind, Earthquake, Winter Storm, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	HMGP, Local fund, General fund
Lead Agency/Department Responsible:	OEM
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Roanoke – Action #3	
Proposed Action:	Develop and implement program to provide NOAA all hazard radios to citizens.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Wildfire, Flooding, Tornado, Drought, Hail, Lightning, Dam Failure, High Wind, Earthquake, Winter Storm
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	HMGP, Partial payment from receiving party, Local fund, donations, citizen cost-share
Lead Agency/Department Responsible:	OEM, LE, FD
Implementation Schedule:	1-2 year
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Roanoke – Action #4	
Proposed Action:	Retrofit Community and Recreation Centers to serve as cooling/warming centers.
BACKGROUND INFORMATION	
Site and Location:	Community and Recreation Centers
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$30,000
Potential Funding Sources:	HMGP, Local funding, donations
Lead Agency/Department Responsible:	OEM, Parks and Recreation
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Roanoke – Action #5	
Proposed Action:	Develop and implement fuel management plan.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Effect on new/existing buildings:	Decrease threat of WUI by maintain defensible spaces around properties. Require new structure built in WUI areas to create and maintain defensible spaces.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,000
Potential Funding Sources:	HMGP, Local funding, ACOE
Lead Agency/Department Responsible:	OEM, FD, Community Development
Implementation Schedule:	12-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Roanoke – Action #6	
Proposed Action:	Hire Consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-Kind
Lead Agency/Department Responsible:	Planning and Zone
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. No dams within city-limits.

City of Roanoke – Action #7	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local Funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City no longer finds action applicable.

City of Roanoke – Action #8	
Proposed Action:	Conduct a soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure.
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal Grants, State Grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. City no longer finds action applicable.

CITY OF SANGER

City of Sanger – Action #1	
Proposed Action:	Implement individual Tornado Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Develop and execute new programs which identify and reduce threats from natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	Some buildings modified for shelter retrofit
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	HMGP, PDM, Resident Match, Local Grant, FEMA
Lead Agency/Department Responsible:	Department of Development Services
Implementation Schedule:	12-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Sanger – Action #2	
Proposed Action:	Protect citizens from extreme weather by building covered patios in public parks.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, High Winds, Lightning
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	PDM, General Budgets, State and Federal Grants, Citizen cost-share, donations
Lead Agency/Department Responsible:	Public Works / Parks
Implementation Schedule:	6-9 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

City of Sanger – Action #3	
Proposed Action:	Purchase of a CASA (WX) Weather Radar System.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Tornados, High Wind, Wildfire, Flooding, Lightning, Dam Failure, Winter Storm Drought, Tropical Storm
Effect on new/existing buildings:	Increase response decisions by 100%
Priority (High, Moderate, Low):	High
Estimated Cost:	\$550,000
Potential Funding Sources:	Local Funding. Federal funding. HMGP, Local grants
Lead Agency/Department Responsible:	Denton County Emergency Management, NCTCOG
Implementation Schedule:	12-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Sanger – Action #4	
Proposed Action:	Adopt and promote public education program to include mitigation measures for each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding, Dam Failure, High Wind, Lightning, Wildfire, Tornado, Hail, Extreme Heat, Drought, Winter Storms, Expansive Soil, Earthquake
Effect on new/existing buildings:	General fund, HMGP, PDM, other state/federal grants, Local fund, citizen cost-share, donations
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funding. Federal funding, HMGP, Local grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Ongoing action using Code Red System.

City of Sanger – Action #5	
Proposed Action:	Reconstruct creek waterways to correct drainage issues.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	Could prevent flooding and disruption to transportation
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$600,000
Potential Funding Sources:	HMGP, General Funds, Local funds, in-kind
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Sanger – Action #6	
Proposed Action:	Hire consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

City of Sanger – Action #7	
Proposed Action:	Adopt and implement stricter building codes consistent with International Residential Building Code.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Winter Storm, Drought, Hail, Earthquake, Expansive Soils, Flood, Extreme Heat, Winter Storm, Drought, Lightning
Effect on new/existing buildings:	Can be retrofit. Reduce impacts of hazards on structure and occupants
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$7,500
Potential Funding Sources:	City budget
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	6-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

City of Sanger – Action #8	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of Sanger – Action #9	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal grants, State grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

TOWN OF SHADY SHORES

Town of Shady Shores – Action #1	
Proposed Action:	Develop and implement mitigation public education and awareness program with resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lighting, High Wind, Flooding, Wildfire, Earthquake, Expansive, Soils, Dam Failure
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500
Potential Funding Sources:	Fire Department
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Public education has been implemented, addressing emergency facilities' location and available funding resources.

Town of Shady Shores – Action #2	
Proposed Action:	Develop and implement a strategy to enforce water conservation regulations.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Partnerships with NCTCOG and other local agencies have assisted in implementing education and awareness. Ordinances are being reviewed and updated to best practices.

Town of Shady Shores – Action #3	
Proposed Action:	Enhance Landscaping and design measure ordinance.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Planning, Public Works
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. New ordinances and public education/awareness have been adopted to address Urban Forests. An Adhoc committee has been formed to address the best use of greenspace.

Town of Shady Shores – Action #4	
Proposed Action:	Develop and implement a town flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Medium
Estimated Cost:	N/A
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Development Service / Engineering Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Adoption of Flood Damage Ordinance. Participation with the NCTCOG and other agencies to identify potential risks and gather ongoing data.

Town of Shady Shores – Action #5	
Proposed Action:	Retrofit existing buildings to meet the requirement of the International Building Code.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding Wildfire, Earthquake, Expansive Soils
Effect on new/existing buildings:	New building codes would allow existing building to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General fund, local fund
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Town purchase of a generator to ensure continuous power.

Town of Shady Shores – Action #6	
Proposed Action:	Adopt and implement International Building Code for new building.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding Wildfire, Earthquake, Expansive Soils
Effect on new/existing buildings:	New building codes would allow existing building to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General fund, local fund
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Building Codes have been adopted and updated.

Town of Shady Shores – Action #7	
Proposed Action:	Develop and implement a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$25,000
Potential Funding Sources:	HMGP, PDM, General fund, local funds, donation, in-kind, grants
Lead Agency/Department Responsible:	Fire Department, County Emergency Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. A partnership with the Fire Department has been established.

Town of Shady Shores – Action #8	
Proposed Action:	Community Safe Room.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Wind
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$700,000
Potential Funding Sources:	HMGP, PDM, General fund, local funds, donation, in-kind, grants
Lead Agency/Department Responsible:	EDC, Planning
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. This action to be revised to promote community awareness, education, and support for acquiring personal safe rooms.

Town of Shady Shores – Action #9	
Proposed Action:	Build an Emergency Operations Center.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storms, Hail, Lightning, Wildfires, Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	TBD
Potential Funding Sources:	HMGP, PDM, General fund, local funds, grants
Lead Agency/Department Responsible:	Fire Department, Develop Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Contracts with the Lake Cities Fire Department, which coordinates the use of an emergency operations center central to the communities.

Town of Shady Shores – Action #10	
Proposed Action:	Hire consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

Town of Shady Shores – Action #11	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

Town of Shady Shores – Action #12	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Town-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal grants, State grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Staff education has begun to attend seminars.

Town of Shady Shores – Action #13	
Proposed Action:	Elevate Shady Shores Road to reduce future loss due to flooding.
BACKGROUND INFORMATION	
Site and Location:	Shady Shores Road
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	HMGP, General fund, local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	Public Works, EDC, Floodplain Manager
Implementation Schedule:	18-24 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. Ongoing and construction is expected to begin in March of 2024.

CITY OF THE COLONY

City of The Colony – Action #1	
Proposed Action:	Promote mitigation public education and awareness programs with resources to mitigate the impacts of each identified hazard.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Extreme Heat, Drought, Winter Storm, Hail, Lightning, High Winds, Flooding, Wildfire, Earthquake, Dam Failure, Expansive Soils
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500
Potential Funding Sources:	Fire Department
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Funds no longer needed for this item: Ongoing efforts for education and awareness programs. We utilized COG’s KnowWhat2Do program and social media outreach. We also put on “preparedness presentations” at our Community Center periodically.

City of The Colony – Action #2	
Proposed Action:	Develop and implement a strategy to enforce water conservation regulations.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Funds no longer needed, and project is complete. Water conservation efforts are implemented and information on water conservation is provided to citizens during droughts.

City of The Colony – Action #3	
Proposed Action:	Enhance Landscaping and design measures ordinance.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	None
Potential Funding Sources:	None
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Ongoing. We have ordinances for landscape requirements.

City of The Colony – Action #4	
Proposed Action:	Develop and implement a City flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Medium
Estimated Cost:	N/A
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Development Services / Engineering Department
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. This ordinance exists and is no longer an action item.

City of The Colony – Action #5	
Proposed Action:	Retrofit existing buildings to meet the requirements of the International Building Code.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storm, Flooding, Wildfire
Effect on new/existing buildings:	New building codes would allow existing buildings to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General funds, Local funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed and Defer to Plan Update. Ongoing. In the process of meeting IBC standards.

City of The Colony – Action #6	
Proposed Action:	Adopt and implement the International Building Code for new buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Winter Storm, Flooding, Wildfire
Effect on new/existing buildings:	New building codes would allow existing buildings to be retrofitted to mitigate against structure-impacting hazards
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	General funds, Local funds
Lead Agency/Department Responsible:	Planning and Zoning
Implementation Schedule:	9-12 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. 2018 IBC is used for all new buildings.

City of The Colony – Action #7	
Proposed Action:	Develop and implement a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	\$25,000
Potential Funding Sources:	HMGP, PDM, General Fund, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	Fire Department, County Emergency Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action. CWPP is not a concern for The Colony currently.

City of The Colony – Action #8	
Proposed Action:	Build a Community Safe Room.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	?
Potential Funding Sources:	HMGP, PDM, General Fund, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	EDC, Planning
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of The Colony – Action #9	
Proposed Action:	Build an Emergency Operations Center.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, High Winds, Extreme Heat, Winter Storms, Lightning., Flooding, Wildfire, Hal
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	Medium
Estimated Cost:	TBD
Potential Funding Sources:	HMGP, PDM, General Fund, Local funds, grants
Lead Agency/Department Responsible:	Fire Department, Develop Services
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of The Colony – Action #10	
Proposed Action:	Protect citizens from extreme weather by building covered patios in public parks.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, High Winds, Lightning
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	PDM, General Budget, State and Federal Grants, citizen cost-share, donations
Lead Agency/Department Responsible:	Public Works / Parks
Implementation Schedule:	6-9 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed. Covered patios have been added to most parks.

City of The Colony – Action #11	
Proposed Action:	Hire consultant to complete new inundation studies of all high and moderate hazard dams.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect existing and new properties from the effects of all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	HMGP, Water Shed Authorities, Dam Sponsors, Local Sponsors, In-kind
Lead Agency/Department Responsible:	Planning and Zoning / NRCS
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Delete Action.

City of The Colony – Action #12	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	HMGP, Local funds
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	6-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update.

City of The Colony – Action #13	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risks, threats and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Effect on new/existing buildings:	Study would identify existing construction most at risk for expansive soil damage. Study would be used to identify undeveloped areas at risk for expansive soil damage for real estate disclosure
Priority (High, Moderate, Low):	Low
Estimated Cost:	TBD
Potential Funding Sources:	Federal grants, State grants, Local Funds
Lead Agency/Department Responsible:	Emergency Management, Public Works
Implementation Schedule:	12-18 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Defer to Plan Update. We have geotechnical reports from our Fire Station 4 and 5 (new builds) but have not conducted a citywide study.

City of The Colony – Action #14	
Proposed Action:	Drainage improvements to mitigate future flash and lake flooding problems reducing the loss of life and property.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Not reflected in previous plan

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flooding
Effect on new/existing buildings:	None
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1 million
Potential Funding Sources:	HMGP, General fund, Local funds, donations, in-kind, grants
Lead Agency/Department Responsible:	EDC, Floodplain Manager, Public Works
Implementation Schedule:	18-36 months
Incorporation into Existing Plans:	Not reflected in previous plan

2022 ANALYSIS:
Completed.

SECTION 19: MITIGATION ACTIONS

Summary.....2

Denton County – County-Wide Actions5

Denton County 11

Town of Argyle67

City of Aubrey 73

Town of Bartonville88

Town of Copper Canyon91

City of Corinth 94

Town of Cross Roads 115

City of Denton 134

Town of DISH..... 175

Town of Double Oak 182

Town of Flower Mound233

City of Hackberry 242

Town of Hebron 247

Town of Hickory Creek..... 250

City of Highland Village..... 264

City of Justin 272

City of Krugerville..... 278

City of Krum 296

City of Lake Dallas 305

Town of Lakewood Village 326

City of Lewisville 331

Town of Little Elm 369

Town of Northlake..... 384

City of Oak Point..... 391

City of Pilot Point..... 405

Town of Ponder..... 416

Town of Providence Village 422

City of Roanoke 432

City of Sanger 440

Town of Shady Shores..... 457

SECTION 19: MITIGATION ACTIONS

City of The Colony467
Town of Trophy Club.....497

SUMMARY

As discussed in Section 2, at the mitigation workshop the planning team and stakeholders met to develop mitigation actions for each of the natural hazards included in the Plan Update. Each of the actions in this section were prioritized based on FEMA’s Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria necessary for the implementation of each action.

As part of the economic evaluation of the STAPLEE analysis, jurisdictions analyzed each action in terms of the overall costs, measuring whether the potential benefit to be gained from the action outweighed costs associated with it. As a result of this exercise, priority was assigned to each mitigation action by marking them as High (H), Moderate (M), or Low (L). An action that is ranked as “High” indicates that the action will be implemented as soon as funding is received. A “Moderate” action is one that may not be implemented right away depending on the cost and number of citizens served by the action. Actions ranked as “Low” indicate that they will not be implemented without first seeking grant funding and after “High” and “Moderate” actions have been completed.

All mitigation actions created by Planning Team members are presented in this section in the form of Mitigation Action Worksheets. More than one hazard is sometimes listed for an action, if appropriate. Actions presented in this section represent a comprehensive range of mitigation actions per current State and FEMA Guidelines, including two actions, per hazard, and of two different types for each participating jurisdiction. The term county-wide action refers to Denton County and the Cities/Towns of: Argyle, Aubrey, Bartonville, Copper Canyon, Corinth, Cross Roads, Denton, DISH, Double Oak, Flower Mound, Hackberry, Hebron, Hickory Creek, Highland Village, Justin, Krugerville, Krum, Lake Dallas, Lakewood Village, Lewisville, Little Elm, Northlake, Oak Point, Pilot Point, Ponder, Providence Village, Roanoke, Sanger, Shady Shores, The Colony, and Trophy Club.

SECTION 19: MITIGATION ACTIONS

Table 19-1. Denton County Mitigation Action Matrix

TYPE OF ACTION	
Action #1 – Plans/Regulations (Blue)	Action #4 – Structural (Orange)
Action #2 – Education/Awareness (Red)	Action #5 – Preparedness/Response (Black)
Action #3 – Natural Systems Protections (Green)	

Jurisdiction	Flood	Thunderstorm Winds	Tornado	Lightning	Hail	Winter Storm	Extreme Heat	Drought	Wildfire	Dam Failure	Earthquake	Expansive Soils
Denton County	XXXX	XXX	XXX	XXX	XXX	XXX	XXXX	XXXX	XXXX	XXX	XXX	XXX
Town of Argyle	XXX	XX	XX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX
City of Aubrey	XXXX	XXX	XXX	XXX	XXX	XXX	XXX	XX	XXX	XXX	XXX	XXX
Town of Bartonville	XX	XX	XX	XX	XX	XXX	XX	XX	XXX	N/A	XX	XXX
Town of Copper Canyon	XXXX	XXX	XXX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX
City of Corinth	XXXX	XXX	XXX	XXX	XXX	XXX	XX	XXX	XXX	N/A	XXX	XXX
Town of Cross Roads	XXXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	N/A	XX	XXX
City of Denton	XXXX	XXX	XXX	XX	XX	XXX	XX	XXX	XXX	XX	XX	XXX
Town of DISH	XXX	XXX	XXX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX
Town of Double Oak	XXXX	XXX	XXX	XXX	XXX	XXX	XXXX	XXXX	XXX	N/A	XXX	XXX
Town of Flower Mound	XX	XX	XX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX
City of Hackberry	XX	XX	XX	XX	XX	XXX	XX	XX	XXX	N/A	XX	XXX
Town of Hebron	XXX	XX	XX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX
Town of Hickory Creek	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	N/A	XX	XXX
City of Highland Village	XX	XX	XX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX
City of Justin	XXX	XXX	XXX	XX	XX	XX	XX	XX	XXXX	N/A	XX	XXX
City of Krugerville	XXX	XXX	XXX	XX	XX	XX	XX	XXX	XXX	N/A	XX	XXX
City of Krum	XXX	XXX	XXX	XXX	XXX	XXX	XX	XXXX	XXXX	N/A	XXX	XXX
City of Lake Dallas	XXX	XXX	XXX	XXX	XXX	XXX	XX	XXX	XXX	N/A	XXX	XXX
Town of Lakewood Village	XX	XX	XX	XX	XX	XXX	XX	XX	XXX	N/A	XX	XXX
City of Lewisville	XXXXX	XXXX	XXXX	XXX	XXX	XXX	XXXXX	XXXXX	XXX	XXXXX	XXX	XXXXX
Town of Little Elm	XXXX	XXX	XXX	XXX	XXX	XXX	XXXX	XXXX	XXX	N/A	XXX	XXX
Town of Northlake	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XX	XXX	N/A	XXX	XXX

SECTION 19: MITIGATION ACTIONS

Jurisdiction	Flood	Thunderstorm Winds	Tornado	Lightning	Hail	Winter Storm	Extreme Heat	Drought	Wildfire	Dam Failure	Earthquake	Expansive Soils
City of Oak Point	XXXX	XXX	XXX	XX	XX	XX	XX	XX	XXXX	N/A	XX	XXX
City of Pilot Point	XX	XXX	XXX	XX	XX	XX	XXX	XXX	XXX	N/A	XX	XXX
Town of Ponder	XXX	XXX	XX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX
Town of Providence Village	XXXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	N/A	XXX	XXXX
City of Roanoke	XXX	XXX	XXX	XX	XX	XXX	XXX	XXX	XXX	N/A	XXX	XXX
City of Sanger	XX	XXX	XXX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX
Town of Shady Shores	XXX	XXX	XXX	XXX	XXX	XXX	XX	XXX	XXX	N/A	XX	XXX
City of The Colony	XXXX	XXX	XXX	XXX	XX	XXX	XXX	XXX	XXX	N/A	XXX	XXX
Town of Trophy Club	XXXX	XXX	XXX	XX	XX	XX	XX	XX	XXX	N/A	XX	XXX

DENTON COUNTY – COUNTY-WIDE ACTIONS

Denton County-wide – Action #1	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide including all participating jurisdictions
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (where applicable), Drought, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm, Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	County and Local Emergency Managers
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Denton County-wide – Action #2	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	Community critical facilities including all participating jurisdictions
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (where applicable), Extreme Heat, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm, Earthquake,
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	County Public Works/City Engineer/Jurisdictional Administrator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

Denton County-wide – Action #3	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures such as greywater reuse systems and drought tolerant landscaping.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities including all participating jurisdictions
Risk Reduction Benefit: <i>(Current Cost/Losses Avoided)</i>	Reduce damages at critical facilities
Type of Action: <i>(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)</i>	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	County Public Works/City Engineer/Jurisdictional Administrator
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan (applicable jurisdictions)

COMMENTS:

Denton County-wide – Action #4	
Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community critical facilities including all participating jurisdictions
Risk Reduction Benefit: <i>(Current Cost/Losses Avoided)</i>	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: <i>(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)</i>	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (where applicable), Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm, Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	County Public Works/City Engineer/City/Town Administrator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan (applicable jurisdictions)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Denton County-wide – Action #5	
Proposed Action:	Develop a Community Wildfire Protection Plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide for those participating jurisdictions that do not have an active plan.
Risk Reduction Benefit: <i>(Current Cost/Losses Avoided)</i>	Reduce risk of damages, injuries, and fatalities.
Type of Action: <i>(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)</i>	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	County/City/Town Administrator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances

COMMENTS:

Denton County-wide – Action #6	
Proposed Action:	Identify and map areas throughout the county that are vulnerable to expansive soils. Conduct soil analysis to determine the scope, impact, and extent of expansive soils. Implement a program for creating a historical record for expansive soil incidents and damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including all participating jurisdictions.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Reduce risk to structures through improved risk analysis and historic event analysis to inform development decisions and construction practices.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to future structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$75,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	County/City/Town Administrator
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances

COMMENTS:

DENTON COUNTY

Denton County – Action #1	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP and departmental SOGs

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #2	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm, Wind, Tornado, Wildfire, Winter Storm.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP and internal facility planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

Denton County – Action #3	
Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm, Wind, Tornado, Wildfire, Winter Storm.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP and facility planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #4	
Proposed Action:	Relocate critical facilities out of high hazard areas.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	Existing buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure continuity of critical services; Reduce or eliminate damages to critical facilities by citing out of known flood hazard areas; Protect/restore function of the natural floodplain.

Denton County – Action #5	
Proposed Action:	Require new public buildings to be sited on low-risk parcels.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce risk of flood damages to future structures by citing out of known flood hazard areas; Protect function of the natural floodplain.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #6	
Proposed Action:	Restrict future development in high-risk areas.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce risk of flood damages to future structures by citing out of known flood hazard areas; Protect function of the natural floodplain.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #7	
Proposed Action:	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way; Remove dead trees from right-of way and drainage systems on a scheduled basis.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind, Hail, Lightning, Tornado, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Maintain capacity of drainage system to reduce potential of flooding.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #8	
Proposed Action:	Adopt on-site retention basin program in conjunction with development to address excessive stormwater / firefighting water source.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$25 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce risk of flood damages to future developments by requiring offset measures for storm runoff; Reduce or eliminate downstream impacts of development.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #9	
Proposed Action:	Incorporate higher standards for hazard resistance in local application of the building code. Conduct studies to assess potential impacts for lesser known hazards such as earthquakes.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm, Wind, Tornado, Wildfire, Winter Storm.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and existing
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	Facility planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce risk of flood damages to future structures through improved construction standards.

Denton County – Action #10	
Proposed Action:	Prohibit animal shelters in known hazard areas.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	N/A
Effect on new/existing buildings:	New and existing
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce risk of flood damages to future structures by citing out of known flood hazard areas; Protect function of the natural floodplain.

Denton County – Action #11	
Proposed Action:	Provide tax incentives for development of low-hazard land parcels.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, Facility planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce risk of flood damages to future development by incentivizing citing out of known flood hazard areas; Protect function of the natural floodplain.

Denton County – Action #12	
Proposed Action:	Develop alternative evacuation routes/plans and designate emergency thoroughfares, particularly in areas with limited capacity. Educate citizens on evacuation routes and procedures. Purchase and Distribution of NOAA All-Hazard S.A.M.E radios to disadvantaged citizens.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact. Educate the public on risks, threats, and vulnerability from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Wildfire, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and existing
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP and facility planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #13	
Proposed Action:	Develop/provide additional means of access into existing single-entry neighborhoods; Update subdivision codes for a higher level of ingress and egress.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	Facility planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protect lives of citizens; Ensure emergency services access.

Denton County – Action #14	
Proposed Action:	Adopt smart growth initiatives. Incorporate a formal hazard mitigation plan in long-term community development planning activities.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Wildfire, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	HMP, EOP, community planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Lessen environmental impacts of development with techniques that include reducing impervious surfaces and protecting natural function of the floodplain; Reduce potential flood impacts.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #15	
Proposed Action:	Equip sewer manholes with watertight covers and inflow guards.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP, community planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce floodwater contamination; Protect citizens.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #16	
Proposed Action:	Raise electrical components of sewage lift stations above BFE.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP, facility planning, community planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce floodwater contamination; Protect citizens.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #17	
Proposed Action:	Require "safe rooms" to be added when constructing new schools, daycares, rest homes and critical care facilities.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	New
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP, facility planning

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Denton County – Action #18	
Proposed Action:	Build safe room shelters at community centers and/or manufactured home parks so that all park residents can reach shelter in less than five minutes.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	New and existing
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, EOP, facility planning

COMMENTS:

Denton County – Action #19	
Proposed Action:	Adopt ordinance requiring tie-downs for mobile homes; Require manufactured housing be securely anchored to permanent foundations.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP, facility planning

COMMENTS:

Denton County – Action #20	
Proposed Action:	Strengthen building codes to mandate the use of steel connectors in new and existing construction.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado,
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, EOP, facility planning, community planning

COMMENTS:

Denton County – Action #21	
Proposed Action:	Implement measures to secure traffic lights and traffic controls from high wind damage.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado,
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

Denton County – Action #22	
Proposed Action:	Require standards for burial of electrical, telephone, cable lines and other utilities in new developments.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado, Dam Failure, Flood, Hail, Lightning, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy
Effect on new/existing buildings:	New
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, EOP, facility planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce damages and help ensure continuity of critical utility services.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #23	
Proposed Action:	Bury existing utility lines.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado, Dam Failure, Flood, Hail, Lightning, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$30 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP, community planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce damages and help ensure continuity of critical utility services.

Denton County – Action #24	
Proposed Action:	Evaluate access and road conditions for response vehicles and formulate/implement options to improve access and/or add redundant access routes in high-risk areas.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protect lives of citizens; Ensure emergency services access.

Denton County – Action #25	
Proposed Action:	Establish, adopt and implement a "green infrastructure" program for parks, nature preserves, greenbelts, etc.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Drought, Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Incorporating permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspiration stormwater and reduce flows to sewer systems or to surface waters.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #26	
Proposed Action:	Require standard tie-downs of propane tanks.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure, Tornado, Thunder Storm Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce risk of floodwater contamination and fire hazards during flood events.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #27	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains and culverts.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Maintain capacity of drainage system to reduce potential of flooding.

Denton County – Action #28	
Proposed Action:	Identify flood prone and repetitive loss properties through the Texas Water Development Board. Identify and implement actions to reduce or eliminate flooding at identified properties.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protect citizens and reduce flood damages at repetitive loss properties. Reduce burden of repetitive loss properties on the flood insurance fund.

Denton County – Action #29	
Proposed Action:	Undertake a comprehensive study of flood risk and reduction alternatives, with the assistance of the US Army Corps of Engineers. Implement feasible alternatives for flood reduction.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations (for unmapped areas)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce potential of flooding through improved drainage and other reduction measures; Protect citizens; Reduce emergency response burden.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #30	
Proposed Action:	Develop a land acquisition program in flood hazard areas. Acquire and demolish repetitive loss properties. Acquire high risk vacant land and maintain as open space.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection (vacant land)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and existing
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce flood damages and restore natural function of the floodplain; Reduce emergency response burden.

Denton County – Action #31	
Proposed Action:	Join the Community Rating System program
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce flood impacts; Reduce flood insurance premiums; Promote flood insurance and mitigation measures; Promote public safety.

Denton County – Action #32	
Proposed Action:	Add thick vegetation on public lands along river banks.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce flood impacts, scour and erosion; Protect natural function of floodplain and streams.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #33	
Proposed Action:	Adopt wetlands development regulations; Implement a Comprehensive Watershed Ordinance for new development.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protect wetlands; Restore or protect natural function of the floodplain; Reduce damages caused by flooding.

Denton County – Action #34	
Proposed Action:	Increase freeboard requirements for permitting structures in the SFHA; Adopt a “no-rise” in BFE in the 100-year floodplain; Update local flood ordinance to prohibit granting of variance in SFHA; Include "cumulative damage" provisions in local floodplain management ordinances.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and existing
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce future flood damages by improved construction practices and greater restrictions on development in floodplain.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #35	
Proposed Action:	Require erosion/sedimentation controls to be utilized during construction; Include on-site sediment retention as a development requirement.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Maintain drainage capacity by limiting the amount of sediment that is carried into lakes, streams, and rivers by storm water runoff.

Denton County – Action #37	
Proposed Action:	Undertake an initiative to increase the number of flood insurance policies.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Increase public awareness; Increase number of flood insurance policies; Reduce burden of flood impacts and repairs; Decrease recovery time and economic impacts following a flood.

Denton County – Action #38	
Proposed Action:	Upgrade undersized stormwater drains and culverts.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	Existing
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP, community planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Increase drainage capacity and reduce impacts and potential for flooding; Protect citizens.

Denton County – Action #39	
Proposed Action:	Implement a flood awareness program by providing FEMA/NFIP materials to mortgage lenders, real estate agents and insurance agents and place them in local libraries.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Increase public awareness; Increase number of flood insurance policies; Reduce burden of flood impacts and repairs; Decrease recovery time and economic impacts following a flood.

Denton County – Action #40	
Proposed Action:	Educate community on the dangers of low water crossings through the installation of warning signs and promotion of "Turn Around, Don't Drown" Program.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promote public safety; Reduce risk to citizens through improved warning and education.

Denton County – Action #41	
Proposed Action:	Provide how-to information to residents for installing backflow valves to prevent reverse-flow floods.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce potential damage from backwater flooding; Reduce risk to citizens through education on mitigation measures.

Denton County – Action #42	
Proposed Action:	Increase drainage capacity; add stormwater detention and/or retention basins as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and existing
Priority (High, Moderate, Low):	High
Estimated Cost:	\$20 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Increase drainage capacity and reduce impacts and potential for flooding; Protect citizens.

Denton County – Action #43	
Proposed Action:	Retain and maintain natural vegetation in stormwater channels.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection OR Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce flood impacts, scour and erosion; Protect natural function of floodplain, channels and streams.

Denton County – Action #44	
Proposed Action:	Implement stream restoration/channelization program to ensure adequate drainage/diversion of stormwater.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Increase drainage capacity and reduce impacts and potential for flooding; Protect citizens.

Denton County – Action #45	
Proposed Action:	Floodproof sewage treatment plants in flood hazard/low-lying areas.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce risk of floodwater contamination; Help to ensure continuity of critical services; Reduce burden of flood impacts and repairs; Decrease recovery time and economic impacts following a flood.

Denton County – Action #46	
Proposed Action:	Adopt regulations to limit amount of impervious cover in conjunction with new development.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP, community planning

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reducing impervious cover and incorporating permeable pavement or other permeable surfaces or substrates to store, infiltrate, or evapotranspiration stormwater and reduce flows to sewer systems or to surface waters.

Denton County – Action #47	
Proposed Action:	Acquire and preserve open spaces adjacent to floodplain areas.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce flood damages and restore natural function of the floodplain.

SECTION 19: MITIGATION ACTIONS

Denton County – Action #48	
Proposed Action:	Conduct public education program on fire risks and wildland fire mitigation, with the assistance of the Texas Forest Service.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

Denton County – Action #49	
Proposed Action:	Work with state and local agencies to determine locations to reduce fuel on public and private lands. Implement fuels reduction program.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection OR Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

Denton County – Action #50	
Proposed Action:	Adopt and implement routine fire hydrant maintenance program.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Denton County – Action #51	
Proposed Action:	Restrict hillside development in wildfire areas; Implement density and setback requirements for structures located in wildfire hazard areas.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and Existing
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	HMP, EOP

COMMENTS:

Denton County – Action #52	
Proposed Action:	Adopt fire resistant construction regulations
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and Existing
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

Denton County – Action #53	
Proposed Action:	Install warning signs at hazardous bridges and roadways subject to ice.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

Denton County – Action #54	
Proposed Action:	Educate citizens on mitigation actions for winter weather
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	N/A
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Within 24 months of completion of HMP
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

Denton County – Action #55	
Proposed Action:	Adopt and implement program to insulate outdoor pipes at public buildings.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and Existing
Priority (High, Moderate, Low):	High
Estimated Cost:	\$30 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

Denton County – Action #56	
Proposed Action:	Add building insulation to walls and attics and wrap/insulate pipes at public facilities.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP

COMMENTS:

Denton County – Action #57	
Proposed Action:	Provide rebate program for individual safe rooms in single-family residences.
BACKGROUND INFORMATION	
Site and Location:	Denton County
Risk Reduction Benefit (Current Cost/Losses Avoided):	Prevents loss of life, property, environment, and negative economic impact.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	All community lifelines
Effect on new/existing buildings:	New and Existing
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Denton County Emergency Management
Implementation Schedule:	Immediately upon availability of funding
Incorporation into Existing Plans:	EOP, HMP, facility planning, community planning

COMMENTS:

TOWN OF ARGYLE

Town of Argyle – Action #1	
Proposed Action:	Prohibit animal shelters in known hazard areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to structures and animals by Requiring development outside of hazardous areas; reduce burden on emergency response during hazardous events
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Argyle Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Argyle – Action #2	
Proposed Action:	Build safe room shelters at community centers and/or manufactured home parks so that all park residents can reach shelter in less than five minutes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Argyle Administration/Public Works
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

Town of Argyle – Action #3	
Proposed Action:	Add building insulation to walls and attics and wrap/insulate pipes at critical and public facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Reduce energy consumption and costs during extreme temperature.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Argyle Public Works
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Argyle – Action #4	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damage at critical facilities
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Argyle Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:

Town of Argyle – Action #5	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Argyle Police Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Argyle – Action #6	
Proposed Action:	Implement drainage improvements for areas identified within Town Flood Study.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Argyle Development Services, NCTCOG
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

CITY OF AUBREY

City of Aubrey – Action #1	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Aubrey – Action #2	
Proposed Action:	Upgrade, Construct, and/or Elevate bridges that are in high-risk areas and prone to flooding.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued flood risk through improving infrastructure. Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Aubrey – Action #3	
Proposed Action:	Drainage improvements: Increase drainage capacity; add stormwater detention and/or retention basins, box-culverts, etc. as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Aubrey – Action #4	
Proposed Action:	Evaluate access and road conditions for response vehicles. Develop and implement options to improve access and/or add redundant access routes in high-risk areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve response time for emergency services; Reduce risk of injury or damages. Provide additional ingress/egress routes through high-risk areas to prevent loss of life and avoid rescue efforts
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Aubrey – Action #5	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injury to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Aubrey – Action #6	
Proposed Action:	Retain and maintain natural vegetation in stormwater channels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages due to erosion or scour during flood events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Public Works
Implementation Schedule:	Within 12months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance; Local Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Aubrey – Action #7	
Proposed Action:	Build safe room shelters throughout jurisdiction to include community centers and/or manufactured home parks so that all park residents can reach shelter in less than five minutes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of Aubrey – Action #8	
Proposed Action:	Provide rebate and/or incentive program for individual safe rooms in single-family residences.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing in home saferooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulation Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000 per safe room
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Administration
Implementation Schedule:	Within 12-24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of Aubrey – Action #9	
Proposed Action:	Expand current warning / alert system.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through Improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Aubrey – Action #10	
Proposed Action:	Implement and enhance an area-wide telephone Emergency Notification System ("Reverse 911").
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through Improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Thunderstorm Winds, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Aubrey – Action #11	
Proposed Action:	Harden/retrofit residential homes to hazard resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at residential homes. Reduce risk of injury to residents, and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Administration
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Aubrey – Action #12	
Proposed Action:	Update building codes to incorporate protection to older structures to be more hazard resistant and to meet Tier 1 requirements.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at residential homes. Reduce risk of injury to residents, and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Aubrey– Action #13	
Proposed Action:	Implement alert system /equipment for residents in proximity inundation zone and educate residents of flood risk downstream in inundation area.
BACKGROUND INFORMATION	
Site and Location:	Community-wide inundation area
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Evacuation Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Aubrey – Action #14	
Proposed Action:	Continue to assess and install cover patios throughout the public areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to at-risk or vulnerable populations by providing shelter during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Thunderstorm Winds, Tornado, Lightning
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Public Works / Parks
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Aubrey – Action #15	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$35,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Fire Department
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

TOWN OF BARTONVILLE

Town of Bartonville– Action #1	
Proposed Action:	Upgrade undersized stormwater drains and culverts
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Bartonville
Implementation Schedule:	Within 12-24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Flood Management Plan; Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Bartonville – Action #2	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities, including but not limited to water towers within community.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Bartonville
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

Town of Bartonville – Action #3	
Proposed Action:	Adopt and implement program to insulate and winterized critical facilities and infrastructure as well as outdoor pipes at public buildings
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure, and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical services during severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations, Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Bartonville
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

TOWN OF COPPER CANYON

Town of Copper Canyon – Action #1	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injury to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Copper Canyon Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of Copper Canyon– Action #2	
Proposed Action:	Retain and maintain natural vegetation in stormwater channels. Add thick vegetation on public lands along riverbanks.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of erosion or scour due to flooding. Reduce damages to infrastructure including roadways, sidewalks, bridges, and culverts; Reduce demands on emergency response during high water events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Copper Canyon Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of Copper Canyon – Action #3	
Proposed Action:	Continue to assess and implement community-wide drainage improvements.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Aubrey Emergency Service / Public Works
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

CITY OF CORINTH

City of Corinth – Action #1	
Proposed Action:	Replace non-functioning (backflow) water valves with new valves to expedite water shutoff capability.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages. Provides capability to shutoff water in the distribution system as needed during an emergency.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Flood, Thunderstorm Winds, Tornado, Wildfire, Winter Storm, Terrorism
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #2	
Proposed Action:	Conduct sealing and lining of manholes to city wastewater/sewer system.
BACKGROUND INFORMATION	
Site and Location:	Creeks and Flood Area
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood water contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$300,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Wastewater Management Plan

COMMENTS:
This will also support day to day public works operations by increasing capacity (increasing pressure to move wastewater) within the pipeline to efficiently move wastewater to treatment facilities.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #3	
Proposed Action:	Increase drainage capacity by replacing above ground drainage channels with underground wastewater pipelines. Install street signs warning of floods on streets and areas subject to flooding.
BACKGROUND INFORMATION	
Site and Location:	Amity Village, West Shady Shores, and Post Oak Neighborhoods
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works
Implementation Schedule:	Within 1-10 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan, Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Corinth – Action #4	
Proposed Action:	Conduct Public Works Infrastructure Assessment to prioritize infrastructure improvement projects/ infrastructure additions to the community that are constructed to mitigate against all hazards.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event. Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$300,000
Potential Funding Sources:	Local, State Funds, & Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works / Engineering
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Corinth – Action #5	
Proposed Action:	Conduct Flood Risk / Vulnerability Assessment to identify vulnerable populations, property, and infrastructure exposed to potential flooding impacts and identify potential regulatory actions, or future structure and infrastructure projects.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, specifically flood mapped and unmapped areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and future impacts to life and property as well as future flood claims through the NFIP.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local, State Funds, & Federal Grants, City Stormwater Fee
Lead Agency/Department Responsible:	City of Corinth Public Works
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances

COMMENTS:
Ordinances would ensure new construction would be built outside the floodplain.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Corinth – Action #6	
Proposed Action:	Propose to utilize regional trash collection devices within existing and proposed drainage channels. Add trash racks to existing open water drainage channels (“drainage ditches”).
BACKGROUND INFORMATION	
Site and Location:	Community-wide, specifically within drainage channels.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce municipal solid waste/debris from damaging wastewater infrastructure and wastewater treatment plant. Reduce risk of sanitary sewer overflows/flooding. Reduce risk of injury to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$750,000
Potential Funding Sources:	Local, State Funds, & Federal Grants, City Stormwater Fee
Lead Agency/Department Responsible:	City of Corinth Public Works
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Subdivision Design Manual

COMMENTS:
This mitigation action would expedite the transfer of wastewater in order to mitigate existing flood risk within the surrounding community.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #7	
Proposed Action:	Develop a land acquisition program in flood hazard areas. Acquire and demolish repetitive loss properties. Acquire high risk vacant land and maintain as open space.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, more specifically for structures identified within the floodplain.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas; Reduce downstream impacts associated with development in the floodplain. Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure Natural Systems Protection (vacant land)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works, Planning and Zoning
Implementation Schedule:	Within 5-10 years of plan adoption
Incorporation into Existing Plans:	Floodplain Reduction Regulations

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #8	
Proposed Action:	Increase drainage capacity; add stormwater detention and or retention basins as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works
Implementation Schedule:	Within 3-5 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #9	
Proposed Action:	Develop an elevation and/or flood mitigation program for residents who are in floodplain. Includes ensuring properties and electric components are approved BFE, and/or exploring other flooding mitigation measures such as installation of flood vents, etc.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, more specifically for structures identified within the floodplain.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas; Reduce risk of injuries to citizens
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works, Planning and Zoning
Implementation Schedule:	Within 5-10 years of plan adoption
Incorporation into Existing Plans:	Floodplain Reduction Regulations

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #10	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm, and low risk / man-made hazards.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #11	
Proposed Action:	Develop water conservation strategies and/or regulations for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000 - \$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Administration / Public Works
Implementation Schedule:	Within 12 -18 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

City of Corinth – Action #12	
Proposed Action:	Adopt a landscape and design ordinance (selection and planting guidelines).
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Planning / Public Works
Implementation Schedule:	Within 9-12 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #13	
Proposed Action:	Design and implement a city flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Planning / Engineering
Implementation Schedule:	Within 9-12 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #14	
Proposed Action:	Develop and implement a buyout program for those personal properties and structures located in high hazard flood zones starting with those that are most vulnerable to life and property loss.
BACKGROUND INFORMATION	
Site and Location:	Community-wide structures within high-risk flood areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Eliminate risk of flood damages to high-risk structures and prevent future losses in high-risk flood hazard areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Planning / Engineering
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Flood Protection Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Corinth – Action #15	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Planning and Zoning
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #16	
Proposed Action:	Adopt and implement International Building Code for new buildings.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Drought, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Planning and Zoning
Implementation Schedule:	Within 9-12 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #17	
Proposed Action:	Develop a Community Wildfire Protection Plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Fire Department, County Emergency Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

City of Corinth – Action #18	
Proposed Action:	Develop a Community Safe Room.
BACKGROUND INFORMATION	
Site and Location:	Site to be determined within city-limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$700,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Planning / EDC
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Corinth – Action #19	
Proposed Action:	Construct an emergency operations center.
BACKGROUND INFORMATION	
Site and Location:	Site to be determined within city-limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Planning / EDC
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Corinth – Action #20	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works, Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

City of Corinth – Action #21	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Corinth Public Works
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

TOWN OF CROSS ROADS

Town of Cross Roads – Action #1	
Proposed Action:	Build safe room shelters throughout jurisdiction to include community centers and/or manufactured home parks so that all park residents can reach shelter in less than five minutes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works / Planning Department
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #2	
Proposed Action:	Harden/retrofit police station to act as evacuation center and/or EOC.
BACKGROUND INFORMATION	
Site and Location:	Police Station - 1401 FM424
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facility. Ensure continuity of critical services during and after a severe storm event. Reduce risk of injury to residents, critical and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works / Planning Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Cross Roads – Action #3	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works / Planning Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #4	
Proposed Action:	Drainage improvements: Increase drainage capacity; add stormwater detention and/or retention basins, box-culverts, etc. as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including but not limited to: Oak Shores sub-division and through to Lake Lewisville area.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Cross Roads – Action #5	
Proposed Action:	Evaluate bridges and access roads conditions for response vehicles. Develop and implement options to improve access and/or add redundant access routes in high-risk areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including but not limited to bridge access on Historic Rd.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve response time for emergency services; Reduce risk of injury or damages. Provide additional ingress/egress routes through high-risk areas to prevent loss of life and avoid rescue efforts
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Cross Roads – Action #6	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injury to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works / Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #7	
Proposed Action:	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way; Remove dead trees from right-of-way and drainage systems on a scheduled basis.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Hail, Lightning, Tornado, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works / Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Maintenance Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Cross Roads – Action #8	
Proposed Action:	Bury existing utility lines. Require standards for burial of electrical, telephone, cable lines and other utilities in new developments.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Hail, Lightning, Tornado, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #9	
Proposed Action:	Implement ordinance and upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities. Reduce risk to vulnerable populations during drought restriction ensuring access to potable water.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works / Administration
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan; Local Ordinance

COMMENTS:

Town of Cross Roads – Action #10	
Proposed Action:	Identify flood prone and repetitive loss properties and implement mitigation actions to reduce or eliminate flooding at identified properties including elevation of properties and other alternative flood mitigation measures. Provide how-to information to residents for installing backflow valves to prevent reverse-flow floods.
BACKGROUND INFORMATION	
Site and Location:	Community-wide high flood risk properties and repetitive loss properties.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works / Administration
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:

Town of Cross Roads – Action #11	
Proposed Action:	Develop a land acquisition program in flood hazard areas. Acquire and demolish repetitive loss properties. Acquire high risk vacant land and maintain as open space.
BACKGROUND INFORMATION	
Site and Location:	Community-wide flood risk areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas; Reduce downstream impacts associated with development in the floodplain; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection (vacant land)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works / Administration
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #12	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Planning Department / Little Elm Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Cross Roads – Action #13	
Proposed Action:	Provide rebate and/or incentive program for individual safe rooms in single-family residences.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing in home saferooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulation Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$135,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances; Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #14	
Proposed Action:	Develop and implement community wildfire protection program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Fire Marshal
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances

COMMENTS:

Town of Cross Roads – Action #15	
Proposed Action:	Develop water conservation strategies and/or regulations for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils, Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works
Implementation Schedule:	Within 24-36 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #16	
Proposed Action:	Coordinate with USACE and County on Lake Ray Roberts Inundation maps and Dam Breach Emergency Action Plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works
Implementation Schedule:	Within 12-48 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Cross Roads – Action #17	
Proposed Action:	Acquire and distribute NOAA weather radios.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, especially to vulnerable populations
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and vulnerable populations through improved communication and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Planning Department
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #18	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Cross Roads – Action #19	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Cross Roads Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

CITY OF DENTON

City of Denton – Action #1	
Proposed Action:	Develop a Floodplain Management Plan: Study would identify existing areas most at risk for flooding. Study would be used to identify potential future floodplain management regulations and property protection activities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$65,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects and Engineering
Implementation Schedule:	Within 12-18 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances, Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Denton – Action #2	
Proposed Action:	Develop a Stormwater Masterplan: Stormwater Masterplan would be used to identify potential future floodplain management regulations and identify drainage capital projects with the highest risk reduction benefit. Due to the scale and cost of such a masterplan it may be completed in stages. The City of Denton is currently working to produce a Stormwater Masterplan Needs Assessment study to help focus any future masterplan activities in the most appropriate areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects and Engineering
Implementation Schedule:	Within 2–5 years of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances, Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Denton – Action #3	
Proposed Action:	Evaluate access and road conditions for response vehicles and formulate/implement options to improve access and/or add redundant access routes in high-risk areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including select city parks
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through maintained and redundant access routes in high-risk areas; Improve response time for emergency services; Reduce risk of injury or damages. Provide additional ingress/egress routes through high-risk areas to prevent loss of life and avoid rescue efforts
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Tornado, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$40,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Facilities, Parks and Recreation
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan, CWPP

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #4	
Proposed Action:	Downtown Storm Sewer Phase 2: Project is currently designed and awaiting construction funding. Would consist of upgrade / reinstallation of drainage system in a portion of town with historical flooding issues.
BACKGROUND INFORMATION	
Site and Location:	Drainage improvements along the UPRR Railroad from Oak to Sycamore
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects
Implementation Schedule:	Within 3-5 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #5	
Proposed Action:	Construction of Elm and Locust Phase 2: Project is currently at 90% design and on hold for easement acquisition funding and construction funding.
BACKGROUND INFORMATION	
Site and Location:	Drainage improvements on Elm and Locust from Oak St. to US 380
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$12,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects
Implementation Schedule:	Within 3-5 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #6	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities, including Civic Center, Recreation Centers, City Hall
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical, Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Facilities
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Denton – Action #7	
Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities, including Civic Center, Recreation Centers, Restrooms
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Facilities
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Denton – Action #8	
Proposed Action:	Add building insulation to walls and attics and wrap/insulate pipes at public facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities, including Civic Center, Recreation Centers, Restrooms, etc.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Reduce energy consumption and costs during extreme temperatures.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Facilities
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

City of Denton – Action #9	
Proposed Action:	<p>Install and replace old irrigation systems and implement effective and efficient watering schedules at public buildings and critical facilities.</p> <p>Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.</p>
BACKGROUND INFORMATION	
Site and Location:	Community-wide facilities and parks
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$300,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Parks and Recreation
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #10	
Proposed Action:	Oakland Area Drainage: Project is currently in initiation phase and City has contracted with an engineering firm for a preliminary drainage study.
BACKGROUND INFORMATION	
Site and Location:	Drainage improvements on Oakland from Withers to Locust St.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects
Implementation Schedule:	Within 3-5 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #11	
Proposed Action:	Construction of PEC 4 phase 3 & 4 Drainage improvements. Project is currently at 90% design and on hold for easement acquisition funding and construction funding.
BACKGROUND INFORMATION	
Site and Location:	From Prairie and Elm north to Mulberry, then West on Mulberry to Bernard.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas. Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural System Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$22,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects
Implementation Schedule:	Within 3-5 years
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
Project 2-year construction time frame.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #12	
Proposed Action:	PEC 5 Mobile Home Park Drainage Improvements: Project is currently designed and awaiting construction funding.
BACKGROUND INFORMATION	
Site and Location:	Drainage improvements in the PEC 5 channel running through the Pecan Creek Mobile Home Park.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects
Implementation Schedule:	Within 3-5 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #13	
Proposed Action:	Build safe room shelters at community centers and/or manufactured home parks so that all park residents can reach shelter in less than five minutes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide facilities and select city parks
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Facilities
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #14	
Proposed Action:	Hire a firm to review current and expand operational safety measure for extreme weather during special events.
BACKGROUND INFORMATION	
Site and Location:	Community-wide facilities and select city parks
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by improving operational standards and response during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Facilities
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #15	
Proposed Action:	Install smart channel flow sensors that measure and transmit level, flow, rain, temperature data to monitor, alert, and share channel flow and alert crews when and where to perform high water response.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages or injuries through timely notification and warning of potential flooding.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$105,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Public Works
Implementation Schedule:	Within 6 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Denton – Action #16	
Proposed Action:	Hire a consultant to perform a stormwater pipe condition assessment to inform City of areas of increased risk of failure of voiding.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000,000 (\$3/foot @103k ft)
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Public Works
Implementation Schedule:	Within 1 year of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton– Action #17	
Proposed Action:	Hire consultant to perform an inventory, condition assessment, and dam breach analysis of all the dams within city limits.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, emphasis on inundation areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000 (lake forest dam assessment x 5)
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Engineering
Implementation Schedule:	Within 12- 18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #18	
Proposed Action:	Raise the roadway and improve culverts to eliminate roadway overtopping on Blagg Road from Mayhill Road to Geesling Road.
BACKGROUND INFORMATION	
Site and Location:	Blagg Road from Mayhill Road to Geesling Road.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #19	
Proposed Action:	Replace culverts with a bridge to handle the 100-year storm event and eliminate overtopping, as well as roadway widening and roadway improvements to increase storm water conveyance.
BACKGROUND INFORMATION	
Site and Location:	Bridge at Cooper Creek and Mingo Road, Roadway improvements from US 380 to Sirius Road.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #20	
Proposed Action:	Replace the bridge on Trinity Road to handle the 100-year storm event and eliminate overtopping, as well as roadway widening and roadway improvements to increase storm water conveyance.
BACKGROUND INFORMATION	
Site and Location:	Bridge at Intersection of Trinity Rd and Mills Rd.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants, TxDOT to fund portion of the bridge replacement
Lead Agency/Department Responsible:	City of Denton Engineering
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #21	
Proposed Action:	Hire consultant to perform a condition assessment on all City-owned retention ponds.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Engineering
Implementation Schedule:	Within 12-18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #22	
Proposed Action:	Construct culvert upgrades at intersection of Sherman at Monterey to increase stormwater conveyance.
BACKGROUND INFORMATION	
Site and Location:	E. Sherman Drive at Monterey Drive
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Engineering
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan, Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #23	
Proposed Action:	Westgate Infrastructure improvements to increase water conveyance and road capacity.
BACKGROUND INFORMATION	
Site and Location:	Westgate Drive from Windsor Drive to Branco Way
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Engineering
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Denton – Action #24	
Proposed Action:	Establish, adopt, implement, and construct a "green infrastructure" program for parks, nature preserves, greenbelts, etc.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impacts of flood through expanded greenspace and restoration of floodplains and wetlands; Reduce impacts of drought through green infrastructure that works to replenish groundwater reserves; Reduce impacts of Urban Island Heat effect in densely populated areas through tree planting.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection, Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Real Estate and Parks and Recreation
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #25	
Proposed Action:	Hire a consultant to perform a storm water pipe condition assessment to inform City of areas of increased risk of failure of voiding.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000,000 (\$2/foot)
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Public Works
Implementation Schedule:	Within 1 year of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Denton – Action #26	
Proposed Action:	Undertake an initiative to increase the number of flood insurance policies.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk and build resiliency. Increase flood risk awareness; Reduce damage impact on residents after a flood event; Reduce the burden on state and federal resources.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects and Engineering
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Denton – Action #27	
Proposed Action:	Develop a land acquisition program in flood hazard areas. Acquire and demolish repetitive loss properties. Acquire high risk vacant land and maintain as open space.
BACKGROUND INFORMATION	
Site and Location:	Community-wide flood risk areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas; Reduce downstream impacts associated with development in the floodplain. Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection (vacant land)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects and Engineering
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #28	
Proposed Action:	Acquire and preserve open spaces adjacent to floodplain areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide flood risk areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk to structures and infrastructure in and near the floodplain; Reduce downstream impacts associated with development in the floodplain; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects and Engineering
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #29	
Proposed Action:	Increase drainage capacity; add stormwater detention and/or retention basins as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$15,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects and Engineering
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Denton – Action #30	
Proposed Action:	Implement stream restoration/channelization program to ensure adequate drainage/diversion of stormwater.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages through improved drainage capacity/stormwater diversion; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects and Engineering
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #31	
Proposed Action:	Upgrade undersized stormwater drains and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide drainage system
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages through improved drainage capacity; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Capital Projects and Engineering
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan, Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #32	
Proposed Action:	Construction of the Dry Fork Interceptor
BACKGROUND INFORMATION	
Site and Location:	Approximately 4500 feet of 24" sewer line, extending from intersection of Bonnie Brae & Highland Park to the intersection of I-35 & Corbin Rd.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate sewer overflows resulting from severe rain events. Current line is already constrained, and new growth risks sewer backups and overflows.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning, Thunderstorm Winds, Winter Storm, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Health/Medical (wastewater)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,784,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Water Utilities
Implementation Schedule:	Within 12-18 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #33	
Proposed Action:	Hard wired generators for the water treatment plants.
BACKGROUND INFORMATION	
Site and Location:	Lake Lewisville Water Treatment Plant and Lake Ray Roberts
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services. Avoid loss of potable water to the City of Denton due to loss of power. Provide redundancy for existing power connections.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Health/Medical (wastewater), Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Water Utilities
Implementation Schedule:	Within 12-18 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Denton – Action #34	
Proposed Action:	Design and Construct 2 nd Storage Tank for the Hickory Creek Detention Facility.
BACKGROUND INFORMATION	
Site and Location:	Hickory Creek Detention Facility (33.166716, -97.148821), which temporarily stores storm surged sewer flows to prevent overflows throughout the sewer system
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate sewer overflows resulting from severe rain events. Current system is already constrained, and new growth risks sewer backups and overflows.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning, Thunderstorm Wind, Winter Storm, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Health/Medical (wastewater)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Water Utilities
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #35	
Proposed Action:	Complete condition assessment and necessary recommendation on city-wide sanitary sewer lift stations.
BACKGROUND INFORMATION	
Site and Location:	Community-wide lift stations (26) across the sewer service area.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce sanitary sewer overflows caused by weather events, including excess inflow and infiltration and power loss.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning, Thunderstorm Wind, Winter Storm, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Health/Medical: Proper collection of sanitary sewer flows
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$260,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Water Utilities
Implementation Schedule:	2023-2027
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #36	
Proposed Action:	Develop a Community Wildfire Protection Plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #37	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Denton – Action #38	
Proposed Action:	Relocate Emergency Operations Center (EOC) to a hardened existing facility out of the floodplain.
BACKGROUND INFORMATION	
Site and Location:	Site to be determined within city-limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages or eliminate loss of resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Emergency Management
Implementation Schedule:	Within 2-5 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Denton – Action #39	
Proposed Action:	Develop water conservation strategies and/or regulations for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Emergency Management, Fire Department
Implementation Schedule:	Within 12 - 24months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

City of Denton – Action #40	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Public Works, Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Denton– Action #41	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Denton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

TOWN OF DISH

Town of DISH – Action #1	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of DISH Administration/ Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

Town of DISH – Action #2	
Proposed Action:	Harden/retrofit town hall to act as evacuation center and/or EOC, in addition to including water storage.
BACKGROUND INFORMATION	
Site and Location:	Town Hall - 5413 Tim Donald Rd DISH, TX 76247
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facility. Ensure continuity of critical services during and after a severe storm event. Reduce risk of injury to residents, critical and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of DISH Administration/ Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of DISH – Action #3	
Proposed Action:	Build safe room shelters throughout jurisdiction to include town hall and/or manufactured home parks.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and/or town hall
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of DISH Administration/ Public Works
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

Town of DISH – Action #4	
Proposed Action:	Provide rebate and/or incentive program for individual safe rooms in single-family residences.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing in home saferooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulation, Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$135,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of DISH Administration/ Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances; Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of DISH – Action #5	
Proposed Action:	Drainage improvements: Increase drainage capacity; add stormwater detention and/or retention basins, box-culverts, etc. as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of DISH Administration/ Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of DISH – Action #6	
Proposed Action:	Road Infrastructure Improvements: Evaluate access roads conditions for response vehicles. Develop and implement options to improve access and/or add redundant access routes in high-risk areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve response time for emergency services; Reduce risk of injury or damages. Provide additional ingress/egress routes through high-risk areas to prevent loss of life and avoid rescue efforts
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of DISH Administration/ Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of DISH – Action #7	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injury to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of DISH Administration/ Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

TOWN OF DOUBLE OAK

Town of Double Oak – Action #1	
Proposed Action:	Acquire and distribute NOAA weather radios.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm and low risk / man-made hazards
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Double Oak – Action #2	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm and low risk / man-made hazards
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

Town of Double Oak – Action #3	
Proposed Action:	Obtain certification in the Nation Weather Service StormReady Program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by educating the public on how to prepare for hazards and disasters
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Winter Storm, Tornado, Hail
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds (staff funds), State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Double Oak – Action #4	
Proposed Action:	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way; Remove dead trees from right-of way and drainage systems on a scheduled basis.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind, Hail, Lightning, Tornado, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Maintenance Plan, CWPP, Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #5	
Proposed Action:	Adopt on-site retention basin program in conjunction with development to address excessive stormwater / firefighting water source.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Requiring developers to implement on-site retention basin for new developments will prevent downstream impacts, reduce impacts to floodplain and provide additional potential water sources for firefighting uses.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration / Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Maintenance Plan, Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #6	
Proposed Action:	Incorporate higher standards for hazard resistance in local application of the building code.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages to structures through improved construction techniques; Reduce recovery efforts for the community after an event
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #7	
Proposed Action:	Provide tax incentives for development of low-hazard land parcels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk in high hazard areas by promoting and incentivizing development in low-risk areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #8	
Proposed Action:	Implement and enhance an area -wide telephone Emergency Notification System ("Reverse 911").
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communication and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Flood, Thunderstorm Winds, Winter Storm, Tornado, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Double Oak – Action #9	
Proposed Action:	Develop alternative evacuation routes/plans and designate emergency thoroughfares, particularly in areas with limited capacity. Educate citizens on evacuation routes and procedures.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk residents through improved evacuation alternatives and awareness efforts.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Double Oak – Action #10	
Proposed Action:	Adopt smart growth initiatives. Incorporate a formal hazard mitigation plan in long-term community development planning activities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in new critical facilities during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:

Town of Double Oak – Action #11	
Proposed Action:	Adopt a landscape ordinance (selection and planting guidelines).
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impact on groundwater; Minimize impacts of expansive soils; Reduce rainfall runoff volume and risk of flooding; Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Wildfire, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:

Town of Double Oak – Action #12	
Proposed Action:	Require "safe rooms" to be added when constructing new schools, daycares, rest homes and critical care facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impact on groundwater; Minimize impacts of expansive soils; Reduce rainfall runoff volume and risk of flooding; Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:

Town of Double Oak – Action #13	
Proposed Action:	Strengthen building codes to mandate the use of steel connectors in new and existing construction.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to structures and infrastructure. Reduce risk of injuries or fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:

Town of Double Oak – Action #14	
Proposed Action:	Require standards for burial of electrical, telephone, cable lines and other utilities in new developments.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to infrastructure; Ensure continuity of critical services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado, Flood, Hail, Lightning, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #15	
Proposed Action:	Bury existing utility lines.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to infrastructure; Ensure continuity of critical services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado, Flood, Hail, Lightning, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration / Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Double Oak – Action #16	
Proposed Action:	Establish, adopt, and implement a "green infrastructure" program for parks, nature preserves, greenbelts, etc.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impacts of flood through expanded greenspace and restoration of floodplains and wetlands; Reduce impacts of drought through green infrastructure that works to replenish groundwater reserves; Reduce impacts of Urban Island Heat effect in densely populated areas through tree planting
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Drought, Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration / Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #17	
Proposed Action:	Require standard tie-downs of propane tanks.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to structures and infrastructure; Reduce risk of hazardous material release and potential fires; Reduce risk of injuries or fatalities; Reduce risk of flood water contamination.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration / Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #18	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000 (annually)
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration / Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #19	
Proposed Action:	Identify floodprone and repetitive loss properties through the Texas Water Development Board. Identify and implement actions to reduce or eliminate flooding at identified properties.
BACKGROUND INFORMATION	
Site and Location:	Community-wide high flood risk properties and repetitive loss properties
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #20	
Proposed Action:	Undertake a comprehensive study of flood risk and reduction alternatives, with the assistance of the US Army Corps of Engineers. Implement feasible alternatives for flood reduction.
BACKGROUND INFORMATION	
Site and Location:	Community-wide high flood hazard areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations (for unmapped areas)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #21	
Proposed Action:	Develop a land acquisition program in flood hazard areas. Acquire and demolish repetitive loss properties.
BACKGROUND INFORMATION	
Site and Location:	Community-wide high flood hazard areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas; Reduce downstream impacts associated with development in the floodplain. Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection (vacant land)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #22	
Proposed Action:	Adopt wetlands development regulations; Implement a Comprehensive Watershed Ordinance for new development.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Preserve/restore the natural function of the floodplain; Reduce flood damages and risk of injuries or fatalities through comprehensive development standards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulation Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #23	
Proposed Action:	Increase freeboard requirements for permitting structures in the SFHA; Adopt a “no-rise” in BFE in the 100-year floodplain; Update local flood ordinance to prohibit granting of variance in SFHA; Include "cumulative damage" provisions in local floodplain management ordinances.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood damages through development restrictions and improved construction requirements in flood-prone areas
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Floodplain Administrator
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #24	
Proposed Action:	Upgrade undersized stormwater drains and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages through improved drainage capacity; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 12-26 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #25	
Proposed Action:	Implement a flood awareness program by providing FEMA/NFIP materials to mortgage lenders, real estate agents and insurance agents and place them in local libraries.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through education and awareness; Increase flood insurance coverage.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #26	
Proposed Action:	Educate community on the dangers of low water crossings through the installation of warning signs and promotion of "Turn Around, Don't Drown" Program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of injuries, fatalities and damages through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Double Oak – Action #27	
Proposed Action:	Provide how-to information to residents for installing backflow valves to prevent reverse-flow floods.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damage impact on residents after a flood event; Reduce risk of sewage back-up in structures; Reduce risk of injury or illness to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #28	
Proposed Action:	Increase drainage capacity; add stormwater detention and/or retention basins as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 12-48 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #29	
Proposed Action:	Retain and maintain natural vegetation in stormwater channels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages due to erosion or scour during flood events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance, Local Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #30	
Proposed Action:	Implement stream restoration/channelization program to ensure adequate drainage/diversion of stormwater.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages through improved drainage capacity/stormwater diversion; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #31	
Proposed Action:	Floodproof sewage treatment plants in flood hazard/low-lying areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood water contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Wastewater Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #32	
Proposed Action:	Adopt regulations to limit amount of impervious cover in conjunction with new development.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood damages and risk of injuries or fatalities through regulated development; Reduce the amount of stormwater runoff in densely developed areas during flood events; Reduce the risk of downstream flooding.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #33	
Proposed Action:	Acquire and preserve open spaces adjacent to floodplain areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk to structures and infrastructure in and near the floodplain; Reduce downstream impacts associated with development in the floodplain; Reduce risk of injuries to citizens. Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration / Floodplain Manager
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Double Oak – Action #34	
Proposed Action:	Adopt and implement routine fire hydrant maintenance program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through routine maintenance of fire hydrants; Reduce risk of injury or damage.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

Town of Double Oak – Action #35	
Proposed Action:	Allow no vegetation in easements or require fire-resistant landscaping.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of wildfires and the spread of wildfire through improved development practices and building requirements/restriction.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:

Town of Double Oak – Action #36	
Proposed Action:	Install a network of dry hydrants in stock ponds, creeks, and small lakes to increase the supply of water for fire protection.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of wildfires and the spread of wildfire by increasing water access and firefighting capabilities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Public Works / Fire Department
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

Town of Double Oak – Action #37	
Proposed Action:	Adopt construction regulations for fire-resistant roofing materials, smoke alarm systems, sprinkler systems, cisterns, escape roads, fuels management requirements, and boxing of eaves, overhangs, and decks; Require fire extinguishers for all homes and businesses; Require large side yards between adjacent buildings in residential and commercial areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of wildfires and the spread of wildfire through improved construction practices and building requirements.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A Local Codes/Ordinances

COMMENTS:

Town of Double Oak – Action #38	
Proposed Action:	Install fire danger rating/burn ban signs.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

Town of Double Oak – Action #39	
Proposed Action:	Implement a community education program regarding fire dangers for identified risk areas; Distribute pamphlets through neighborhood associations or insert flyers in water bills to make residents aware of wildfire hazard areas and fire protection measures for homes and yards.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Double Oak Administration / Fire Department
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

Town of Double Oak – Action #40	
Proposed Action:	Install warning signs at hazardous bridges and roadways subject to ice.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries on roadways and bridges during winter storm events through education and awareness programs; Reduce demand on emergency response during winter storms.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

Town of Double Oak – Action #41	
Proposed Action:	Educate citizens on mitigation measures to prevent frozen pipes; Educate homeowners on carbon monoxide monitors/alarms.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries through mitigation education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

Town of Double Oak – Action #42	
Proposed Action:	Adopt and implement program to insulate outdoor pipes at public buildings. Add building insulation to walls and attics and wrap/insulate pipes at critical and public facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical and public services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:

Town of Double Oak – Action #43	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at critical facilities
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

Town of Double Oak – Action #44	
Proposed Action:	Build safe room shelters throughout jurisdiction to include community centers and/or manufactured home parks so that all park residents can reach shelter in less than five minutes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather event
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds. Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

Town of Double Oak – Action #45	
Proposed Action:	Provide rebate program for individual safe rooms in single-family residences.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing in-home safe rooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000 per safe room
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

Town of Double Oak – Action #46	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm, and low risk / man-made hazards.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Administration/ Emergency Management
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Double Oak – Action #47	
Proposed Action:	Mitigate storm water damage through adoption and implementation of TCEQ approved storm water pollution and prevention plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages or eliminate loss of resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Works
Implementation Schedule:	Annually
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Double Oak – Action #48	
Proposed Action:	Expand outdoor warning system to cover new developments and population increases.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm, and low risk / man-made hazards.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Emergency Management
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Double Oak – Action #49	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities, including but not limited to Police Department and EOC.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Public Work / Emergency Management
Implementation Schedule:	Within 12-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Double Oak – Action #50	
Proposed Action:	Develop water conservation strategies and/or landscape ordinance for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Emergency Management, Fire Department
Implementation Schedule:	Within 12 - 24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

Town of Double Oak – Action #51	
Proposed Action:	Hire consultant to complete studies within the surrounding high-risk areas near the Messe Dam. Implement improvements to reduce flood-risk in areas that could be affected based on study.
BACKGROUND INFORMATION	
Site and Location:	Community-wide including high-risk areas known to flood
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Double Oak Planning and Zoning, Engineers
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

TOWN OF FLOWER MOUND

Town of Flower Mound – Action #1	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities, including but not limited to designated Town shelters and the emergency operations center such as: Community Activity Center, Senior Center, Fire Administrative Building
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound Facilities Department
Implementation Schedule:	Within 12-24 months of plan adoption, then ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

Town of Flower Mound – Action #2	
Proposed Action:	Harden/retrofit critical facilities to a hazard-resistant level, including identifying a facility as an alternative EOC.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities. Alternative new EOC to be proposed for Fire Station 6 or the future Fire Station 8.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facility. Ensure continuity of critical services during and after a severe storm event. Reduce risk of injury to residents, critical and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound Facilities Department
Implementation Schedule:	Within 24-36 months of plan adoption, then ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Flower Mound – Action #3	
Proposed Action:	Develop and implement public education program to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound DEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Flower Mound – Action #4	
Proposed Action:	Upgrade undersized stormwater drains and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injury to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Flower Mound – Action #5	
Proposed Action:	Implement stream restoration/channelization projects to ensure adequate drainage/diversion of stormwater.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injury to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Flower Mound – Action #6	
Proposed Action:	Implement streambank protection projects to ensure adequate protection from streambank erosion to structures.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injury to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of Flower Mound – Action #7	
Proposed Action:	Covered parking for Flower Mound Police Department response vehicles.
BACKGROUND INFORMATION	
Site and Location:	Police Station
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages to emergency response equipment. Ensure continuity of critical services during and after storm event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado, Hail, Lightning, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$600,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound Facilities Department
Implementation Schedule:	Within 60 months of plan adoptions
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:

Town of Flower Mound – Action #8	
Proposed Action:	Conduct soil testing and conditioning for new and reconstructed streets.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages and erosion.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound Facilities Department
Implementation Schedule:	Within 60 months of plan adoptions
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:

Town of Flower Mound – Action #9	
Proposed Action:	Targeted wildland/urban interface mitigation projects based on neighborhoods identified in CWPP.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages or eliminate loss of resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Flower Mound Fire Department
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	CWPP

COMMENTS:

CITY OF HACKBERRY

City of Hackberry– Action #1	
Proposed Action:	Upgrade undersized stormwater drains and culverts
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Hackberry
Implementation Schedule:	Within 12-24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Flood Management Plan; Drainage Plan

COMMENTS:
City currently in middle of project, use of city funds
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Hackberry– Action #2	
Proposed Action:	Harden/retrofit critical facilities and infrastructure to a hazard-resistant level.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facility. Ensure continuity of critical services during and after a severe storm event. Reduce risk of injury to residents, critical and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Hackberry
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Hackberry– Action #3	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities, including but not limited to water towers within community.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Hackberry
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Hackberry– Action #4	
Proposed Action:	Adopt and implement program to insulate and winterized critical facilities and infrastructure as well as outdoor pipes at public buildings
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure, and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical services during severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Hackberry
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Hackberry– Action #5	
Proposed Action:	Town has no shelters or safe rooms available: Build a community safe room and/or shelter for residents to utilize during extreme weather conditions.
BACKGROUND INFORMATION	
Site and Location:	Vacant lot (own by town) to be explored as a potential site location
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical services during severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Thunderstorm Winds, Tornado, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Hackberry
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

TOWN OF HEBRON

Town of Hebron – Action #1	
Proposed Action:	Acquire and distribute NOAA weather radios to vulnerable or at-risk residents.
BACKGROUND INFORMATION	
Site and Location:	Community-wide vulnerable and at-risk residents
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hebron Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes safety.

SECTION 19: MITIGATION ACTIONS

Town of Hebron – Action #2	
Proposed Action:	Implement and enhance an area-wide telephone Emergency Notification System ("Reverse 911").
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Flood, Thunderstorm Winds, Winter Storm, Tornado, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hebron Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes safety.

SECTION 19: MITIGATION ACTIONS

Town of Hebron – Action #3	
Proposed Action:	Join the National Flood Insurance Program (NFIP).
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide access to flood insurance for local residents; Reduce flood risk and build resiliency.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Hebron Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

TOWN OF HICKORY CREEK

Town of Hickory Creek– Action #1	
Proposed Action:	Evaluate bridges and access roads conditions for response vehicles. Develop and implement options to improve access and/or add redundant access routes in high-risk areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including but not limited to Point Vista Road.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve response time for emergency services; Reduce risk of injury or damages. Provide additional ingress/egress routes through high-risk areas to prevent loss of life and avoid rescue efforts
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Administration
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Hickory Creek– Action #2	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injury to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Hickory Creek – Action #3	
Proposed Action:	Install warning signs at hazardous bridges and roadways subject to ice.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries on roadways and bridges during winter storm events through education and awareness programs; Reduce demand on emergency response during winter storms
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Administration
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

Town of Hickory Creek – Action #4	
Proposed Action:	Educate citizens on mitigation measures to prevent frozen pipes; Educate homeowners on carbon monoxide monitors/alarms.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries through mitigation education and awareness
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Hickory Creek – Action #5	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Promotes public safety.

Town of Hickory Creek – Action #6	
Proposed Action:	Develop water conservation strategies and/or ordinance for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Public Works
Implementation Schedule:	Within 12 - 24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

Town of Hickory Creek – Action #7	
Proposed Action:	Enhance landscaping and design measure ordinance.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Development Services / Public Works
Implementation Schedule:	Within 12 - 24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

Town of Hickory Creek – Action #8	
Proposed Action:	Develop and implement a flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Development Services
Implementation Schedule:	Within 12 - 24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Hickory Creek – Action #9	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels to meet code requirements.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Planning and Zoning.
Implementation Schedule:	Within 12-48 months of plan adoption
Incorporation into Existing Plans:	International Building Code

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Hickory Creek – Action #10	
Proposed Action:	Adopt and implement International Building Code.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Winter Storms
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Planning and Zoning
Implementation Schedule:	Within 12 - 24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Hickory Creek – Action #11	
Proposed Action:	Adopt and implement Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages to property, loss of life and reduce risk of injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Fire Department
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances

COMMENTS:

Town of Hickory Creek – Action #12	
Proposed Action:	Upgrade/ Retrofit current facility and/or create a community safe room.
BACKGROUND INFORMATION	
Site and Location:	AMC Theatre, or site to be determined within town-limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Planning / EDC
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Hickory Creek – Action #13	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Public Works, Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

Town of Hickory Creek – Action #14	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Hickory Creek Public Works
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

CITY OF HIGHLAND VILLAGE

City of Highland Village – Action #1	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Highland Village Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
The City of Highland Village is on the shores of Lake Lewisville. A serious sanitary sewer overflow would contaminate the lake which also serves as a drinking water supply to many cities in the area. It could also damage homes and property.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Highland Village– Action #2	
Proposed Action:	Conduct a comprehensive drainage study.
BACKGROUND INFORMATION	
Site and Location:	Community-wide drainage system
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Highland Village Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Highland Village – Action #3	
Proposed Action:	Implement drainage improvements: Increase drainage capacity; add stormwater detention and/or retention basins, box-culverts, etc. as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000 annually for next 10 years
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Highland Village Public Works
Implementation Schedule:	Within 2-5 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Highland Village – Action #4	
Proposed Action:	Implement CASA WX radar system into dispatch and EOC.
BACKGROUND INFORMATION	
Site and Location:	Community-wide,
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,00 per year subscription
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Highland Village Fire Department
Implementation Schedule:	Within 1-2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Highland Village– Action #5	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Highland Village Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Highland Village – Action #6	
Proposed Action:	Install Electronic Water Meters to track water usage and more accurately limit water use during times of drought.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1.2 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Highland Village Water Department
Implementation Schedule:	Within 12 - 24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

City of Highland Village – Action #7	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Highland Village Public Works, Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

City of Highland Village – Action #8	
Proposed Action:	Adopt and implement the ICC Building Codes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities; Enact and enforce regulatory measures that enforce hazard mitigation measures.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	D am Failure, Drought, Earthquake, Expansive Soils, Extreme Heat, Flooding, Hail, High Winds, Lightning, Tornado, Wildfire, Winter Storms
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and substantially improved existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000
Potential Funding Sources:	General Funds
Lead Agency/Department Responsible:	Building Inspection
Implementation Schedule:	12-24 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

CITY OF JUSTIN

City of Justin – Action #1	
Proposed Action:	Develop a land acquisition program in flood hazard areas. Acquire and demolish repetitive loss properties. Acquire high risk vacant land and maintain as open space.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, with emphasis on floodplain along creeks
Risk Reduction Benefit (Current Cost/Losses Avoided):	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas; Reduce downstream impacts associated with development in the floodplain; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection (vacant land)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Justin
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Floodplain Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Justin – Action #2	
Proposed Action:	Install backup generators at Justin Fire Station and City of Justin City Hall.
BACKGROUND INFORMATION	
Site and Location:	Justin Fire Department – 310 N Sealy Ave City of Justin City Hall Complex – 415 N. College
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Wind, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Justin
Implementation Schedule:	Within 6 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Currently the Justin City Hall complex (Justin PD and Emergency operations Center) and Justin Fire Department do not have emergency backup generators. With both of these facilities being critical infrastructure to provide emergency services to the citizen. With the extreme weather conditions that can happen in our area this is an important asset to have.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Justin – Action #3	
Proposed Action:	Conduct public education program on fire risks and wildland fire mitigation, with the assistance of the Texas Forest Service, Denton County Emergency Services and Justin Fire Department. Also, cut firebreaks into wooded areas according to risk factors and target hazard areas identified by the entities involved.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, with emphasis on areas within WUI.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through education and awareness programs; Reduce risk of damages and injuries
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Justin Fire Department/Texas Forrester Service
Implementation Schedule:	Within 6 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

With the recent drought that has occurred in the summer of 2022 it has been a good reminder of how volatile and at risk our communities can be. With the rapid growth of developments in what used to be wide open land, it has presented a large wildland/urban interface risk. As we all have seen with the incidents in Balch Springs and Rendon this summer, a small grass fire can turn into a large wildland incident with multiple structures involved. Along with community education, there might need to be some fuel reduction take place on the outer edges of some of the developments in our city.

City of Justin – Action #4	
Proposed Action:	Provide rebates for residents through a local Safe Room Rebate Program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens providing shelter during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,430,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Justin Emergency Management / Services
Implementation Schedule:	Within 1-3 years of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances; Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Justin – Action #5	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Justin Emergency Management / Services
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Justin – Action #6	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$30,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Justin Emergency Management / Services
Implementation Schedule:	Within 2-5 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

CITY OF KRUGERVILLE

City of Krugerville – Action #1	
Proposed Action:	Build safe room shelters throughout jurisdiction to include critical facilities and/or manufactured home parks.
BACKGROUND INFORMATION	
Site and Location:	City Hall - 5097 Highway 377, Krugerville TX 76227 Police Station - 5246 Highway 377, Krugerville TX 76227
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of Krugerville – Action #2	
Proposed Action:	Harden/retrofit critical facilities to act as evacuation center and/or EOC.
BACKGROUND INFORMATION	
Site and Location:	City Hall - 5097 Highway 377, Krugerville TX 76227 Police Station - 5246 Highway 377, Krugerville TX 76227
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facility. Ensure continuity of critical services during and after a severe storm event. Reduce risk of injury to residents, critical and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Krugerville – Action #3	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado, Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Krugerville – Action #4	
Proposed Action:	Conduct city-wide Hydrologic and Hydraulic (H&) study.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through identifying flood risk with current storm drainage infrastructure. Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Krugerville – Action #5	
Proposed Action:	Drainage improvements: Increase drainage capacity; add stormwater detention and/or retention basins, box-culverts, etc. as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Kruggerville – Action #6	
Proposed Action:	Continue to assess necessary drainage improvements to the old Kruggerville subdivision area.
BACKGROUND INFORMATION	
Site and Location:	Old Kruggerville
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kruggerville Administration
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Krugerville – Action #7	
Proposed Action:	Identify flood prone and repetitive loss properties and implement mitigation actions to reduce or eliminate flooding at identified properties including elevation of properties and other alternative flood mitigation measures. Provide how-to information to residents for installing backflow valves to prevent reverse-flow floods.
BACKGROUND INFORMATION	
Site and Location:	Community-wide high flood risk properties and repetitive loss properties.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plain

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Krugerville – Action #8	
Proposed Action:	Assess and implement plan to address homes that are sinking due to residing on sand and repetitive flooding experienced in impacted residential area.
BACKGROUND INFORMATION	
Site and Location:	Community-wide high-risk areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages or injuries through flood mitigation at high-risk structures. Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plain

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Krugerville – Action #9	
Proposed Action:	Assess and upgrade current septic system to reduce water contamination and health concerns during severe weather event.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages within critical infrastructure but reduce potential water contamination.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 24-60 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan; Local Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Krugerville– Action #10	
Proposed Action:	Provide rebate and/or incentive program for individual safe rooms in single-family residences.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing in home saferooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$350,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Emergency Management
Implementation Schedule:	Within 1-3 years of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances; Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Krugerville – Action #11	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm, Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Emergency Management / Public Work
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Krugerville – Action #12	
Proposed Action:	Develop and implement waterways stabilization program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity. Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$850,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Krugerville – Action #13	
Proposed Action:	Acquire and distribute NOAA weather radios.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, especially to vulnerable populations
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and vulnerable populations through improved communication and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Emergency Management
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Krugerville– Action #14	
Proposed Action:	Continue to assess and install cover patios throughout the public areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to at-risk or vulnerable populations by providing shelter during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Hail, Thunderstorm Winds, Tornado, Lightning
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$7,500 per site location
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Public Works / Parks
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of Krugerville – Action #15	
Proposed Action:	Develop a Community Wildfire Protection Plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$55,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Krugerville – Action #16	
Proposed Action:	Develop water conservation strategies and/or regulations for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000 - \$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Administration
Implementation Schedule:	Within 12 -18 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Krugerville – Action #17	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Public Works / Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of Krugerville – Action #18	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krugerville Public Works
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

CITY OF KRUM

City of Krum – Action #1	
Proposed Action:	Work with the City and the Krum Independent School District to implement tornado safe rooms into future school buildings.
BACKGROUND INFORMATION	
Site and Location:	Krum Independent School District Buildings
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to residents by providing shelter during extreme weather event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krum Administration and KISD Police Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Krum – Action #2	
Proposed Action:	Install standby / back-up generators in critical facilities and designated community shelters to ensure power remains on during periods of extreme weather.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Krum Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Krum – Action #3	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages caused by flooding by maintaining or restoring drainage capacity
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,00 (annually)
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krum Public Works Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Krum – Action #4	
Proposed Action:	Work with state and local agencies to determine locations to reduce fuel on public and private lands. Implement fuels reduction program and cut fire breaks where applicable.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of wildfires and the spread of wildfire through targeted fuels reduction programs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$70,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Krum Fire Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	CWPP, Emergency Response Plan

COMMENTS:

City of Krum – Action #5	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krum Administration / Fire Department
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Krum– Action #6	
Proposed Action:	Develop and implement building codes that would mitigate hazard-related damage on structures and their occupants.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Drought, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krum Planning and Zoning / Code Enforcement – Fire Department
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Krum – Action #7	
Proposed Action:	Develop water conservation strategies and/or regulations for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krum Administration / Public Works
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

City of Krum – Action #8	
Proposed Action:	Increase drainage capacity throughout the city. Reconstruct and increase capacity of waterways to correct drainage issues.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries; Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krum Public Works
Implementation Schedule:	Within 24 -26 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Krum – Action #9	
Proposed Action:	Promote the use of CodeRed. Encourage signing up for CodeRed alerts via social media posts, city websites, signage, and fliers.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Krum Fire Department
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

CITY OF LAKE DALLAS

City of Lake Dallas – Action #1	
Proposed Action:	Harden/retrofit Emergency Operations Center and Community Shelter Renovations (e.g., generator, HVAC replacement, kitchen rehab, security system, etc.)
BACKGROUND INFORMATION	
Site and Location:	EOC and Community Shelter
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facility. Ensure continuity of critical services during and after a severe storm event. Reduce risk of injury to residents, critical and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Lake Dallas – Action #2	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Lake Dallas – Action #3	
Proposed Action:	Conduct a comprehensive drainage study.
BACKGROUND INFORMATION	
Site and Location:	Community-wide drainage system
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Lake Dallas – Action #4	
Proposed Action:	Implement drainage improvements: Increase drainage capacity; add stormwater detention and/or retention basins, box-culverts, etc. as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including but not limited to: Oak Shores sub-division and through to Lake Lewisville area.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Lake Dallas– Action #5	
Proposed Action:	Adopt and implement program to insulate and winterized critical facilities and infrastructure as well as outdoor pipes at public buildings
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure, and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical services during severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas / Public Works
Implementation Schedule:	Within 12-18 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

City of Lake Dallas– Action #6	
Proposed Action:	Educate citizens on mitigation measures to prevent frozen pipes; Educate homeowners on carbon monoxide monitors/alarms
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries through mitigation education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas
Implementation Schedule:	Within 6-18 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

City of Lake Dallas– Action #7	
Proposed Action:	Require standards for burial of electrical, telephone, cable lines and other utilities in new developments, and use of steel connectors in new and existing construction.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to structures and infrastructure. Reduce risk of injuries or fatalities
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Lightning, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Lake Dallas
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #8	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Lake Dallas – Action #9	
Proposed Action:	Develop water conservation strategies and/or regulations for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000 - \$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Administration / Public Works
Implementation Schedule:	Within 12 -24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

City of Lake Dallas – Action #10	
Proposed Action:	Adopt a landscape and design ordinance (selection and planting guidelines).
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Planning / Public Works
Implementation Schedule:	Within 9-12 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #11	
Proposed Action:	Design and implement a city flood protection ordinance.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Development Services / Engineering Department
Implementation Schedule:	Within 9-12 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Lake Dallas – Action #12	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Planning and Zoning
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #13	
Proposed Action:	Adopt and implement International Building Code for new buildings.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Drought, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Planning and Zoning
Implementation Schedule:	Within 9-12 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #14	
Proposed Action:	Increase the ability of residents and business to receive severe weather and emergency notification through Black Board Connect communications notification system.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$6,300
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Police Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Lake Dallas – Action #15	
Proposed Action:	Install additional warning sirens to alert the public of severe weather.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages through early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$30,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #16	
Proposed Action:	Adopt and implement a Community Wildfire Protection Plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Fire Department, County Emergency Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #17	
Proposed Action:	Develop a Community Safe Room.
BACKGROUND INFORMATION	
Site and Location:	Site to be determined within city-limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Planning / EDC
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #18	
Proposed Action:	Construct an emergency operations center.
BACKGROUND INFORMATION	
Site and Location:	Site to be determined within city-limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Development Services / Fire Department
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #19	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Public Works / Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

City of Lake Dallas – Action #20	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Public Works
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lake Dallas – Action #21	
Proposed Action:	Elevate Shady Shore Road to reduce future loss due to flooding.
BACKGROUND INFORMATION	
Site and Location:	Shady Shore Road
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities. Ensure continuity of emergency response efforts.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lake Dallas Public Works / Floodplain Manager
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	Floodplain Ordinance; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

TOWN OF LAKEWOOD VILLAGE

Town of Lakewood Village – Action #1	
Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure, including well pumps.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facility. Ensure continuity of critical services during and after a severe storm event. Reduce risk of injury to residents, critical and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Lakewood Village
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Lakewood Village – Action #2	
Proposed Action:	Raise electrical components of sewage lift stations above BFE.
BACKGROUND INFORMATION	
Site and Location:	Sewer Plant
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood water contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Lakewood Village
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Lakewood Village – Action #3	
Proposed Action:	Elevate and implement/upgrade current water and stormwater infrastructure.
BACKGROUND INFORMATION	
Site and Location:	Sewer Plant
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood water contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services. Ensures potable water during time of extreme weather conditions
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive, Extreme Heat, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Lakewood Village
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Flood Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Lakewood Village – Action #4	
Proposed Action:	Adopt and implement program to insulate outdoor pipes at public buildings.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities including but not limited to City Hall, and Water/Sewer Operation Plants
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of public service.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Lakewood Village
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Lakewood Village – Action #5	
Proposed Action:	Educate citizens on mitigation measures to prevent frozen pipes; Educate homeowners on carbon monoxide monitors/alarms.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries through mitigation education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Lakewood Village
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

CITY OF LEWISVILLE

City of Lewisville – Action #1	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado, Lightning, Hail, Winter Storm, Extreme Heat, Drought, Wildfire, Dam Failure, Earthquake, Expansive Soils, low-risk and man/made hazards.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Community Relations, and Tourism
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #2	
Proposed Action:	Participate in the Collaborative Adaptive Sensing of the Atmosphere (CASA) Weather Radar program / to include CASA Alerts Mobile app for residents.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promotes hazard awareness through early warning and communication. Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado, Lightning, Hail, Winter Storm, Extreme Heat, Drought, Wildfire, Dam Failure, Earthquake, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$11,500 annual operating cost share
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Lewisville – Action #3	
Proposed Action:	Purchase a Mobile Traffic Barrier designed to block errant vehicles and protect first responders and their vehicles during highway emergency incidents. The Mobile Traffic Barrier consists of a trailer designed to redirect vehicles away from the incident scene, mounted attenuator to reduce the energy involved in a collision to the rear of the trailer. Can be used during highway crashes, investigations, emergency repairs, and unplanned lane/road closures from wildfires, flooding, storm damage, icing, etc.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events. Ensure emergency response and continuity of critical services during and after an event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness and Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado, Lightning, Hail, Winter Storm, Extreme Heat, Drought, Wildfire, Dam Failure, Earthquake, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$350,000
Potential Funding Sources:	Local Funds, State and Federal Grants, UASI
Lead Agency/Department Responsible:	City of Lewisville OEM, Fire and Police Department
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management and Response Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Lewisville – Action #4	
Proposed Action:	Utilize CERT members to implement the Map-Your-Neighborhood program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado, Lightning, Hail, Winter Storm, Extreme Heat, Drought, Wildfire, Dam Failure, Earthquake, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Lewisville – Action #5	
Proposed Action:	Acquire a radio station to disseminate preparedness information and emergency messaging to residents and travelers.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning. Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado, Lightning, Hail, Winter Storm, Extreme Heat, Drought, Wildfire, Dam Failure, Earthquake, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Community Relations, and Tourism
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #6	
Proposed Action:	City facility shelter with backup generator that can also be used as a cooling or warming station.
BACKGROUND INFORMATION	
Site and Location:	City facility shelter
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Parks and Recreation Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety. Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Lewisville – Action #7	
Proposed Action:	Expand outdoor warning system to cover LLELA.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado, Lightning, Hail, Winter Storm, Wildfire, Dam Failure, Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$35,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Parks and Recreation Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Lewisville – Action #8	
Proposed Action:	Acquire generator trailer with hard wire quick connections at Emergency Operations Center.
BACKGROUND INFORMATION	
Site and Location:	Emergency Operations Center
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$30,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #9	
Proposed Action:	Purchase potable water buffalo trailers to provide residents with drinkable water.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness and Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$30,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Public Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety; Protect citizens; Provide critical services.

City of Lewisville – Action #10	
Proposed Action:	Establish, adopt, and implement a green infrastructure program for parks, nature preserves, greenbelts, etc. and plant trees on public lands and ROW– Healthy Infrastructure Plan
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impacts of flood through expanded greenspace and restoration of floodplains and wetlands. Reduce impacts of drought through green infrastructure that works to replenish groundwater reserves; Reduce impacts of Urban Island Heat effect in densely populated areas through tree planting.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Extreme Heat, Flood, Drought, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville Parks and Recreation Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Lewisville – Action #11	
Proposed Action:	Build safe room shelters at community centers and/or manufactured home parks so that all park residents can reach shelter in less than five minutes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:

City of Lewisville – Action #12	
Proposed Action:	Implement a safe room rebate program for residential structures.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances

COMMENTS:

City of Lewisville – Action #13	
Proposed Action:	Create an education campaign for residents on hiring roof contractors.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on risk, threats, and vulnerability from all natural hazards
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado, Hail
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #14	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant native species, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Public Services, Parks and Recreation Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #15	
Proposed Action:	Create a brace and bolt program to assist homeowners to retrofit their houses and bolt their houses to foundations/crawl spaces
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #16	
Proposed Action:	Purchase and install flood gauges at Timber Creek, Midway Branch, Denton Creek, and Prairie Creeks
BACKGROUND INFORMATION	
Site and Location:	Timber Creek, Midway Branch, Denton Creek, and Prairie Creeks
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$75,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Engineering
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Flood Prevention Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #17	
Proposed Action:	Purchase and install Automated High-Water Warning Signs at known flood areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide high-risk flood areas.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of injuries and fatalities. Reduce emergency response demand.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Engineering
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #18	
Proposed Action:	Incentive program for residents to install roof lightning rods and/or surge protectors.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #19	
Proposed Action:	Provide how-to information to residents for shutting their water meter off during a hard freeze and electrical outage; Educate residents on how to prepare for prolonged utility outages and generator safety during a winter storm.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	Staff time
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Lewisville OEM, Public Services, Community Relations and Tourism
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #20	
Proposed Action:	Assist homeowners in purchasing and planting trees to help shade their home.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

City of Lewisville – Action #21	
Proposed Action:	Install fire danger rating and burn ban signs at LLELA, Lake Park, and LISD Outdoor Learning Area (LISDOLA) facility.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$75,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Fire Department, Parks and Recreation Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of Lewisville – Action #22	
Proposed Action:	Purchase Fuel Reduction Unit designed to access areas where other vehicles cannot, and to provide the equipment needed to reduce the fuel in wildland fire prone areas, including LLELA and City Parks. The unit UTV with pump and tank and a transport trailer. Other equipment includes various hand tools, power tools, drip torches and PPE to support fuel reduction and cleanup efforts, as well as prescribed burns. This will include creating defensible spaces in high-risk areas within the City / Wild Urban Interface (WUI) areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide with emphasis on WUI areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness – Preparedness / Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:

City of Lewisville – Action #23	
Proposed Action:	Educate residents who are downstream of Lewisville Dam on response procedures, emergency notifications, and evacuation routes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide with emphasis on inundation areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Community Relations and Tourism
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:

City of Lewisville – Action #24	
Proposed Action:	Increase network security.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure network systems
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from cyber security events
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Cyber Security
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Information Technology Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

City of Lewisville – Action #25	
Proposed Action:	Increase Supervisory Control and Data Acquisition (SCADA) system security.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure network systems
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from cyber security events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Cyber Security
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Information Technology Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

City of Lewisville – Action #26	
Proposed Action:	Purchase mobile/modular vehicle barriers to protect crowds at parades or outdoor special events.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from terrorist events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Public Services, Police Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan, Anti-Terrorism Plan

COMMENTS:

City of Lewisville – Action #27	
Proposed Action:	Ensure secure water systems; perimeter barrier around the City of Lewisville Water Plant water supply intake.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from terrorist events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Terrorism
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Public Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan, Anti-Terrorism Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #28	
Proposed Action:	Purchase and stockpile N-95 or KN-95 masks.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from pandemic events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness and Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Infectious Disease
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

City of Lewisville – Action #29	
Proposed Action:	Ensure that computer equipment, network accessibility, licenses, software, and virtual desktops are available for employees to work remotely.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from pandemic events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Infectious Disease
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Information Technology Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #30	
Proposed Action:	Install appropriate surge protectors and Uninterrupted Power Supply (UPS) Battery Backup on all city systems.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Geomagnetic Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Public Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

City of Lewisville – Action #31	
Proposed Action:	Install generators for all critical infrastructure.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage. Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Geomagnetic Storm, Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Public Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Lewisville – Action #32	
Proposed Action:	Adopt ordinance requiring tie-downs for mobile homes: Require manufactured housing be securely anchored to permanent foundations.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to structures and infrastructure. Reduce risk of injuries or fatalities
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:

City of Lewisville – Action #33	
Proposed Action:	Assess building code for cost effective strategies that could be local amendments, if needed
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages to structures through improved construction techniques; Reduce recovery efforts for the community after an event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado, Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Neighborhood Services
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:

City of Lewisville – Action #34	
Proposed Action:	Develop a Wildfire Contingency Plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Fire Department
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #35	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquake to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Educate the public on actions they can take to prevent or reduce the loss of life or property from all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$30,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

City of Lewisville – Action #36	
Proposed Action:	Conduct and implement a study to identify storm shelter areas in the city.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and injuries resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lewisville – Action #37	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (where applicable), Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM, Public Works
Implementation Schedule:	Within 12-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Lewisville – Action #38	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lewisville OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

TOWN OF LITTLE ELM

Town of Little Elm – Action #1	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Facilities
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Little Elm – Action #2	
Proposed Action:	Drainage improvements: Increase drainage capacity; add stormwater detention and/or retention basins, box-culverts, etc. as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Little Elm – Action #3	
Proposed Action:	Install warning signs at hazardous bridges and roadways subject to ice.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries on roadways and bridges during winter storm events through education and awareness programs; Reduce demand on emergency response during winter storms.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Public Works
Implementation Schedule:	Within 18-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

Town of Little Elm – Action #4	
Proposed Action:	Establish, adopt, and implement a "green infrastructure" program for parks, nature preserves, greenbelts, etc.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impacts of flood through expanded greenspace and restoration of floodplains and wetlands. Reduce impacts of drought through green infrastructure that works to replenish groundwater reserves; Reduce impacts of Urban Island Heat effect in densely populated areas through tree planting.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Drought, Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Little Elm– Action #5	
Proposed Action:	Adopt and implement program to insulate and winterized critical facilities and infrastructure as well as outdoor pipes at public buildings
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure, and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical services during severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Emergency Management / Public Works
Implementation Schedule:	Within 12-18 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Little Elm– Action #6	
Proposed Action:	Educate citizens on mitigation measures to prevent frozen pipes; Educate homeowners on carbon monoxide monitors/alarms
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries through mitigation education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Public Works / Communications Department
Implementation Schedule:	Within 6-18 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Little Elm – Action #7	
Proposed Action:	Expand and upgrade current warning sirens to reach areas with gaps throughout the jurisdiction.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages through early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Emergency Management
Implementation Schedule:	Within 18-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Little Elm – Action #8	
Proposed Action:	Develop a new stormwater ordinance.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity to mitigate future flash and lake flooding problem. Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Development Services
Implementation Schedule:	Within 18-36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Little Elm– Action #9	
Proposed Action:	Acquire mobile CASA-Weather radios for large incidents and events.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, especially to vulnerable populations
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and vulnerable populations through improved communication and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Thunderstorm Winds, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000 annually
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Emergency Management
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Little Elm – Action #10	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm, and low risk / man-made hazards.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Emergency Management
Implementation Schedule:	Within 9-12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Little Elm – Action #11	
Proposed Action:	Develop and implement water conservation strategies and/or regulations for implementation during droughts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Public Works
Implementation Schedule:	Within 12 -24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Little Elm – Action #12	
Proposed Action:	Adopt and/or enhance landscape and design ordinance to include xeriscaping, using native plants to reduce water usage, etc.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Development Services
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

Town of Little Elm – Action #13	
Proposed Action:	Adopt and implement International Building Code for new buildings.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Drought, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Little Elm Planning and Zoning
Implementation Schedule:	Within 9-12 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Little Elm – Action #14	
Proposed Action:	Increase the ability of residents and business to receive severe weather and emergency notification through the Little Elm Alert public communications notification system.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$14,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Little Elm – Action #15	
Proposed Action:	Provide opportunities throughout the community for citizens to escape extreme heat, including but not limited to exploring improvements to the following areas: The Cove, splash pad, improvements to Little Elm Park, and Cottonwood Park.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to at-risk or vulnerable populations by providing shelter during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Little Elm Planning / EDC
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

TOWN OF NORTHLAKE

Town of Northlake – Action #1	
Proposed Action*:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location*:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Expansive Soils, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost*:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible*:	Town of Northlake Public Works
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Comprehensive outreach to address all threats from hazards listed in the plan. Additional emphasis can be placed on the hazards most likely to affect the residents of Northlake-specifically.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Northlake – Action #2	
Proposed Action*:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location*:	Community-wide critical facilities, including pump and lift stations
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost*:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible*:	Town of Northlake Public Works
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

Town of Northlake – Action #3	
Proposed Action*:	Adopt code that requires all new critical facilities to be equipped with emergency generator.
BACKGROUND INFORMATION	
Site and Location*:	Community-wide new construction of critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost*:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible*:	Town of Northlake Administration
Implementation Schedule:	Within 1 years of plan adoption
Incorporation into Existing Plans:	Local Codes

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

Town of Northlake – Action #4	
Proposed Action*:	Evaluate access and road conditions for response vehicles and formulate/implement options to improve access and/or add redundant access routes in high-risk areas.
BACKGROUND INFORMATION	
Site and Location*:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through maintained and redundant access routes in high-risk areas; Improve response time for emergency services; Reduce risk of injury or damages. Provide additional ingress/egress routes through high-risk areas to prevent loss of life and avoid rescue efforts
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Flood, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost*:	\$200,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible*:	Town of Northlake Public Works
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Northlake – Action #5	
Proposed Action*:	Adopt and implement program to insulate outdoor pipes at critical facilities and public buildings.
BACKGROUND INFORMATION	
Site and Location*:	Community-wide critical and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical and public services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost*:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible*:	Town of Northlake Public Works
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Local Codes

COMMENTS:
Comprehensive program to insulate outdoor pipes would be an improvement over case-by-case insulation for facilities.

SECTION 19: MITIGATION ACTIONS

Town of Northlake – Action #6	
Proposed Action*:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location*:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost*:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible*:	Town of Northlake Public Works
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:

Town of Northlake – Action #7	
Proposed Action*:	Increase/ Upgrade drainage capacity including but not limited to stormwater detention and/or retention basins, stormwater drains and culverts, as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location*:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries; Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost*:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible*:	Town of Northlake Public Works
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

CITY OF OAK POINT

City of Oak Point – Action #1	
Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide (virtually @ Oak Point City Hall)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Expansive Soils, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, DPS
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Currently, the City of Oak Point utilizes various methods of communication to engage with citizens and promote hazard mitigation when needed including social media, our quarterly newsletter, and electronic messaging sign outside City Hall.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Oak Point – Action #2	
Proposed Action:	Enhance and actively promote our City Emergency Notification System.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Expansive Soils, Flood, Hail, Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, DPS
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Blackboard Connect is the existing notification system we use for residents. However, our subscription only allows for a limited number of users and only sends notifications about severe weather. Ideally, we would like to upgrade the system to allow for more subscribers and so that we can notify residents about other safety issues.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Oak Point – Action #3	
Proposed Action:	Require standard tie-downs of above-ground propane tanks.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to structures and infrastructure; Reduce risk of injuries or fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornados, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, Code Enforcement
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Local Codes/ Ordinances

COMMENTS:
We would likely pass a resolution/ordinance to incorporate this requirement into our existing code.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Oak Point – Action #4	
Proposed Action:	Educate community on the dangers of low water crossing through the installation of warning signs and promotion of the “Turn Around, Don’t Drown” Program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of injuries, fatalities, and damages through education and awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, Public Works, DPS
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Oak Point – Action #5	
Proposed Action:	Continue to monitor the need for increased drainage capacity and the addition of stormwater detention and/or retention basins as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, Public Works
Implementation Schedule:	Within 24-48 of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
City has made improvements to stormwater infrastructure recently but are still needing to continue enhancing it. The city is hoping to adopt stormwater impact fees by the end of the year to assist with this and will continue to monitor areas in the City where improvements are needed.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Oak Point – Action #6	
Proposed Action:	Retain and maintain natural vegetation in stormwater channels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages due to erosion or scour during flood events
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Oak Point – Action #7	
Proposed Action:	Display fire danger rating and/or burn ban information on electronic sign outside of City Hall.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through education and awareness programs; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, DPS
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Oak Point – Action #8	
Proposed Action:	Establish community cooling/warming centers for vulnerable populations during extreme temperatures.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of injury and fatalities to at-risk and vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storms
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, DPS
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
City administration is currently in the process of acquiring new generators for both our City Hall & DPS buildings to support hosting a warming/cooling center.

City of Oak Point – Action #9	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,00,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, DPS
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Oak Point – Action #10	
Proposed Action:	Upgrade undersized stormwater drains and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages through improved drainage capacity; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration, Public Works
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
City has recently upgraded some of our stormwater infrastructure and plan to continue with improvements as needed
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Oak Point – Action #11	
Proposed Action:	Continue to assess for buy-out/acquisition of housing with high-risk flood areas. Acquire and preserve open spaces adjacent to floodplain areas
BACKGROUND INFORMATION	
Site and Location:	Community-wide repetitive loss and/or severe repetitive loss properties within floodplain and high-risk areas
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk to structures and infrastructure in and near the floodplain; Reduce downstream impacts associated with development in the floodplain; Reduce risk of injuries to citizens; Reduce burden on emergency services during and after a flood event
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
City has recently purchased several housing sites near a floodplain area and will continue to assess.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Oak Point – Action #12	
Proposed Action:	Adopt and implement routine fire hydrant maintenance plan
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through routine maintenance of fire hydrants; Reduce risk of injury or damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point DPS in conjunction with our various water providers
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	

COMMENTS:

City of Oak Point – Action #13	
Proposed Action:	Install additional firebreaks into public wooded areas according to risk factors.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of wildfires and the spread of wildfire through targeted firebreaks.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point DPS
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	

COMMENTS:

City of Oak Point – Action #14	
Proposed Action:	Install warning signs at hazardous bridges and roadways subject to ice
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries on roadways and bridges during winter storm events through education and awareness programs; Reduce demand on emergency response during winter storms.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Oak Point Administration
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	N/A

COMMENTS:

CITY OF PILOT POINT

City of Pilot Point – Action #1	
Proposed Action:	Acquire and install back-up power source and/or generators with hard wired quick connections and/or transfer switch. Install natural gas generators with diesel backup to eliminate pollution.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities including but not limited to: <ul style="list-style-type: none"> • Berend Well-1154 Berend Road, Pilot Point, Tx 76258 • Montague Well- 512 North Montague, Pilot Point, Tx 76258 • Massey Well- Massey Road 11900 Massey Road, Pilot Point, Tx 76258
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Generator backup power is now mandated on new well designs.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Pilot Point – Action #2	
Proposed Action:	Acquire and install back-up power source and/or generators.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities including but not limited to: <ul style="list-style-type: none"> • Public Works Annex- 110 West Division, Pilot Point, Tx 76258 • Wastewater Treatment Facility, 1400 North St. James Road, Pilot Point, Tx 76258
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Public Works
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
New wastewater plant to be built. We hope to have generator power available.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Pilot Point – Action #3	
Proposed Action:	Acquire generac systems for each city building for emergency power.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities including but not limited to: Fire Department, Police department, City Hall, Public Works Annex, Senior Center, Library, Museum.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services. Identified buildings also use as shelter for public to reduce risk of injuries and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of Pilot Point – Action #4	
Proposed Action:	Acquire and install back-up power source and/or generators, as schools will be utilized emergency shelters and warming centers during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	7 school site locations within city-limits.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Public Works / Emergency Management / ISD superintendent
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Pilot Point – Action #5	
Proposed Action:	Purchase and secure radios for emergency communication during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk through improved communications and early warning. Ensure emergency response to impact areas. Reduce risk of injury to resident and first responders.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes safety.

City of Pilot Point – Action #6	
Proposed Action:	Harden/retrofit police and fire stations to act as an EOC.
BACKGROUND INFORMATION	
Site and Location:	Police Station - 1797 North Washington St Fire Station - 1789 North Washington St
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facility. Ensure continuity of critical services during and after a severe storm event. Reduce risk of injury to residents, critical and emergency response personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Thunderstorm Winds, Lightning, Wildfire, Winter Storm
Effect on new/existing buildings:	Safety/Security
Priority (High, Moderate, Low):	Reduce risk to existing structures
Estimated Cost:	Moderate
Potential Funding Sources:	\$500,000
Lead Agency/Department Responsible:	Local Funds, State and Federal Grants
Implementation Schedule:	City of Pilot Point Public Works / Emergency Management
Incorporation into Existing Plans:	Within 24-36 months of plan adoption

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Pilot Point – Action #7	
Proposed Action:	Acquire mobile CASA-Weather radios for large incidents and events in coordination with Denton County.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, especially to vulnerable populations
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and vulnerable populations through improved communication and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Thunderstorm Winds, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Pilot Point – Action #8	
Proposed Action:	Develop and implement a water conservation program through efficient irrigation systems and drought resistant landscaping.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Development Services
Implementation Schedule:	Within 12 -24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Pilot Point – Action #9	
Proposed Action:	Implement “Texas Safe Room Rebate Program”.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and injuries resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Development Services
Implementation Schedule:	Within 2-3 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Pilot Point – Action #10	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Public Works / Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Pilot Point – Action #11	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Pilot Point Public Works
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

TOWN OF PONDER

Town of Ponder – Action #1	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Ponder Emergency Services
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Ponder – Action #2	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities, including but not limited to sewage and water infrastructure.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$32,350,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Ponder Emergency Services
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Ponder – Action #3	
Proposed Action:	Implement “Texas Safe Room Rebate Program”.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and injuries resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Ponder Administration / Emergency Services
Implementation Schedule:	Within 1-4 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Ponder – Action #4	
Proposed Action:	Adopt and implement a Community Wildfire Protection Plan and Program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,875,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Ponder Administration / Emergency Services
Implementation Schedule:	Within 1-2 years of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Ponder – Action #5	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Ponder Public Works / Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Ponder – Action #6	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Ponder Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

TOWN OF PROVIDENCE VILLAGE

Town of Providence Village – Action #1	
Proposed Action:	Join the National Flood Insurance Program (NFIP).
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide access to flood insurance for local residents. Reduce flood risk and build resiliency
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Town of Providence Village Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Providence Village – Action #2	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$30,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Providence Village – Action #3	
Proposed Action:	Develop and implement stormwater improvement program for structures and creek waterways.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$80,000 / year
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration and Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Providence Village – Action #4	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration and Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

Town of Providence Village – Action #5	
Proposed Action:	Maintain and update land use ordinances, subdivision regulations, building codes and enforcement, open space preservation and stormwater management regulations and master plans.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages to structures through improved construction techniques; Reduce recovery efforts for the community after an event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Extreme Heat, Thunderstorm Winds, Tornado, Flood, Drought, Winter Storms, Hail, Lightning, Earthquake, Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration and Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of Providence Village – Action #6	
Proposed Action:	Obtain certification in the National Weather Service StormReady Program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by educating the public on how to prepare for hazards and disasters
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Winds, Tornado, Winter Storm, Hail
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$00,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration and Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Providence Village – Action #7	
Proposed Action:	Adopt and implement program to insulate outdoor pipes at critical facilities and public buildings.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and public buildings
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical and public services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration and Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Providence Village – Action #8	
Proposed Action:	Retain and maintain natural vegetation in stormwater channels.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood damages due to erosion or scour during flood events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$175,000 / year
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration and Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of Providence Village – Action #9	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains and culverts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$30,000 (annually)
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration and Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of Providence Village – Action #10	
Proposed Action:	Equip sewer manholes with watertight covers and inflow guards.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood water contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Providence Village Administration and Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

CITY OF ROANOKE

City of Roanoke – Action #1	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Roanoke OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Roanoke – Action #2	
Proposed Action:	Drainage improvements: Increase drainage capacity; add stormwater detention and/or retention basins, box-culverts, etc. as deemed necessary to reduce flood risk.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including but not limited to: Oak Shores sub-division and through to Lake Lewisville area.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Roanoke OEM / Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Roanoke – Action #3	
Proposed Action:	Provide rebate and/or incentive program for individual safe rooms in single-family residences.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing in home saferooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulation Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$135,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Roanoke OEM / Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Codes and Ordinances; Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Roanoke – Action #4	
Proposed Action:	Develop and implement public education program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Roanoke OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Roanoke – Action #5	
Proposed Action:	Create and implement master utility/storm water plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of property damages, injuries, and fatalities. Reduce flood risk through improved drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Drought, Flood, Thunderstorm Winds, Tornado, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Roanoke Development Services
Implementation Schedule:	Within 12 -24 months of plan adoptions
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Roanoke – Action #6	
Proposed Action:	Acquire and distribute NOAA weather radios.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, especially to vulnerable populations
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and vulnerable populations through improved communication and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Roanoke OEM, Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Roanoke – Action #7	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels, including integration of cooling and warming centers for vulnerable populations.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities including but not limited Community and Recreation Centers
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Roanoke OEM, Parks and Recreation
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Roanoke – Action #8	
Proposed Action:	Adopt and implement Fuel Management Plan. Plan would incorporate maintaining wildfire mitigation measures including firebreaks in wooded areas, burn bans signs, no vegetation in easement, requiring fire-resistant landscaping and/or requiring new structure built in WUI areas to create and maintain defensible spaces.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Roanoke OEM, Fire Department, and Community Development
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

CITY OF SANGER

City of Sanger– Action #1	
Proposed Action:	Retrofit and/or build additional fire station on the East side of the railroad track with necessary equipment such as ATV to ensure emergency response during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	Marion Rd. and F.M. 455
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and vulnerable populations through improved communication and early warning. If there was a severe weather incident emergency response would be unable to access half of district.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Flood, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$550,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Fire Department
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Sanger– Action #2	
Proposed Action:	Retrofit and/or build additional fire station on West side of I-35 with necessary equipment such as ATV to ensure emergency response during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	F.M. 455 and Keaton Rd.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and vulnerable populations through improved communication and early warning. If there was a severe weather incident emergency response would be unable to access half of district.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Flood, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$6,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Fire Department
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of Sanger– Action #3	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Fire Department / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #4	
Proposed Action:	Upgrade/ Rebuild subgrade and repave necessary areas within city-limits.
BACKGROUND INFORMATION	
Site and Location:	7 th St. between Willow St. and Houston St. Oak St. between Willow St. and Dead End (south) Wood St. between 10 th St. and I-35 Service Rd. Church St. between 10 th St. and 7 th St. Denton St. between Houston St. and Marshall St
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued damages through improvements in critical infrastructure. Reduce risk of injuries. Ensures emergency response during extreme weather conditions.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$285,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #5	
Proposed Action:	Upgrade/ Rebuild subgrade and repave necessary areas within city-limits.
BACKGROUND INFORMATION	
Site and Location:	3 rd St. from Willow St. to Wayne St. Austin St. from 3 rd St. to 5 th St. Church St. from 2 nd St. to 5 th St. Jackilu St. from 2 nd St. to 3 rd St. Locust St. from 2 nd St. to 3 rd St. Marshall St. from 3 rd St. to 5 th St. Wayne St. from 3 rd St. to Aster Dr. Wood St. from 2 nd St. to 5 th St.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued damages through improvements in critical infrastructure. Reduce risk of injuries. Ensures emergency response during extreme weather conditions.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$365,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #6	
Proposed Action:	Upgrade/ Rebuild subgrade and repave necessary areas within city-limits.
BACKGROUND INFORMATION	
Site and Location:	Carolyn Dr. from I-35 Service Rd. to David Dr. Allen Dr. from I-35 Service Rd. to Carolyn Dr. David Dr. from I-35 Service Rd. to Freese Dr. Stephen Dr. from I-35 Service Rd. to David Dr.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued damages through improvements in critical infrastructure. Reduce risk of injuries. Ensures emergency response during extreme weather conditions.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$180,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Sanger – Action #7	
Proposed Action:	Upgrade/ Rebuild subgrade and repave necessary areas within city-limits.
BACKGROUND INFORMATION	
Site and Location:	Southland Dr. from Cowling Rd. to Dead End (West) South Manor from South Meadow Dr. to Dead End (West) South Park Ct. from South Meadow Dr. to Dead End (West) Southside Dr. from I-35 Service Rd. to Southland Dr. South Meadow Dr. from Southland Dr. to Southside Dr.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued damages through improvements in critical infrastructure. Reduce risk of injuries. Ensures emergency response during extreme weather conditions.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$355,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of Sanger – Action #8	
Proposed Action:	Upgrade/ Rebuild subgrade and repave necessary areas within city-limits.
BACKGROUND INFORMATION	
Site and Location:	Houston St. from Katheryn St. to 5 th St. Marcia Ln. from Katheryn St. to Colonial Heights Bucklew Dr. from Freese Dr. to Katheryn St. Katheryn St. from Bucklew Dr. to Austin St. Diane Dr. from Houston St. to 5 th St. Hillcrest Dr. from Diane Dr. to Houston St. Colonial Heights from Dead End (North) to Dead End (South) Turtle Creek from Colonial Heights to 5 th St.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued damages through improvements in critical infrastructure. Reduce risk of injuries. Ensures emergency response during extreme weather conditions.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$675,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #9	
Proposed Action:	Upgrade/ Rebuild subgrade and repave necessary areas within city-limits.
BACKGROUND INFORMATION	
Site and Location:	Wood St. from 5 th St. to 7 th St. 6 th St. from Willow St. to Wood St. Marshall St. from 7 th St. to 10 th St. Walnut St. from Church St. to Wood St. Willow St. from 5 th St. to 10 th St. Railroad St. from Willow St. to Ball Park (South) Railroad St. from Willow St. to RR tracks (North)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued damages through improvements in critical infrastructure. Reduce risk of injuries. Ensures emergency response during extreme weather conditions.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$540,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #10	
Proposed Action:	Upgrade/ Rebuild subgrade and repave necessary areas within city-limits.
BACKGROUND INFORMATION	
Site and Location:	Brooke Dr. from N. Keaton Rd. to Laney Dr. Laney Dr. from N. Keaton Rd. to Duck Creek Rd. Benjamin Dr. from Laney Dr. to N. Keaton Rd. Rising Star Ln. from Duck Creek Rd. to Dead End (North)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued damages through improvements in critical infrastructure. Reduce risk of injuries. Ensures emergency response during extreme weather conditions.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$365,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #11	
Proposed Action:	Upgrade/ Rebuild subgrade and repave necessary areas within city-limits.
BACKGROUND INFORMATION	
Site and Location:	Rebuild subgrade and repave: Brook Glen Dr. from Keaton Rd. to Dead End (East) Fairfield Cr. From Brook Glen Dr. to Dead End (East)
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce continued damages through improvements in critical infrastructure. Reduce risk of injuries. Ensures emergency response during extreme weather conditions.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$65,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #12	
Proposed Action:	Implement individual tornado safe room rebate program.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life and injuries resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Department of Development Services
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Sanger– Action #13	
Proposed Action:	Purchase of a CASA (WX) Weather Radar System.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, especially to vulnerable populations
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens and vulnerable populations through improved communication and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$550,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger, Denton County, NCTCOG
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #14	
Proposed Action:	Continue to promote use of Code Red system and public education program through utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm, and low risk / man-made hazards.
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Administration / Emergency Management, Denton County
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #15	
Proposed Action:	Improve drainage throughout city. Reconstruct creek waterways to correct drainage issues.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries; Reduce emergency response demands
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$600,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Sanger – Action #16	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works / Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

City of Sanger – Action #17	
Proposed Action:	Conduct earthquake assessment study to determine potential for earthquakes to affect public facilities and utilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sanger Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

TOWN OF SHADY SHORES

Town of Shady Shores – Action #1	
Proposed Action:	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in the right-of-way; Remove dead trees from right-of-way and drainage systems on a scheduled basis.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulation Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind, Hail, Lightning, Tornado, Winter Storm, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores Public Works
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Maintenance Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Shady Shores – Action #2	
Proposed Action:	Evaluate access and road conditions for response vehicles and formulate/implement options to improve access and/or add redundant access routes in high-risk areas.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk and spread of wildfires through maintained and redundant access routes in high risk areas; Improve response time for emergency services; Reduce risk of injury or damages; Provide additional ingress/egress routes through high risk areas to prevent loss of life and avoid rescue efforts
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing and future structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores Public Works, Floodplain Manager, Engineering, Emergency Management
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

Town of Shady Shores – Action #3	
Proposed Action:	Continue to evaluate landscape and design ordinance by ensuring best use of green space which can include xeriscaping, using native plants to reduce water usage, etc.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores and Adhoc Committee
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Shady Shores – Action #4	
Proposed Action:	Continue participation with the NCTCOG and other agencies to identify potential risks and gather ongoing data in an effort to update flood damage ordinance.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores / NTCOG
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Town of Shady Shores – Action #5	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels and retrofit to meet the requirements of the International Building Code.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores Planning and Zoning
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Shady Shores – Action #6	
Proposed Action:	Continue coordination and partnership with Fire Department to implement a Community Wildfire Protection Plan.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores Fire Department, County Emergency Services
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

Town of Shady Shores – Action #7	
Proposed Action:	Develop and promote community awareness, education, and support for acquiring personal safe rooms.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Winds
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shade Shores Planning / EDC
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

Town of Shady Shores – Action #8	
Proposed Action:	Continue to promote education and attendance to seminars regarding the impact and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores Public Works / Emergency Management
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Shady Shores – Action #9	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores Public Works
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Shady Shores – Action #10	
Proposed Action:	Elevate Shady Shore Road to reduce future loss due to flooding.
BACKGROUND INFORMATION	
Site and Location:	Shady Shore Road
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages, injuries, and fatalities. Ensure continuity of emergency response efforts.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5 million
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Town of Shady Shores Public Works / Floodplain Manager
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	Floodplain Ordinance; Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

CITY OF THE COLONY

City of The Colony – Action #1	
Proposed Action:	Undertake a comprehensive study of flooding issues near North Colony Blvd. and Taylor Street intersection areas and determine reduction alternatives. Implement feasible alternatives for flood reduction. Upgrade undersize storm water pipes, inlets and outfall structures.
BACKGROUND INFORMATION	
Site and Location:	North Colony Blvd. and Taylor Street intersection
Risk Reduction Benefit (Current Cost/Losses Avoided):	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries. Resolve roadway-flooding issues.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City Engineering Department
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
If not resolved, city facilities could see flood damages. Fire Station 2 is in this area – response times to service calls could be affected by flooding.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #2	
Proposed Action:	Detail design and construction of retaining wall, grading, clearing debris and dead trees, stabilize the banks for erosion and creek bank stabilization of Office Creek from Blair Oaks Dr. culvert to the Good Shepard Church area.
BACKGROUND INFORMATION	
Site and Location:	Office Creek from Blair Oaks Dr. culvert to Good Shepard Church Area.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$7,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City Engineering Department
Implementation Schedule:	Within 3 years of plan adoption.
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of The Colony – Action #3	
Proposed Action:	Adopt and implement a program for clearing debris from creeks, storm drainpipes, inlets and culverts.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$60,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City Engineering; Public Works; Emergency Management
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Local Codes

COMMENTS:
Stop flooding incidents in the Five Star Complex area; The Colony High School is across the street from Five Star Complex (students use the Five Star parking lot Monday-Friday).
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #4	
Proposed Action:	Detail design and construction of rock rip-rap, outfall structure, grading, clearing debris and dead trees for erosion in the area between south of Five Star Sports Complex and north of Memorial Dr.
BACKGROUND INFORMATION	
Site and Location:	South of Five Star Sports Complex and north of Memorial Dr.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$8,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City Engineering Department
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Stop flooding incidents in the Five Star Complex area; The Colony High School is across the street from Five Star Complex (students use the Five Star parking lot Monday-Friday).
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

City of The Colony – Action #5	
Proposed Action:	Remove and replace expansive soils under Lebanon Road, remove and replace existing concrete pavement as per the geotechnical report recommendation.
BACKGROUND INFORMATION	
Site and Location:	Lebanon Road in The Colony.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduces damages at critical infrastructures.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$6,000,00
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City Engineering Department
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
Removal of expansive soils will stop damage to Lebanon Road; this area is heavily trafficked from the Tribute Neighborhood and two schools (Strike Middle School and Prestwick Elementary).

City of The Colony – Action #6	
Proposed Action:	Increased PSA/Education via City of The Colony multimedia. Designed to educate the public on hazard awareness and appropriate measures. Task Force Assignment staffing of Engine and Brush Truck designed to enhance availability for staff to respond to incidents, appropriate EMS-related inventories, and quicker response times.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security; Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Fire Department
Implementation Schedule:	Within 12-18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of The Colony – Action #7	
Proposed Action:	Implement Disaster Planning measures and Structure Triage and Protection as resources permit, increase daily staffing to cover increase in calls for services, utilization of mutual aid resources for water rescue incidents.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, especially Lake Lewisville area
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning. Enhances response time and more organization for calls for service for flood-related incidents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security; Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Fire Department
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #8	
Proposed Action:	Update / Adjust incident response model to ensure fire apparatus availability during times of increased storm related call volume.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through improved communications and early warning. Enhances response times due to increased fire apparatus availability during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning, Thunderstorm Winds, Tornado, Wildfire, Winter Storms
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security; Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Fire Department
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Respective county elevations combined with residential construction types and signs does create increase rate of structure fire incidents. These episodes are typically brief and not sustained over standard IAP-required timelines.

City of The Colony – Action #9	
Proposed Action:	Implementation of Disaster Planning measures. Implement and scale IMS to appropriate measures to address community Search and Rescue, EMS, and fire suppression services. Activate and support prolonged community disaster relief measures. Adjust daily staffing model to ensure emergency response availability during prolonged incident stabilization timelines. Disaster measure for community displacement and sheltering. Traffic clearing of storm debris and traffic control for incident stabilization and security measures.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages. Ensure continuity of emergency response efforts.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security; Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Fire Department
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of The Colony – Action #10	
Proposed Action:	Implementation of Disaster Planning, Deicing operations. Activate and support prolonged community relief measures, staffing model adjustments to ensure response availability during winter storm and post-storm thaw operations of increased incident volume. Activation of public warming shelters.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Promote hazard awareness and protect citizens from potential injuries and damages. Ensure continuity of emergency response efforts.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security; Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Fire Department
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

City of The Colony – Action #11	
Proposed Action:	Adopt and implement a program to insulate outdoor pipes at critical facilities and public buildings.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Ensure continuity of critical and public services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Local Codes

COMMENTS:

City of The Colony – Action #12	
Proposed Action:	Add building insulation to walls and attics and wrap/insulate pipes at critical and public facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical and public facilities
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages at public buildings resulting from freezing temperatures; Reduce energy consumption and costs during extreme Temperatures.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$125,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

City of The Colony – Action #13	
Proposed Action:	Educate citizens on mitigation measures to prevent frozen pipes.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries through mitigation education and awareness on mitigation activities for winter storms.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #14	
Proposed Action:	Install irrigation systems and implement watering schedule at public buildings and critical facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to structures and infrastructure due to expansive soils by maintaining adequate soil moisture. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Local Codes

COMMENTS:

City of The Colony – Action #15	
Proposed Action:	Identify flood prone and repetitive loss properties through the Texas Water Development Board. Identify and implement actions to reduce or eliminate flooding at identified properties.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$75,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #16	
Proposed Action:	Purchase and install a generator for the Public Works/Fleet complex buildings.
BACKGROUND INFORMATION	
Site and Location:	Public Works/Fleet Complex
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Wind, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #17	
Proposed Action:	Purchase and install a generator for Fire Station #2.
BACKGROUND INFORMATION	
Site and Location:	Fire Station 2
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Wind, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of The Colony – Action #18	
Proposed Action:	Purchase and install a generator for the Community Center.
BACKGROUND INFORMATION	
Site and Location:	Community Center
Risk Reduction Benefit (Current Cost/Losses Avoided):	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Wind, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #19	
Proposed Action:	Purchase a portable generator for Facilities use.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Continuity of operations for city facilities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Wind, Lightning, Wildfire, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$90,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Facilities
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

City of The Colony – Action #20	
Proposed Action:	Monitor and adhere to CDC and best practice emergency medical operations, adjust staffing models and response plans to ensure minimization of exposure to personnel, prolonged personnel fitness for duty, and appropriate incident resource allocation. Adjust medical personal protective equipment (PPE) inventories to meet prolonged operations, communicate factual and best practices of situation to public, and coordinate with area hospitals and department medical control to prevent system strain through patient overpopulation at their respective facility.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Protect community and personnel from infectious disease.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Infectious Disease
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security; Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$3,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of the Colony Fire Department
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

City of The Colony – Action #21	
Proposed Action:	Adopt and implement landscape and design ordinance to include xeriscaping, using native plants to reduce water usage, etc.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Public Works
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #22	
Proposed Action:	Harden/Retrofit critical facilities to hazard-resistant levels and retrofit to meet the requirements of the International Building Code.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils, Earthquake, Extreme Heat, Flood, Hail, Thunderstorm Winds, Lightning, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Planning and Zoning
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Local Plans and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #23	
Proposed Action:	Develop a Community Safe Room.
BACKGROUND INFORMATION	
Site and Location:	Site to be determined within city-limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of life resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$700,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Planning / EDC
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #24	
Proposed Action:	Construct an emergency operations center.
BACKGROUND INFORMATION	
Site and Location:	Site to be determined within city-limits
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, High Winds, Tornado, Lightning, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Development Services and Fire Department
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of The Colony – Action #25	
Proposed Action:	Conduct soil analysis to determine the scope, impact, and extent of expansive soils.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Expansive Soils
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Public Works / Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #26	
Proposed Action:	Conduct earthquake study to assess potential for earthquakes and their impacts.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Conduct studies to determine hazard and vulnerability threat assessment for all natural hazards.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Earthquake
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Public Works
Implementation Schedule:	Within 12-24 months of plan adoption. In progress
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #27	
Proposed Action:	Conduct Public Works Infrastructure Assessment to prioritize infrastructure improvement projects/infrastructure additions to the community that are constructed to mitigate against all hazards.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce damages at critical facilities; Ensure continuity of critical services during and after event. Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, High Winds, Lightning, Tornado, Wildfire, Winter Storm, and man-made hazards
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$300,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Public Works / Engineering
Implementation Schedule:	Within 60 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #28	
Proposed Action:	Conduct sealing and lining of manholes to city wastewater/sewer system.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of flood water to contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, High Winds, Lightning, Tornado, Wildfire, Winter Storm, and man-made hazards
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$300,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Public Works
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Wastewater Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of The Colony – Action #29	
Proposed Action:	Purchase and design a mobile command post to be used during disaster events.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate loss of resulting from severe weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, High Winds, Lightning, Tornado, Wildfire, Winter Storm, and man-made hazards
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Emergency Management / Fire Department
Implementation Schedule:	Within 60 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

City of The Colony – Action #30	
Proposed Action:	Increase network security.
BACKGROUND INFORMATION	
Site and Location:	Community-wide critical facilities and infrastructure network systems
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce or eliminate the loss of life and property damage resulting from cyber security events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Cybersecurity
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of The Colony Information Technology
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

TOWN OF TROPHY CLUB

Town of Trophy Club – Action #1	
Proposed Action:	Upgrade and expand Emergency Alert System and Warning Sirens.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, with emphasis on SE & NW part of town
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens through Improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Fire Department
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Trophy Club – Action #2	
Proposed Action:	Develop and implement a safe room rebate program for individual safe rooms in single-family residences.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing in-home saferooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000 per safe room
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Marketing and Community Development
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Trophy Club – Action #3	
Proposed Action:	Install warning signs at hazardous bridges and roadways subject to ice.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries on roadways and bridges during winter storm events through education and awareness programs; Reduce demand on emergency response during winter storms.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Streets Department
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

Town of Trophy Club – Action #4	
Proposed Action:	Join the Community Rating System Program (CRS).
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood insurance premiums for local residents. Reduce flood risk and build resiliency
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Trophy Club Community Development
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Trophy Club – Action #5	
Proposed Action:	Build safe room shelters at Park and Recreation locations – Pool, Baseball Fields, Parks, etc.
BACKGROUND INFORMATION	
Site and Location:	1 Trophy Wood Drive 2675 Trophy Park Dr 699 Indian Creek Dr 501 Parkview Dr 2885 Trophy Park Dr
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Park and Recreation
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Trophy Club – Action #6	
Proposed Action:	Build a Safe Room/Shelter at Town Hall and Fire Station
BACKGROUND INFORMATION	
Site and Location:	1Trophy Wood Drive and 295 Trophy Club Dr.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Community Development and Engineering
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:

Town of Trophy Club – Action #7	
Proposed Action:	Require safe rooms to be added when construction new schools, day cares, rest homes, critical care facilities.
BACKGROUND INFORMATION	
Site and Location:	Community-wide
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk to citizens by providing shelter in new critical facilities during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Winds, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate to High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Community Development and Marketing
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Town of Trophy Club – Action #8	
Proposed Action:	Stormwater drainage upgrades.
BACKGROUND INFORMATION	
Site and Location:	Community-wide including Inverness Drive
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Streets and Engineering
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

Town of Trophy Club – Action #9	
Proposed Action:	Upgrade stormwater drain inlets along Trophy Club Drive
BACKGROUND INFORMATION	
Site and Location:	1100 Trophy Club Drive
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Streets Department
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Trophy Club – Action #10	
Proposed Action:	Consult with engineering to raise bridge and prevent flooding.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, with emphasis on bridge located Trophy Club Drive & Beck Park
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce risk of damages and injuries. Reduce emergency response demands and injuries to first responders.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Streets and Engineering
Implementation Schedule:	Within 5 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Town of Trophy Club – Action #11	
Proposed Action:	Complete assessment to implement engineering and construction solution to creek erosion and flooding.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including areas surrounding Skyline Creek from Greenleaf to TW King.
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk and risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Projects, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$8,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Engineering
Implementation Schedule:	Within 4 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

Town of Trophy Club – Action #12	
Proposed Action:	Raise Right-of-Way/Approach of driveways to reduce flooding.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including Greebrier Court
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk and risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations, Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Streets and Engineering
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Local Codes

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

Town of Trophy Club – Action #13	
Proposed Action:	Add stormwater inlets at rear residential property lines and adjacent cemetery to reduce erosion of private property.
BACKGROUND INFORMATION	
Site and Location:	Community-wide, including areas between Summit Cove and Cemetery
Risk Reduction Benefit (Current Cost/Losses Avoided):	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries. Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Trophy Club Engineering Department
Implementation Schedule:	Within 3 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 20: PLAN MAINTENANCE

Plan Maintenance Procedures 1

Incorporation 1

 Process of Incorporation 1

Monitoring and Evaluation 11

 Monitoring..... 12

 Evaluation..... 13

Updating..... 13

 Plan Revisions..... 13

 Five (5) Year Review..... 13

Continued Public Involvement 14

PLAN MAINTENANCE PROCEDURES

The following is an explanation of how the participating jurisdictions within Denton County, and the general public will be involved in implementing, evaluating, and enhancing the Denton County Hazard Mitigation Action Plan Update over time. When the Plan is discussed in all maintenance procedures it includes mitigation actions and hazard assessments. The sustained hazard mitigation planning process consists of four main parts:

- Incorporation
- Monitoring and Evaluation
- Updating and Reviewing
- Continued Public Involvement

INCORPORATION

Participating jurisdictions within Denton County will be responsible for further development and implementation of mitigation actions. Each action has been assigned to a specific department within the participating jurisdictions. The following describes the process by which participating jurisdictions will incorporate elements of the mitigation plan into other planning mechanisms.

PROCESS OF INCORPORATION

Once the Plan Update is adopted, participating jurisdictions within Denton County will implement actions based on priority and the availability of funding. The Planning Area currently implements policies and programs to reduce loss to life and property from hazards. The mitigation actions developed for this Plan Update enhance this ongoing effort and will be implemented through other program mechanisms where possible.

The potential funding sources listed for each identified action may be used when the jurisdiction seeks funds to implement actions. An implementation time period or a specific implementation date has been assigned to each action as an incentive for completing each task and gauging whether actions are implemented in a timely manner.

Participating jurisdictions within Denton County will integrate implementation of their mitigation actions with other plans and policies such as construction standards and emergency management plans, and ensure that these actions, or proposed projects, are reflected in other planning efforts. Coordinating and integrating components of other plans and policies into goals and objectives of the Plan Update will further maximize funding and provide possible cost-sharing of key projects, thereby reducing loss of lives and property and mitigating hazards affecting the area.

Upon formal adoption of the Plan Update, planning team members from each participating jurisdiction will work to integrate the hazard mitigation strategies into other plans and codes as they are developed. Participating team members will conduct periodic reviews of plans and policies, once per year at a minimum, and analyze the need for revisions in light of the approved Plan. The planning team will review all capital improvement plans (applicable jurisdictions only), annual budget reviews, emergency operations or management plans, and transportation plans (applicable jurisdictions only) to guide and control development. Participating jurisdictions will ensure that capital improvement planning (applicable jurisdictions only) in the future will also contribute to the goals of this hazard mitigation Plan Update to reduce the long-term risk to life and property from all hazards. Within one year of formal adoption of the hazard mitigation Plan Update, existing planning mechanisms will be reviewed by each jurisdiction.

Denton County is committed to supporting the participating jurisdictions as they implement their mitigation actions. Planning team members will review and revise, as necessary, the long-range goals and objectives in strategic plan and budgets to ensure that they are consistent with this mitigation action plan. Additionally, the Planning Area will work to advance the goals of this hazard mitigation plan through its routine, ongoing, long-range planning, budgeting, and work processes.

Table 20-1 identifies types of planning mechanisms and examples of methods for incorporating the Plan Update into other planning efforts. The team members, listed in Table 20-2 below, will be responsible for the review of these planning mechanisms and their incorporation of the plan, with the exception of the Floodplain Management Plans; the jurisdictions who have a Floodplain Administrator on staff will be responsible for incorporating the plan when floodplain management plans are updated, or new plans are developed.

Table 20-1. Methods of Incorporation of the Plan

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Annual Budget Review	Denton County: Emergency Management Coordinator Town of Argyle: Emergency Management Coordinator City of Aubrey: Emergency Management Coordinator Town of Bartonville: Emergency Management Coordinator Town of Copper Canyon: Emergency Management Coordinator City of Corinth: Emergency Management Coordinator	Various departments and key personnel that participated in the planning process for participating jurisdictions within Denton County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.

SECTION 20: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	Town of Cross Roads: Emergency Management Coordinator City of Denton: Emergency Management Coordinator Town of DISH: Mayor Town of Double Oak: Mayor Town of Flower Mound: Emergency Management Coordinator City of Hackberry: Mayor Town of Hebron: Mayor Town of Hickory Creek: Town Administrator City of Highland Village: Emergency Management Coordinator City of Justin: Emergency Management Coordinator City of Krugerville: Emergency Management Coordinator City of Krum: Emergency Management Coordinator City of Lake Dallas: Emergency Management Coordinator Town of Lakewood Village: Emergency Management Coordinator City of Lewisville: Emergency Management Coordinator Town of Little Elm: Emergency Management Coordinator Town of Northlake: Emergency Management Coordinator City of Oak Point: Emergency Management Coordinator City of Pilot Point: Emergency Management Coordinator Town of Ponder: Emergency Management Coordinator Town of Providence Village: Emergency Management Coordinator	

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	City of Roanoke: Emergency Management Coordinator City of Sanger: Emergency Management Coordinator Town of Shady Shores: Emergency Management Coordinator City of The Colony: Emergency Management Coordinator Town of Trophy Club: Emergency Management Coordinator	
Capital Improvement Plans	Denton County: Emergency Management Coordinator Town of Argyle: Emergency Management Coordinator City of Aubrey: Emergency Management Coordinator Town of Copper Canyon: Town Administrator / Emergency Management Coordinator City of Corinth: City Manager Town of Cross Roads: Town Administrator City of Denton: Emergency Management Coordinator Town of DISH: Mayor Town of Flower Mound: Emergency Management Coordinator Town of Hickory Creek: Town Administrator City of Highland Village: Emergency Management Coordinator City of Justin: Emergency Management Coordinator City of Krum: Emergency Management Coordinator City of Lake Dallas: Emergency Management Coordinator Town of Lakewood Village: Emergency Management Coordinator	Some participating jurisdictions have a Capital Improvement Plan (CIP) in place. Prior to any revisions to the CIP, City and town departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	City of Lewisville: Emergency Management Coordinator Town of Little Elm: Emergency Management Coordinator Town of Northlake: Emergency Management Coordinator City of Oak Point: Emergency Management Coordinator City of Pilot Point: Emergency Management Coordinator Town of Providence Village: Emergency Management Coordinator City of Roanoke: Emergency Management Coordinator City of Sanger: Emergency Management Coordinator Town of Shady Shores: Emergency Management Coordinator City of The Colony: Emergency Management Coordinator Town of Trophy Club: Emergency Management Coordinator	
Comprehensive Plans	Denton County: Emergency Management Coordinator Town of Argyle: Emergency Management Coordinator City of Aubrey: Emergency Management Coordinator Town of Bartonville: Emergency Management Coordinator Town of Copper Canyon: Emergency Management Coordinator City of Corinth: Emergency Management Coordinator Town of Cross Roads: Emergency Management Coordinator City of Denton: Emergency Management Coordinator Town of DISH: Mayor	Some participating jurisdictions within Denton County have Long-term Comprehensive Development Plans in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	Town of Flower Mound: Emergency Management Coordinator Town of Hickory Creek: Town Administrator City of Highland Village: Emergency Management Coordinator City of Justin: Emergency Management Coordinator City of Krum: Emergency Management Coordinator City of Lake Dallas: Emergency Management Coordinator Town of Lakewood Village: Emergency Management Coordinator City of Lewisville: Emergency Management Coordinator Town of Little Elm: Emergency Management Coordinator Town of Northlake: Emergency Management Coordinator City of Oak Point: Emergency Management Coordinator City of Pilot Point: Emergency Management Coordinator Town of Providence Village: Emergency Management Coordinator City of Roanoke: Emergency Management Coordinator City of Sanger: Emergency Management Coordinator City of The Colony: Emergency Management Coordinator Town of Trophy Club: Emergency Management Coordinator	
Floodplain Management Plans	Denton County: Floodplain Administrator Town of Argyle: Floodplain Administrator City of Aubrey: Floodplain Administrator	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 6 of this Plan Update discussing the people

SECTION 20: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	Town of Bartonville: Floodplain Administrator Town of Copper Canyon: Floodplain Administrator City of Corinth: Floodplain Administrator Town of Cross Roads: Floodplain Administrator City of Denton: Floodplain Administrator Town of DISH: Floodplain Administrator Town of Double Oak: Floodplain Administrator Town of Flower Mound: Floodplain Administrator City of Hackberry: Floodplain Administrator Town of Hebron: Floodplain Administrator City of Highland Village: Floodplain Administrator City of Justin: Floodplain Administrator City of Krugerville: Floodplain Administrator City of Krum: Floodplain Administrator City of Lake Dallas: Floodplain Administrator Town of Lakewood Village: Floodplain Administrator City of Lewisville: Floodplain Administrator Town of Little Elm: Floodplain Administrator Town of Northlake: Floodplain Administrator City of Oak Point: Floodplain Administrator City of Pilot Point: Floodplain Administrator Town of Ponder: Floodplain Administrator	and property at risk to flood will be reviewed and revised when participating jurisdictions within Denton County update their management plans or develops new plans.

SECTION 20: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	Town of Providence Village: Floodplain Administrator City of Roanoke: Floodplain Administrator City of Sanger: Floodplain Administrator Town of Shady Shores: Floodplain Administrator City of The Colony: Floodplain Administrator Town of Trophy Club: Floodplain Administrator	
Grant Applications	Denton County: Emergency Management Coordinator Town of Argyle: Emergency Management Coordinator City of Aubrey: Emergency Management Coordinator Town of Bartonville: Town Administrator Town of Copper Canyon: Emergency Management Coordinator City of Corinth: Emergency Management Coordinator City of Denton: Emergency Management Coordinator Town of DISH: Town Secretary Town of Double Oak: Mayor Town of Flower Mound: Emergency Management Coordinator City of Hackberry: Mayor Town of Hebron: Mayor Town of Hickory Creek: Town Administrator City of Highland Village: City Manager City of Justin: City Manager City of Krugerville: Emergency Management Coordinator City of Krum: Emergency Management Coordinator City of Lake Dallas: Emergency Management Coordinator	The Plan will be evaluated by some participating jurisdictions within Denton County when grant funding is sought for mitigation projects. If a project is not in the Plan Update, a Plan Revision may be necessary to include the action in the Plan.

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	City of Lewisville: Emergency Management Coordinator Town of Little Elm: Emergency Management Coordinator Town of Northlake: Emergency Management Coordinator City of Oak Point: Emergency Management Coordinator City of Pilot Point: Emergency Management Coordinator Town of Ponder: Emergency Management Coordinator Town of Providence Village: Town Administrator City of Roanoke: Emergency Management Coordinator City of Sanger: Emergency Management Coordinator Town of Shady Shores: Emergency Management Coordinator City of The Colony: Emergency Management Coordinator Town of Trophy Club: Emergency Management Coordinator	
Regulatory Plans	Denton County: Emergency Management Coordinator Town of Argyle: Emergency Management Coordinator City of Aubrey: Emergency Management Coordinator Town of Bartonville: Emergency Management Coordinator Town of Copper Canyon: Emergency Management Coordinator City of Corinth: Emergency Management Coordinator Town of Cross Roads: Emergency Management Coordinator City of Denton: Emergency Management Coordinator Town of DISH: Mayor	Currently, some participating jurisdictions within Denton County have regulatory plans in place, such as Emergency Management Plans, Continuity of Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when County and City departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.

SECTION 20: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	Town of Double Oak: Mayor Town of Flower Mound: Emergency Management Coordinator City of Hackberry: Mayor Town of Hebron: Mayor City of Highland Village: Emergency Management Coordinator City of Justin: Emergency Management Coordinator City of Krugerville: Emergency Management Coordinator City of Krum: Emergency Management Coordinator City of Lake Dallas: Emergency Management Coordinator Town of Lakewood Village: Emergency Management Coordinator City of Lewisville: Emergency Management Coordinator Town of Little Elm: Emergency Management Coordinator Town of Northlake: Emergency Management Coordinator City of Oak Point: Emergency Management Coordinator City of Pilot Point: Emergency Management Coordinator Town of Ponder: Emergency Management Coordinator Town of Providence Village: Emergency Management Coordinator City of Roanoke: Emergency Management Coordinator City of Sanger: Emergency Management Coordinator Town of Shady Shores: Emergency Management Coordinator City of The Colony: Emergency Management Coordinator	

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	Town of Trophy Club: Emergency Management Coordinator	

MONITORING AND EVALUATION

Periodic revisions of the Plan are required to ensure that goals, objectives, and mitigation actions are kept current. When the plan is discussed in these sections it includes the risk assessment and mitigation actions as a part of the monitoring, evaluating, updating and review process. Revisions may be required to ensure the Plan is in compliance with federal and state statutes and regulations. This section outlines the procedures for completing Plan revisions, updates, and review. Table 20-2 indicates the department and title of the party responsible for Plan monitoring, evaluating, updating, and review of the Plan.

Table 20-2. Team Members Responsible for Plan Monitoring, Evaluating, Updating, and Review of the Plan

JURISDICTION	TITLE
Denton County	Director of Emergency Management
Denton County	Emergency Management Officer II
Town of Argyle	Emergency Management Coordinator / Town Administrator
City of Aubrey	Assistant Fire Chief
Town of Bartonville	Town Administrator
Town of Copper Canyon	Town Administrator
City of Corinth	Assistant to City Manager
Town of the Cross Roads	Chief of Police
City of Denton	Emergency Management Coordinator
Town of DISH	Mayor
Town of Double Oak	Mayor
Town of Flower Mound	Emergency Management Coordinator / Fire Chief
City of Hackberry	Mayor
Town of Hebron	Mayor
Town of Hickory Creek	Town Administrator
City of Highland Village	Deputy Director of Public Works
City of Justin	City Manager

JURISDICTION	TITLE
City of Krugerville	City Secretary
City of Krum	Emergency Management Coordinator / Fire Chief
City of Lake Dallas	City Manager
Town of Lakewood Village	Town Administrator
City of Lewisville	Emergency Management Coordinator
Town of Little Elm	Emergency Management Coordinator
Town of Northlake	Public Works Management Analyst
City of Oak Point	City Manager
City of Pilot Point	City Manager
Town of Ponder	Fire Chief
Town of Providence Village	Town Manager
City of Roanoke	Fire Chief
City of Sanger	Fire Marshal
Town of Shady Shores	Town Administrator
City of The Colony	Emergency Management Coordinator
Town of Trophy Club	Senior Community Development Specialist

MONITORING

Designated Planning Team members are responsible for monitoring, evaluating, updating, and reviewing the Plan, as shown in Table 20-2. Individuals holding the title listed in Table 20-2 will be responsible for monitoring the Plan on an annual basis. Plan monitoring includes reviewing and incorporating into the Plan other existing planning mechanisms that relate or support goals and objectives of the Plan; monitoring the incorporation of the Plan into future updates of other existing planning mechanisms as appropriate; reviewing mitigation actions submitted and coordinating with various County, Town and City departments to determine if mitigation actions need to be re-evaluated and updated; evaluating and updating the Plan as necessary; and monitoring plan maintenance to ensure that the process described is being followed, on an annual basis, throughout the planning process. The Planning Team will develop a brief report that identifies policies and actions in the plan that have been successfully implemented and any changes in the implementation process needed for continued success. A summary of meeting notes will report the particulars involved in developing an action into a project. In addition to the annual monitoring, the Plan will be similarly reviewed immediately after extreme weather events include but not limited to state and federally declared disasters.

EVALUATION

As part of the evaluation process, the Planning Team will assess changes in risk; determine whether the implementation of mitigation actions is on schedule; determine whether there are any implementation problems, such as technical, political, legal, or coordination issues; and identify changes in land development or programs that affect mitigation priorities for each respective department or organization.

The Planning Team will meet on an annual basis to evaluate the Plan and identify any needed changes and assess the effectiveness of the plan achieving its stated purpose and goals. The team will evaluate the number of mitigation actions implemented along with the loss-reduction associated with each action. Actions that have not been implemented will be evaluated to determine if any social, political, or financial barriers are impeding implementation and if any changes are necessary to improve the viability of an action. The team will evaluate changes in land development and/or programs that affect mitigation priorities in their respective jurisdictions. The annual evaluation process will help to determine if any changes are necessary. In addition, the Plan will be similarly evaluated immediately after extreme weather events including but not limited to state and federally declared disasters.

UPDATING

PLAN REVISIONS

At any time, minor technical changes may be made to update the Denton County Hazard Mitigation Action Plan Update 2023. Material changes to mitigation actions or major changes in the overall direction of the Plan or the policies contained within it, must be subject to formal adoption by the participating jurisdictions.

The participating jurisdictions within Denton County will review proposed revisions and vote to accept, reject, or amend the proposed change. Upon ratification, the Revision will be transmitted to TDEM.

In determining whether to recommend approval or denial of a Plan Revision request, participating jurisdictions will consider the following factors:

- Errors or omissions made in the identification of issues or needs during the preparation of the Plan Update;
- New issues or needs that were not adequately addressed in the Plan Update; and
- Changes in information, data, or assumptions from those on which the Plan Update was based.

FIVE (5) YEAR REVIEW

The Plan will be thoroughly reviewed by the Planning Team at the end of three years from the approval date, to determine whether there have been significant changes in the planning area that necessitate changes in the types of mitigation actions proposed. Factors that may affect the content of the Plan include new development in identified hazard areas, increased exposure to hazards, disaster declarations, increase or decrease in capability to address hazards, and changes to federal or state legislation.

The Plan review process provides the participating jurisdictions within Denton County an opportunity to evaluate mitigation actions that have been successful, identify losses avoided due

SECTION 20: PLAN MAINTENANCE

to the implementation of specific mitigation measures, and address mitigation actions that may not have been successfully implemented as assigned.

It is recommended that the full Executive and Advisory Planning Team (Section 2, Tables 2-1 and 2-2) meet to review the Plan at the end of three years because grant funds may be necessary for the development of a five-year update. Reviewing planning grant options in advance of the five-year Plan update deadline is recommended considering the timelines for grant and planning cycles can be in excess of a year.

Following the Plan review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and Plan Revision process outlined herein. Upon completion of the review, update, and revision process the revised Plan will be submitted to TDEM for final review and approval in coordination with FEMA.

CONTINUED PUBLIC INVOLVEMENT

Public input was an integral part of the preparation of this Plan and will continue to be essential for Plan updates. The Public will be directly involved in the annual evaluation, monitoring, reviews and cyclical updates. Changes or suggestions to improve or update the Plan will provide opportunities for additional public input.

The public can review the Plan on the participating jurisdictions' websites, where officials and the public are invited to provide ongoing feedback, via email.

The Planning Team may also designate voluntary citizens from the planning area or willing stakeholder members from the private sector businesses that were involved in the Plan's development to provide feedback on an annual basis. It is important that stakeholders and the immediate community maintain a vested interest in preserving the functionality of the planning area as it pertains to the overall goals of the mitigation plan. The Planning team is responsible for notifying stakeholders and community members on an annual basis and maintaining the Plan.

Media, including local newspaper and radio stations, will be used to notify the public of any maintenance or periodic review activities during the implementation, monitoring, and evaluation phases. Additionally, local news media will be contacted to cover information regarding Plan updates, status of grant applications, and project implementation. Local and social media outlets, such as Facebook and Twitter, will keep the public and stakeholders apprised of potential opportunities to fund and implement mitigation projects identified in the Plan.

APPENDIX A: PLANNING TEAM

Planning Team Members 1
 Stakeholders 5

PLANNING TEAM MEMBERS

Denton County Hazard Mitigation Action Plan 2023 was organized using a direct representative model. An Executive Planning Team from the participating jurisdictions, shown in Table A-1, was formed to coordinate planning efforts and request input and participation in the planning process. Table A-2 reflects the Advisory Planning Team, consisting of area organizations and departments that participated throughout the planning process. Table A-3 is comprised of stakeholders who were invited to provide Plan input. Public outreach efforts and meeting documentation is provided in Appendix E.

Table A-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Denton County	Director of Emergency Management
Denton County	Emergency Management Officer II
Town of Argyle	Town Administrator
City of Aubrey	Assistant Fire Chief
Town of Bartonville	Town Administrator
Town of Copper Canyon	Town Administrator
City of Corinth	Assistant to City Manager
Town of Cross Roads	Chief of Police
City of Denton	Emergency Management Coordinator
Town of DISH	Mayor
Town of Double Oak	Mayor
Town of Flower Mound	Emergency Management Coordinator / Fire Chief
City of Hackberry	Mayor
Town of Hebron	Mayor
Town of Hickory Creek	Town Administrator
City of Highland Village	Deputy Director of Public Works
City of Justin	City Manager

ORGANIZATION / DEPARTMENT	TITLE
City of Krugerville	Assistant City Administrator and City Secretary
City of Krum	Emergency Management Coordinator / Fire Chief
City of Lake Dallas	City Manager
Town of Lakewood Village	City Administrator
City of Lewisville	Emergency Management Coordinator
Town of Little Elm	Emergency Management Coordinator
Town of Northlake	Public Works Management Analyst
City of Oak Point	City Manager
City of Pilot Point	City Manager
Town of Ponder	Fire Chief
Town of Providence Village	Town Manager
City of Roanoke	Fire Chief
City of Sanger	Fire Marshal
Town of Shady Shores	Town Administrator
City of The Colony	Emergency Management Coordinator
Town of Trophy Club	Senior Community Development Specialist

Table A-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Denton County	PHEP Program Coordinator
Denton County	Senior Development Coordinator
Town of Argyle	Chief of Police
Town of Argyle	Community Development Director
Town of Argyle	Public Works Director
City of Aubrey	Fire Chief
City of Aubrey	Mayor
City of Aubrey	Police Lieutenant

ORGANIZATION / DEPARTMENT	TITLE
Town of Bartonville	Mayor
Town of Copper Canyon	Emergency Management Coordinator / Council Member
City of Corinth	City Engineer
City of Corinth	City Manager
City of Corinth	City Marshal
City of Corinth	Director of Public Works
City of Corinth	Emergency Management Intern
City of Corinth	Fire Chief
City of Corinth	City Engineer
City of Corinth	Streets and Stormwater Manager
Town of the Cross Roads	Town Administrator
City of Denton	City Engineer
City of Denton	Deputy City Engineer
City of Denton	Deputy Director of Operations
City of Denton	Public Information Officer
Town of DISH	Town Secretary
Town of Double Oak	Director of Public Works
Town of Flower Mound	Emergency Management Specialist
Town of Flower Mound	Floodplain Manager
City of Hackberry	Town Secretary
City of Highland Village	Assistant Fire Chief
City of Justin	City Secretary
City of Krugerville	Mayor
City of Krum	Deputy Fire Chief
City of Krum	Fire Captain
City of Krum	Fire Deputy
City of Krum	Fire Deputy - Intern

ORGANIZATION / DEPARTMENT	TITLE
City of Lake Dallas	Public Works Superintendent
Town of Lakewood Village	Mayor
City of Lewisville	Administrative Intern for OEM
City of Lewisville	Assistant City Manager
City of Lewisville	Emergency Management Specialist
City of Lewisville	Fire Marshal
City of Lewisville	GIS Administrator
City of Lewisville	Internal Services Manager
City of Lewisville	NRO Sergeant
City of Lewisville	Public Works Manager
Town of Northlake	Director of Public Works
Town of Northlake	Town Secretary
City of Oak Point	Support Services Coordinator
City of Pilot Point	Director of Public Works
City of Pilot Point	Fire Chief
City of Pilot Point	Mayor
City of Pilot Point	Police Chief
Town of Ponder	Chief of Police
Town of Providence Village	EM Specialist
City of Roanoke	Assistant Fire Chief
City of Roanoke	Captain of Field Operations
City of Sanger	Director of Development Services
Town of Shady Shores	Communication Relations Manager
City of The Colony	Emergency Management Specialist
City of The Colony	Senior Engineer
Town of Trophy Club	Administrative Assistant to Fire Department
Town of Trophy Club	Director of Community Development

ORGANIZATION / DEPARTMENT	TITLE
Town of Trophy Club	Fire Chief
Town of Trophy Club	Streets / Drainage Superintendent

STAKEHOLDERS

The following groups listed in Table A-3 represent a list of organizations invited to stakeholder meetings, public meetings, and workshops throughout the planning process and include: non-profit organizations, private businesses, universities, and legislators. The public were also invited to participate via e-mail throughout the planning process. Many of the invited organizations and stakeholders participated and were integral to providing comments and data for the Plan. For a list of attendees at meetings, please see Appendix E¹.

Table A-3. Stakeholders

AGENCY	TITLE
American Red Cross	Program Manager
American Red Cross	Volunteer
Argyle Independent School District	Chief of Police
Argyle Independent School District	Director of Communications
Argyle Independent School District	Superintendent
Aubrey Independent School District	Chief of Police
City of Denton	Director of Public Utilities involved in Incorporating Green Infrastructure into Denton County
City of Denton	Watershed Protection Manager involved in Incorporating Green Infrastructure into Denton County
Collin County	Assistant Emergency Management Coordinator
Cooke County	Emergency Management Coordinator / Fire Marshal
Conserv	Utility Representative
Dallas County	Chief of Emergency Services
Denton County ESD #1	Board Member
Denton County Fresh Water Supply District 10	District Representative

¹ Information contained in Appendix E is exempt from public release under the Freedom of Information Act (FOIA).

AGENCY	TITLE
Denton Creek Wastewater Facility	Facility Representative
Denton Chronicle	News Editor
Denton Independent School District	Director of Operations
Denton Independent School District	Superintendent
Denton Municipal Electric	Utility Representative
Department of Homeland Security	Media and Communications Office
Devon Energy Water Treatment Facility	Facility Representative
Doe Branch / Riverbend Wastewater Facility	Facility Representative
Environmental Protection Agency	Region 6 Representative involved in Incorporating Green Infrastructure into Denton County
Frisco Fire Department	Emergency Management Analyst
Grayson County	Emergency Management Coordinator
Krum Independent School District	Chief of Police
Krum Independent School District	Director of Operations
Krum Independent School District	Interim Superintendent
Lake Dallas Independent School District	Director of Operations
Lake Dallas Independent School District	Superintendent
Lewisville Independent School District	Director of Safety and Security
Lewisville Independent School District	Superintendent
Lewisville Sewage Plant	Plant Representative
Lewisville Water Treatment Plant	Plant Representative
Little Elm Independent School District	Executive Director of Construction / Operations
Little Elm Independent School District	Superintendent
Northwest Independent School District	Director of Facilities
Northwest Independent School District	Director of Safety and Security
OnCor	Utility Representative
Pilot Point Independent School District	Director of Operations

AGENCY	TITLE
Pilot Point Independent School District	Superintendent
Ponder Independent School District	Superintendent
Sanger Independent School District	Superintendent
NOAA	Regional Representative
North Central Texas Council of Governments	Mitigation Strategies Representative
North Central Texas Council of Governments	Regional Emergency Preparedness Representative
Tarrant County	Emergency Management Coordinator
Texas A&M Agrilife Extension	District Representative
Texas A&M Agrilife Extension	Water Resource Specialist / Researcher involved in Incorporating Green Infrastructure into Denton County
Texas A&M Forest Service	District Representative / Staff Forester
Texas Commission of Environmental Quality	Regional Director
Texas Department of Emergency Management	District Coordinator
Texas Department of Transportation	Area Engineer
Texas Parks and Wildlife	District Leader
Texas Water Board	Deputy Executive Administrator
Texas Women’s University	Director of Risk Management
The Colony WWTP	City Representative
TNMP Power	Utility Representative
Trinity River Authority	Director of Operations
University of North Texas	Director of Emergency Management and Safety Services
University of North Texas	Emergency Preparedness and Business Continuity Manager
University of North Texas	Emergency Management Specialist
USACE	Research Biologist involved in Incorporating Green Infrastructure into Denton County
USACE	Southwest Division Representative
U.S Fish and Wildlife	Southwest Regional Director

APPENDIX A: PLANNING TEAM

AGENCY	TITLE
Upper Trinity Regional Water District	Region Representative
Upper Trinity Regional Water District	Water Education Coordinator involved in Incorporating Green Infrastructure into Denton County
Wise County	Emergency Management Coordinator

APPENDIX B: PUBLIC SURVEY RESULTS

Overview 1
Public Survey Results 2

OVERVIEW

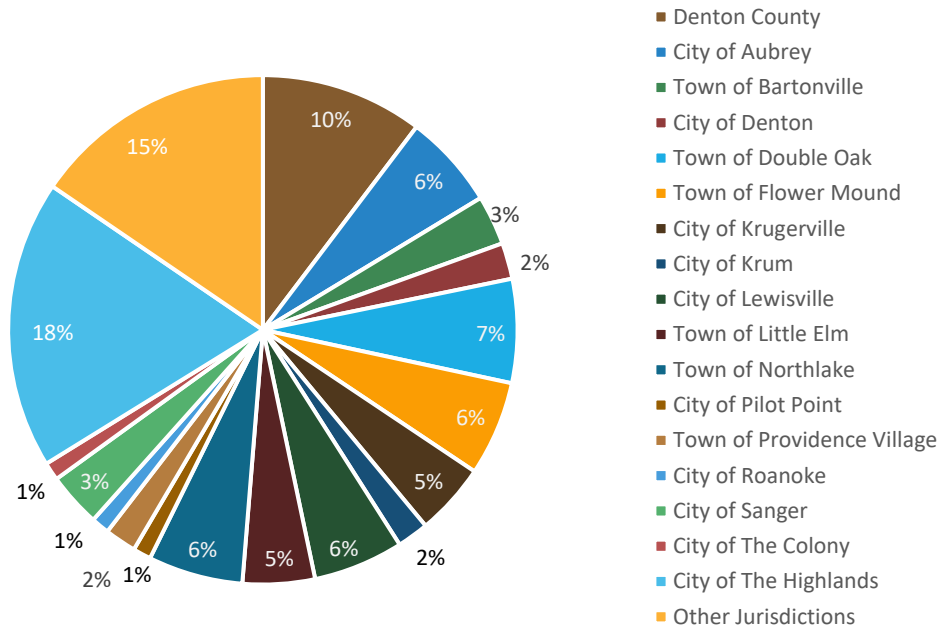
Denton County prepared a public survey that requested public opinion on a wide range of questions relating to natural hazards. The survey was made available via the County’s websites, along with participating jurisdictions. This survey link was also distributed at public meetings and stakeholder events throughout the planning process.

A total of 354 surveys were collected, the results of which are analyzed in Appendix B. The purpose of the survey was twofold: 1) to solicit public input during the planning process, and 2) to help the jurisdictions identify any potential actions or problem areas.

The following survey results depict the percentage of responses for each answer. Similar responses have been summarized for questions that did not provide a multiple-choice answer or that required an explanation.

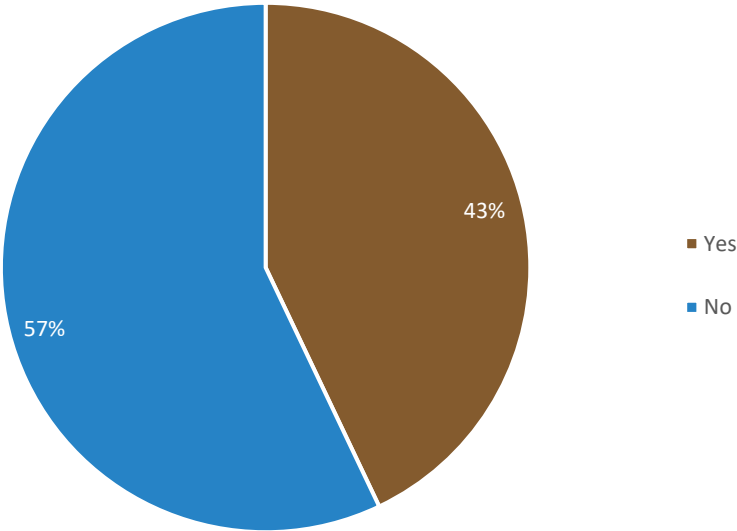
PUBLIC SURVEY RESULTS

1. Please state the jurisdiction (city or community) where you reside.

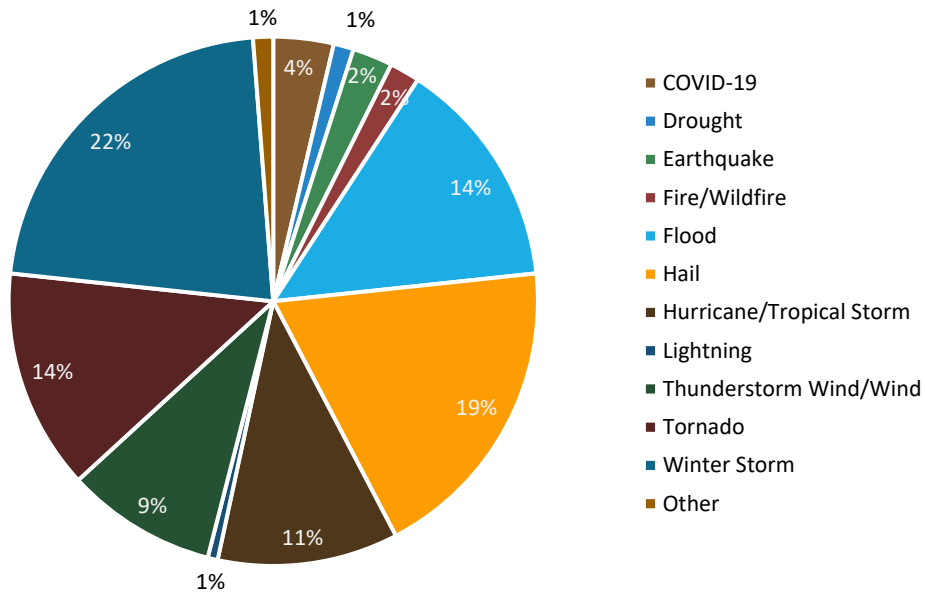


“Other Jurisdictions” includes responses from: Town of Argyle, City of Canyon Falls, City of Carrollton, Collin County, Town of Copper Canyon, City of Corinth, City of Fort Worth, City of Harvest, City of Highland Village, City of Justin, City of Lake Dallas, Town of Lakewood Village, City of Lantana, City of Oak Point, Town of Ponder, Town of Shady Shores, City of The Tribute, City of Winn Ridge, Town of DISH, Town of Hickory Creek, City of Canyon Falls, City of Slidell, City of Highland Hills, City of Hilltown, , City of Pecan Creek, Town of Cross Roads, City of Hackberry, Town of Hebron, and Town of Trophy Club. These jurisdictions were less than 1% of the survey results or not participating jurisdictions within the plan.

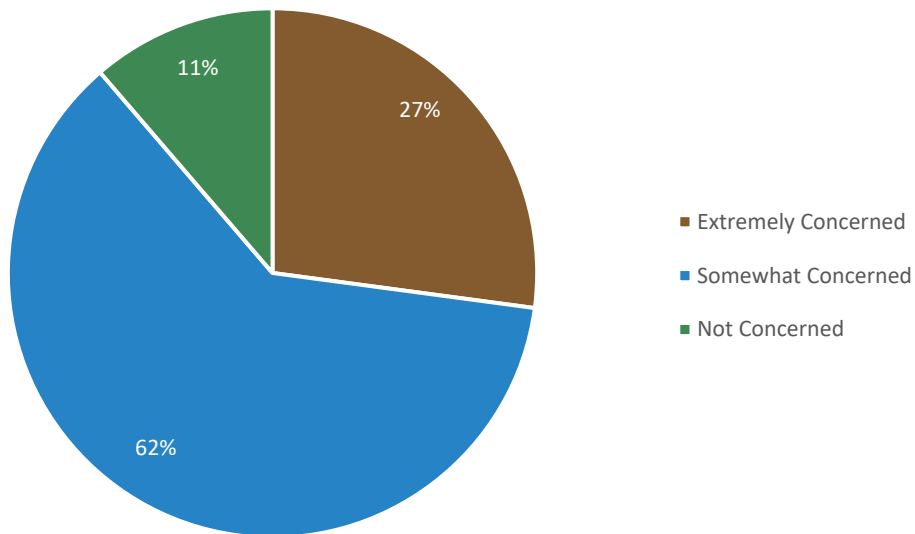
2. Have you ever experienced or been impacted by a disaster?



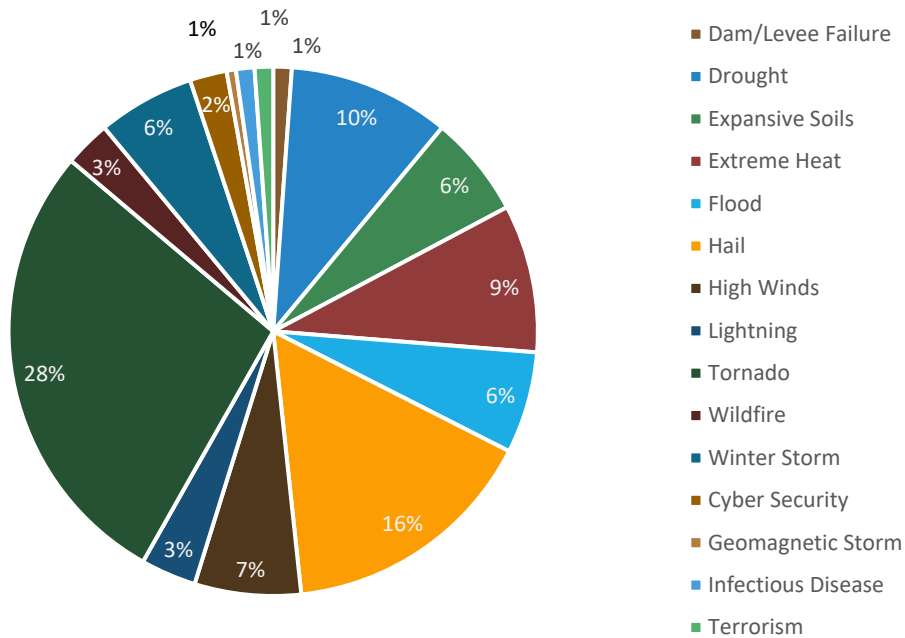
3. If you answered “Yes” to Question #2, please explain.



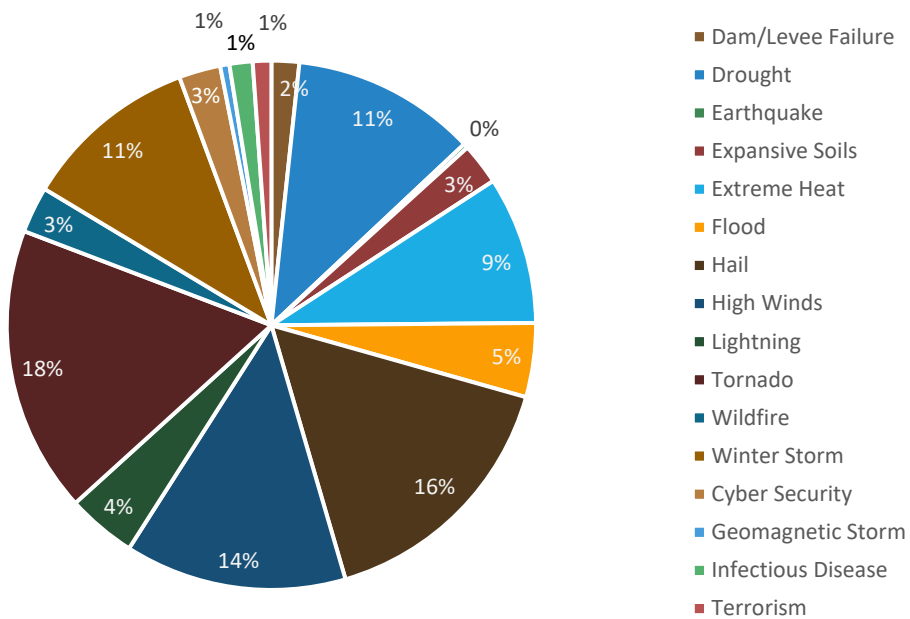
4. How concerned are you about the possibility of your community being impacted by a disaster?



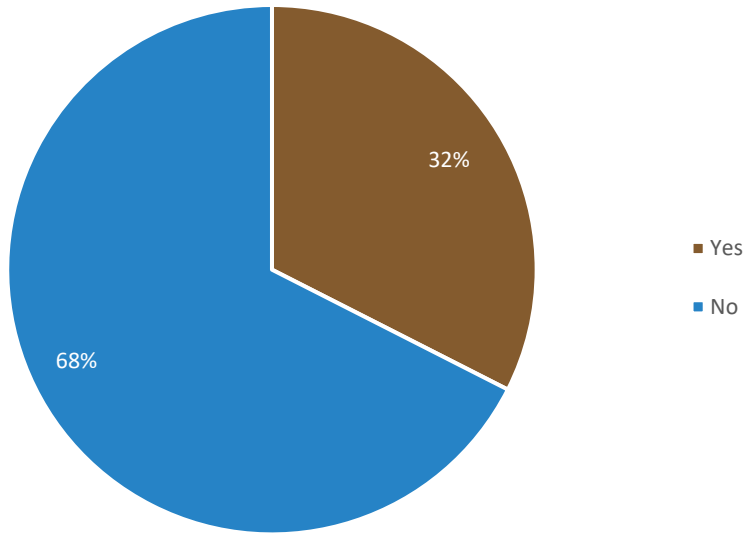
5. Please select the one hazard you think is the highest threat to your neighborhood:



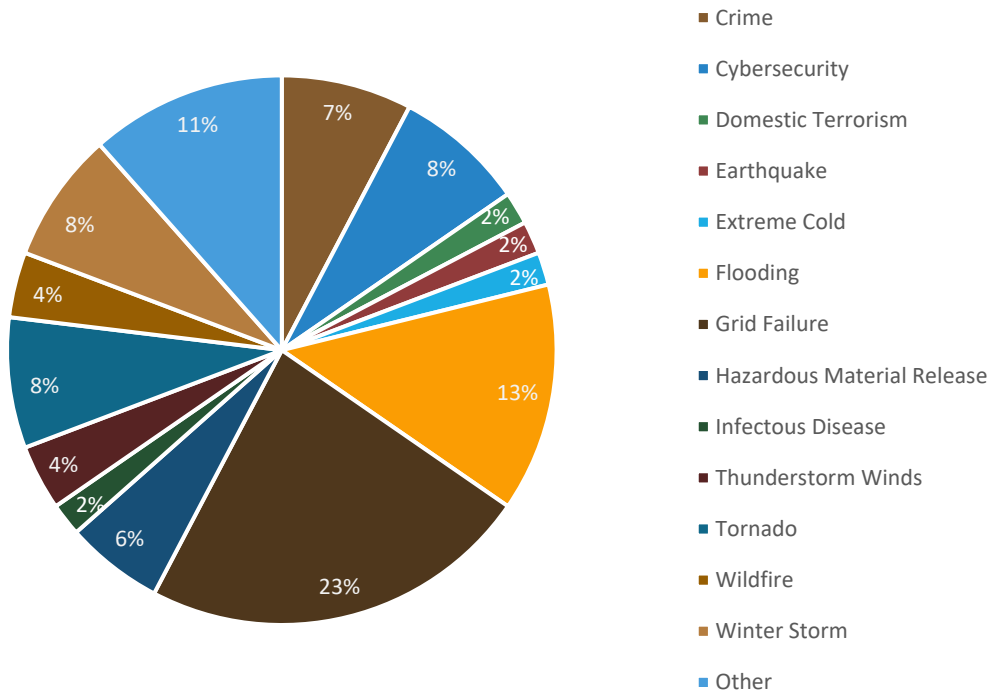
6. Please select the one hazard you think is the second highest threat to your neighborhood:



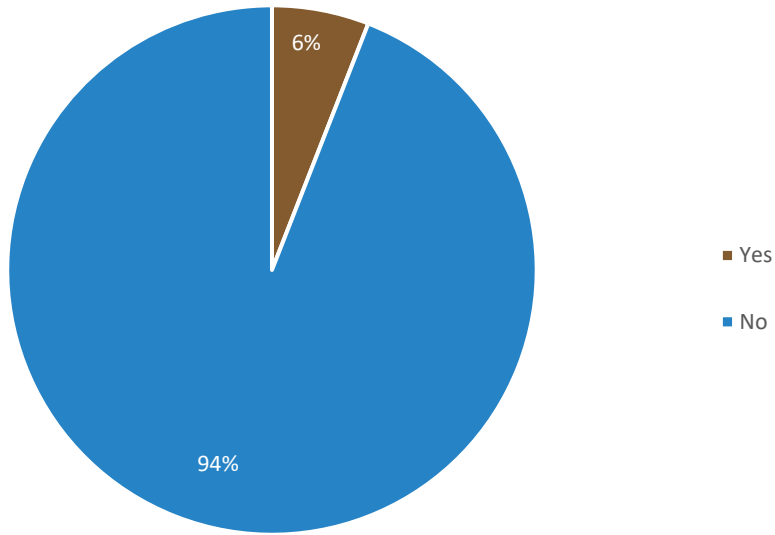
7. Is there another hazard not listed above that you think is a wide-scale threat to your neighborhood?



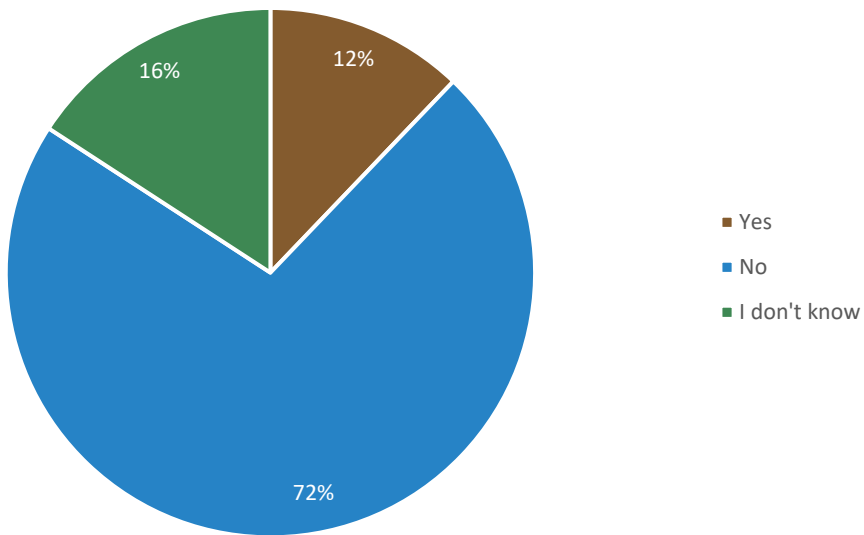
8. If you answered "Yes" to Question #7, please explain.



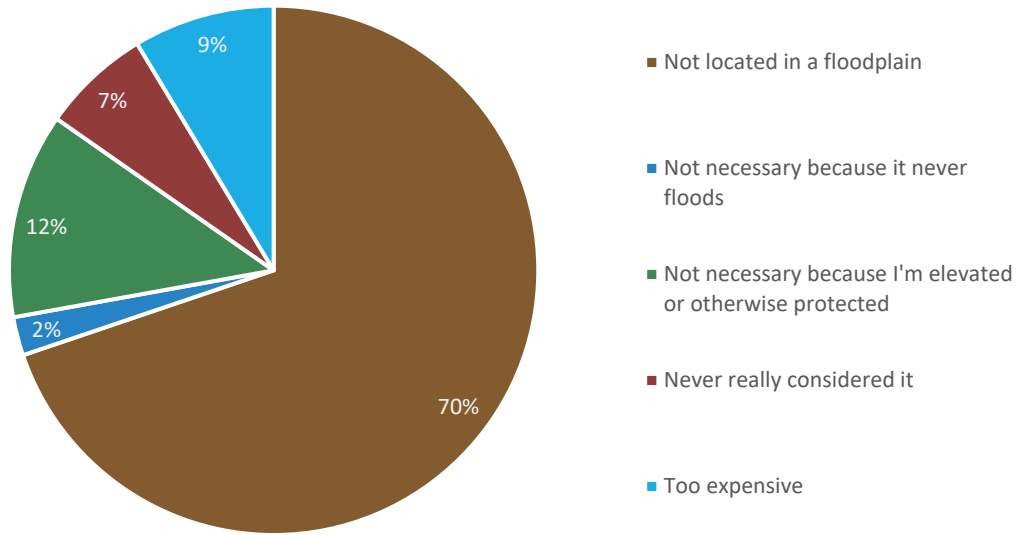
9. Is your home located in a floodplain?



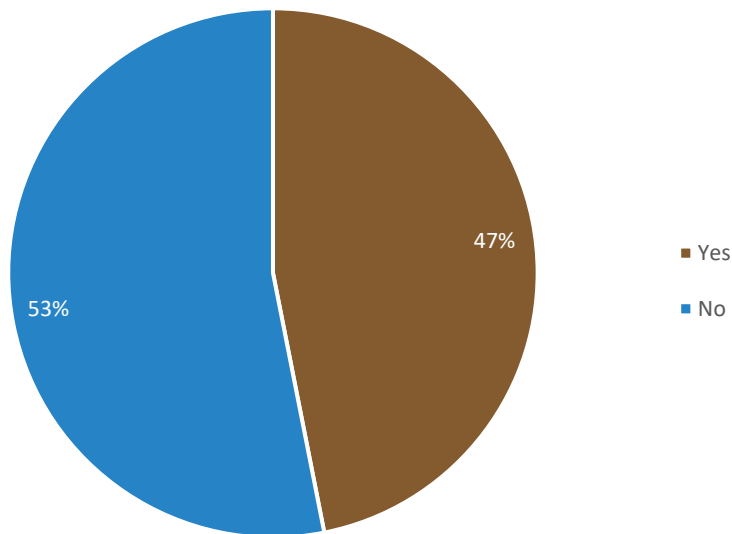
10. Do you have flood insurance?



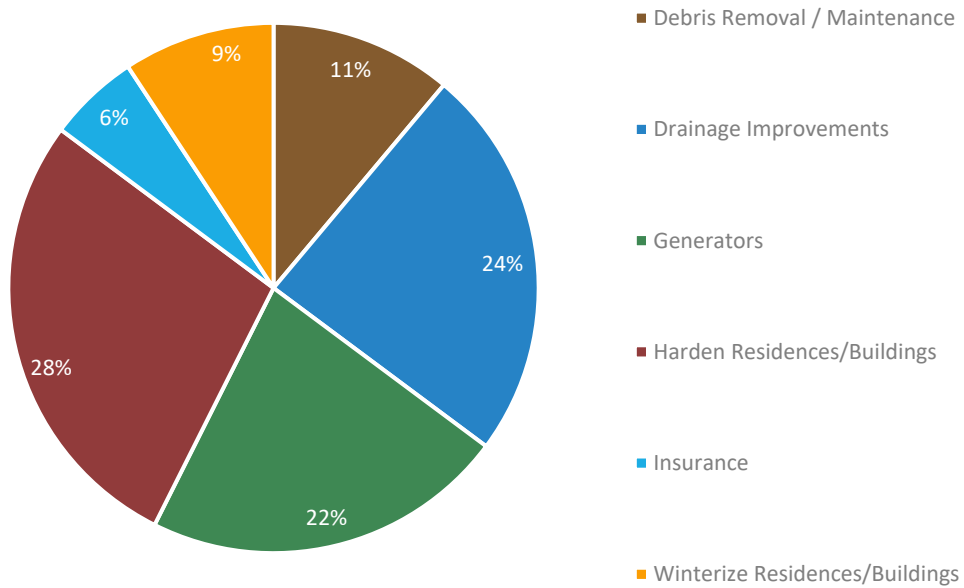
11. If you do not have flood insurance, why not?



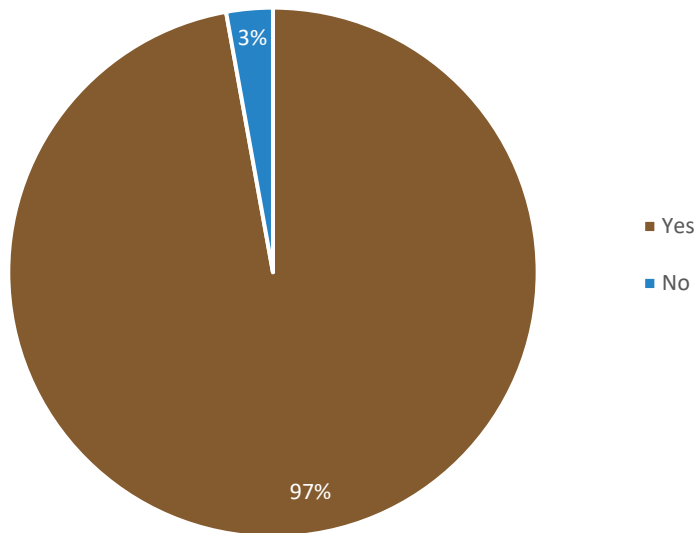
12. Have you taken any actions to make your home or neighborhood more resistant to hazards?



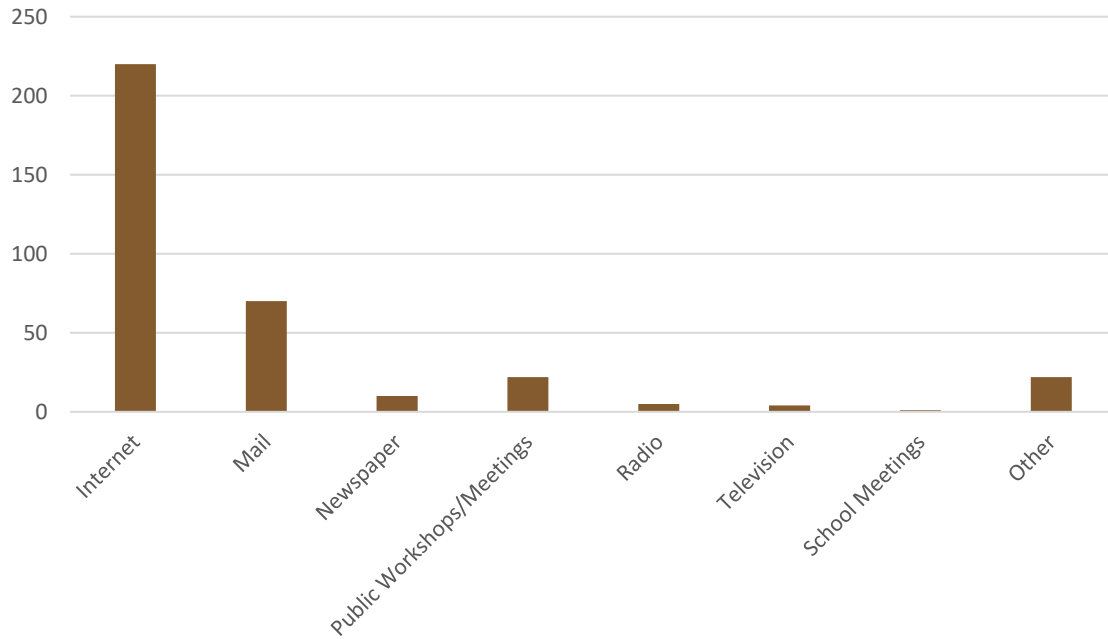
13. If you answered “Yes” to Question #12, please explain.



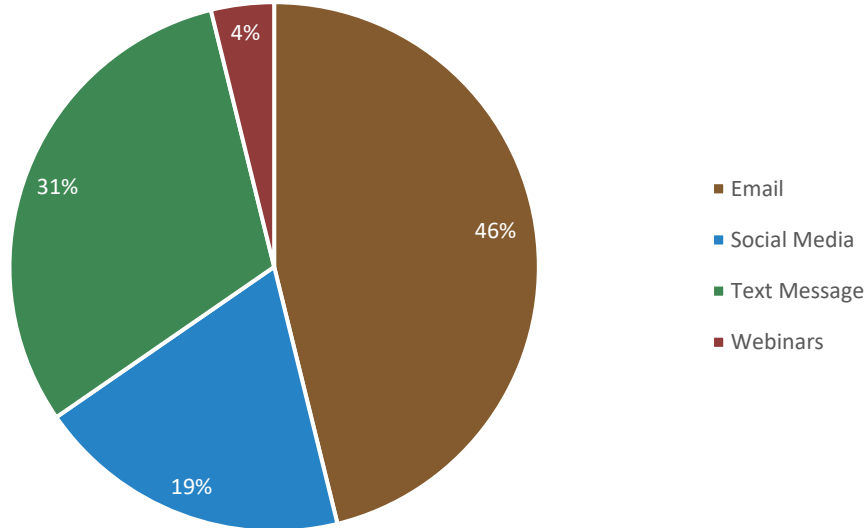
14. Are you interested in making your home or neighborhood more resistant to hazards?



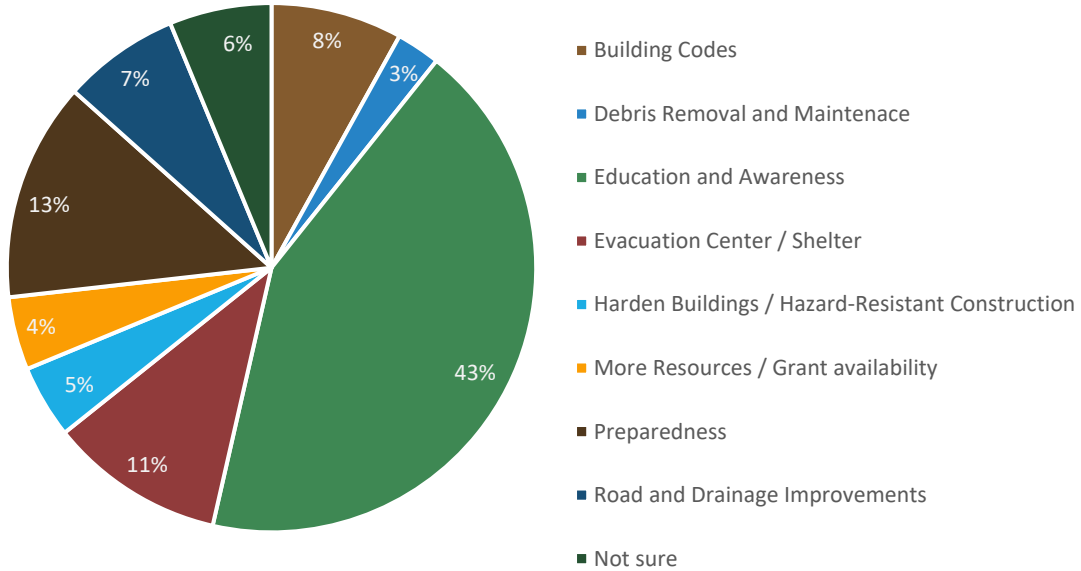
15. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?



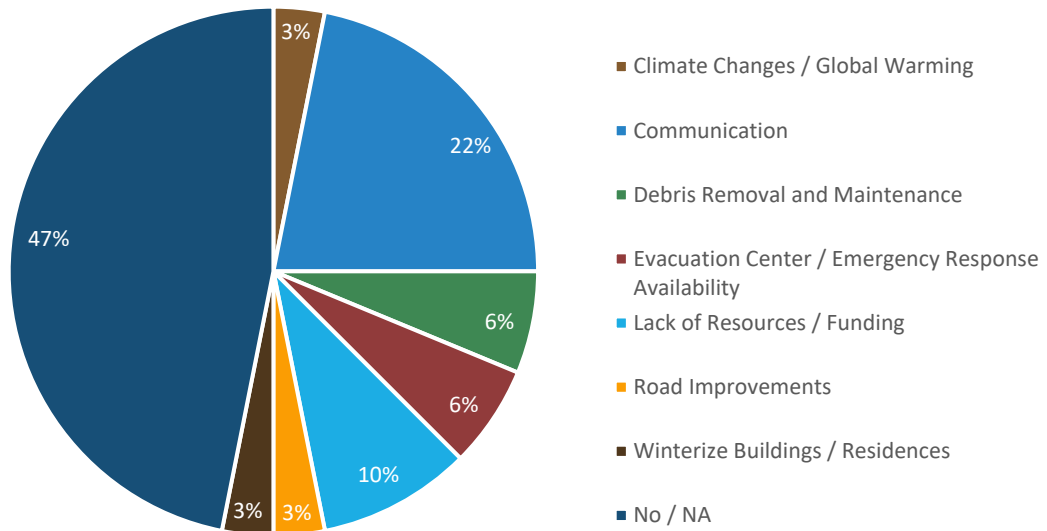
16. If you answered “Other” to Question #15, please explain.



17. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?

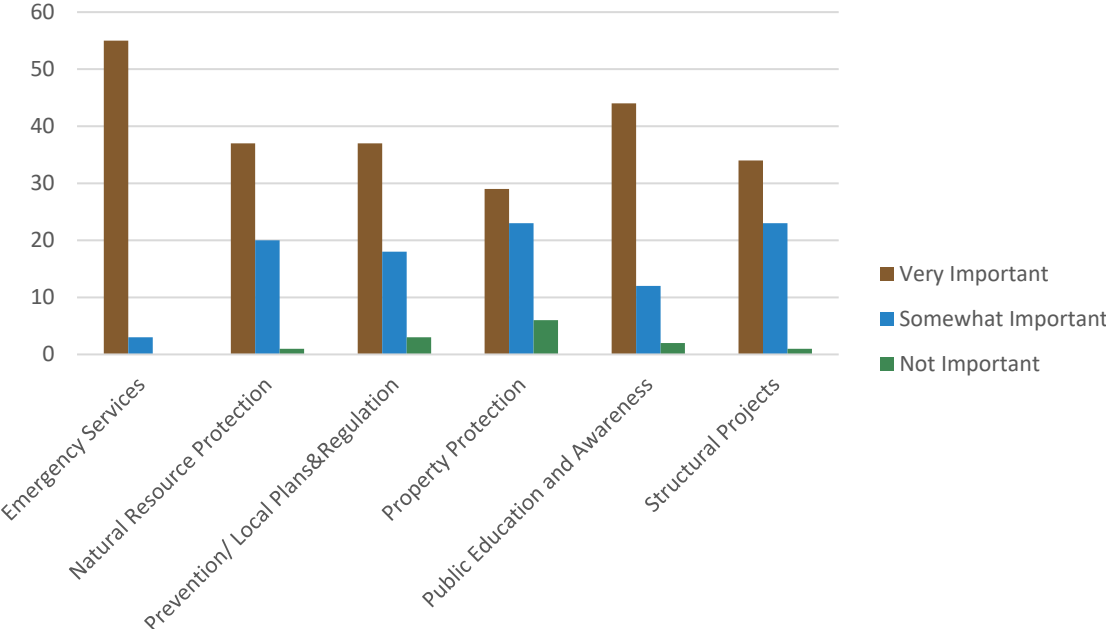


18. Are there any other issues regarding the reduction of risk and loss associated with hazards or disaster in the community that you think are important?



APPENDIX B: PUBLIC SURVEY RESULTS

19. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.



Emergency Services - Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical facilities or systems.

Natural Resource Protection - Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.

Prevention / Local Plans & Regulations - Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.

Property Protection - Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.

Public Education and Awareness - Actions to inform citizens about hazards and techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials, and demonstration events.

Structural Projects - Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, seawalls detention / retention basins, channel modification, retaining walls, and storm sewers.

APPENDIX C: CRITICAL FACILITIES

Appendix C is For **Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX D: DAM LOCATIONS

Appendix D is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX E: MEETING DOCUMENTATION

Appendix E is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX F: CAPABILITY ASSESSMENT

Section J, Item 9.

Appendix F is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX G: UPPER TRINITY REGIONAL WATER DISTRICT – DC GREENBELT PLAN

Overview 1
 Participation 1
 Protective Measures 2
 Funding for Greenbelt Projects 2
 Mitigation Activities in Greenbelt Plan..... 2

OVERVIEW

The Upper Trinity Regional Water District is not a participating jurisdiction in the plan; however, they are very involved in mitigation activities in the Denton County Planning Area. This appendix and Appendix H provide needed information that is pertinent to mitigation planning in the planning area. Appendix H is a copy of the plan that has been written. This is a provided narrative in which the plan can be integrated into the HMAP for mitigation activities in the planning area.

The Denton County Greenbelt Plan is not intended to be a regulatory document; rather, the Plan is a convenient guide to encourage and enable closer coordination among stakeholders within the County. Therefore, successful implementation of the Plan, on a voluntary basis, will require strong leadership at all levels: support from County officials, and active support from the municipalities and citizens.

PARTICIPATION

It is important to note that the Upper Trinity water/wastewater is based in the City of Lewisville and serves 29 communities. The service communities are the following: (Town of Argyle, Town of Bartonville, City of Celina, Town of Copper Canyon, City of Corinth, DCFWSD #7 (Lantana), City of Denton, Denton County, Town of Double Oak, City of Highland Village, City of Irving, City of Krum, Lake Cities Municipal Utility Authority, City of Lewisville, Mustang SUD, City of Pilot Point, Town of Ponder, Town of Prosper, and the City of Sanger).

As of November 1, 2019, the following entities have adopted the Denton County Greenbelt Plan:

Table G-1. Jurisdictions that have Adopted the Denton County Greenbelt Plan

PARTICIPATING JURISDICTIONS	
City of Aubrey	City of Lantana
City of Corinth	City of Lewisville
City of Denton	City of Pilot Point
Town of Flower Mound	City of Sanger
Town of Hickory Creek	Lake Cities Municipal Utility Authority

PARTICIPATING JURISDICTIONS	
City of Justin	

PROTECTIVE MEASURES

Denton County, as well as the local municipalities have a distinct role in implementing the Denton County Greenbelt Plan - these entities can enact ordinances, zoning requirements or other measures that will protect greenbelt corridors within their communities.

These include the establishment of Greenbelt Districts, purchase of development rights, conservation easements, and property tax exemptions.

In addition to greenbelt protection, municipalities can manage stormwater by enacting other Low Impact Development or Green Stormwater Infrastructure practices in their development standards.

One helpful resource for this is the i-SWM program, developed by the North Central Texas Council of Governments. With design criteria and manuals, this tool can assist municipalities to proactively manage stormwater in their communities.

Land management resources that are offered within the Denton County Greenbelt Plan include grazing and cropland management, riparian corridor restoration, and invasive species control

FUNDING FOR GREENBELT PROJECTS

Numerous funding opportunities are available to assist in the preservation of greenbelts, including bonds, grants, and donations. Specific funding opportunities outlined in the Denton County Greenbelt Plan include, but are not limited to:

- General Obligation Bonds
- Community Development Block Grants
- Texas Farm and Ranch Lands Conservation Program
- USDA - Natural Resources Conservation Service Cost-Share Programs
- Recreation Grants
- Highway Grants
- Clean Water Act Section 319(h) Grants
- Public - Private Partnerships

MITIGATION ACTIVITIES IN GREENBELT PLAN

The Denton County Greenbelt Plan identifies several mitigation activities and actions that are directly in line with the HMAP. Therefore, it was decided to include these for reference in an appendix. This serves several purposes such as integrating into other planning mechanisms, identification of already accepted actions in the county, identifies other hazard mitigation actions and ensures duplicity of work is kept to a minimum. Below is a list of activities that Upper Trinity Regional Water District is currently focusing on. Maps in Appendix H identify targeted areas.

Table G-2 Mitigation Activities by Type

TYPE OF ACTIVITY	ACTIVITIES
Education/Awareness/Public Involvement	<ul style="list-style-type: none"> ● Watershed Protection Program ● Education Awareness (e.g., trash-pick-up; reduction in fertilizer) ● Funding and Grant opportunities
Structural/Infrastructure	<ul style="list-style-type: none"> ● Conservation of Easements
Natural Resources	<ul style="list-style-type: none"> ● Pull Water from Lewisville Lake ● Securing Easements ● Hickory Creek Watershed Protection (e.g., reduce pollution and control erosion) ● Greenscaping
Plans/Ordinances/Regulations	<ul style="list-style-type: none"> ● Land Trusts ● Voluntary Agreement (e.g., building restrictions, preserving natural environment/ landscape) ● Develop Codes for Setbacks of 50 ft ● Create Support Plans as necessary ● Legislative Requirement EMOP ● GI Infrastructure Plan

APPENDIX H: INCORPORATING GREEN INFRASTRUCTURE INTO HMAP

Overview 1

OVERVIEW

The Incorporating Green Infrastructure/Low Impact Development, Open Space, and Nature Based Systems into the Denton County Hazard Mitigation Plan was a collaboration between The Ecological Engineering Program at Texas A&M AgriLife, EPA Region 6, the City of Denton, and the Upper Trinity Regional Water District.

This appendix provides needed information that is pertinent to mitigation planning in the planning area. Appendix H is a copy of the plan that has been written. This is a provided narrative in which the plan can be integrated into the HMAP for mitigation activities in the planning area.

As noted, Green Infrastructure in Denton County is not a new concept. A county-wide “greenbelt plan” was developed to encourage the preservation of green spaces and limiting encroachment in floodplain zones. For further information, please see the final report completed in September 2021.

APPENDIX I: MAN-MADE HAZARDS

Overview 1

Hazard Profiles, Vulnerability, and Impact 1

 Infectious Disease 1

 Cyber-Attack..... 9

 Terrorism 15

 Geomagnetic Storm 18

OVERVIEW

During the early stages of the planning process the team analyzed several man-made hazards including Infectious Disease, Cyber Attack, Terrorism, and Geomagnetic Storm. A description of the hazard and Denton County’s overall vulnerability to that hazard was developed. Annualized loss data is provided where available and impact is addressed looking at the warning time or potential speed of onset of the hazard, where appropriate.

HAZARD PROFILES, VULNERABILITY, AND IMPACT

For each of the four man-made hazards, a description of the hazard and Denton County’s overall vulnerability to that hazard was developed. Impact is addressed looking at the warning time or potential speed of onset of the hazard. Impact statements are defined in Table I-1 below.

Table I-1. Impact Statements

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

INFECTIOUS DISEASE

An infectious disease is defined as a clinically evident disease resulting from the presence of pathogenic microbial agents. According to FEMA, infectious diseases are a major threat around the world, killing millions globally each year. Transmission of an infectious disease may occur

APPENDIX I: MAN-MADE HAZARDS

through one or more means including physical contact with infected individuals. These infecting agents may also be transmitted through liquids, food, bodily fluids, contaminated objects, airborne inhalation or through vector-borne dissemination.

There are three classifications of disease impacts: endemic, epidemic, and pandemic. An endemic is always present at a low frequency, such as chicken pox in the United States. An epidemic is a sudden severe outbreak of disease, such as the bubonic plague during Medieval Times. A pandemic is an epidemic that becomes very widespread and affects a whole region, a continent, or the world, for example the 1957 flu pandemic caused at least 70,000 deaths in the United States and one to two million deaths worldwide. In recent years, fears of pandemic have risen because the globalized economy and growing population fosters large scale international travel and trade. Growing populations increase the vulnerability of all areas to disease because a denser population increases the risk of exposure to an infectious disease and advances the spread of infection.

The top 10 infectious diseases according to the World Health Organization (WHO) based upon number of deaths are presented in Table I-2.

Table I-2. Worldwide Mortality Due to Infectious Disease¹

RANK	CAUSE OF DEATH	APPROXIMATE WORLDWIDE DEATHS IN 2018
1	Lower Respiratory Infections	4.4 million
2	Diarrheal diseases	3.1 million
3	Tuberculosis (TB)	3.1 million
4	Malaria	2.1 million
5	Hepatitis B	1.1 million
6	HIV/AIDS	1.0 million
7	Measles	1.0 million
8	Tetanus	160,000
9	Whooping Cough	355,000
10	Intestinal Worm Disease	135,000

While all of these diseases are monitored by Denton County on a regular basis, the primary disease of concern at the time of this planning process was the Coronavirus disease (COVID-19) due to its rapid spread and impact on the global economy.

Coronavirus disease (COVID-19) is an infectious disease caused by a newer strain of coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate

¹ Source: World Health Organization

APPENDIX I: MAN-MADE HAZARDS

respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

Approximately one year prior to drafting of this plan, vaccinations for COVID-19 were approved by the Food and Drug Administration (FDA). To date more than 74.3% of Texans have been partially vaccinated against the virus with 61.7% fully vaccinated. Similar to communities around the globe, Denton County has been dramatically impacted by this virus with 201,959 confirmed cases and 1,401 related deaths.² The economic impact of the virus has been devastating for the planning area. The planning area continues to slowly recover from the effects of the pandemic but full economic recovery is likely to take years. The COVID-19 infection was declared a pandemic by the World Health Organization on March 11, 2020.

Public health authorities including the U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) continue to issue advisories and recommendations on protective measures, including vaccinations, along with regular advisories when variants of the virus emerge.

LOCATION

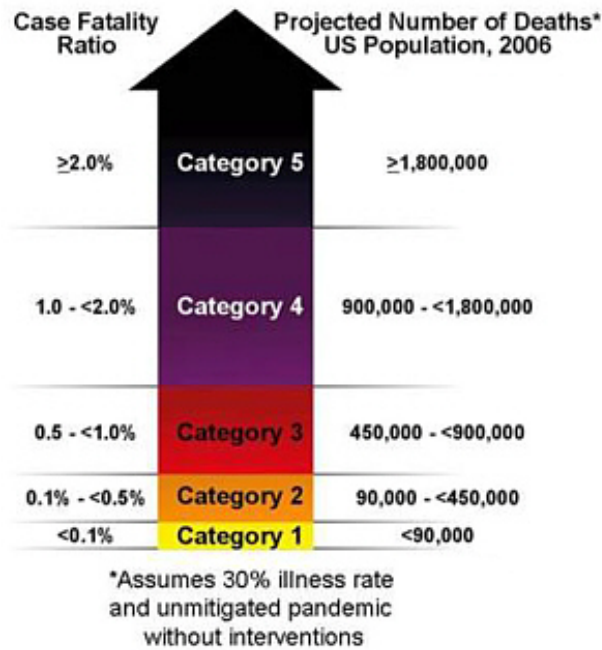
Pandemics are random and only a few happen every century. The impacts from an infectious disease event can affect all areas of the world, therefore all areas are vulnerable, as evidenced by the current COVID-19 pandemic. Since air travel and worldwide shipping have increased, it has become increasingly difficult to contain localized outbreaks as infected or exposed people travel across the globe in a matter of hours. Third world countries have fewer resources to fight disease and may be more vulnerable than more industrialized nations. In the United States, the U.S. public health system works at the federal, state and local level to monitor diseases, plan and prepare for outbreaks, and prevent epidemics where possible. There is no distinct geographic boundary to infectious disease, therefore, it can occur throughout the Denton County planning area.

EXTENT

The severity of a pandemic virus can be evaluated from the perspective of the individual who has been infected; or from the population level, how many complications and deaths might be expected as a whole. The most common measure of severity for a pandemic virus event is the case-fatality rate (CFR) as depicted in Figure I-1.

² The number of confirmed cases and related deaths from COVID-19 as of November 2022.
<https://usafacts.org/visualizations/coronavirus-covid-19-spread-map/state/texas/county/denton-county>

Figure I-1. Case-Fatality Rate for Severity



The magnitude of a pandemic event is identified in terms of warning levels based on population. Figure I-2 illustrates the various warning levels for pandemic. The current COVID-19 pandemic warning level is at Phase 4 for the State of Texas, including the Denton County planning area.

Figure I-2. Risk levels for Pandemic (World Health Organization)



HISTORICAL OCCURRENCES

Occurrences of a biological event hazard are fairly common. Historically, there have been a number of *E. coli* and similar outbreaks traced to issues or deficiencies in the nation’s food supply. In Texas, there have been several occurrences of biological hazards, as reported by the Center for Disease Control (CDC). From 2011 to 2015, the average number of *E. coli* outbreaks in Texas was 563 cases per year. In 2017, there was the largest mumps outbreak with 470 cases in Texas since 1990.

In March of 2009, a novel strain of Influenza A (H1N1 or “Swine Flu”) virus was detected in Mexico and the United States. The virus spread worldwide. Final infection estimates were published in 2011. These final estimates were that from April 12, 2009, to April 10, 2010, approximately 60.8 million cases, 274,304 hospitalizations, and 12,469 deaths occurred in the United States due to H1N1.³ The most commonly reported symptoms include cough, fever, sore throat, and gastrointestinal symptoms, such as vomiting and diarrhea. Most individuals infected with H1N1 did not require hospitalization and had symptoms that lasted four days.⁴

³ SDS website: https://www.cdc.gov/h1n1flu/estimates_2009_h1n1.htm

⁴ Carrat, F. et al. Timelines of Infection and Disease in Human Influenza: A Review of Volunteer Challenge Studies. *American Journal of Epidemiology*, 2008, 167: 775–785.

APPENDIX I: MAN-MADE HAZARDS

COVID-19 is the disease caused by a newer strain of coronavirus called SARS-CoV-2. The World Health Organization (WHO) first learned of this new virus on December 31, 2019, following a report of a cluster of cases of ‘viral pneumonia’ in Wuhan, People’s Republic of China. The virus quickly spread worldwide in the early spring of 2020. Since the early spring of 2020, 201,959 number of COVID-19 cases have been reported for the planning area with 1,401 associated fatalities.⁵ The disease has been associated with a long list of potential symptoms, the worst of which are significant respiratory issues that can lead to death. Most individuals infected with COVID-19 did not require hospitalization. While the length of symptoms is still being studied, most patients experience symptoms for a few days to one week but can be infections for up to fourteen days, even after symptoms have subsided.⁶

PROBABILITY OF FUTURE EVENTS

Epidemics and pandemics have occurred in human and animal populations for thousands of years. As humans began to gather and congregate in urban areas, the potential for pandemics and epidemics increased. As trade routes became established and contact with other cities became more frequent, the potential for transmission of illnesses increased. In modern society, the ease of global travel has created a situation where viruses and bacteria can spread quickly from one continent to another.

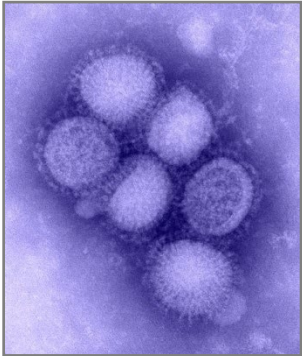
Historical evidence shows that the population of the Denton County planning area is vulnerable to disease outbreak, and the probability of future infectious disease or pandemic events is possible. Local public health officials maintain surveillance in hopes of identifying disease prominence and containing potential threats before they become epidemics. Of concern is the reduction and treatment of COVID-19.

With only one pandemic in recent history, the probability of an infectious disease epidemic or pandemic in the Denton County planning area is unlikely with an event probable in the next ten years or more. At the time this plan was being developed, the Denton County planning area was still suffering the impacts of the 2020 World Pandemic of COVID-19.

VULNERABILITY AND IMPACT

Estimated potential losses to the built environment are difficult to calculate because infectious disease causes little damage to the built environment and generally losses are experienced through public health response and medical costs, and lost wages of patients. Therefore, it is assumed that all buildings and facilities are exposed to disease but would experience negligible damage in the occurrence of an outbreak event. For example, upkeep and maintenance of buildings and facilities would fall behind due to the high absenteeism of employees or the closing of facilities.

Critical infrastructure services, such as emergency services, utility services, water services and telecommunications can be limited by an infectious disease event. With the COVID-19 pandemic, most of the people affected have mild illness and do not require hospitalization. People at the highest risk for developing complications from COVID-19 include adults 60 years of age and older. In addition, people who have medical conditions, such as heart disease; chronic lung disease; blood,



⁵ The number of confirmed cases and related deaths from COVID-19 as of November 10, 2022.
⁶ University of Maryland Medical System: <https://www.umms.org/coronavirus/what-to-know/treat-covid-at-home>

APPENDIX I: MAN-MADE HAZARDS

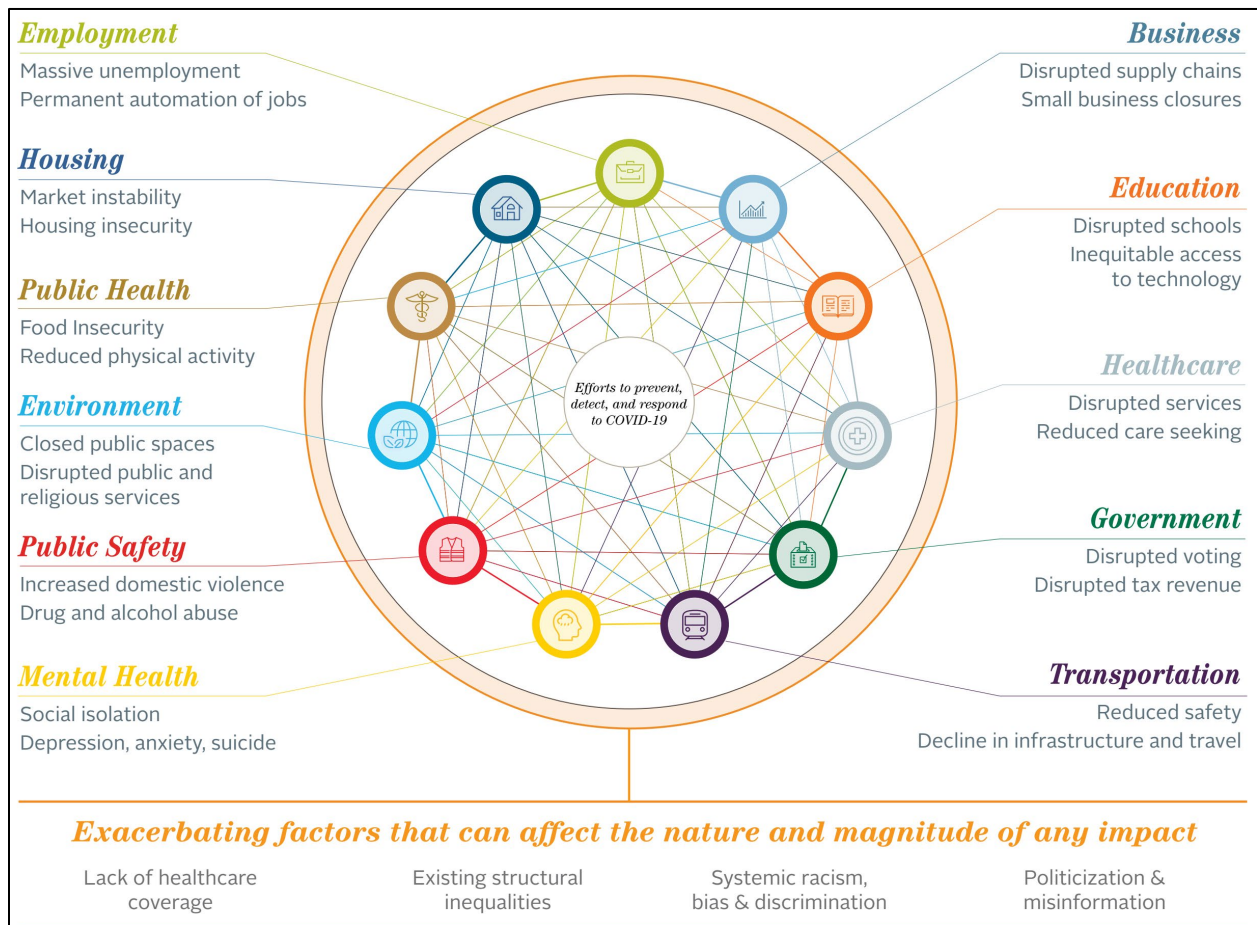
endocrine, kidney, liver or metabolic disorders; obesity, or a weakened immune system, can experience a worsening of existing conditions if they contract the COVID-19.

The current COVID-19 pandemic has demonstrated that the response costs to the public health sector for an outbreak, the economic impact, and the impact to health as a whole for the Denton County planning area, is “Substantial.” Multiple deaths can be expected, and the Denton County planning area facilities could be shut down for at least 4 weeks. Property damage could result from high absenteeism of persons responsible for property management.

The Denton County planning area executed a mandatory shutdown of non-essential businesses for three weeks as a direct result of COVID-19. The gradual re-opening of businesses and restaurants was completed in incremental stages to try and limit the spread of the infection and protect consumers while restarting the economy. Larger gatherings of people were limited to 50 and below and at times to 10 and below. Area school districts closed all campuses and implemented remote learning in the spring of 2020 and for the first weeks of the 2020-2021 school year. At the time of the drafting of this plan, in-person and remote learning was on-going with contract tracing for infected students.

The impacts of COVID-19, the mandatory shutdown, large gathering limits, ISD closures and pervasive unemployment in the early phases of the pandemic have led to extensive secondary impacts. Figure I-3 provides an overview of secondary impacts of COVID-19 in the United States.

Figure I-3. Secondary Impacts of the COVID-19 Pandemic in the United States



APPENDIX I: MAN-MADE HAZARDS

ASSESSMENT OF IMPACTS

Pandemics impact larger than normal segments of the population, and few sectors of the population are left untouched by infectious disease, as evidenced by the current pandemic. The physical problems associated with the infectious disease may be short term or may lead to long-term physical maladies.

The impact of an infectious disease event will be measured by the number of fatalities, how the community is affected, and to what extent. If a large number of people get sick simultaneously, major social consequences will occur. Absenteeism in the workplace can have negative impacts on the overall functioning of society, particularly if it is prolonged.

The risks to public health and safety include first responders and others with increased exposure to the disease. Response personnel likely to experience the greatest impact would be those with medical responsibilities, such as fire fighters, ambulance workers, and clinic and hospital personnel. Response personnel could be in frequent contact with those who are either sick or infected and are prone to suffer proportionally higher impacts as a result.

Depending on the severity of the infectious disease event, there could be serious problems with continuity of operations and delivery of services. If county, city or town staff stay home due to illness, someone in their home is ill, or because they fear becoming ill, the ability of local government to maintain operations and deliver services could be seriously limited or compromised. A pandemic illness that impacts county, city and town staff could have significant negative impacts, particularly for departments that do not have or exercise a Continuity of Operations Plan (COOP). Without a COOP that takes into account department-specific issues, or regular exercise of that COOP, critical departments may not be able to function and provide necessary services.

A pandemic event may result in heightened stress for responders, health care providers, public health workers, individuals, and communities. A vital part of pandemic planning is the development of strategies and tactics to address these potential problems. Psychological health resources should be provided to ensure that special populations are identified prior to the event and that unique service and transportation needs are incorporated into the local pandemic influenza emergency management plan. Stress management support to those who are symptomatic, those who believe they are ill, and to staff who are dealing with the increased workloads and personal concerns will be required. The public will require information on how to recognize and cope with the short- and long-term risks of sustained stress during mass vaccinations, for those debilitated by an illness, and their caregivers.

An infectious disease hazard affects living beings, therefore the vulnerability of property to an infectious disease event is minimal. Pandemics are unlikely to directly result in physical damage to the built environment. However, there is the possibility of indirect damage resulting from staff absenteeism and lack of routine operations and maintenance. Increased absenteeism of maintenance staff could result in reduced maintenance operations, which could negatively impact the operation of the system.

Human infectious diseases do not normally pose a risk to the natural environment. Infectious diseases tend to be specific to humans, and therefore pose little threat to the natural environment or non-mammalian species. However, certain exceptions exist including the avian flu, which can affect both birds and humans. It is possible that other pathogens may affect more than one species, but those pathogens would likely be limited to specific species.

APPENDIX I: MAN-MADE HAZARDS

Seasonal flu occurs annually and is estimated to cost the U.S. economy between \$71 million and \$167 million per year.⁷ Severe pandemics have been predicted to cause more than \$700 billion in economic losses, and to result in a 5.5% decrease in U.S. Gross Domestic Product (GDP).⁸

Major infectious disease events and pandemics can be expected to have larger and deeper impacts to the local and national economies. If the disease is slow progressing, particularly long-lasting, or has long-term residual effects, the impact to the economy could be extended.

If the normal movement of the epidemic within society needs to be curtailed, a process known as “social distancing,” then a greater impact to the local economy could occur. Social distancing can be accomplished by a number of means; two ways of increasing social distance activity restrictions are to cancel events and close buildings or to restrict access to certain sites or buildings. These measures are sometimes called "focused measures to increase social distance."

Depending on the situation, examples of cancellations and building closures might include cancellation of public events, such as concerts, sports events, movies, plays; and closure of recreational facilities, such as community swimming pools, youth clubs, gymnasiums. While necessary to limit the spread of the pathogen, facility closures could have economic ramifications.⁹

Infectious disease events are complicated hazards. Accurate information and clear, concise explanation during an infectious disease event are critical when conveying messages to the public. When a communication to the public fails, it can result in a loss of credibility, and can result in a loss of public confidence in leadership.

Infectious disease events can undermine the public’s confidence in its government and leaders. Public dissatisfaction with government response will typically increase as the number of cases rise and public fear increases. Perceptions of inequality in medical care, particularly if those inequalities are based on socioeconomic status, ethnicity, age, gender, or seniority, can lead to increased dissatisfaction with government and leadership, and may result in a weakening of social order or hostility towards those in leadership or medical roles. Required rationing of supplies or vaccinations should be conscientiously carried out to avoid the appearance of bias or impropriety. Decisions regarding vaccinations, guidance, and treatment should be explained clearly and consistently to the public.

There could be significant public resistance to a decision to quarantine those who are ill or exposed, to restrict travel, or to implement social distancing. Any decision to restrict individual movement must be accompanied by a major public relations campaign to assure the public that these actions are necessary. If decisions are perceived by the public as necessary for their protection, the public is more likely to comply with official instruction.

CYBER-ATTACK

A cyber-attack is any type of offensive maneuver employed by individuals or organizations that targets computer information systems, infrastructures, computer networks, and personal computer devices by various means of malicious acts. The malicious act usually originates from

⁷ Source: World Health Organization
⁸ Source: Federal Reserve Bank of St. Louis
⁹ Source: GlobalSecurity.org

APPENDIX I: MAN-MADE HAZARDS

an anonymous source that either steals, alters, or destroys a specified target by hacking into a susceptible system.

Cyberspace and its underlying infrastructure are vulnerable to a wide range of risk including both physical and cyber threats and hazards. Sophisticated cyber actors and nation-states exploit vulnerabilities to steal information and money and can develop capabilities to disrupt, destroy, or threaten the delivery of essential services. Various crimes are perpetrated through cyberspace including the production and distribution of child pornography and child exploitation conspiracies, banking and financial fraud, intellectual property violations, and other crimes, all of which have substantial human and economic consequences.



Cyberspace is particularly difficult to secure from cyber-attack events, due to a number of factors including the ability of malicious actors to operate from anywhere in the world, the links between cyberspace and physical systems, and the difficulty of reducing vulnerabilities and consequences in complex cyber networks. Of growing concern is the cyber threat to critical infrastructure, which is increasingly subject to sophisticated cyber intrusions that pose new risks. As information technology becomes increasingly integrated with physical infrastructure operations, there is increased risk for wide scale or high-consequence events that could cause harm or disrupt services upon which our economy and the daily lives of millions of Americans depend. In light of the risk and potential consequences of cyber events, strengthening the security and resilience of cyberspace has become an important homeland security mission.¹⁰

Denton County has enjoyed continued growth over the past decade. To address this growth, Denton County has become a leader in its use of computers, networks, and the data stored on them. The county takes steps to safeguard the integrity of its data and to prevent unauthorized access to information that is maintained in their computer systems. These measures are designed and intended to prevent corruption of data, block unauthorized access, and to ensure the integrity of information. This section reviews the hazards to the cybersecurity assets for the Denton County planning area.

HAZARDS

DENIAL OF SERVICE ATTACKS

A denial-of-service attack (DoS) is the attempt to make a computer or network resource unavailable to its intended users. A DoS attack may come from one or several computers, while a distributed denial of service attack (DDoS) will be launched from many, often thousands of computers. While a DoS attack may occur frequently and typically can be handled by the County’s equipment, a DDoS attack can overload the Denton County’s network or computer resources resulting in extended downtime. Often these attacks rely on lower level network vulnerabilities.

DATA LOSS/LEAKAGE

Data loss can result from a variety of reasons, both intentional and unintentional. Data loss may result from a failure to properly backup or have disaster recovery equipment and processes,

¹⁰ Source: Department of Homeland Security

APPENDIX I: MAN-MADE HAZARDS

employees improperly handling sensitive data, and criminal activities such as espionage, theft, sabotage, and other malicious acts.

INFRASTRUCTURE LOSS/FAILURE

Loss of computer and network resources may result from a variety of natural and human-caused disasters including tornadoes, hurricanes, and explosions due to accident, power loss, terrorism, and fire.

INSIDER THREATS

Insider threats are malicious threats to the planning area that comes from Denton County employees, contractors, and volunteers who have access to the County’s computers, networks, and data. An insider can initiate a DoS attack, leak or steal data, and sabotage the infrastructure and data.

ORGANIZED CYBERCRIME, STATE-SPONSORED HACKERS ESPIONAGE

Organized cybercrime, which may include state-sponsored cybercrime, are attacks on the Denton County’s computers, network, and data by criminal organizations. These criminals may be motivated by money or political reasons. Often these attacks are well planned out, difficult to identify due to their more limited scope, and can result in extensive damage.

THIRD PARTY MISMANAGEMENT

Reliance on third parties for cyber services implies acceptance of the risk that the third party will properly protect the cyber resources from loss or unavailability. Hazards from the use of third parties include DoS, DDoS, data loss and leakage, infrastructure loss and failure, insider threats, and organized cybercrime.

ADVANCE PERSISTENT THREATS

An advanced persistent threat (APT) is a stealthy and continuous attack on Denton County over a long period of time. The "advanced" process signifies sophisticated techniques using malware to exploit vulnerabilities in systems. The "persistent" process suggests that an external command and control system is continuously monitoring and extracting data from a specific target. The "threat" process indicates human involvement in orchestrating the attack.

CIVIL DISORDER

Civil disorder may impact the cybersecurity of the planning area by directly or indirectly impacting Denton County’s ability to support its computers, networks, and data. Civil disorder can result in the planning area not having resources due to direct impact to the computers and networks, and indirectly by limiting the resources necessary to run the computers and networks.

LOCATION

Cyberwar is deceptive, invisible to most, and fought out of sight. It takes place in cyberspace, a location that cannot be seen, touched, or felt. Physical instruments, such as computers, routers, and cables can be seen; however, these instruments interact in cyberspace, a virtual and unseen realm. Thus, the source of the hazard can extend from one part of the world to attacks on public or private sector entities in another part of the world, and the perpetrator can remain unknown in a legally provable sense. The entire Denton County planning area, including all participating jurisdictions, can be affected by a cyber-attack.

EXTENT

Currently an official index for measuring the extent of a cyber-attack does not exist. The extent, nature, and timing of cyber-attack events are impossible to predict. There may or may not be any warning. Some cyber-attack events take a long time (weeks, months or years) to be discovered

APPENDIX I: MAN-MADE HAZARDS

and identified.¹¹ Therefore, the Denton County planning area is vulnerable to all types of cyber-attack, and can occur anywhere, and at any time.

The extent of damages is based on historical incidents in the Denton County planning area are classified as low, medium, and high; third party information regarding the impact; and if the planning area has experienced an occurrence of the incident.

Denial of service attacks: Low

A DoS and DDoS attack could result in an extended cyber-outage in the planning area. The outage, although impacting the daily business of the planning area, would not have a substantial economic impact to the county.

Data loss/leakage: High

Data loss and leakage experienced by the planning area could result in costly remediation efforts to ensue. For example, if personally identifiable information (PII) is leaked, the county may be required to pay for credit protection services. Since Denton County manages a large quantity of sensitive information, the possibility of costly remediation efforts is high.

Infrastructure loss/failure: High

Loss of a cyber-processing facility could result in very high expenses to remediate, repair, and recover from the loss.

Insider threats: Medium

Insider threats can result in substantial impacts to the organization, depending on what data the insider has accessed. Denton County has remediated insider threats by using the industry standard separation of duties, and performing background checks of its employees, contractors, and volunteers.

Organized cybercrime, state-sponsored hackers’ espionage: High

The planning area is a moderate target for organized criminals and state-sponsored hackers due to its political environment and the size of the organization. Due to the potential extent of attacks by organized criminals, the possibility and severity of resulting damages are great.

Third party mismanagement: Low

Since each vendor is isolated to the service it performs, the damages from one third party’s mismanagement is fairly low.

Advanced persistent threats: High

The impact of an APT to the planning area can be severe because a large number of systems can be affected and the remediation of such an attack could be expensive to recover from.

Civil disorder: High

The impacts of civil disorder on cybersecurity could be extensive due to the typical physical nature of the attacks.

HISTORICAL OCCURRENCES

USA Today reported that the electric grid is attacked every four days either physically or through cyber threats. The numbers of attacks are accelerating and becoming more sophisticated. The Texas Governor announced that websites belonging to state agencies have seen an increase in attempted cyber-attacks coming out of Iran (about 10,000 per minute) in the time since Iranian

¹¹ Source: <http://www.ready.gov/cyber-attack>

APPENDIX I: MAN-MADE HAZARDS

general Qassem Soleimani was killed in a U.S. drone strike.¹² While the attacks to gather data have not been successful, Denton County’s technology security team remains on high alert. The Electric Reliability Council of Texas (ERCOT) reportedly has a team of professionals and a series of procedures they utilized to protect the planning area systems from cyber-attacks.

Even though cyber-attack events are virtually impossible to predict, the Denton County planning area has the potential of an occurrence happening at any time.

PROBABILITY OF FUTURE EVENTS

The probability of occurrence based on historical incidents in the planning area are classified as low, medium, and high; as well as third party information regarding the likelihood of incidents if the county has not had an occurrence of the incident.

Denial of service attacks: Low

The planning area has frequent DOS attacks which are not severe enough to cause impact to Denton County’s service levels. Although there have been attempts for service disruptions through phishing emails, a fraudulent attempt to obtain sensitive information has not been successful. In the past, significant bad actors were identified by the U.S. Federal Government as Russia, Iran, and North Korea who historically attempt to disrupt or corrupt systems by damaging or gaining sensitive information through software. Denton County employs vendor software, which supports critical infrastructure. During the years of 2020 and 2021, the bad actors attempted to gain sensitive information continuously through vendor software. Although successful in some areas of the United States, Denton County was not affected.

Data loss/leakage: Low

The planning area is subject to several compliance requirements which specifically address data loss and leakage. These compliance standards include but are not limited to:

- Payment Card Industry Security Standard (PCI DSS)
- Health Insurance Portability and Accountability Act of 1996 (HIPAA)
- Criminal Justice Information Services Division (CJIS)

Historically, the county had no instances of data loss over the last year which resulted in the county having to remediate the situation.

Infrastructure loss/failure: Low

The planning area has multiple data centers which are hardened in various ways to minimize the possibility of outage. Resilience and redundancy are continuously being reviewed and addressed to reduce the risk of loss or failure. Additionally, many internal education and awareness campaigns are a part of critical infrastructure policy where members are tested internally by sending national phishing emails. The results of the test are made known internally for awareness as a prevention method. Historically, the infrastructure has had few outages that were extended. A prime example would be health care systems within the planning area.

¹² Statesman News Network, January 2020, Website: <https://www.statesman.com/news/20200110/austin-on-guard-after-texas-hit-with-increased-cyberattacks-from-iran>

APPENDIX I: MAN-MADE HAZARDS

Insider threats: Low

The planning area requires anyone who has access to Denton County’s enterprise network and resources to have gone through a background check, which is regularly reviewed. All activity that steps outside the norm is monitored with various tools such as UEBA, identity monitoring, threat hunting, etc. There has never been evidence of successful insider attacks.

Organized cybercrime, state-sponsored hackers’ espionage: Medium

Denton County has had several unsuccessful instances of organized attempted attacks via DDoS and malware by organizations over the last five years. As a large public entity, Denton County is more prone to these types of attacks. Many layers of defense to detect, respond and mitigation this risk are utilized, including proactive and reactive systems and managed services.

Third party mismanagement: Low

Denton County utilizes third parties for its cyber activities, and vets all contracts prior to final agreement. Many resources are dedicated to review contracts and vet vendors. Over the past few years, this vendor management program has been a proactive effort, starting from standard information gathering questions to personally interviewing third party IT and security teams. As part of the contractual agreements, all data are required to be stored within the U.S. and segregated from other entities’ data. After the contractual agreements are signed, external validation (BitSight, SpyCloud, NCFTA, etc.) must occur, and meetings are set up to continue down the path of improvement. A CMMC style expectation is used that vendors will stop failing to do the basics. There has not been any known instances of Third-party mismanagement to date.

Advanced persistent threats: Low

Denton County maintains systems which monitor symptoms of APT; and vulnerability management is taken very seriously with monthly meetings and tracking of all vluns. Over the last five years there have been plenty of attempts to establish advanced persistence, but none have succeeded.

Civil disorder: Low

Denton County has experienced civil disorder in the form of protests or large gatherings. National trends or urban developments in historical areas, makes Denton County subject to such events. The county, historically, has relatively low civil disorder events. Elections are and will continue to be Denton County’s highest risk area; this could change if there is a high visibility event (with the Sheriff’s office, for example). The square is a hot-button area for physical risk, but many cameras are watching this area at all times. Nationally, civil disorder events have been correlated or followed up by a cyber-attack to critical infrastructure. However, within the planning area, there have been no cyber-attacks tied into civil disturbance events in the past or within the last five years. Local, state and federal officials monitor such events and establish lines of communication in the event that a cyber incident may unfold. The probability to follow this national trend is low for the planning area.

Historical evidence shows that the Denton County planning area is vulnerable to a range of cyber threats, and the probability of future cyber-attacks is considered “Highly Likely” meaning an event is probable in the next year.

APPENDIX I: MAN-MADE HAZARDS

VULNERABILITY AND IMPACT

With the internet being largely open and unregulated, it leaves the planning area vulnerable to cyber-attacks and threats. The attack can be on information systems resulting in a data breach, or the spread of a virus. With the growing dependence on digital interconnectivity even a small incident may have widespread, and damaging consequences.



Transportation, public safety, and utility services are all critical, and highly dependent on information technology. The motive behind such disruptions can be driven by religious, political, other objectives.

A cyber-attack can last a few minutes to a couple of days, although large-scale events and their impacts can last much longer. Cyber-attacks differ by motive, type, vector, and perpetrator profile.

Cybersecurity involves protecting infrastructure by preventing, detecting, and responding to cyber-attack incidents. Unlike physical threats that prompt immediate action, such as “stop, drop, and roll,” in the event of a fire; cyber threats are often difficult to identify and comprehend. Among these dangers are viruses erasing entire systems, intruders breaking into systems and altering files, intruders using a computer or device to attack others, and intruders stealing confidential information. The spectrum of cyber-attack risks is limitless. Threats of cyber-attack can have wide-ranging effects on the individual, community, organizational, and national level. Risks from cyber-attack include:

- Organized cybercrime, state-sponsored hackers, and cyber espionage, which can pose national security risks to our country.
- Transportation, power, and other services may be disrupted by large scale cyber incidents, and the extent of the disruption is highly uncertain as it will be determined by many unknown factors including the target and size of the incident.
- Vulnerability to data breach and loss increases if an organization’s network is compromised, and therefore information about a company, its employees, and its customers can be at risk.
- Individually owned devices such as computers, tablets, mobile phones, and gaming systems that connect to the Internet are vulnerable to intrusion, and therefore personal information may be at risk without proper security.¹³

Based on historical events, the potential impact of cyber-attacks on the entire Denton County planning area can be considered “Major” due to the critical facilities that can be indirectly impacted by an attack. While deaths, injuries or damages to the built environment are not directly impacted from a cyber-attack, the secondary or cascading effects of an attack could be devastating.

TERRORISM

The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as one of two types—domestic terrorism or international terrorism. Domestic terrorism involves groups or

¹³ Source: <http://www.ready.gov/cyber-attack>

APPENDIX I: MAN-MADE HAZARDS

individuals whose terrorist activities are directed at elements of our government or population without foreign direction. International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside of the United States, or whose activities transcend their national boundaries.

A terrorist attack can take several forms, depending on the technological means available to the terrorist, the nature of issue motivating the attack, and the points of weakness of the terrorist’s target. Bombings are the most frequently used terrorist method in the United States. A terrorist using a chemical or biological weapon is of particular concern to officials. Special training and equipment is needed in order to safely manage a Weapons of Mass Destruction incident.

Biological agents are infectious microbes or toxins used to produce illness or death in people, animals or plants. Biological agents can be dispersed as aerosols or airborne particles. Terrorists may use biological agents to contaminate food or water, as they are extremely difficult to detect.

Chemical agents kill or incapacitate people, destroy livestock, or ravage crops. Some chemical agents are odorless and tasteless and are therefore difficult to detect. These chemical agents can have an immediate effect (a few seconds to a few minutes) or a delayed effect (several hours to several days).

The Department of Defense estimates that as many as 26 nations may possess chemical agents and/or weapons, and an additional 12 may be seeking to develop them. The Central Intelligence Agency reports that at least 10 countries are believed to possess or are currently conducting research on biological agents for weaponization.

Terrorist incidents – as with other natural and technological disasters – involve the application of one or more modes of harmful force to the built environment. These modes include contamination (as in the case of chemical, biological radiological or nuclear hazards), energy (explosives, arson, and even electromagnetic waves), or denial of service (sabotage, infrastructure breakdown, and transportation service disruption).

LOCATION

There is no distinct geographic boundary to the threat of terrorism. An event is possible throughout the Denton County planning area.

EXTENT

The Homeland Security Advisory System, issued by the U. S. Department of Homeland Security, previously used a color-coded terrorism warning system that identified five threat levels. In 2011, the Department of Homeland Security (DHS) replaced the color-coded alerts of the Homeland Security Advisory System (HSAS) with the National Terrorism Advisory System (NTAS), designed to more effectively communicate information about terrorist threats by providing timely, detailed information to the American public.

NTAS now consists of two types of advisories: Bulletins and Alerts. DHS has added Bulletins to the advisory system to be able to communicate current developments or general trends regarding threats of terrorism. NTAS Bulletins permit the Secretary to communicate critical terrorism information that, while not necessarily indicative of a specific threat against the United States, can reach homeland security partners or the public quickly, thereby allowing recipients to implement necessary protective measures. Because DHS may issue NTAS Bulletins in circumstances not warranting a more specific warning, NTAS Bulletins provide the Secretary with greater flexibility to provide timely information to stakeholders and members of the public.

When there is specific, credible information about a terrorist threat against the United States, DHS will share an NTAS Alert with the American public when circumstances warrant doing so. The Alert may include specific information, if available, about the nature of the threat, including the geographic region, mode of transportation, or critical infrastructure potentially affected by the threat, as well as steps that individuals and communities can take to protect themselves and help prevent, mitigate or respond to the threat. The Alert may take one of two forms: Elevated, if there is credible threat information, but only general information about timing and target such that it is reasonable to recommend implementation of protective measures to thwart or mitigate against an attack; or Imminent, if the threat is believed credible, specific, and impending in the very near term. Terrorism Advisory System Alerts are described in Figure I-4.¹⁴

Figure I-4. National Terrorism Advisory



¹⁴ Source: Department of Homeland Security, <https://www.dhs.gov/national-terrorism-advisory-system>

APPENDIX I: MAN-MADE HAZARDS

Red Cross also issues Advisory System Recommendations for individuals, families, neighborhoods, schools and businesses for each alert level. These may be found at: www.redcross.org.

Heightened periods for terrorism risk are based on intelligence and other information. A potential terrorist event could devastate the community physically, economically and psychologically for many years to come. Warning time for terrorism may be minimal to none.

HISTORICAL OCCURRENCES

The history of terrorism on United States soil includes the attacks of September 11, 2001, on the World Trade Center in New York and the Pentagon in Washington, D.C. and the ensuing anthrax attacks; the 1995 bombing of the Murrah Federal Building in Oklahoma City; and the bombing of the World Trade Center in 1993.

Denton County has not experienced a terrorist act. While complete prevention of an attack may not be attainable, the County can lessen the likelihood and/or the potential effects of an incident. The County continues to improve its readiness to respond to a terrorist incident through participation in state and federal programs that provide training and equipment for agencies that would respond to a local terrorist incident, and in exercises that help to improve agency coordination and test local response plans.

PROBABILITY OF FUTURE EVENTS

The types, frequencies, and locations of many natural hazards are identifiable and, even in some cases, predictable, as the laws of physics and nature govern them. Malevolence, however, cannot be forecast with any accuracy. There is, therefore, some potential for most, if not all, types of intentional terrorist acts to occur anywhere and at any time.

VULNERABILITY AND IMPACT

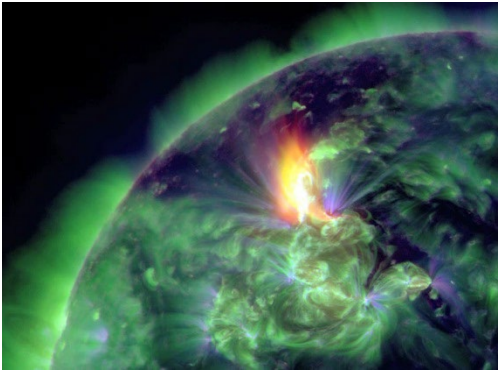
There is no defined geographic boundary for a terrorist event. All of the population, buildings, critical facilities, infrastructure and lifelines and hazardous materials facilities are considered exposed to the hazards of terrorism and could potentially be affected.

There are no past local events. Therefore, all assets and facilities are potentially at risk to damages that may, for the most part, be secondary.

Terrorist events can have a “substantial” severity of impact. They can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage.

GEOMAGNETIC STORM

Geomagnetic storms are a major disturbance of Earth’s magnetosphere that occur when there is a very efficient exchange of energy from solar wind into the space environment surrounding the Earth. Magnetic storms can cause a technological disruption by affecting the performance of equipment, upset radio communications, blackout radars, and disrupt radio navigation systems.



LOCATION

Space weather impacts various aspects of everyday life including a variety of phenomena that occur due to the

APPENDIX I: MAN-MADE HAZARDS

variability of the sun over periods ranging from hours to years. Technological disruption due to geomagnetic storms can happen anywhere and at any time within the entire world, including the Denton County planning area.

EXTENT

The National Oceanic and Atmospheric Administration (NOAA) Space Weather Scales were introduced as a way to publicly communicate the current and future space weather conditions and their possible effects on people and systems. Many of the Space Weather Prediction Center (SWPC) products describe the space environment, but few have described the effects that can be experienced as the result of environmental disturbances. The scales describe the environmental disturbances for three event types including geomagnetic storms, solar radiation storms, and radio blackouts. The scales have numbered levels, analogous to events that convey severity including hurricanes, tornadoes, and earthquakes. The scales identify possible effects of an event, how frequently events occur, and the intensity of the physical causes.¹⁵

Table I-3. Geomagnetic Storms

SCALE	DESCRIPTION	EFFECT	PHYSICAL MEASURE	AVERAGE FREQUENCY (1 CYCLE = 11 YEARS)
G 5	Extreme	<p>Power systems: Widespread voltage control problems and protective system problems can occur, and some grid systems may experience complete collapse or blackouts. Transformers may experience damage.</p> <p>Spacecraft operations: Problems with extensive surface charging, orientation, uplink/downlink, and tracking satellites can occur.</p> <p>Other systems: Pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geographic lat.).</p>	Kp = 9	4 per cycle (4 days per cycle)
G 4	Severe	<p>Power systems: Possible widespread voltage control problems and some protective systems will</p>	Kp = 8, including a 9	100 per cycle (60 days per cycle)

¹⁵ Source: <http://www.swpc.noaa.gov/noaa-scales-explanation>

SCALE	DESCRIPTION	EFFECT	PHYSICAL MEASURE	AVERAGE FREQUENCY (1 CYCLE = 11 YEARS)	
		<p>mistakenly trip out key assets from the grid.</p> <p>Spacecraft operations: Problems with surface charging and tracking can occur, and corrections may be needed for orientation problems.</p> <p>Other systems: Induced pipeline currents can affect preventive measures, HF radio propagation is sporadic, satellite navigation degraded for hours, low-frequency radio navigation disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geographic lat.).</p>			
	<p>G 3</p>	<p>Strong</p>	<p>Power systems: Voltage corrections can be required, and false alarms triggered on some protection devices.</p> <p>Spacecraft operations: Surface charging can occur on satellite components, drag can increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems.</p> <p>Other systems: Intermittent satellite navigation and low-frequency radio navigation problems can occur, HF radio can be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geographic lat.).</p>	<p>Kp = 7</p>	<p>200 per cycle (130 days per cycle)</p>
	<p>G 2</p>	<p>Moderate</p>	<p>Power systems: High-latitude power systems can experience voltage alarms, and long-duration storms can cause transformer damage.</p> <p>Spacecraft operations: Corrective actions to orientation can be required by ground control, and possible changes in drag can affect orbit predictions.</p> <p>Other systems: HF radio propagation can fade at higher latitudes, and aurora has been seen</p>	<p>Kp = 6</p>	<p>600 per cycle (360 days per cycle)</p>

SCALE	DESCRIPTION	EFFECT	PHYSICAL MEASURE	AVERAGE FREQUENCY (1 CYCLE = 11 YEARS)
		as low as New York and Idaho (typically 55° geographic lat.).		
G 1	Minor	<p>Power systems: Weak power grid fluctuations can occur.</p> <p>Spacecraft operations: Minor impact on satellite operations are possible.</p> <p>Other systems: Migratory animals are affected, and aurora is commonly visible at high latitudes (northern Michigan and Maine).</p>	Kp = 5	1700 per cycle (900 days per cycle)

Table I-4. Solar Radiation Storms

SCALE	DESCRIPTION	EFFECT	PHYSICAL MEASURE (Flux level of >= 10 MeV particles)	AVERAGE FREQUENCY (1 Cycle = 11 Years)
S 5	Extreme	<p>Biological: Unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity) occurs; and passengers and crew in high-flying aircraft at high latitudes can be exposed to radiation risk.</p> <p>Satellite operations: Satellites can be rendered useless, memory impacts can cause loss of control, serious noise in image data can occur, star-trackers may be unable to locate sources; and permanent damage to solar panels is possible.</p> <p>Other systems: Complete blackout of HF communications is possible through the polar regions, and position errors make navigation operations extremely difficult.</p>	10 ⁵	Fewer than 1 per cycle

SCALE	DESCRIPTION	EFFECT	PHYSICAL MEASURE (Flux level of ≥ 10 MeV particles)	AVERAGE FREQUENCY (1 Cycle = 11 Years)
S 4	Severe	<p>Biological: Unavoidable radiation hazard to astronauts on EVA can occur; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.</p> <p>Satellite operations: Memory device problems and noise on imaging systems can occur; star-tracker problems can cause orientation problems, and solar panel efficiency can be degraded.</p> <p>Other systems: Blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.</p>	10 ⁴	3 per cycle
S 3	Strong	<p>Biological: Radiation hazard avoidance is recommended for astronauts on EVA, and passengers and crew in high-flying aircraft at high latitudes can be exposed to radiation risk.</p> <p>Satellite operations: Single-event upsets, noise in imaging systems, and slight reduction of efficiency in solar panel are likely.</p> <p>Other systems: Degraded HF radio propagation through the polar regions and navigation position errors are likely.</p>	10 ³	10 per cycle
S 2	Moderate	<p>Biological: Passengers and crew in high-flying aircraft at high latitudes can be exposed to elevated radiation risk.</p> <p>Satellite operations: Infrequent single-event upsets are possible.</p> <p>Other systems: Small effects on HF propagation through the polar regions can occur, and navigation at polar cap locations can be possibly affected.</p>	10 ²	25 per cycle
S 1	Minor	<p>Biological: None.</p> <p>Satellite operations: None.</p> <p>Other systems: Minor impacts on HF radio in the polar regions.</p>	10	50 per cycle

Table I-5. Radio Blackouts

SCALE	DESCRIPTION	EFFECT	PHYSICAL MEASURE	AVERAGE FREQUENCY (1 CYCLE = 11 YEARS)
R 5	Extreme	<p>HF Radio: Complete HF (high frequency) radio blackout on the entire sunlit side of the Earth lasting for a number of hours can occur. This results in no HF radio contact with mariners and en route aviators in this sector.</p> <p>Navigation: Low-frequency navigation signals used by maritime and general aviation systems can experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours can occur on the sunlit side of Earth, which may spread into the night side.</p>	X20 (2 x 10 ⁻³)	Less than 1 per cycle
R 4	Severe	<p>HF Radio: HF radio communication blackout on most of the sunlit side of Earth can occur for one to two hours, and HF radio contact is lost during this time.</p> <p>Navigation: Outages of low-frequency navigation signals can cause increased error in positioning for one to two hours, and minor disruptions of satellite navigation are possible on the sunlit side of Earth.</p>	X10 (10 ⁻³)	8 per cycle (8 days per cycle)
R 3	Strong	<p>HF Radio: Wide area blackout of HF radio communication, and loss of radio contact for about an hour on sunlit side of Earth can occur.</p> <p>Navigation: Low-frequency navigation signals can be degraded for about an hour.</p>	X1 (10 ⁻⁴)	175 per cycle (140 days per cycle)
R 2	Moderate	<p>HF Radio: Limited blackout of HF radio communication on the sunlit side of the Earth, and loss of radio contact for tens of minutes can occur.</p>	M5 (5 x 10 ⁻⁵)	350 per cycle (300 days per cycle)

SCALE	DESCRIPTION	EFFECT	PHYSICAL MEASURE	AVERAGE FREQUENCY (1 CYCLE = 11 YEARS)
		Navigation: Degradation of low-frequency navigation signals for tens of minutes can occur.		
R 1	Minor	<p>HF Radio: Weak or minor degradation of HF radio communication on the sunlit side of the Earth, and occasional loss of radio contact can occur.</p> <p>Navigation: Low-frequency navigation signals can be degraded for brief intervals.</p>	M1 (10 ⁻⁵)	2000 per cycle (950 days per cycle)

The societal and economic impacts of a geomagnetic disturbance scenario have been mapped in Figure I-5. Texas large capacity EHV transformer vulnerability is represented per the parameters set forth in the figure. This does not mean that Texans are safe from power-grid failure. In recent years, utilities have joined grids together to allow long-distance transmission of low-cost power to areas experiencing sudden demand. The Interconnectedness of the power-grid makes the system susceptible to wide-ranging "cascade failures."¹⁶

The U.S. electric grid has three main components including generation (creation of electricity), transmission (long haul transport of electricity), and distribution (shorter distances connecting the electricity to the consumer and end user). The electric grid is complex with in increasing number of connection points. The U.S. has 80,000 miles of extra-high voltage (EHV) transmission lines comprising the backbone of the transmission grid that enables the long-haul transport of electricity. EHV transformers are considered critical equipment on the transmission grid and 90 percent of consumed power passes through a high voltage transformer at some point. If EHV transformers fail, especially in large numbers, the resulting damage could be extensive.

EHV transformers are huge, weighing hundreds of tons, making them difficult to transport, and in some cases rare and specialized rail cars must be used for transport. Many of the EHV transformers installed in the U.S. are approaching or exceeding the end of their design lifetimes (approx. 30-40 years), increasing their vulnerability to failure. Although the utility industry does maintain limited spares, the ability to quickly and rapidly replace several transformers at once could be a challenge.¹⁷

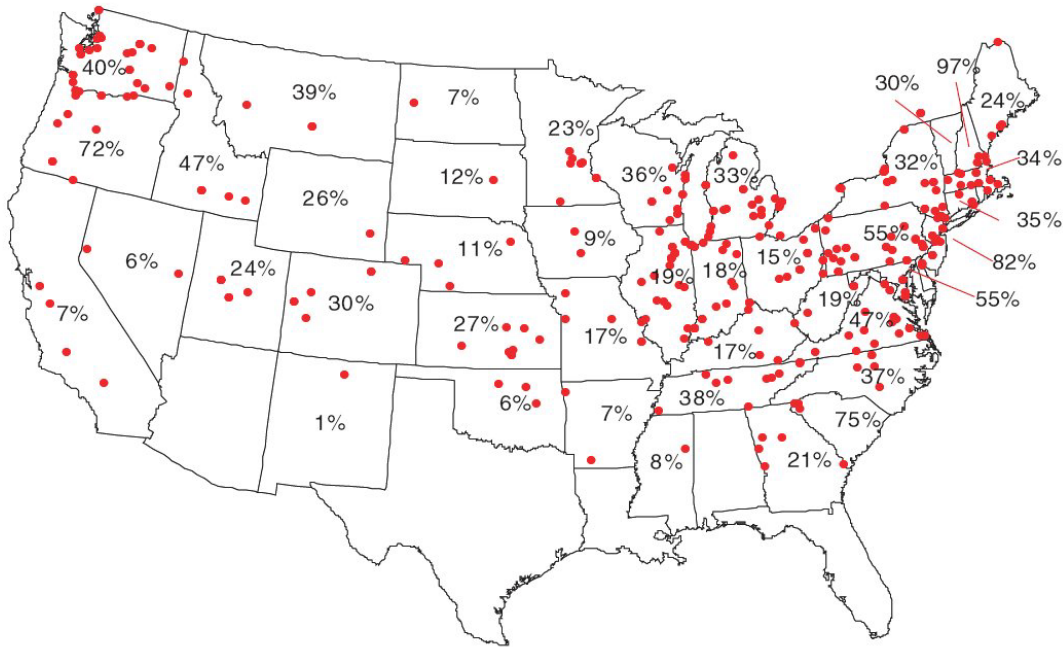
¹⁶ Source: http://science.nasa.gov/science-news/science-at-nasa/2009/21jan_severespaceweather/

¹⁷ Source: <http://www.dhs.gov/science-and-technology/power-hungry-prototyping-replacement-ehv-transformers>

Figure I-5. At Risk Extra High Voltage (EHV) Transformer Capacity Map by State

FUTURE SOLUTIONS, VULNERABILITIES, AND RISKS

79



A map showing the at-risk EHV transformer capacity (estimated at ~365 large transformers) by state for a 4800 nT/min geomagnetic field disturbance at 50° geomagnetic latitude. Regions with high percentages of at-risk capacity could experience long-duration outages that could extend multiple years. SOURCE: J. Kappenman, Metatech Corp., “The Future: Solutions or Vulnerabilities?,” presentation to the space weather workshop, May 23, 2008.

HISTORICAL OCCURRENCES

July 23, 2012

The solar storm of 2012 was an unusually large and strong coronal mass ejection (CME) event that occurred on July 23, 2012. It missed the Earth with a margin of approximately nine days, as the equator of the Sun rotates around its own axis with a period of about 25 days. The region that produced the outburst was thus not pointed directly towards the Earth at that time. The strength of the eruption was comparable to the 1859 Carrington event (see below) that caused damage to electrical equipment worldwide, which at that time consisted mostly of telegraph systems.

October-November 2003

The Halloween Solar Storms were a series of solar flares and coronal mass ejections that occurred from mid-October to early November 2003, peaking around October 28–29. Satellite-based systems and communications were affected, aircraft were advised to avoid high altitudes near the Polar Regions, and a one-hour-long power outage occurred in Sweden as a result of solar activity. Aurorae were observed at latitudes as far south as Texas and the Mediterranean countries of Europe.

The Solar and Heliospheric Observatory (SOHO) satellite failed temporarily, and the Advanced Composition Explorer was damaged by solar activity. Numerous other spacecraft were damaged or experienced downtime. Some spacecrafts were intentionally put into safe mode in order to protect sensitive equipment. Astronauts aboard the International Space Station had to stay inside the more shielded parts of the Russian Orbital Segment to protect themselves against the

APPENDIX I: MAN-MADE HAZARDS

increased radiation levels. Both the Ulysses spacecraft which was near Jupiter at the time, and Cassini, approaching Saturn, were able to detect the emissions. In April 2004, Voyager 2 was also able to detect them as they reached the spacecraft.

These events occurred during solar cycle 23, approximately three years after its peak in 2000, which was marked by another occurrence of solar activity known as the Bastille Day Flare.

March 9-13, 1989

The March 1989 geomagnetic storm was a severe storm that caused the collapse of Hydro-Québec's electricity transmission system. It occurred during solar cycle 22.

The storm began on Earth with extremely intense auroras at the poles. The aurora could be seen as far south as Texas and Florida. As this occurred during the Cold War, an unknown number of people worried that a nuclear first strike might be in progress. Others considered the intense auroras to be associated with the Space Shuttle mission STS-29, which had been launched on March 13, 1989, at 9:57:00 AM. The burst caused short-wave radio interference, including the disruption of radio signals from Radio Free Europe into Russia. It was initially believed that the signals had been jammed by the Soviet government.

Through the evening of March 13, a river of charged particles and electrons in the ionosphere flowed from west to east, inducing powerful electrical currents in the ground that surged into many natural nooks and crannies.

Some satellites in polar orbits lost control for several hours. Geostationary Operational Environmental Satellite (GOES) weather satellite communications were interrupted, causing weather images to be lost. National Aeronautics and Space Administration's (NASA) Tracking and Data Relay Satellite (TDRS)-1 communication satellite recorded over 250 anomalies caused by the increased particles flowing into its sensitive electronics. The Space Shuttle Discovery was having its own problems: a sensor on one of the tanks supplying hydrogen to a fuel cell was showing unusually high pressure readings on March 13, 1989. The problem went away after the solar storm subsided.

May 13 -15, 1921

The May 1921 geomagnetic storm was a significant event caused by the impact of an extraordinarily powerful coronal mass ejection on Earth's magnetosphere. It took place May 13 through May 15, 1921 and was part of solar cycle 15. This event occurred before extensive interconnectivity of electrical systems and the general electrical dependency across infrastructures in the developed world, so the effect was restricted to certain sectors. Resulting ground currents were up to an order of magnitude greater than those of the March 1989 geomagnetic storm that blacked out large parts of northeastern North America. At the time, scientists estimated the size of the sunspot that began on May 10, 1921, and caused the storm, as being 94,000 by 21,000 miles (131,000 km by 33,800 km).

August 28-September 2, 1859

The 1859 Solar Flare is the largest magnetic explosion recorded and is referred to as the Carrington Event, named for British Astronomer Richard Carrington, who witnessed growing sunspots and documented a bright white flash that lasted about five minutes. The impacts on Earth were colorful and bright auroras were seen as far south as Hawaii and Cuba. Telegraph operators experienced sparks from telegraph equipment that started fires. Scientists predict that such an event today would be devastating to the internet, communications, and power

APPENDIX I: MAN-MADE HAZARDS

transformers, satellites, airplanes, or any GPS guided system. Solar activity is closely monitored as sun storms have increased since 2011. Studies have shown that a solar storm of this magnitude occurring today would likely cause widespread problems for modern civilization. The solar storm of 2012 was of similar magnitude, but it passed Earth's orbit without striking the planet.

PROBABILITY OF FUTURE EVENTS

Geomagnetic storms for the Denton County planning area are likely and are expected to continue in the near future. Solar storm activity is expected to increase and is being mapped by NASA's Solar Shield Project and NOAA's Space Weather Prediction Center to show strong currents and warn power companies to protect their systems. The entire Denton County planning area could be affected should there be another major solar flare, dependent on location of penetration within the Earth's atmosphere.

VULNERABILITY AND IMPACT

Different types of space weather can affect different technologies at Earth. Solar flares can produce strong x-rays that degrade or block high-frequency radio waves used for radio communication during events known as Radio Blackout Storms. Solar Energetic Particles (energetic protons) can penetrate satellite electronics and cause electrical failure. These energetic particles also block radio communications at high latitudes during Solar Radiation Storms. Space weather has been recognized as causing problems with new technology since the invention of the telegraph in the 19th century.

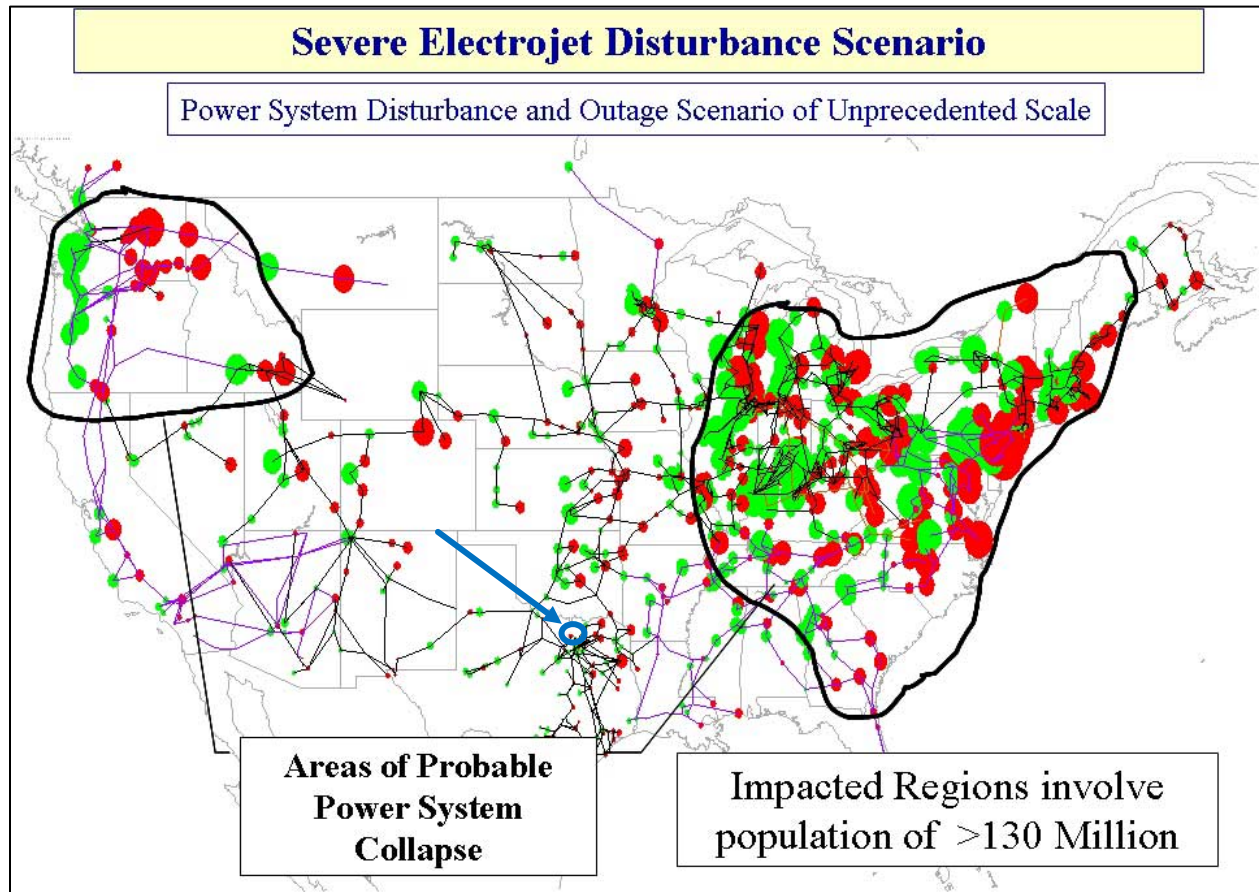
Besides emitting a continuous stream of plasma called the solar wind, the sun periodically releases billions of tons of matter called coronal mass ejections. These immense clouds of material, when directed toward Earth, can cause large magnetic storms in the magnetosphere and upper atmosphere. Such space weather can affect the performance and reliability of space-borne and ground-based technological systems. Coronal Mass Ejections (CME) can cause Geomagnetic Storms at Earth and induce extra currents in the ground that can degrade power grid operations.

Geomagnetic storms can modify the signal from radio navigation systems (GPS and GNSS) causing degraded accuracy. Geomagnetic storms also produce the aurora. Space weather will impact people who depend on all of these technologies.

A catastrophic failure of commercial and government infrastructure in space and on the ground can be mitigated through raising public awareness, improving vulnerable infrastructure and developing advanced forecasting capabilities. Without preventive actions or plans, the trend of increased dependency on space-weather sensitive technology could make society more vulnerable to a technological disruption event in the future.

Figure I-6 identifies a hypothetical scenario presented by a study on potential extreme space weather events that could result in a partial, wide-spread collapse of the U.S. electric power grid with enormous consequences for the affected population. As seen in Figure I-6, the Denton County planning area would be affected. Improvements in space weather forecasting, public awareness and infrastructure preparedness can mitigate the potential effects of technological disruption.

Figure I-6. Power System Disturbance Scenario¹⁸



¹⁸ Source: NASA, San Antonio is indicated by the blue circle.



CITY OF CORINTH
Staff Report

Meeting Date:	4/6/2023	Title: Ordinance Liquid Waste Ordinance
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input checked="" type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development	
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission n/a	

Item/Caption

Consider approval of the Liquid Waste Ordinance to ensure the City of Corinth meet the Texas Commission on Environmental Quality (TCEQ).

Item Summary/Background/Prior Action

TCEQ requires treatment plants to ensure they have a means and methods to enforce liquid waste regulations. The City of Denton and Upper Trinity are the local operators for the City of Corinth’s treatment and they require their sewer contributors to meet the TCEQ requirement for discharge regulations.

This ordinance is being required by Denton to ensure that the City of Denton and the City of Corinth meet the TCEQ regulations.

Financial Impact

N/A

Applicable Policy/Ordinance

N/A

Staff Recommendation/Motion

Approve the Sewer Liquid Waste Ordinance as presented.

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF CORINTH, TEXAS, AMENDING TITLE V: “PUBLIC WORKS” CHAPTER 50: “WATER AND SANITARY WASTEWATER SYSTEMS”, TO ADOPT A NEW SECTION 50.50, “LIQUID WASTE” OF CHAPTER 50, TITLE V, OF THE CITY OF CORINTH CODE OF ORDINANCES, SETTING FORTH UNIFORM REQUIREMENTS FOR LIQUID WASTE GENERATORS AND LIQUID WASTE TRANSPORTERS OPERATING WITHIN THE CITY AND RELATING TO SANITARY WASTEWATER REGULATIONS; PROVIDING FOR THE INCORPORATION OF PREMISES; PROVIDING AMENDMENTS, INCLUDING REGULATIONS TO AID IN PREVENTING WASTEWATER OVERFLOWS FROM BLOCKAGES DUE TO ACCUMULATION OF FATS, OILS AND GREASE, TO PROMOTE PROPER MAINTENANCE OF GREASE INTERCEPTORS AND GRIT TRAPS, TO ENSURE PROPER HANDLING, DISPOSAL, TRANSPORT, AND TRACKING OF TRAP WASTE AND OTHER LIQUID WASTE; PROVIDING FOR CRIMINAL PENALTIES WITH A FINE NOT TO EXCEED TWO THOUSAND DOLLARS (\$2,000) PER DAY FOR EACH DAY OR PART OF A DAY THAT A VIOLATION EXISTS OR CONTINUES; PROVIDING CIVIL PENALTIES IN ACCORDANCE WITH STATE LAW AND PROVIDING OTHER ENFORCEMENT MECHANISMS; AUTHORIZING THE COLLECTION OF RELATED FEES AS ADOPTED BY THE CIYT OF DENTON TEXAS; PROVIDING A CUMULATIVE REPEALER CLAUSE; PROVIDING FOR SEVERABILITY; PROVIDING SAVINGS; PROVIDING FOR CIVIL PENALTIES AND A CRIMINAL PENALTY NOT-TO-EXCEED TWO THOUSAND DOLLARS (\$2,000) FOR EACH DAY OR PART OF A DAY THAT A VIOLATION OCCURS AND/OR CONTINUES; ; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, the City of Corinth is a home rule municipality and pursuant to its Charter and state law; and

WHEREAS, the City must adopt uniform requirements for liquid waste generators and liquid waste transporters operating in the City to comply with all applicable State and Federal laws and regulations, including the Clean Water Act (33 United States Code § 1251 et seq), and applicable administrative regulations; and

WHEREAS, Pursuant to the Texas Water Code and the regulations of the Texas Commission on Environmental Quality, it is advisable that the City adopt regulations related to liquid waste.

WHEREAS, the City of Corinth discharges to the City of Denton and to UTRWD, each of which require compliance with their respective ordinances and regulations and requirement the payment of certain fees; and

WHEREAS, in order to comply with requirements of the Denton and UTRWD, the City has determined it necessary to adopt this Ordinance.

WHEREAS, the City has determined it is in the best interest of human health, the environment, and general welfare of the public to amend the City Code of Ordinances to adopt uniform requirements for liquid waste generators and liquid waste transporters and enable the City to enforce such regulations

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CORINTH, TEXAS:

SECTION 1

INCORPORATION OF PREMISES

That the foregoing recitals are findings of the Corinth City Council and are incorporated into this Ordinance as if written word for word.

SECTION 2

AMENDMENTS

The City Code of Ordinances is hereby amended to enact Title V: “Public Works” Chapter 50: Water and Sanitary Wastewater Systems, Adopting Section 50.50 “Liquid Waste” and to be read in its entirety as follows, and all other subparagraphs and subsections of Title V, “Public Works” not specifically amended hereby shall remain in full force and effect without amendment:

§ 50.50 LIQUID WASTE

A. Purpose and Policy:

- 1) Set forth uniform requirements for liquid waste generators and liquid waste transporters operating in the City and enables the City to comply with all applicable State and Federal laws and regulations, including the Clean Water Act (33 United States Code § 1251 et seq)
- 2) Objectives:

- a. To aid in the prevention of sanitary sewer overflows resulting from blockages and obstructions due to the accumulation of fats, oils, and grease from commercial and industrial facilities;
- b. To promote the proper maintenance of grease interceptors and grit traps; and
- c. To ensure the proper handling, disposal, transport and tracking of trap waste and other liquid waste.

B. Applicability and Prohibitions:

- 1) Section § 50.50 LIQUID WASTE shall apply to all Users of Publicly Owned Treatment Works (POTW), as defined in this section.
- 2) Grease traps or grease interceptors shall not be required for residential users.
- 3) Facilities generating fats, oils, or grease as a result of food manufacturing, processing, preparation or food service shall install, use, and maintain appropriate grease traps. These facilities include but are not limited to restaurants, food manufacturers, food processors, hospitals, hotels, motels, schools, nursing homes, and any other facility preparing, service, or otherwise making any foodstuff available for consumption.
- 4) It shall be unlawful for a user to intentionally or unintentionally allow the discharge of any petroleum oil, non-biodegradable cutting oil, mineral oil, or any fats, oils, or grease of animal or vegetation origin into the POTW in concentrations greater than those promulgated in state or federal law, rule or regulations, or local ordinance, including without limitation the City of Denton
- 5) It shall be unlawful to discharge trucked or hauled pollutants, except as deemed suitable and at discharge points designated by the city manager or their designee.
- 6) It shall be unlawful for a person to create a public nuisance.

C. Definitions:

The definitions in other parts of the Code of Ordinances are hereto applicable.

- 1) *Approved* - Accepted as satisfactory under the terms of this article and given formal and official sanction by the City of Denton.
- 2) *Car Wash* - Establishments primarily engaged in cleaning, washing, and/or waxing automotive vehicles, such as passenger cars, trucks, vans, and trailers and are categorized by North American Industry Classification System number 811192 and by Standard Industrial Classification number 7542.
- 3) *Chemical Oxygen Demand (COD)* - The value of the test for chemical oxygen demand, as analyzed in accordance with 40 CFR § 136.3.
- 4) *City* – City of Corinth, Texas
- 5) *Director* - The Director of Public Works of the City, which may include a person appointed by the Director, City Manager or their respective designee.

- 6) *Disposal* - The discharge, deposit, release, injection, dumping, spilling, leaking, or placing of any liquid waste into or on any land or water so that such waste or any constituent thereof may enter the environment, be emitted into the air or discharged to any sewers or waters, including ground waters.
- 7) *Disposal Site* - A permitted site or part of a site at which liquid waste is processed, treated, and/or intentionally placed into or on any land and at which the waste will remain after site closure.
- 8) *Disposer* - A person who receives, stores, retains, processes, or disposes of liquid waste.
- 9) *Fat, Oil, And Grease (FOG)* - Organic polar compounds derived from animal and/or plant sources that contain multiple carbon chain triglyceride molecules. These substances are detectable and measurable using analytical test procedures established in 40 CFR 136, as may be amended from time to time. All are sometimes referred to herein as "grease" or "greases."
- 10) *Food Service Facility* - Every food preparation and food service establishment including, but not limited to bakeries, bars, butcher shops, cafes, clubhouses, delicatessens, ice cream parlors, hospitals, hotels, restaurants, schools, or similar places where meat, poultry, seafood, dairy products, or fried foods are prepared, served, or offered for sale, but shall not apply to any single-family residence or dwelling not used for the commercial preparation and sale of food items.
- 11) *Liquid Waste Generator* - Any person who causes, creates, generates, or otherwise produces liquid waste, or a person who for any reason has a liquid waste removed from his property by a transporter of liquid waste.
- 12) *Grease Interceptor (or "Grease Trap")* - A device designed to use differences in specific gravities to separate and retain light density liquids, waterborne fats, oils, and greases prior to the wastewater entering the sanitary sewer collection system. These devices also serve to collect settleable solids, generated by and from food preparation activities, prior to the water exiting the trap and entering the sanitary sewer collection system.
- 13) *Grease Interceptor Waste* - Any organic, inorganic, greasy or fatty liquid, semi-liquid, and/or solid wastes collected by and removed from a grease trap.
- 14) *Grit Trap/Oil Separator (or "Grit Trap")* - A watertight receptacle designed and constructed to intercept and prevent the passage of petroleum-based oil, grease wastes and solids into the sanitary sewer system to which the receptacle is directly or indirectly connected.
- 15) *Grit Trap Waste* - Oil and grease waste, inorganic solids generated by a commercial facility that are collected by and removed from a grit trap.
- 16) *Liquid Waste* - Water-borne solids and liquids containing dissolved or suspended waste material including but not limited to septage and wastes from grease traps and grit traps.
- 17) *Hazardous Waste* - Any liquid, semi-liquid or solid waste (or combination of wastes), which because of its quantity, concentration, physical, chemical or infectious characteristics may:

- a. Have any of the following characteristics: toxic, corrosive, and irritant, a strong sensitizer, flammable or combustible, explosive or otherwise capable of causing substantial personal injury or illness;
 - b. Pose a substantial hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise improperly managed, and is identified or listed as a hazardous waste as defined by the Texas Solid Waste Disposal Act or the administrator, U.S. Environmental Protection Agency (EPA) pursuant to the Federal "Solid Waste Disposal Act", as amended by the: Resource Conservation and Recovery Act of 1976" (RCRA), and as it may be amended in the future.
- 18) *Manifest* - The written multi-part documentation required to be in the possession of the transporter enabling disposal of hauled grit trap waste, grease trap waste, and septage at a permitted or registered disposal site.
- 19) *Manifest System* - A system consisting of a five-part trip ticket used to document the generation, transportation and disposal of liquid waste.
- 20) *Person* - Any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity or any other legal entity, or their legal representatives, agents or assigns.
- 21) *Public Nuisance* - The discharge or exposure of grease, sewage or other organic waste in such a way as to be a potential instrument or medium in disease transmission to a person or between persons.
- 22) *Publicly Owned Treatment Works or "POTW"* - A treatment works, as defined by Section 212 of the Act (33 U.S.C. Section 1292), which is owned by the city. This definition includes any devices or systems used in the collection, storage, treatment, recycling, and reclamation of sewage or industrial wastes of a liquid nature and any conveyances, which convey wastewater to a treatment plant.
- 23) *Section* – Section 50.50, et seq. of Chapter 50, “Water and Sanitary Wastewater System” of Title V: “Public Works” of the Code of Ordinances of the City of Corinth, Texas, as amended.
- 24) *Septage* - Liquid waste and sludge containing sufficient liquid content, which is removed from a portable toilet, chemical toilet, septic tank, or cesspool. Septage does not include non-domestic wastes from commercial or industrial facilities.
- 25) *TCEQ* - The Texas Commission on Environmental Quality, and its predecessor and successor agencies.
- 26) *Transporter* - Any person who is registered with and authorized by the TCEQ to transport sewage sludge, water treatment sludge, domestic septage, chemical toilet waste, grit trap waste, or grease trap waste in accordance with 30 Texas Administrative Code, Chapter 312, Subchapter G, Section 312.42.
- 27) *Trip Ticket* - The shipping document originated and signed by the transporter that contains the information required by the approving authority.

- 28) *Wash Water* - The water-borne solids, liquids, gaseous substances or other residue and debris resulting from a washing or cleaning process. Wash water shall not be discharged to the storm sewer and may require pretreatment before being discharged to the sanitary sewer.
- 29) *Wash Water Operation* - Any cleaning process generally conducted outdoors, such as washing vehicles, equipment, structures, or paved surfaces for maintenance, safety, aesthetic, or stormwater pollution prevention purposes, and which generates wash water. Examples would include cleaning of petroleum products from parking lots or service station drives, mobile washing operations or equipment/vehicle washing, which does not drain to a grit trap.

D. Liquid Waste Generators:

1) New Facilities

- a. Food processing facilities or food service facilities which are newly proposed or constructed, or existing facilities which will be expanded or renovated to include a food service facility, where such facility did not previously exist, shall be required to design, install, operate and maintain a grease trap in accordance with locally adopted plumbing codes or other applicable ordinances. Grease traps shall be installed and inspected prior to issuance of a certificate of occupancy.
- b. Facilities which perform washing, cleaning, or servicing of automobiles, trucks, buses, or similar equipment which are newly proposed or constructed with floor drains in areas of operation, shall be required to design, install, operate and maintain a grit trap/oil separator in accordance with locally adopted plumbing codes or other applicable ordinances and written guidelines as required by the City. Grit traps/oil separators shall be installed and inspected prior to issuance of certificate of occupancy.

2) Existing facilities

- a. Existing grease traps or grit traps/oil separators must be operated and maintained in accordance with the manufacturer's recommendations and in accordance with these standards referenced herein, unless specified in writing and approved by the POTW. Other commercial users may be required by the city manager to install an approved grease trap, grit trap/oil separator when the concentration of oil, grease waste or suspended solids is greater than concentrations promulgated in article V, chapter 26 of the City of Denton Code of Ordinances, as amended, or when discharges may cause blockages in the wastewater collection system.
- b. Existing food processing or food service facilities that change in ownership, or existing facilities which will be expanded or renovated to include a food service facility, where such facility did not previously exist or where there is

an inadequately sized grease interceptor, shall be required to design, install, operate and maintain a grease interceptor in accordance with locally adopted plumbing codes, or other applicable ordinances. Grease interceptors shall be installed and inspected prior to the issuance of a certificate of occupancy and a health permit.

- c. Existing facilities which perform washing, cleaning, or servicing of automobiles, trucks, buses, or similar equipment with floor drains in the areas of operation that change in ownership or are expanded or renovated to include floor drains in areas of operation shall be required to design, install, operate and maintain a grit trap/oil separator in accordance with locally adopted plumbing codes, or other applicable ordinances. Grit traps/oil separators shall be installed and inspected prior to the issuance of a certificate of occupancy.
- 3) A generator shall install a sample port to allow access to sample the waste-stream as close as possible to the connection with the city sanitary sewer main within the bounds of the facility property. The port shall be installed according to the specifications of the city manager. The port shall be installed and maintained at the user's expense. The port shall be installed perpendicular to the effluent flow to allow visual observation and sampling.
- 4) Grease interceptors and grit traps/oil separators shall be installed pursuant to a single certificate of occupancy. No person or persons shall allow the use of a single interceptor or trap by more than one business as defined by a certificate of occupancy without prior written approval.

E. Responsibilities:

- 1) A generator of liquid waste shall have all liquid waste material picked up from his premises by a liquid waste transporter who holds a valid permit from the city, and the liquid waste shall be transported to an approved site for disposal.
- 2) Cleaning schedule.
 - a. Grease interceptors shall be cleaned as often as necessary to ensure that sediment and floating materials do not accumulate to impair the efficiency of the grease interceptor; that the discharge is in compliance with local wastewater discharge limits; and, to ensure that no visible grease is observed in the discharge.
 - b. Grease interceptors shall be completely evacuated at a minimum of every ninety (90) days, or more frequently when:
 - i. Twenty-five (25) percent or more of the wetted height of the grease trap or grease interceptor, as measured from the bottom of the device to the invert of the outlet pipe, contains floating materials, sediment, oils or greases;

- ii. The discharge exceeds BOD, COD, TSS, FOG, pH, or other pollutant levels established by the city manager; or,
 - iii. If there is a history of noncompliance.
- 3) Grit traps/oil separators shall be completely evacuated based on one (1) of the two (2) following schedules:
 - a. At a minimum of every one hundred eighty (180) days, or
 - b. At a frequency determined by the owner/operator if all of the following best management practices are employed:
 - i. At a minimum of once per week, all facilities with a grit trap must be routinely checked and perform preventive maintenance as required on all connections, valves, hoses, chemical storage containers, drains, and other equipment necessary to prevent an accidental release or slug discharge of chemicals.
 - ii. At a minimum of once per month, all facilities with a grit trap must routinely check the level of sediment in each grit trap in order to determine a maintenance schedule that will facilitate consistent compliance with all discharge limits and requirements.
 - iii. All self-service and coin-operated car wash facilities must post and maintain signs, in an area that is clearly visible to the public, directing customers not to dispose of oils or chemical wastes at the facility.
 - iv. All facilities must document the best management practices, including routine checks, preventive maintenance and repair logs, and maintain grit trap maintenance records for a minimum of three years.
 - v. If at any time, the above practices are not being employed or the required documentation is not available for review, the owner/operator will be required to perform maintenance on the grit trap(s) immediately and once every one hundred eighty (180) days thereafter.
- 4) Any person who owns or operates a grease interceptor may submit to the city manager a request in writing for an exception to the required pumping frequency of the grease interceptor. The city manager may grant an extension for required cleaning frequency on a case-by-case basis when:
 - a. The grease interceptor owner/operator has demonstrated the specific interceptor will produce an effluent with no visible grease, and based on defensible analytical results, can demonstrate consistent compliance with established local discharge limits such as BOD, TSS, FOG, or other parameters as determined by the POTW; and
 - b. Less than twenty-five (25) percent of the wetted height of the grease interceptor, as measured from the bottom of the device to the invert of the outlet pipe, contains floating materials, sediment, oils or greases.

- 5) The City Manager may also require traps to be serviced on a single-event basis or scheduled basis if deemed necessary for the proper operation of the grease interceptor or grit trap/oil separator.
- 6) In the event that the establishment ceases operation, the establishment is required to pump the interceptor or trap before abandoning the property. If the owner of the business fails to empty the interceptor or trap, it shall become the responsibility of the property owner.
- 7) A Liquid Waste Generator shall not have hazardous waste or liquid waste in combination with hazardous waste removed from his premises by a liquid waste hauler operating under a city permit.
- 8) A Liquid Waste Generator shall verify the accuracy of the trip ticket from the transporter and then legibly complete and sign the trip ticket, to certify the statements on the trip ticket, when a load is picked up by the transporter. The generator shall keep a copy of all trip tickets for a period of three years at the site of generation, unless otherwise approved. The City Manager may inspect and copy these records at any time.
- 9) A Liquid Waste Generator shall:
 - a. Provide equipment and facilities of a type and capacity approved by the City;
 - b. Locate the interceptor or trap in a manner that provides ready and easy accessibility for cleaning and inspection;
 - c. Maintain the trap in effective operating condition.
 - d. Not install or utilize any system, process or pretreatment involving the use of enzymes, bacteria, or other additives, nor alter the design or function of the grease interceptor or grit trap/oil separator unless approved in writing by the City Manager; and
 - e. Supervise proper cleaning and complete removal of the contents of the trap.
- 10) A Liquid Waste Generator shall maintain the grease interceptor or grit trap/oil separator and its surrounding areas in sanitary conditions, free of litter and odors.
- 11) A Liquid Waste Generator shall immediately report spills and accidents involving liquid waste to the City Manager.
- 12) A Liquid Waste Generator shall clean up all spills and abate all unsanitary conditions immediately, and have material used for abatement, such as absorbent materials, disposed of by approved means and in a timely manner.
- 13) A Liquid Waste Generator of Wash Water or other liquid waste shall:
 - a. Contain, collect and dispose of liquid waste by approved means;
 - b. Protect the storm sewer system and the environment from discharges of liquid waste or other contaminants;
 - c. Use approved methods for on-site or mobile treatment of liquid waste; and

d. Accurately measure, by approved means, the volume of liquid waste collected and disposed of by the transporter.

14) Rates for sampling and/or analysis. Should any sampling and/or analysis be required by city staff pursuant to any provision in this article provided for generators, then the published rate for "sampling/analysis charges" that is contained in the City Fee Schedule is applicable and will be charged and shall be paid by the generator.

F. Liquid Waste Transporters:

Permit Required

- 1) Permit required. All persons owning or operating a vacuum truck, cesspool pump truck, liquid waste transport truck or other vehicle shall not service any septic tank, seepage pit, grease interceptor, grit trap/oil separator, or cesspool without first having received a valid transport truck discharge (TTD) permit or as required in the Code of Ordinances of the City, whichever is applicable.
- 2) Permit fee. TTD permits shall be issued by the City of Denton upon proper application and payment of a fee established by the Denton city council and on file in the office of the Denton city secretary. All TTD permits shall be valid for one year.
- 3) Unloading or discharge of waste or wastewater. It shall be unlawful for any person to unload or discharge waste or wastewater except in a manner and at a place designated by the City of Denton pursuant to the requirements adopted by the City of Denton.
- 4) Rates for discharge. Any person discharging waste under a TTD permit under the provisions of this Section shall pay all applicable fees and comply with all requirements of the City of Denton.
- 5) Rates for sampling and/or analysis. Costs of sampling and analysis shall be paid to the City of Denton in accordance with Denton's adopted fee schedule.

G. Manifest Requirements:

- 1) Persons who generate, collect, and transport grease interceptor and grit trap/oil separator waste shall maintain a record of each individual collection and deposit. Such records shall be in the form of a manifest. The manifest shall include:
 - a. Name, address, telephone, and TCEQ registration number of transporter;
 - b. Name, signature, address, and telephone of the person who generated the waste and the date collected;
 - c. Type and amount(s) of waste collected or transported;
 - d. Name and signature(s) of responsible person(s) collecting, transporting, and depositing the waste;
 - e. Date and place where the waste was deposited;
 - f. Identification (permit or site registration number, location, and operator) of the facility where the waste was deposited;

- g. Name and signature of the facility on-site representative acknowledging receipt of the waste;
 - h. The volume of the waste received;
 - i. A consecutive numerical tracking number to assist transporters, waste generators, and regulating authorities in tracking the volume of grease transported.
- 2) Transporters shall obtain manifests from the City of Denton as required by ordinances and regulations of the City of Denton.
- 3) Copies of manifests returned to the waste generator shall be retained for three (3) years and be readily available for review.

H. Responsibilities:

- 1) Each grease interceptor or grit trap/oil separator that is pumped shall be fully evacuated unless the trap volume is greater than the tank capacity on the vacuum truck in which case the transporter shall arrange for additional transportation capacity so that the trap is fully evacuated within a twenty-four-hour period, in accordance with 30 Texas Administrative Code, Chapter 312, Section 312, as amended.

I. Enforcement Actions:

- 1) Notice of violation. When the responsible official for the City of Denton finds that a generator or transporter has violated, or continues to violate, any provision of this Section of Chapter V, a wastewater discharge permit or order issued hereunder, or any other pretreatment standard or requirement, Denton official may serve upon that generator or transporter a written notice of violation. Within the timeframe specified in this notice, which is usually but not always ten (10) days, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted by the generator or transporter to the Denton official. Submission of this plan in no way relieves the generator or transporter of liability for any violations occurring before or after receipt of the notice of violation. Nothing in this section shall limit the authority of the City of Denton to take any action, including emergency actions or any other enforcement action, without first issuing a notice of violation.
- 2) Administrative orders.
 - a. Compliance orders. When the responsible official for the City of Denton finds that a generator or transporter has violated, or continues to violate, any provision of this Section, a wastewater discharge permit or order issued hereunder, or any other pretreatment standard or requirement, the city manager may issue an order to the generator or transporter responsible for the discharge directing that the generator or transporter come into compliance within a specified time. If the generator or transporter does not come into compliance within the time provided, sewer service may be discontinued, or a permit issued pursuant to this chapter may be revoked. Compliance orders also may contain other requirements to address the noncompliance, including

additional self-monitoring and management practices designed to minimize the amount of pollutants discharged to the sewer. A compliance order may not extend the deadline for compliance established for a pretreatment standard or requirement, nor does a compliance order relieve the generator or transporter of liability for any violation, including any continuing violation. Issuance of a compliance order shall not be a bar against, or a prerequisite for, taking any other action against the generator or transporter.

- b. Cease and desist orders. When the responsible official for the City of Denton finds that a generator or transporter has violated, or continues to violate, any provision of this Section a wastewater discharge permit or order issued hereunder, or any other pretreatment standard or requirement, or that the generator's or transporter's past violations are likely to recur, the city manager may issue an order to the generator or transporter:
 - i. directing it to cease and desist all such violations; and
 - ii. Immediately comply with all requirements; and
 - iii. Take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation, including halting operations and/or terminating the discharge.
- 3) Service of notice or order. Any notice or order issued under this Section shall be in writing and served in person or by registered or certified mail on the generator or transporter of the liquid waste or other persons determined to be responsible for such violation. Issuance of a cease-and-desist order shall not be a bar against, or a prerequisite for, taking any other action against the generator or transporter.
- 4) Appeals. Any person may appeal an order of an official of the City of Denton by filing a written notice of appeal with the Denton City Manager on forms provided by the City of Denton Utilities Administration Office. Such notice of appeal shall be filed with the city secretary within ten (10) days of service of the order.
- 5) Termination of service and revocation of permit. If no timely appeal is filed, the responsible official for the City of Denton may, if a violation is continuing or reoccurring or may reoccur, terminate wastewater service or revoke the permit of the person ordered to correct or abate such violation if such violation has not been corrected or abated within the time specified in such order.
- 6) Emergency suspension of service.
 - a. Suspension. The responsible official for the City of Denton may, without prior notice, suspend water service, sanitary sewer service and/or storm sewer access to a user or to a person discharging to the sanitary sewer or storm sewer when such suspension is necessary in the opinion of the city manager to stop an actual or threatened discharge which:
 - i. Presents or may present imminent substantial danger to the environment or to the health or welfare of persons or the public;
 - ii. Presents or may present imminent substantial danger to the POTW, storm sewer or waters of the state; or

- iii. Will cause pass through or interference of the POTW.
 - b. Notice of suspension. As soon as is practicable after the suspension of service, the responsible official for the City of Denton shall notify the user or the person discharging to the wastewater or storm sewer of the suspension and order such person to cease the discharge immediately.
 - c. Reinstating service. The responsible official for the City of Denton shall reinstate suspended services to the wastewater user or to the person discharging to the storm sewer:
 - i. Upon proof by such person that the non-complying discharge has been eliminated;
 - ii. Upon payment by such person of its outstanding water, sewer and stormwater utility charges;
 - iii. Upon payment by such person of all costs incurred by the city in responding to the discharge or threatened discharge; and
 - iv. Upon payment by such person of all costs incurred by the city in reconnecting service and penalties assessed against such person in accordance with this Section or other state law.
 - d. Written statement. Within five (5) days of the day of suspension of services, the wastewater user or the person discharging to the storm sewer shall submit to the responsible official for the City of Denton a detailed written statement describing the cause of the discharge and the measures taken to prevent any future occurrence.
- 7) Right to hearing. A person whose service has been suspended under this section may apply to the department which suspended service for a hearing on the issue of the suspension. The hearing shall be conducted in accordance with the ordinances of the City of Denton.
- 8) Other steps. If a person fails to comply with a notice or order issued under this section, the responsible official for the City of Denton shall take such steps as it deems necessary to prevent or minimize damage to the storm sewer, POTW or waters of the state, or to minimize danger to persons. Such steps may include immediate severance of a person's sanitary sewer connection.
- 9) Hearing and determination. A hearing shall be provided in accordance with the regulations contained in the ordinances of the City of Denton.
 - a. Should the appellant fail to comply with the order of the City of Denton, in addition to any other remedy provided for in this Section of Chapter V, the City of Denton may terminate sewer service to the appellant.

J. Enforcement/Penalties:

- 1) **City Manager.** The City Manager of Corinth, or his designee, in cooperation with the City of Denton, shall be authorized to enforce the provisions of this Section 50.50.
- 2) **City Attorney.** The city attorney of Denton is authorized to commence an action for appropriate legal or equitable relief in a court of competent jurisdiction. Such relief may include, without limitation:
 - a. An injunction to prevent a violation of this Section
 - b. Recovery for damages to the POTW, storm sewer, or drainage channels resulting from a violation of this Section;
 - c. Recovery for expenses incurred by the city in responding to a violation of this Section;
 - d. A daily civil fine of up to the maximum provided by Texas Local Government and set forth herein, for a violation of this Section; and
 - e. all other damages, costs, and remedies to which the city may be entitled at law or in equity.
- 3) **Criminal Penalty.** Any person, firm or corporation who intentionally, recklessly, or knowingly violates any provision of this Section or of Chapter V of the Code of Ordinances of the City, as amended hereby, that governs the public health and sanitation, or fails to comply therewith or with any requirements thereof, or a permit or certificate issued thereunder, shall upon conviction be guilty of a misdemeanor punishable by a daily fine of an amount not-to-exceed two thousand dollars (\$2,000) per day, as provided by Section 54.001(b) of the Texas Local Government Code, as amended.
- 4) **Civil Penalty.** Any person or entity who intentionally, knowingly or recklessly violates any provisions of this ordinance that relates to point source effluent limitations, or discharge of a pollutant, other than from a non-point source, into a sewer system, including sanitary or storm sewer system owned by the City and/or for which the City utilizes as its system , shall be guilty of and subject to a daily civil penalty not to exceed the sum of five thousand dollars (\$5,000) per day, pursuant to Chapter 54 of the Texas Local Government Code. As amended,
- 5) **Separate Offense.** Each such person or entity shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of this ordinance is committed or continued, and upon conviction or adjudication of any such violations such person shall be punished within the limits provided herein.“

SECTION 4

CUMULATIVE REPEALER

This Ordinance shall be cumulative of all other Ordinances of the City of Corinth and shall not repeal any of the provisions of such Ordinances except for those instances where there are direct

conflicts with the provisions of this Ordinance or where expressly repealed hereby. Ordinances or parts thereof in force at the time this Ordinance shall take effect and that are inconsistent with this Ordinance are hereby repealed to the extent that they are inconsistent with this Ordinance.

SECTION 5

SEVERABILITY

If any section, subsection, clause, phrase, or provision of this Ordinance, or the application thereof to any person or circumstance, shall to any extent be held by a court of competent jurisdiction to be invalid, void, or unconstitutional, the remaining sections, subsections, clauses, phrases, and provisions of this Ordinance, or the application thereof to any person or circumstance, shall remain in full force and effect and shall in no way be affected, impaired or invalidated.

SECTION 6

SAVINGS

In the event of a conflict between the provisions of this Ordinance and any other regulation or rule prescribed by Charter, another ordinance, resolution or other authorization of the City, the provisions of this Ordinance shall control. Notwithstanding the foregoing, all rights and remedies of the City are expressly saved as to any and all complaints, actions, claims, or lawsuits, which have been initiated or have arisen under or pursuant to such conflicting Ordinance, or portion thereof, on the date of adoption of this Ordinance shall continue to be governed by the provisions of that Ordinance and for that purpose the conflicting Ordinance shall remain in full force and effect.

SECTION 7

PENALTY

Any person, firm or corporation who violates any provision of this Ordinance or the Code of Ordinances, as amended hereby, that governs the public health and sanitation, or fails to comply therewith or with any requirements thereof, or a permit or certificate issued thereunder, shall be guilty of a misdemeanor punishable by a daily fine of not-to-exceed two thousand dollars (\$2,000) per day, as provided by Section 54.001(b) of the Texas Local Government Code; and

Civil Penalty. Any person or entity who shall violate any provisions of this ordinance that relates to point source effluent limitations, or discharge of a pollutant, other than from a non-point source, into a sewer system, including sanitary or storm sewer system owned by the City and/or for which the City utilizes as its system , shall be guilty of and subject to a daily civil penalty not to exceed the sum of five thousand dollars (\$5,000) per day, pursuant to Chapter 54 of the Texas Local Government Code. As amended; and

Separate Offense. Each such person or entity shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of this ordinance is committed or continued , and upon conviction or adjudication of any such violations such person shall be punished within the limits provided herein.

SECTION 8

PUBLICATION/EFFECTIVE DATE

This Ordinance shall take effect upon its publication as required by law. The City Secretary is directed to publish the caption and penalty of this Ordinance as required by the City Charter and state law.

DULY PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF CORINTH, TEXAS on this ____ day of _____, 2023.

APPROVED:

Bill Heidemann, Mayor

ATTEST:

Lana Wylie, City Secretary

APPROVED AS TO FORM:

Patricia A. Adams, City Attorney



CITY OF CORINTH Staff Report

Meeting Date:	4/6/2023	Title:	Ordinance Sewer Indirect Discharge Ordinance
Strategic Goals:	<input type="checkbox"/> Resident Engagement <input checked="" type="checkbox"/> Proactive Government <input type="checkbox"/> Organizational Development <input checked="" type="checkbox"/> Health & Safety <input type="checkbox"/> Regional Cooperation <input type="checkbox"/> Attracting Quality Development		
Owner Support:	<input type="checkbox"/> Planning & Zoning Commission <input type="checkbox"/> Economic Development Corporation <input type="checkbox"/> Parks & Recreation Board <input type="checkbox"/> TIRZ Board #2 <input type="checkbox"/> Finance Audit Committee <input type="checkbox"/> TIRZ Board #3 <input type="checkbox"/> Keep Corinth Beautiful <input type="checkbox"/> Ethics Commission n/a		

Item/Caption

Consider approval of the Sewer Indirect Discharge Ordinance to ensure the City of Corinth meet the Texas Commission on Environmental Quality (TCEQ).

Item Summary/Background/Prior Action

TCEQ requires treatment plants to ensure they have a means and methods to enforce discharge regulations. The City of Denton and Upper Trinity are the local operators for the City of Corinth’s treatment and they require their sewer contributors to meet the TCEQ requirement for discharge regulations.

This ordinance is being required by Denton to ensure that the City of Denton and the City of Corinth meet the TCEQ regulations.

Financial Impact

N/A

Applicable Policy/Ordinance

N/A

Staff Recommendation/Motion

Approve the Sewer Indirect Discharge Ordinance as presented.

Section 50.60: INDIRECT DISCHARGE INTO THE SANITARY WASTEWATER SYSTEM

1

DIVISION 1. GENERALLY

Sec. 50.60-151. Purpose and policy.

This Section sets forth uniform requirements for users of the publicly owned treatment works for the City of Corinth and enables the city to comply with all applicable state and federal laws, including the Clean Water Act (33 United States Code section 1251 et seq.) and the General Pretreatment Regulations (Title 40 of the Code of Federal Regulations, Part 403). The objectives of this Section are:

- (a) To prevent the introduction of pollutants into the publicly owned treatment works that will interfere with its operation;
- (b) To prevent the introduction of pollutants into the publicly owned treatment works that will pass through the publicly owned treatment works, inadequately treated, into receiving waters, or otherwise be incompatible with the publicly owned treatment works;
- (c) To protect both publicly owned treatment works personnel who may be affected by wastewater and sludge in the course of their employment and the general public;
- (d) To promote reuse and recycling of industrial wastewater and sludge from the publicly owned treatment works;
- (e) To provide for fees for the equitable distribution of the cost of operation, maintenance, and improvement of the publicly owned treatment works; and
- (f) To enable the city to comply with its National Pollutant Discharge Elimination System permit conditions, sludge use and disposal requirements, and any other federal or state laws to which the publicly owned treatment works is subject.

This Section shall apply to all users of the publicly owned treatment works, and shall, among other things, provide for the regulation of sewer construction in areas within the jurisdiction of the city, the approval of plans for sewer construction, the quantity and quality of wastewater discharged, and the degree of wastewater pretreatment required. The ordinance authorizes the issuance of individual wastewater discharge permits; provides for monitoring, compliance, and enforcement activities; establishes administrative review procedures; requires user reporting; and provides for the setting of fees for the equitable distribution of costs resulting from the program established herein.

Sec. 50.60-152. Administration.

Except as otherwise provided herein or provided in the pretreatment program procedures, enforcement response plan, and enforcement response guide, the city manager, or designee, shall administer, implement, and

enforce the provisions of this Section. Any powers granted to or duties imposed upon city manager may be delegated by the city manager to a duly-authorized city employee.

(Ord. No. 21-242a , § 1, 3-16-21)

Sec. 50.60-153. Abbreviations.

The following abbreviations, when used in this Section, shall have the designated meanings:

- BOD - Biochemical oxygen demand.
- BMP - Best management practice.
- BMR - Baseline monitoring report.
- CFR - Code of Federal Regulations.
- CIU - Categorical industrial user.
- COD - Chemical oxygen demand.
- EPA - U.S. Environmental Protection Agency.
- gpd - gallons per day.
- IU - Industrial user.
- mg/l - milligrams per liter.
- NPDES - National Pollutant Discharge Elimination System.
- NSCIU - Non-significant categorical industrial user.
- POTW - Publicly owned treatment works.
- RCRA - Resource Conservation and Recovery Act.
- SIU - Significant industrial user.
- SNC - Significant noncompliance.
- TSS - Total suspended solids.
- U.S.C. - United States Code.

(Ord. No. 21-242a , § 1, 3-16-21)

Sec. 50.60-154. Definitions.

Unless a provision explicitly states otherwise, the following terms and phrases, as used in this Section, shall have the meanings hereinafter designated:

Abnormal strength wastewater. Wastewater having a TSS content, BOD content, and/or total phosphorus content in excess of that allowable in normal wastewater, but which is otherwise acceptable into the POTW under the terms of this Section.

Act or "the Act." The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. section 1251 et seq.

Approval authority. The regional administrator of the EPA, or the director of a state agency delegated to act on the EPA's behalf with an approved pretreatment program (e.g, the Director of the Texas Commission on Environmental Quality (TCEQ)).

Authorized or duly authorized representative of the user.

- (1) If the user is a corporation:
 - (a) The president, secretary, treasurer, or a vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or
 - (b) The manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiate and direct other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; can ensure that the necessary systems are established or actions taken to gather complete and accurate information for individual wastewater discharge permit requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- (2) If the user is a partnership or sole proprietorship: a general partner or proprietor, respectively.
- (3) If the user is a federal, state, or local governmental facility: a director or the highest official appointed or designated to oversee the operation and performance of the activities of the government facility, or their designee.
- (4) The individuals described in paragraphs (1) through (3), above, may designate a duly-authorized representative if the authorization is in writing, the authorization specifies the individual or position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company, and the written authorization is submitted to the city.

Biochemical oxygen demand or BOD. The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures for five (5) days at twenty (20) degrees centigrade, usually expressed as a concentration (e.g., mg/l).

Best management practices or BMPs. A schedule or schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to implement the prohibitions listed in section 50.60-155(a) and (b) (40 CFR 403.5(a)(1) and (b)). BMPs include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage.

Building. Any structure used or intended for supporting or sheltering any use or occupancy.

Building drain. That part of the piping of a building drainage system which receives the discharge of all soil, waste and other drainage from inside the structure and conveys the drainage to the building service line outside the foundation wall of such building.

Categorical pretreatment standard or categorical standard. Any regulation containing pollutant discharge limits promulgated by EPA in accordance with Sections 307(b) and (c) of the Act (33 U.S.C. section 1317) that apply to a specific category of users and that appear in 40 CFR Chapter I, Subchapter N, Parts 405—471.

Categorical industrial user. An industrial user subject to a categorical pretreatment standard or categorical standard.

City. The City of Corinth, Texas.

Chemical oxygen demand or COD. A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

City manager. Chief executive officer of the city and the head of the administrative branch of city government

Committee means the environmental appeals committee.

Composite sample. A sample that is collected over time, formed either by continuous sampling or by mixing discrete samples. The sample may be composited either as a time composite sample; composed of discrete sample aliquots collected in one container at constant time intervals providing representative samples irrespective of stream flow; or as a flow proportional composite sample: collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increases while maintaining a constant time interval between the aliquots.

Control authority. The City of Corinth, Texas, acting by and through its city manager, or their designee.

Control manhole. An opening giving access to a service line at some point before the service line discharges to the wastewater system which must be approved by the city as to type, size, and location.

Daily maximum. The arithmetic average of all effluent samples for a pollutant collected during a calendar day or any twenty-four-hour period that reasonably represents the calendar day for purposes of sampling.

Daily maximum limit. The maximum allowable discharge limit of a pollutant during a calendar day or any twenty-four-hour period that reasonably represents the calendar day for purposes of sampling. Where daily maximum limits are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where daily maximum limits are expressed in terms of a concentration, the daily discharge is the arithmetic average measurement of the pollutant concentration derived from all measurements taken that day.

Domestic user or domestic discharge. A source of the introduction of pollutants into a POTW from any source not regulated under Section 307(b), (c), or (d) of the Act.

Dry closet. An indoor room or an outdoor privy used as a toilet, but lacking water for conveyance of waste.

Environmental Protection Agency or EPA. The U.S. Environmental Protection Agency or, where appropriate, the Regional Water Management Division Director, the Regional Administrator, or other duly authorized official of said agency.

Existing source. Any source of discharge that is not a "new source."

Grab sample. A sample that is taken from a wastestream without regard to the flow in the wastestream and over a period of time not to exceed fifteen (15) minutes.

Indirect discharge or discharge. The introduction of pollutants into the POTW from any nondomestic source.

Interference. A discharge that, alone or in conjunction with a discharge or discharges from other sources, inhibits or disrupts the POTW, its treatment processes or operations or its sludge processes, use or disposal; and therefore, is a cause of a violation of the city's TPDES permit or of the prevention of sewage sludge use or disposal in compliance with any of the following statutory/regulatory provisions or permits issued thereunder, or any more stringent State or local regulations: Section 405 of the Act; the Solid Waste Disposal Act, including Title II commonly referred to as the Resource Conservation and Recovery Act (RCRA); any State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the Solid Waste Disposal Act; the Clean Air Act; the Toxic Substances Control Act; and the Marine Protection, Research, and Sanctuaries Act.

Instantaneous limit. The maximum concentration of a pollutant allowed to be discharged at any time, determined from the analysis of any discrete or composited sample collected, independent of the industrial flow rate and the duration of the sampling event.

Local limit. Specific discharge limits developed and enforced by the city upon industrial or commercial facilities to implement the general and specific discharge prohibitions listed in 40 CFR 403.5(a)(1) and (b).

May means that the possibility or likelihood of response exists; discretionary action.

Medical waste. Isolation wastes, infectious agents, human blood and blood products, pathological wastes, sharps, body parts, contaminated bedding, surgical wastes, potentially contaminated laboratory wastes, and dialysis wastes.

Monthly average. The sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

Monthly average limit. The highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

Natural outlet. Any outlet into a watercourse, ditch, lake or other body of surface water or groundwater.

National Pollutant Discharge Elimination System (NPDES). The permit program of the Environmental Protection Agency, and/or the permit program of the state agency delegated to act on EPA's behalf with an approved pretreatment program (e.g. TPDES or Texas Pollutant Discharge Elimination System).

New source.

- (1) Any building, structure, facility, or installation from which there is (or may be) a discharge of pollutants, the construction of which commenced after the publication of proposed pretreatment standards under Section 307(c) of the Act that will be applicable to such source if such standards are thereafter promulgated in accordance with that section, provided that:
 - a. The building, structure, facility, or installation is constructed at a site at which no other source is located; or
 - b. The building, structure, facility, or installation totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or
 - c. The production or wastewater generating processes of the building, structure, facility, or installation are substantially independent of an existing source at the same site. In determining whether these are substantially independent, factors such as the extent to which the new facility is integrated with the existing plant, and the extent to which the new facility is engaged in the same general type of activity as the existing source, should be considered.
- (2) Construction on a site at which an existing source is located results in a modification rather than a new source if the construction does not create a new building, structure, facility, or installation meeting the criteria of subsection (1)b. or c. above but otherwise alters, replaces, or adds to existing process or production equipment.
- (3) Construction of a new source as defined under this paragraph has commenced if the owner or operator has:
 - a. Begun, or caused to begin, as part of a continuous onsite construction program.
 - (i) Any placement, assembly, or installation of facilities or equipment; or
 - (ii) Significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary for the placement, assembly, or installation of new source facilities or equipment; or
 - b. Entered into a binding contractual obligation for the purchase of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or

contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under this paragraph.

Noncontact cooling water. Water used for cooling that does not come into direct contact with any raw material, intermediate product, waste product, or finished product.

Pass through. A discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the city's NPDES permit, including an increase in the magnitude or duration of a violation.

Person. Any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity, or any other legal entity; or their legal representatives, agents, or assigns. This definition includes all federal, state, and local governmental entities.

pH. A measure of the acidity or alkalinity of a solution, expressed in standard units.

Pollutant. Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, medical wastes, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, municipal, agricultural and industrial wastes, and certain characteristics of wastewater (e.g., pH, temperature, TSS, turbidity, color, BOD, COD, toxicity, or odor).

Pretreatment. The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to, or in lieu of, introducing such pollutants into the POTW. This reduction or alteration can be obtained by physical, chemical, or biological processes; by process changes; or by other means, except by diluting the concentration of the pollutants unless allowed by an applicable pretreatment standard.

Pretreatment requirements. Any substantive or procedural requirement related to pretreatment imposed on a user, other than a pretreatment standard.

Pretreatment standards, National Pretreatment Standards, or standards. Pretreatment standards shall mean prohibited discharge standards, categorical pretreatment standards, and local limits.

Privy. An outhouse or similar type small building used as a toilet where wastes are either buried on site or collected and disposed of elsewhere.

Process wastewater. Any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product.

Prohibited discharge standards or prohibited discharges. Absolute prohibitions against the discharge of certain substances; these prohibitions appear in Subsection 50.60-155 of this Section.

Publicly owned treatment works or POTW. A treatment works, as defined by Section 212 of the Act (33 U.S.C. Section 1292), which is owned by the city. This definition includes any devices or systems used in the collection, storage, treatment, recycling, and reclamation of sewage or industrial wastes of a liquid nature and any conveyances, which convey wastewater to a treatment plant.

Section – Section 50.60, et seq. of Chapter 50, “Water and Sanitary Wastewater System” of Title V: “Public Works” of the Code of Ordinances of the City of Corinth, Texas, as amended.

Septic tank waste. Any sewage from holding tanks such as vessels, chemical toilets, campers, trailers, and septic tanks.

Service line. That part of the horizontal piping of the building drainage system beginning at the outside foundation wall and terminating at its connection with the wastewater system.

Sewage. Human excrement and gray water (household showers, dishwashing operations, etc.).

Shall means the obligation or necessity to respond; mandatory action.

Significant industrial user (SIU). Except as provided in paragraphs (3) and (4) of this definition, a significant industrial user is:

- (1) An industrial user subject to categorical pretreatment standards; or
- (2) An industrial user that:
 - a. Discharges an average of twenty-five thousand (25,000) gpd or more of process wastewater to the POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater);
 - b. Contributes a process wastestream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or
 - c. Is designated as such by the city on the basis that it has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement.
- (3) The city may determine that an industrial user subject to categorical pretreatment standards is a non-significant categorical industrial user rather than a significant industrial user on a finding that the industrial user never discharges more than one hundred (100) gallons per day (gpd) of total categorical wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater, unless specifically included in the pretreatment standard) and the following conditions are met:
 - a. The industrial user, prior to the city's finding, has consistently complied with all applicable categorical pretreatment standards and requirements;
 - b. The industrial user annually submits the certification statement required in Subsection 50.60-193(b) [see 40 CFR 403.12(q)], together with any additional information necessary to support the certification statement; and
 - c. The industrial user never discharges any untreated concentrated wastewater.
- (4) Upon a finding that a user meeting the criteria in subsection (2) of this definition has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the city may at any time, on its own initiative or in response to a petition received from an industrial user, and in accordance with procedures in 40 CFR 403.8(f)(6), determine that such user should not be considered a significant industrial user.

Slug load or slug discharge. Any discharge at a flow rate or concentration, which could cause a violation of the prohibited discharge standards in Subsection 50.60-155 of this Section. A slug discharge is any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge, which has a reasonable potential to cause interference or pass through, or in any other way violate the POTW's regulations, local limits or permit conditions.

Stormwater. Any flow occurring during or following any form of natural precipitation, and resulting from such precipitation, including snowmelt.

Total suspended solids or suspended solids. The total suspended matter that floats on the surface of, or is suspended in, water, wastewater, or other liquid, and that is removable by laboratory filtering.

User or industrial user. A source of non-domestic indirect discharge that discharges pollutants to the POTW.

Wastewater. Liquid and water carried-industrial wastes and sewage from residential dwellings, commercial buildings, industrial and manufacturing facilities, and institutions, whether treated or untreated, which are contributed to the POTW.

Wastewater treatment plant or treatment plant. That portion of the POTW which is designed to provide treatment of municipal sewage and industrial waste.

(Ord. No. 21-242a , § 1, 3-16-21)

DIVISION 2. SEWER USE REQUIREMENTS

Sec. 50.60-155. Prohibited discharge standards.

- (a) *General prohibitions.* No user shall introduce or cause to be introduced into the POTW or into a natural outlet, any pollutant or wastewater which causes pass through or interference or has an adverse effect on the environment or may otherwise endanger life, health, or property or constitute a public nuisance. These general prohibitions apply to all users of the POTW whether or not they are subject to categorical pretreatment standards or any other national, state, or local pretreatment standards or requirements.
- (b) *Specific prohibitions.* No user shall introduce or cause to be introduced into the POTW the following pollutants, substances, or wastewater:
 - (1) Pollutants which create a fire or explosive hazard in the POTW, including, but not limited to, wastestreams with a closed cup-flashpoint of less than one hundred forty (140) degrees Fahrenheit (sixty (60) degrees Celsius) using the test methods specified in 40 CFR 50.601.21.
 - (2) Wastewater having a pH less than 5.0 or greater than 12.5, or otherwise causing corrosive structural damage to the POTW or equipment.
 - (3) Solid or viscous substances in amounts which will cause obstruction of the flow in the POTW resulting in interference, blockage, or damage to the POTW.
 - (4) Pollutants, including oxygen-demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which, either singly or by interaction with other pollutants, will cause interference with the POTW.
 - (5) Wastewater having a temperature greater than one hundred fifty (150) degrees Fahrenheit (sixty-five (65) degrees Celsius), or which will inhibit biological activity in the treatment plant resulting in interference, but in no case wastewater which causes the temperature at the introduction into the treatment plant to exceed one hundred four (104) degrees Fahrenheit (forty (40) degrees Celsius).
 - (6) Petroleum oil, non-biodegradable cutting oil or products of mineral oil origin, in amounts that will cause interference or pass through.
 - (7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.
 - (8) Trucked or hauled pollutants, except at discharge points designated by the city manager, or their designee, in accordance with Subsection 50.60-164 of this Section.
 - (9) Noxious or malodorous liquids, gases, solids, or other wastewater which, either singly or by interaction with other wastes, are sufficient to create a public nuisance or a hazard to life, or to prevent entry into the sewers for maintenance or repair.

- (10) Wastewater which imparts color which cannot be removed by the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions, which consequently imparts color to the treatment plant's effluent, thereby violating the city's NPDES permit.
 - (11) Wastewater containing any radioactive wastes or isotopes except in compliance with applicable state or federal regulations.
 - (12) Stormwater, surface water, ground water, artesian well water, roof runoff, subsurface drainage, de-ionized water, noncontact cooling water, and unpolluted wastewater, unless specifically authorized by the city manager, or their designee.
 - (13) Sludges, screenings, or other residues from the pretreatment of industrial wastes.
 - (14) Medical wastes, except as specifically authorized by the city manager, or their designee.
 - (15) Wastewater causing, alone or in conjunction with other sources, the treatment plant's effluent to fail toxicity test.
 - (16) Detergents, surface-active agents, or other substances which might cause excessive foaming in the POTW.
 - (17) Pesticides or herbicides in concentrations which are not amenable to treatment. Pollutants, substances, or wastewater prohibited by this Subsection shall not be processed or stored in such a manner that they could be discharged to the POTW.
- (c) *Discharge of waters not containing wastewater.*
- (1) It shall be unlawful for any person to discharge unpolluted waters into the wastewater system. Except with the approval of the city manager, or their designee, or as otherwise provided by this Section, no stormwater connection from any building or yard nor any drain from any catch basin, lake, swamp, or pond nor any outlet for surface water, stormwater, or groundwater of any kind shall be connected to the wastewater system.
 - (2) Within any area served by a separate sanitary sewer and a storm sewer, no stormwater shall be allowed to enter the sanitary sewer from waste or vent pipes of any building. Within any such area no downspout, roof leaders, gutters, other pipes or drains such as channels which may at any time carry stormwater, surface drainage derived from hydraulic pressure or from well points or lake water shall be connected with any sanitary sewer.
- (d) *Discharge to a natural outlet.* It shall be unlawful for any person to discharge polluted water to any storm sewer or natural outlet within the area served by the city, except where suitable treatment has been provided in accordance with the provisions of this Section and except where a Federal National Pollutant Discharge Elimination Systems (NPDES) permit has been duly issued and is currently valid for such discharge. A valid copy of such a permit and any modifications thereof must be filed with the city manager, or their designee.

(Ord. No. 21-242a , § 1, 3-16-21)

Sec. 50.60-156. National Categorical Pretreatment Standards.

Users must comply with the categorical pretreatment standards found at 40 CFR Chapter I, Subchapter N, Parts 405—471.

- (a) Where a categorical pretreatment standard is expressed only in terms of either the mass or the concentration of a pollutant in wastewater, the city manager, or their designee, may impose equivalent concentration or mass limits in accordance with 40 CFR Part 403.6(c)(1).

- (b) When the limits in a categorical pretreatment standard are expressed only in terms of mass of pollutant per unit of production, the city manager, or their designee, may convert the limits to equivalent limitations expressed either as mass of pollutant discharged per day or effluent concentration for purposes of calculating effluent limitations applicable to individual industrial users.
- (c) When wastewater subject to a categorical pretreatment standard is mixed with wastewater not regulated by the same standard, the city manager, or their designee, shall impose an alternate limit in accordance with 40 CFR 403.6(e).
- (d) Once included in its permit, the industrial user must comply with the equivalent limitations developed in this Subsection, in lieu of the promulgated categorical standards from which the equivalent limitations were derived.
- (e) Many categorical pretreatment standards specify one limit for calculating maximum daily discharge limitations and a second limit for calculating maximum monthly average, or four-day average, limitations. Where such standards are being applied, the same production or flow figure shall be used in calculating both the average and the maximum equivalent limitation.
- (f) Any industrial user operating under a permit incorporating equivalent mass or concentration limits calculated from a production-based standard shall notify the city manager, or their designee, within two (2) business days after the user has a reasonable basis to know that the production level will significantly change within the next calendar month. Any user not notifying the city manager, or their designee, of such anticipated change will be required to meet the mass or concentration limits in its permit that were based on the original estimate of the long term average production rate.

(Ord. No. 21-242a , § 1, 3-16-21)

Sec. 50.60-157. Reserved.

Sec. 50.60-158. Local limits.

- (a) The city manager is authorized to establish local limits pursuant to 40 CFR 403.5(c).
- (b) The following pollutant limits are established to protect against pass through and interference. No person shall discharge wastewater containing in excess of the following daily maximum limits:

POLLUTANT	DAILY MAXIMUM DISCHARGE LIMITS (mg/l)
Aluminum	137.45
Arsenic	0.12
Cadmium	0.08
Chromium	2.19
Chromium (VI)	0.66
Copper	0.84
Cyanide	0.36
Lead	0.51
Mercury	0.0006
Molybdenum	1.18
Nickel	1.10
Selenium	0.09
Silver	0.13
Zinc	0.96

- (1) Any wastewater containing fats, wax, grease or oils, whether emulsified or not, in excess of two hundred (200) mg/l measured as total oil and grease, or containing substances which may solidify or become viscous at temperatures between thirty-two (32) degrees Fahrenheit (32°F)/zero (0) degrees Celsius (0°C) and one hundred fifty degrees (150) Fahrenheit (150°F)/sixty-five (65) degrees Celsius (65°C) and which might cause obstruction of flow in the POTW resulting in interference.
- (2) Other metals not listed in Subsection 50.60-158(b) which will, in the opinion of the city manager, or their designee, damage the wastewater system or interfere with the treatment process.
- (3) Toxic organics found in quantifiable concentration greater than 0.01 mg/l (10 ppb) shall not total more than 2.13 mg/l for any discharge. Any organic compound considered toxic by the city manager, or their designee, and reasonably expected to be found in the industrial user's discharge may be included in the industrial user's discharge may be included in the calculations of total toxic organics if detected in any industry's discharge in quantifiable concentration greater than 0.01 mg/l.
- (4) Quantities of flow, concentrations or both which constitute a slug.

The pollutant limits in subsections (1) through (3) of this Subsection will be applied to users through inclusion in a wastewater discharge permit when the city manager, or their designee, determines that the pollutant(s) is reasonably expected to be present in the user's indirect discharge and has the potential to cause pass through or interference.

- (c) Waters contaminated by petroleum fuel or petroleum substances are subject to the following daily maximum limits (TPDES General Permit No. TXG 830000); under provisions of Section 402 of the Clean Water Act and Chapter 26 of the Texas Water Code.

POLLUTANTS	DAILY MAXIMUM DISCHARGE LIMITS (mg/l)
Total Petroleum Hydrocarbons	15
Total Lead	0.10
Benzene	0.005
Total BTEX	0.10
Polynuclear Aromatic Hydrocarbons (PAH)	0.01
MTBE	0.24

NOTES:

1. TPH must be analyzed using Texas Method 1005.
2. BTEX shall be measured as the sum of benzene, toluene, ethylbenzene, and total xylenes (EPA Method No. 8 50.600 B).
3. PAH shall be measured as the sum of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorine, indeno(1.2.3-cd)pyrene, naphthalene, phenantherene, and pyrene.
4. MTBE is methyl tert-butyl ether.

The limits in subsections (b) and (c) of this Subsection apply at the point where the wastewater is discharged to the POTW. All concentrations for metallic substances are for total metal unless indicated otherwise. The city manager, or their designee, may impose mass limitations in addition to the concentration based-limitations above.

- (d) The city manager, or their designee, may develop best management practices (BMPs), by ordinance or in individual wastewater discharge permits, to implement local limits and the requirements of Subsection 50.60-155.

(Ord. No. 21-242a , § 1, 3-16-21)

Sec. 50.60-159. City's right of revision.

The city reserves the right to establish, by ordinance or in individual wastewater discharge permits, more stringent standards or requirements on discharges to the POTW consistent with the purpose of this Section.

(Ord. No. 21-242a , § 1, 3-16-21)

Sec. 50.60-160. Dilution.

No user shall ever increase the use of process water, or in any way attempt to dilute a discharge, as a partial or complete substitute for adequate treatment to achieve compliance with a discharge limitation unless expressly authorized by an applicable pretreatment standard or requirement. The city manager, or their designee, may impose mass limitations on users who are using dilution to meet applicable pretreatment standards or requirements, or in other cases when the imposition of mass limitations is appropriate.

DIVISION 3. PRETREATMENT OF WASTEWATER

Sec. 50.60-161. Pretreatment facilities.

Users shall provide wastewater treatment as necessary to comply with this Section and shall achieve compliance with all categorical pretreatment standards, local limits, and the prohibitions set out in division 2 of this Section within the time limitations specified by EPA, the state, or the city manager, whichever is the most stringent. Any facilities necessary for compliance shall be provided, operated, and maintained at the user's expense. Detailed plans describing such facilities and operating procedures shall be submitted to the city manager, or their designee, for review, and shall be acceptable to the city manager, or their designee, before such facilities are constructed. The review of such plans and operating procedures shall in no way relieve the user from the responsibility of modifying such facilities as necessary to produce a discharge acceptable to the city under the provisions of this Section.

Sec. 50.60-162. Additional pretreatment measures.

- (a) Whenever deemed necessary, the city manager, or their designee, may require users to restrict their discharge during peak flow periods, designate that certain wastewater be discharged only into specific sewers, relocate and/or consolidate points of discharge, separate sewage wastestreams from industrial wastestreams, and such other conditions as may be necessary to protect the POTW and determine the user's compliance with the requirements of this Section.
- (b) The city manager, or their designee, may require any person discharging into the POTW to install and maintain, on their property and at their expense, a suitable storage and flow-control facility to ensure equalization of flow. An individual wastewater discharge permit may be issued solely for flow equalization.
- (c) Users with the potential to discharge flammable substances may be required to install and maintain an approved combustible gas detection meter.

Sec. 50.60-163. Accidental discharge/slug discharge control plans.

The city manager, or their designee, shall evaluate, within one year of being designated as a SIU, whether each SIU needs an accidental discharge/slug discharge control plan or other action to control slug discharges. The city manager, or their designee, may require any user to develop, submit for approval, and implement such a plan or take such other action that may be necessary to control slug discharges. Alternatively, the city manager, or their

designee, may develop such a plan for any user. An accidental discharge/slug discharge control plan shall address, at a minimum, the following:

- (a) Description of discharge practices, including non-routine batch discharges;
- (b) Description of stored chemicals;
- (c) Procedures for immediately notifying the city manager, or their designee, of any accidental or slug discharge, as required by Subsection 50.60-185 of this Section; and
- (d) Procedures to prevent adverse impact from any accidental or slug discharge. Such procedures include, but are not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, including solvents, and/or measures and equipment for emergency response.

Sec. 50.60-164. Hauled wastewater.

- (a) Septic tank waste may be introduced into the POTW only at locations designated by the city manager, or their designee, and at such times as are established by the city manager, or their designee. Such waste shall not violate Subsection 50.60-155 of this Section.
- (b) The city manager, or their designee, may require haulers of industrial and/or commercial waste to obtain individual wastewater discharge permits. The city manager, or their designee, may require generators of hauled industrial waste to obtain individual wastewater discharge permits. The city manager, or their designee, also may prohibit the disposal of hauled industrial waste. The discharge of hauled industrial waste is subject to all other requirements of this Section.
- (c) Industrial waste haulers may discharge loads only at locations designated by the city manager, or their designee. No load may be discharged without prior consent of the city manager, or their designee. The city manager, or their designee, may collect samples of each hauled load to ensure compliance with applicable standards and may require the industrial waste hauler to provide a waste analysis of any load prior to discharge.
- (d) Industrial waste haulers must provide a waste-tracking form for every load. This form shall include, at a minimum, the name and address of the industrial waste hauler, permit number, truck identification, names and addresses of sources of waste, and volume and characteristics of waste. The form shall identify the type of industry, known or suspected waste constituents, and whether any wastes are RCRA hazardous wastes.

DIVISION 4. INDIVIDUAL WASTEWATER DISCHARGE PERMITS

Sec. 50.60-165. Wastewater analysis.

When requested by city manager, or their designee, a user must submit information on the nature and characteristics of its wastewater by the date stipulated in the request. The city manager, or their designee, is authorized to prepare a form for this purpose and may periodically require users to update this information.

Sec. 50.60-166. Individual wastewater discharge permit requirement.

- (a) No significant industrial user shall discharge wastewater into the POTW without first obtaining an individual wastewater discharge permit from the city manager, or their designee, except that a significant industrial user that has filed a timely application pursuant to Subsection 50.60-167 of this Section may continue to discharge for the time period specified therein.

- (b) The city manager, or their designee, may require other users to obtain individual wastewater discharge permits as necessary to carry out the purposes of this Section.
- (c) Any violation of the terms and conditions of an individual wastewater discharge permit shall be deemed a violation of this Section and subjects the wastewater discharge permittee to the sanctions set out in divisions 10 and 11 of this Section. Obtaining an individual wastewater discharge permit does not relieve a permittee of its obligation to comply with all federal and state pretreatment standards or requirements or with any other requirements of federal, state, and local law.

Sec. 50.60-167. Individual wastewater discharge permitting: Existing connections.

Any user required to obtain an individual wastewater discharge permit who was discharging wastewater into the POTW prior to the effective date of this Section and who wishes to continue such discharges in the future, shall, apply for an individual wastewater discharge permit in accordance with Subsection 50.60-169 of this Section, and shall not cause or allow discharges to the POTW to continue after one hundred eighty (180) days, except in accordance with an individual wastewater discharge permit issued by the city manager, or their designee.

Sec. 50.60-168. Individual wastewater discharge permitting: New connections.

Any user required to obtain an individual wastewater discharge permit who proposes to begin or recommence discharging into the POTW must obtain such permit prior to the beginning or recommencing of such discharge. An application for this individual wastewater discharge permit, in accordance with Subsection 50.60-169 of this Section, must be filed at least ninety (90) days prior to the date upon which any discharge will begin or recommence.

Sec. 50.60-169. Individual wastewater discharge permit application contents.

All users required to obtain an individual wastewater discharge permit must submit a permit application. The city manager, or their designee, may require users to submit all or some of the following information as part of a permit application:

- (a) *Identifying information.* The name and address of the facility, including the name of the operator and owner; contact information, description of activities, facilities, and plant production processes on the premises.
- (b) *Environmental permits.* A list of any environmental control permits held by or for the facility.
- (c) *Description of operations.*
 - (1) A brief description of the nature, average rate of production (including each product produced by type, amount, processes, and rate of production), and standard industrial classifications of the operation(s) carried out by such user. This description should include a schematic process diagram, which indicates points of discharge to the POTW from the regulated processes.
 - (2) Types of wastes generated, and a list of all raw materials and chemicals used or stored at the facility which are, or could accidentally or intentionally be, discharged to the POTW.
 - (3) Number and type of employees, hours of operation, and proposed or actual hours of operation.
 - (4) Type and amount of raw materials processed (average and maximum per day).
 - (5) Site plans, floor plans, mechanical and plumbing plans, and details to show all sewers, floor drains, and appurtenances by size, location, and elevation, and all points of discharge.
- (d) *Time and duration of discharges.*

- (e) *The location for monitoring all wastes covered by the permit.*
- (f) *Flow Measurement.* Information showing the measured average daily and maximum daily flow, in gallons per day, to the POTW from regulated process streams and other streams, as necessary, to allow use of the combined wastestream formula set out in Subsection 50.60-156(c) [40 CFR 403.6(e)].
- (g) *Measurement of pollutants.*
 - (1) The categorical pretreatment standards applicable to each regulated process and any new categorically regulated processes for existing sources.
 - (2) The results of sampling and analysis identifying the nature and concentration, and/or mass, where required by the standard or by the city manager, or their designee, of regulated pollutants in the discharge from each regulated process.
 - (3) Daily maximum, and long-term average concentrations, or mass, where required, shall be reported.
 - (4) The sample shall be representative of daily operations and shall be analyzed in accordance with procedures set out in Subsection 50.60-189 of this Section. Where the standard requires compliance with a BMP or pollution prevention alternative, the user shall submit documentation as required by the city manager, or their designee, or the applicable standards to determine compliance with the standard.
 - (5) Sampling must be performed in accordance with procedures set out in Subsection 50.60-190 of this Section.
- (h) Any requests for a monitoring waiver (or a renewal of an approved monitoring waiver) for a pollutant neither present nor expected to be present in the discharge based on Subsection 50.60-183(b) [40 CFR 403.12(e)(2)].
- (i) Any other information as may be deemed necessary by the city manager, or their designee, to evaluate the permit application.

Incomplete or inaccurate applications will not be processed and will be returned to the user for revision.

Sec. 50.60-170. Application signatories and certifications.

All wastewater discharge permit applications, user reports and certification statements must be signed by an authorized representative of the user and contain the certification statement in Subsection 50.60-193(a). If the designation of an authorized representative is no longer accurate because a different individual or position has responsibility for the overall operation of the facility or overall responsibility for environmental matters for the company, a new written authorization satisfying the requirements of this Section must be submitted to the city manager, or their designee, prior to or together with any reports to be signed by an authorized representative. A facility determined to be a non-significant categorical industrial user by the city manager, or their designee, pursuant to Subsection 50.60-154 must annually submit the signed certification statement in Subsection 50.60-193(b).

Sec. 50.60-171. Individual wastewater discharge permit decisions.

- (a) The city manager, or their designee, will evaluate the data furnished by the user and may require additional information. Within a reasonable time frame from the date of receipt of a complete permit application, the city manager, or their designee, will determine whether to issue an individual wastewater discharge permit. The city manager, or their designee, may deny any application for an individual wastewater discharge permit.

- (b) As a prerequisite to receiving an industrial commercial wastewater discharge permit, the city manager, or their designee, may, when necessary to monitor wastewater discharged into the wastewater system, require a significant industrial user to install a suitable control manhole, together with such meters, equipment and appurtenances as deemed necessary by the city manager, or their designee, in order to adequately sample and measure such wastewater. All required control manholes shall be located so as to permit unrestricted access by the city manager, or their designee.

DIVISION 5. INDIVIDUAL WASTEWATER DISCHARGE PERMIT ISSUANCE

Sec. 50.60-172. Individual wastewater discharge permit duration.

An individual wastewater discharge permit shall be issued for a specified time period, not to exceed five (5) years from the effective date of the permit. An individual wastewater discharge permit may be issued for a period less than five (5) years, at the discretion of the city manager, or their designee. Each individual wastewater discharge permit will indicate a specific date upon which it will expire.

Sec. 50.60-173. Individual wastewater discharge permit contents.

An individual wastewater discharge permit shall include such conditions as are deemed reasonably necessary by the city manager, or their designee, to prevent pass through or interference, protect the quality of the water body receiving the treatment plant's effluent, protect worker health and safety, facilitate sludge management and disposal, and protect against damage to the POTW.

- (a) Individual wastewater discharge permit must contain:
 - (1) A statement that indicates the wastewater discharge permit issuance date, expiration date and effective date;
 - (2) A statement that the wastewater discharge permit is nontransferable without prior notification to the city, in accordance with Subsection 50.60-176 of this Section, and provisions for furnishing the new owner or operator with a copy of the existing wastewater discharge permit;
 - (3) Effluent limits, including BMPs, based on applicable pretreatment standards;
 - (4) Self-monitoring, sampling, reporting, notification, and record-keeping requirements. These requirements shall include an identification of pollutants (or BMP) to be monitored, sampling location, sampling frequency, and sample type based on federal, state, and local law;
 - (5) The process for seeking a waiver from monitoring for a pollutant neither present nor expected to be present in the discharge in accordance with Subsection 50.60-183(b);
 - (6) A statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements, and any applicable compliance schedule. Such schedule may not extend the time for compliance beyond that required by applicable federal, state, or local law;
 - (7) Requirements to control slug discharge, if determined by the city manager, or their designee, to be necessary;
 - (8) Any grant of the monitoring waiver by the city manager, or their designee, Subsection 50.60-183(b) must be included as a condition in the user's permit.
- (b) Individual wastewater discharge permits may contain, but need not be limited to, the following conditions:

- (1) Limits on the average and/or maximum rate of discharge, time of discharge, and/or requirements for flow regulation and equalization;
- (2) Requirements for the installation of pretreatment technology, pollution control, or construction of appropriate containment devices, designed to reduce, eliminate, or prevent the introduction of pollutants into the treatment works;
- (3) Requirements for the development and implementation of spill control plans or other special conditions including management practices necessary to adequately prevent accidental, unanticipated, or nonroutine discharges;
- (4) Development and implementation of waste minimization plans to reduce the amount of pollutants discharged to the POTW;
- (5) The unit charge or schedule of user charges and fees for the management of the wastewater discharged to the POTW;
- (6) Requirements for installation and maintenance of inspection and sampling facilities and equipment, including flow measurement devices;
- (7) A statement that compliance with the individual wastewater discharge permit does not relieve the permittee of responsibility for compliance with all applicable federal and state pretreatment standards, including those which become effective during the term of the individual wastewater discharge permit; and
- (8) Other conditions as deemed appropriate by the city manager, or their designee, to ensure compliance with this Section, and state and federal laws, rules, and regulations.

Sec. 50.60-174. Reserved.

Sec. 50.60-175. Permit modification.

- (a) The city manager, or their designee, may modify an individual wastewater discharge permit for good cause, including, but not limited to, the following reasons:
 - (1) To incorporate any new or revised federal, state, or local pretreatment standards or requirements;
 - (2) To address significant alterations or additions to the user's operation, processes, or wastewater volume or character since the time of the individual wastewater discharge permit issuance;
 - (3) A change in the POTW that requires either a temporary or permanent reduction or elimination of the authorized discharge;
 - (4) Information indicating that the permitted discharge poses a threat to the city's POTW, city personnel, or the receiving waters;
 - (5) Violation of any terms or conditions of the individual wastewater discharge permit;
 - (6) Misrepresentations or failure to fully disclose all relevant facts in the wastewater discharge permit application or in any required reporting;
 - (7) Revision of or a grant of variance from categorical pretreatment standards pursuant to 40 CFR 403.13;
 - (8) To correct typographical or other errors in the individual wastewater discharge permit; or
 - (9) To reflect a transfer of the facility ownership or operation to a new owner or operator where requested in accordance with Subsection 50.60-176;

- (10) The user shall be informed of any proposed changes in his permit at least thirty (30) days prior to the effective date of change.

Sec. 50.60-176. Individual wastewater discharge permit transfer.

Individual wastewater discharge permits may be transferred to a new owner or operator only if the permittee gives at least ninety (90) days advance notice to the city manager, or their designee, and the city manager, or their designee, approves the individual wastewater discharge permit transfer. The notice to the city manager, or their designee, must include a written certification by the new owner or operator which:

- (a) States that the new owner and/or operator have no immediate intent to change the facility's operations and processes;
- (b) Identifies the specific date on which the transfer is to occur; and
- (c) Acknowledges full responsibility for complying with the existing individual wastewater discharge permit.

Failure to provide advance notice of a transfer renders the individual wastewater discharge permit void as of the date of facility transfer.

Sec. 50.60-177. Individual wastewater discharge permit revocation.

The city manager, or their designee, may revoke an individual wastewater discharge permit for good cause, including, but not limited to, the following reasons:

- (a) Failure to notify the city manager, or their designee, of significant changes to the wastewater prior to the changed discharge;
- (b) Failure to provide prior notification to the city manager, or their designee, of changed conditions pursuant to Subsection 50.60-184 of this Section;
- (c) Misrepresentation or failure to fully disclose all relevant facts in the wastewater discharge permit application;
- (d) Falsifying self-monitoring reports and certification statements;
- (e) Tampering with monitoring equipment;
- (f) Refusing to allow the city manager, or their designee, timely access to the facility premises and records;
- (g) Failure to meet effluent limitations;
- (h) Failure to pay fines;
- (i) Failure to pay sewer charges;
- (j) Failure to meet compliance schedules;
- (k) Failure to complete a wastewater survey or the wastewater discharge permit application;
- (l) Failure to provide advance notice of the transfer of business ownership of a permitted facility; or
- (m) Violation of any pretreatment standard or requirement, or any terms of the wastewater discharge permit or this Section.

Individual wastewater discharge permits shall be voidable upon cessation of operations or transfer of business ownership. All individual wastewater discharge permits issued to a user are void upon the issuance of a new individual wastewater discharge permit to that user.

Sec. 50.60-178. Individual wastewater discharge permit reissuance.

A user with an expiring individual wastewater discharge permit shall apply for individual wastewater discharge permit reissuance by submitting a complete permit application, in accordance with Subsection 50.60-169 of this Section, a minimum of sixty (60) days prior to the expiration of the user's existing individual wastewater discharge permit.

Sec. 50.60-179. Regulation of waste received from other jurisdictions.

- (a) If another municipality, or user located within another municipality, contributes wastewater to the POTW, the city manager, or their designee, shall enter into an interlocal agreement with the contributing municipality.
- (b) Prior to entering into an agreement required by paragraph (a), above, the city manager, or their designee, shall request the following information from the contributing municipality:
 - (1) A description of the quality and volume of wastewater discharged to the POTW by the contributing municipality;
 - (2) An inventory of all users located within the contributing municipality that are discharging to the POTW; and
 - (3) Such other information as the city manager, or their designee, may deem necessary.
- (c) An interlocal agreement, as required by paragraph (a), above, shall contain the following conditions:
 - (1) A requirement for the contributing municipality to adopt a sewer use ordinance which is at least as stringent as this Section and local limits, including required baseline monitoring reports (BMRs) which are at least as stringent as those set out in Subsection 50.60-158 of this Section. The requirement shall specify that such ordinance and limits must be revised as necessary to reflect changes made to the city's ordinance or local limits;
 - (2) A requirement for the contributing municipality to submit a revised user inventory on at least an annual basis;
 - (3) A provision specifying which pretreatment implementation activities, including individual wastewater discharge permit issuance, inspection and sampling, and enforcement, will be conducted by the contributing municipality; which of these activities will be conducted by the city manager, or their designee, and which of these activities will be conducted jointly by the contributing municipality and the city manager, or their designee;
 - (4) A requirement for the contributing municipality to provide the city manager, or their designee, with access to all information that the contributing municipality obtains as part of its pretreatment activities;
 - (5) Limits on the nature, quality, and volume of the contributing municipality's wastewater at the point where it discharges to the POTW;
 - (6) Requirements for monitoring the contributing municipality's discharge;

- (7) A provision ensuring the city manager, or their designee, access to the facilities of users located within the contributing municipality's jurisdictional boundaries for the purpose of inspection, sampling, and any other duties deemed necessary by the city manager, or their designee; and
- (8) A provision specifying remedies available for breach of the terms of the interlocal agreement.

DIVISION 6. REPORTING REQUIREMENTS

Sec. 50.60-180. Baseline monitoring reports.

- (a) Within either one hundred eighty (180) days after the effective date of a categorical pretreatment standard, or the final administrative decision on a category determination under 40 CFR 403.6(a)(4), whichever is later, existing categorical industrial users currently discharging to or scheduled to discharge to the POTW shall submit to the city manager, or their designee, a report which contains the information listed in paragraph (b), below. At least ninety (90) days prior to commencement of their discharge, new sources, and sources that become categorical industrial users subsequent to the promulgation of an applicable categorical standard, shall submit to the city manager, or their designee, a report which contains the information listed in paragraph (b), below. A new source shall report the method of pretreatment it intends to use to meet applicable categorical standards. A new source also shall give estimates of its anticipated flow and quantity of pollutants to be discharged.
- (b) Users described above shall submit the information set forth below:
 - (1) All information required in Subsection 50.60-169(a), Subsection 50.60-169(b), Subsection 50.60-169(c)(1) and Subsection 50.60-169(f).
 - a. Measurement of pollutants.
 - (i) The user shall provide the information required in Subsection 50.60-169(g)(1) through (4).
 - (ii) The user shall take a minimum of one representative sample to compile that data necessary to comply with the requirements of this paragraph.
 - (iii) Samples shall be taken immediately downstream from pretreatment facilities if such exist or immediately downstream from the regulated process if no pretreatment exists. If other wastewaters are mixed with the regulated wastewater prior to pretreatment the user shall measure the flows and concentrations necessary to allow use of the combined wastestream formula in 40 CFR 403.6(e) to evaluate compliance with the pretreatment standards. Where an alternate concentration or mass limit has been calculated in accordance with 40 CFR 403.6(e) this adjusted limit along with supporting data shall be submitted to the control authority.
 - (iv) Sampling and analysis shall be performed in accordance with Subsection 50.60-189.
 - (v) The city manager, or their designee, may allow the submission of a baseline report which utilizes only historical data so long as the data provides information sufficient to determine the need for industrial pretreatment measures.
 - (vi) The baseline report shall indicate the time, date and place of sampling and methods of analysis, and shall certify that such sampling and analysis is representative of normal work cycles and expected pollutant discharges to the POTW.
 - (2) Compliance certification. A statement, reviewed by the user's authorized representative as defined in Subsection 50.60-154 and certified by a qualified professional, indicating whether pretreatment standards are being met on a consistent basis, and, if not, whether additional operation and

maintenance (O&M) and/or additional pretreatment is required to meet the pretreatment standards and requirements.

- (3) Compliance schedule. If additional pretreatment and/or O&M will be required to meet the pretreatment standards, the shortest schedule by which the user will provide such additional pretreatment and/or O&M must be provided. The completion date in this schedule shall not be later than the compliance date established for the applicable pretreatment standard. A compliance schedule pursuant to this Subsection must meet the requirements set out in Subsection 50.60-181 of this Section.
- (4) Signature and report certification. All baseline monitoring reports must be certified in accordance with Subsection 50.60-193(a) of this Section and signed by an authorized representative as defined in Subsection 50.60-154.

Sec. 50.60-181. Compliance schedule progress reports.

The following conditions shall apply to the compliance schedule required by Subsection 50.60-180(b)(3) of this Section:

- (a) The schedule shall contain progress increments in the form of dates for the commencement and completion of major events leading to the construction and operation of additional pretreatment required for the user to meet the applicable pretreatment standards (such events include, but are not limited to, hiring an engineer, completing preliminary and final plans, executing contracts for major components, commencing and completing construction, and beginning and conducting routine operation);
- (b) No increment referred to above shall exceed nine (9) months;
- (c) The user shall submit a progress report to the city manager, or their designee, no later than fourteen (14) days following each date in the schedule and the final date of compliance including, as a minimum, whether or not it complied with the increment of progress, the reason for any delay, and, if appropriate, the steps being taken by the user to return to the established schedule; and
- (d) In no event shall more than nine (9) months elapse between such progress reports to the city manager, or their designee.

Sec. 50.60-182. Reports on compliance with categorical pretreatment standard deadline.

Within ninety (90) days following the date for final compliance with applicable categorical pretreatment standards, or in the case of a new source following commencement of the introduction of wastewater into the POTW, any user subject to such pretreatment standards and requirements shall submit to the city manager, or their designee, a report containing the information described in Subsection 50.60-169(f) and (g) and Subsection 50.60-180(b)(1)a. of this Section. For users subject to equivalent mass or concentration limits established in accordance with the procedures in Subsection 50.60-156, this report shall contain a reasonable measure of the user's long-term production rate. For all other users subject to categorical pretreatment standards expressed in terms of allowable pollutant discharge per unit of production (or other measure of operation), this report shall include the user's actual production during the appropriate sampling period. All compliance reports must be signed and certified in accordance with Subsection 50.60-193(a) of this Section. All sampling will be done in conformance with Subsection 50.60-190.

Sec. 50.60-183. Periodic compliance reports.

- (a) All significant industrial users must, at a frequency determined by the city manager, or their designee, submit no less than twice per year, reports indicating the nature and concentration of pollutants in the discharge which are limited by pretreatment standards and the measured or estimated average and maximum daily flows for the reporting period. In cases where the pretreatment standard requires compliance with a best management practice (BMP) or pollution prevention alternative, the user must submit documentation required by the city manager, or their designee, or the pretreatment standard necessary to determine the compliance status of the user.
- (b) The city may authorize an industrial user subject to pretreatment standards to forego sampling of a pollutant regulated by a categorical pretreatment standard or local limit if the industrial user has demonstrated through sampling and other technical factors that the pollutant is neither present nor expected to be present in the discharge, or is present only at background levels from intake water and without any increase in the pollutant due to activities of the industrial user [see 40 CFR 403.12(e)(2)]. This authorization is subject to the following conditions:
 - (1) The waiver may be authorized where a pollutant is determined to be present solely due to sanitary wastewater discharged from the facility provided that the sanitary wastewater is not regulated by an applicable categorical standard and otherwise includes no process wastewater.
 - (2) The monitoring waiver is valid only for the duration of the effective period of the individual wastewater discharge permit, but in no case longer than five (5) years. The user must submit a new request for the waiver before the waiver can be granted for each subsequent individual wastewater discharge permit. See Subsection 50.60-169(h).
 - (3) In making a demonstration that a pollutant is not present, the industrial user must provide data from at least one sampling of the facility's process wastewater prior to any treatment present at the facility that is representative of all wastewater from all processes.
 - (4) The request for a monitoring waiver must be signed in accordance with Subsection 50.60-154 and include the certification statement in Subsection 50.60-193(a) [40 CFR 403.6(a)(2)(ii)].
 - (5) Non-detectable sample results may be used only as a demonstration that a pollutant is not present if the EPA approved method from 40 CFR Part 136 with the lowest minimum detection level for that pollutant was used in the analysis.
 - (6) Any grant of the monitoring waiver by the city manager, or their designee, must be included as a condition in the user's permit. The reasons supporting the waiver and any information submitted by the user in its request for the waiver must be maintained by the city manager, or their designee, for three (3) years after expiration of the waiver.
 - (7) Upon approval of the monitoring waiver and revision of the user's permit by the city manager, or their designee, the industrial user must certify on each report with the statement in Subsection 50.60-193(c) below, that there has been no increase in the pollutant in its wastestream due to activities of the industrial user.
 - (8) In the event that a waived pollutant is found to be present or is expected to be present because of changes that occur in the user's operations, the user must immediately: Comply with the monitoring requirements of Subsection 50.60-183(a), or other more frequent monitoring requirements imposed by the city manager, or their designee, and notify the city manager, or their designee.
 - (9) This provision does not supersede certification processes and requirements established in categorical pretreatment standards, except as otherwise specified in the categorical pretreatment standard.

- (c) All periodic compliance reports must be signed and certified in accordance with Subsection 50.60-170 of this Section.
- (d) All wastewater samples must be representative of the user's discharge. Wastewater monitoring and flow measurement facilities shall be properly operated, kept clean, and maintained in good working order at all times. The failure of a user to keep its monitoring facility in good working order shall not be grounds for the user to claim that sample results are unrepresentative of its discharge.
- (e) If a user subject to the reporting requirement in this Subsection monitors any regulated pollutant at the appropriate sampling location more frequently than required by the city manager, or their designee, using the procedures prescribed in Subsection 50.60-190 of this Section, the results of this monitoring shall be included in the report.

Sec. 50.60-184. Reports of changed conditions.

Each user must notify the city manager, or their designee, of any significant changes to the user's operations or system which might alter the nature, quality, or volume of its wastewater at least ninety (90) days before the change.

- (a) The city manager, or their designee, may require the user to submit such information as may be deemed necessary to evaluate the changed condition, including the submission of a wastewater discharge permit application under Subsection 50.60-169 of this Section.
- (b) The city manager, or their designee, may issue an individual wastewater discharge permit under Subsection 50.60-178 of this Section or modify an existing wastewater discharge permit under Subsection 50.60-175 of this Section in response to changed conditions or anticipated changed conditions.

Sec. 50.60-185. Reports of potential problems.

- (a) In the case of any discharge, including, but not limited to, accidental discharges, discharges of a nonroutine, episodic nature, a noncustomary batch discharge, a slug discharge or slug load, that might cause potential problems for the POTW, the user shall immediately telephone and notify the city manager, or their designee, of the incident. This notification shall include the location of the discharge, type of waste, concentration and volume, if known, and corrective actions taken by the user.
- (b) Within five (5) days following such discharge, the user shall, unless waived by the city manager, or their designee, submit a detailed written report describing the cause(s) of the discharge and the measures to be taken by the user to prevent similar future occurrences. Such notification shall not relieve the user of any expense, loss, damage, or other liability which might be incurred as a result of damage to the POTW, natural resources, or any other damage to person or property; nor shall such notification relieve the user of any fines, penalties, or other liability which may be imposed pursuant to this Section.
- (c) A notice shall be permanently posted on the user's bulletin board or other prominent place advising employees who to call in the event of a discharge described in paragraph (a), above. Employers shall ensure that all employees, who could cause such a discharge to occur, are advised of the emergency notification procedure.
- (d) Significant industrial users are required to notify the city manager, or their designee, immediately of any changes at its facility affecting the potential for a slug discharge.

Sec. 50.60-186. Reports from unpermitted users.

All users not required to obtain an individual wastewater discharge permit shall provide appropriate reports to the city manager, or their designee, may require.

Sec. 50.60-187. Notice of violation/repeat sampling and reporting.

If sampling performed by a user indicates a violation, the user must notify the city manager, or their designee, within twenty-four (24) hours of becoming aware of the violation. The user shall also repeat the sampling and analysis and submit the results of the repeat analysis to the city manager, or their designee, within thirty (30) days after becoming aware of the violation. Re-sampling by the industrial user is not required if the city performs sampling at the user's facility at least once a month, or if the city performs sampling at the user between the time when the initial sampling was conducted and the time when the user or the city receives the results of this sampling, or if the city has performed the sampling and analysis in lieu of the industrial user.

Sec. 50.60-188. Notification of the discharge of hazardous waste.

- (a) Any user who commences the discharge of hazardous waste shall notify the POTW, the EPA regional waste management division director, and state hazardous waste authorities, in writing, of any discharge into the POTW of a substance which, if otherwise disposed of, would be a hazardous waste under 40 CFR Part 50.601. Such notification must include the name of the hazardous waste as set forth in 40 CFR Part 50.601, the EPA hazardous waste number, and the type of discharge (continuous, batch, or other). If the user discharges more than one hundred (100) kilograms of such waste per calendar month to the POTW, the notification also shall contain the following information to the extent such information is known and readily available to the user: An identification of the hazardous constituents contained in the wastes, an estimation of the mass and concentration of such constituents in the wastestream discharged during that calendar month, and an estimation of the mass of constituents in the wastestream expected to be discharged during the following twelve (12) months. All notifications must take place no later than one hundred and eighty (180) days after the discharge commences. Any notification under this paragraph need be submitted only once for each hazardous waste discharged. However, notifications of changed conditions must be submitted under Subsection 50.60-184 of this Section. The notification requirement in this Subsection does not apply to pollutants already reported by users subject to categorical pretreatment standards under the self-monitoring requirements of Subsection 50.60-180, Subsection 50.60-182 and Subsection 50.60-183 of this Section.
- (b) Dischargers are exempt from the requirements of paragraph (a), above, during a calendar month in which they discharge no more than fifteen (15) kilograms of hazardous wastes, unless the wastes are acute hazardous wastes as specified in 40 CFR 50.601.30(d) and 50.601.33(e). Discharge of more than fifteen (15) kilograms of nonacute hazardous wastes in a calendar month, or of any quantity of acute hazardous wastes as specified in 40 CFR 50.601.30(d) and 50.601.33(e), requires a one-time notification. Subsequent months during which the user discharges more than such quantities of any hazardous waste do not require additional notification.
- (c) In the case of any new regulations under Section 3001 of RCRA identifying additional characteristics of hazardous waste, or listing any additional substance as a hazardous waste, the user must notify the city manager, or their designee, the EPA regional waste management waste division director, and the state hazardous waste authorities of the discharge of such substance within ninety (90) days of the effective date of such regulations.

- (d) In the case of any notification made under this Subsection, the user shall certify that it has a program in place to reduce the volume and toxicity of hazardous wastes generated to the degree it has determined to be economically practical.
- (e) This provision does not create a right to discharge any substance not otherwise permitted to be discharged by this Section, a permit issued thereunder, or any applicable federal or state law.

Sec. 50.60-189. Analytical requirements.

All pollutant analyses, including sampling techniques, to be submitted as part of a wastewater discharge permit application or report shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto, unless otherwise specified in an applicable categorical pretreatment standard. If 40 CFR Part 136 does not contain sampling or analytical techniques for the pollutant in question, or where the EPA determines that the Part 136 sampling and analytical techniques are inappropriate for the pollutant in question, sampling and analyses shall be performed by using validated analytical methods or any other applicable sampling and analytical procedures, including procedures suggested by the city manager, or their designee, or other parties approved by EPA.

Sec. 50.60-190. Sample collection.

- (a) Samples collected to satisfy reporting requirements must be based on data obtained through appropriate sampling and analysis performed during the period covered by the report, based on data that is representative of conditions occurring during the reporting period. Except as indicated in subsections (b) and (c) below, the user must collect wastewater samples using twenty-four-hour flow-proportional composite sampling techniques, unless time-proportional composite sampling or grab sampling is authorized by the city manager, or their designee. Where time-proportional composite sampling or grab sampling is authorized by the city, the samples must be representative of the daily discharge. Using protocols (including appropriate preservation) specified in 40 CFR Part 136 and appropriate EPA guidance, multiple grab samples collected during a twenty-four-hour period may be composited prior to the analysis as follows: for cyanide, total phenols, and sulfides the samples may be composited in the laboratory or in the field; for volatile organics and oil and grease, the samples may be composited in the laboratory. Composite samples for other parameters unaffected by the compositing procedures as documented in approved EPA methodologies may be authorized by the city, as appropriate. In addition, grab samples may be required to show compliance with instantaneous limits.
- (b) Samples for oil and grease, temperature, pH, cyanide, total phenols, sulfides, and volatile organic compounds must be obtained using grab collection techniques.
- (c) For sampling required in support of baseline monitoring and 90-day compliance reports required in Subsection 50.60-180 and Subsection 50.60-182 [40 CFR 403.12(b) and (d)], a minimum of four (4) grab samples must be used for pH, cyanide, total phenols, oil and grease, sulfide and volatile organic compounds for facilities for which historical sampling data do not exist; for facilities for which historical sampling data are available, the city manager, or their designee, may authorize a lower minimum. For the reports required by paragraphs section 50.60-183 [40 CFR 403.12(e) and 403.12(h)], the industrial user is required to collect the number of grab samples necessary to assess and assure compliance by with applicable pretreatment standards and requirements.
- (d) All sampling required to be reported must include a chain-of-custody form which documents the date, exact place, method, time of sampling, and the name of the person(s) taking the samples.

Sec. 50.60-191. Date of receipt of reports.

Written reports will be deemed to have been submitted on the date postmarked. For reports, which are not mailed, postage prepaid, into a mail facility serviced by the United States Postal Service, the date of receipt of the report shall govern.

Sec. 50.60-192. Recordkeeping.

Users subject to the reporting requirements of this Section shall retain, and make available for inspection and copying, all records of information obtained pursuant to any monitoring activities required by this Section, any additional records of information obtained pursuant to monitoring activities undertaken by the user independent of such requirements, and documentation associated with best management practices established under Subsection 50.60-158(d). Records shall include a chain-of-custody form which documents the date, exact place, method, time of sampling, and the name of the person(s) taking the samples; the dates analyses were performed; who performed the analyses; the analytical techniques or methods used; and the results of such analyses. These records shall remain available for a period of at least three (3) years. This period shall be automatically extended for the duration of any litigation concerning the user or the city, or where the user has been specifically notified of a longer retention period by the city manager, or their designee.

Sec. 50.60-193. Certification statements.

- (a) *Certification of Permit Applications, user Reports and Initial Monitoring Waiver.* The following certification statement is required to be signed and submitted by users submitting permit applications in accordance with Subsection 50.60-170; users submitting baseline monitoring reports under Subsection 50.60-180(e); users submitting reports on compliance with the categorical pretreatment standard deadlines under Subsection 50.60-182; users submitting periodic compliance reports required by Subsection 50.60-183(a) through (c); and users submitting an initial request to forego sampling of a pollutant on the basis of Subsection 50.60-183(b)(4). The following certification statement must be signed by an authorized representative as defined in Subsection 50.60-154:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

- (b) *Annual certification for non-significant categorical industrial users.* A facility determined to be a non-significant categorical industrial user by the city manager, or their designee, pursuant to Subsection 50.60-154 and Subsection 50.60-170 must annually submit the following certification statement signed in accordance with the signatory requirements in Subsection 50.60-154. This certification must accompany an alternative report required by the city manager, or their designee.

Based on my inquiry of the person or persons directly responsible for managing compliance with the categorical Pretreatment Standards under 40 CFR ____, I certify that, to the best of my knowledge and belief that during the period from _____, _____ to _____, _____ [months, days, year]:

- (1) The facility described as _____ [facility name] met the definition of a non-significant categorical industrial user as described in Subsection 50.60-154;
- (2) The facility complied with all applicable pretreatment standards and requirements during this reporting period; and

- (3) The facility never discharged more than one hundred (100) gallons of total categorical wastewater on any given day during this reporting period.

This compliance certification is based on the following information.

- (c) *Certification of pollutants not present.* Users that have an approved monitoring waiver based on Subsection 50.60-183(b) must certify on each report with the following statement that there has been no increase in the pollutant in its wastestream due to activities of the user.

Based on my inquiry of the person or persons directly responsible for managing compliance with the Pretreatment Standard for 40 CFR _____ [specify applicable National Pretreatment Standard part(s)], I certify that, to the best of my knowledge and belief, there has been no increase in the level of _____ [list pollutant(s)] in the wastewaters due to the activities at the facility since filing of the last periodic report under Subsection 50.60-183(a).

DIVISION 7. COMPLIANCE MONITORING

Sec. 50.60-194. Right of entry: Inspection and sampling.

The city manager, or their designee, shall have the right to enter the premises of any user to determine whether the user is complying with all requirements of this Section and any individual wastewater discharge permit or order issued hereunder. Users shall allow the city manager, or their designee, ready access to all parts of the premises for the purposes of inspection, sampling, records examination and copying, and the performance of any additional duties.

- (a) Where a user has security measures in force which require proper identification and clearance before entry into its premises, the user shall make necessary arrangements with its security guards so that, upon presentation of suitable identification, the city manager, or their designee, shall be permitted to enter without delay for the purposes of performing specific responsibilities.
- (b) The city manager, or their designee, shall have the right to set up on the user's property, or require installation of, such devices as are necessary to conduct sampling and/or metering of the user's operations.
- (c) The city manager, or their designee, may require the user to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the user at its own expense. All devices used to measure wastewater flow and quality shall be calibrated at a frequency required by the city manager, or their designee, to ensure their accuracy.
- (d) Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the user at the written or verbal request of the city manager, or their designee, and shall not be replaced. The costs of clearing such access shall be borne by the user.
- (e) Unreasonable delays in allowing the city manager, or their designee, access to the user's premises shall be a violation of this Section.
- (f) It shall be a violation of this Section to tamper with any equipment required by this Section.
- (g) In accordance with 40 CFR Part 403, the city shall inspect and monitor each significant industrial user a minimum of once per year and will maintain records as required herein.

Sec. 50.60-195. Inspection warrants.

If the city manager, or their designee, has been refused access to a building, structure, or property, or any part thereof, and is able to demonstrate probable cause to believe that there may be a violation of this Section, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program of the city designed to verify compliance with this Section or any permit or order issued hereunder, or to protect the overall public health, safety and welfare of the community, the city manager, or their designee, may seek issuance of an inspection warrant from the Municipal Court of the City.

DIVISION 8. CONFIDENTIAL INFORMATION

Information and data on a user obtained from reports, surveys, wastewater discharge permit applications, individual wastewater discharge permits, and monitoring programs, and from the city manager, or their designee, inspection and sampling activities, shall be available to the public without restriction, unless the user specifically requests in writing, and is able to demonstrate to the satisfaction of the city manager, or their designee, that the release of such information would divulge information, processes, or methods of production entitled to protection as trade secrets under applicable state law. Any such request must be asserted in writing at the time of submission of the information or data. When requested and demonstrated by the user furnishing a report that such information should be held confidential, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public, but shall be made available immediately upon request to governmental agencies for uses related to the NPDES program or pretreatment program, and in enforcement proceedings involving the person furnishing the report. Wastewater constituents and characteristics and other effluent data, as defined at 40 CFR 2.302 shall not be recognized as confidential information and shall be available to the public without restriction.

DIVISION 9. PUBLICATION OF USERS IN SIGNIFICANT NONCOMPLIANCE

The city manager, or their designee, shall publish annually, in a newspaper of general circulation that provides meaningful public notice within the jurisdictions served by the POTW, a list of the users which, at any time during the previous twelve (12) months, were in significant noncompliance with applicable pretreatment standards and requirements. The term significant noncompliance shall be applicable to all significant industrial users (or any other industrial user that violates paragraphs (c), (d) or (h) of this Subsection) and shall mean:

- (a) Chronic violations of wastewater discharge limits, defined here as those in which sixty-six (66) percent or more of all the measurements taken for the same pollutant parameter taken during a six-month period exceed (by any magnitude) a numeric pretreatment standard or requirement, including instantaneous limits as defined in division 2;
- (b) Technical review criteria (TRC) violations, defined here as those in which thirty-three (33) percent or more of wastewater measurements taken for each pollutant parameter during a six-month period equals or exceeds the product of the numeric pretreatment standard or requirement including instantaneous limits, as defined by division 2, multiplied by the applicable criteria (1.4 for BOD, TSS, fats, oils and grease, and 1.2 for all other pollutants except pH);
- (c) Any other violation of a pretreatment standard or requirement as defined by division 2 (daily maximum, long-term average, instantaneous limit, or narrative standard) that the city manager, or their designee, determines has caused, alone or in combination with other discharges, interference or pass through, including endangering the health of POTW personnel or the general public;

Subpart A - CODE OF ORDINANCES

Chapter 50.60 - UTILITIES

ARTICLE V. - INDIRECT DISCHARGE INTO THE SANITARY WASTEWATER SYSTEM

DIVISION 9. PUBLICATION OF USERS IN SIGNIFICANT NONCOMPLIANCE

- (d) Any discharge of a pollutant that has caused imminent endangerment to the public or to the environment, or has resulted in the city manager's, or their designee's, exercise of its emergency authority to halt or prevent such a discharge;
- (e) Failure to meet, within ninety (90) days of the scheduled date, a compliance schedule milestone contained in an individual wastewater discharge permit or enforcement order for starting construction, completing construction, or attaining final compliance;
- (f) Failure to provide within forty-five (45) days after the due date, any required reports, including baseline monitoring reports, reports on compliance with categorical pretreatment standard deadlines, periodic self-monitoring reports, and reports on compliance with compliance schedules;
- (g) Failure to accurately report noncompliance; or
- (h) Any other violation(s), which may include a violation of best management practices, which the city manager, or their designee, determines will adversely affect the operation or implementation of the local pretreatment program.

DIVISION 10. PROCEDURES FOR ABATEMENT OF VIOLATIONS

Sec. 50.60-196. Administrative enforcement remedies.

- (a) *Notification of violation.* When the city manager, or their designee, finds that a user has violated, or continues to violate, any provision of this Section, an individual wastewater discharge permit, or any order issued hereunder, or any other pretreatment standard or requirement, the city manager, or their designee, may serve upon that user a written notice of violation. Within a specified number of days from the user's receipt of such notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted by the user to the city manager, or their designee. Submission of such a plan in no way relieves the user of liability for any violations occurring before or after receipt of the notice of violation. Nothing in this Subsection shall limit the authority of the city manager, or their designee, to take any action, including emergency actions or any other enforcement action, without first issuing a notice of violation.
- (b) *Administrative orders.*
 - (1) *Compliance orders.* When the city manager, or their designee, finds that a user has violated, or continues to violate, any provision of this chapter, a wastewater discharge permit or order issued hereunder, or any other pretreatment standard or requirement, the city manager, or their designee, may issue an order to the user responsible for the discharge directing that the user come into compliance within a specified time. If the user does not come into compliance within the time provided, sewer service may be disconnected unless adequate treatment facilities, devices, or other related appurtenances are installed and properly operated. Compliance orders also may contain other requirements to address the noncompliance, including additional self-monitoring and management practices designed to minimize the amount of pollutants discharged to the sewer. A compliance order may not extend the deadline for compliance established for a pretreatment standard or requirement, nor does a compliance order relieve the user of liability for any violation, including any continuing violation. Issuance of a compliance order shall not be a bar against, or a prerequisite for, taking any other action against the user.

- (2) *Cease and desist orders.* When the city manager, or their designee, finds that a user has violated or continues to violate, any provision of this chapter, a wastewater discharge permit or order issued hereunder, or any other pretreatment standard or requirement, or that the user's past violations are likely to recur, the city manager, or their designee, may issue an order to the user directing it to cease and desist all such violations and directing the user to:
 - a. Immediately comply with all requirements; and
 - b. Take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation, including halting operations, and/or terminating the discharge.
- (c) *Service of notice or order.* Any notice or order issued under this Section shall be in writing and served in person or by registered or certified mail on the record user or users of the wastewater system or other persons determined to be responsible for such violation. Issuance of a cease and desist order shall not be a bar against, or a prerequisite for, taking any other action against the user.
- (d) *Appeals.* Any person may appeal an order of the city manager, or their designee, by filing a written notice of appeal with the city manager, or their designee, on forms provided by the utilities administration office. Such notice of appeal shall be filed within ten (10) days of service of the order.
- (e) *Termination of discharge.* In the addition to the provisions in provisions in Subsection 50.60-177 (revocation) of this Section, any user who violates the following conditions is subject to discharge termination:
 - (1) Violation of individual wastewater discharge permit conditions;
 - (2) Failure to accurately report the wastewater constituents and characteristics of its discharge;
 - (3) Failure to report significant changes in operations or wastewater volume, constituents, and characteristics prior to discharge;
 - (4) Refusal of reasonable access to the user's premises for the purpose of inspection, monitoring, or sampling; or
 - (5) Violation of the pretreatment standards in division 2 of this Section.Exercise of this option by the city manager, or their designee, shall not be a bar to, or a prerequisite for, taking any other action against the user.
- (f) *Emergency suspension of service.* The city manager, or their designee, may, without prior notice, suspend water service, sanitary sewer service and/or storm sewer access to a user or to a person discharging to the sanitary sewer or storm sewer when such suspension is necessary in the opinion of the city manager, or their designee, to stop an actual or threatened discharge which presents or may present imminent substantial danger to the environment or to the health or welfare of persons; presents or may present imminent substantial danger to the POTW, storm sewer or waters of the state; or will cause pass through or interference of the POTW.
 - (1) *Notice of suspension.* As soon as practicable after the suspension of service, the city manager, or their designee, shall notify the user or the person discharging to the wastewater or storm sewer of the suspension, and order such person to cease the discharge immediately.
 - (2) *Reinstating service.* The city manager, or their designee, shall reinstate suspended services to the wastewater user or to the person discharging to the storm sewer upon proof by such person that the non-complying discharge has been eliminated; upon payment by such person of its outstanding water, sewer and stormwater utility charges; upon payment by such person of all costs incurred by the city in responding to the discharge or threatened discharge; and upon payment by such person of all costs incurred by the city in reconnecting services.

- (3) *Written statement.* Within five (5) days of the day of suspension of services, the wastewater user or the person shall submit to the city manager, or their designee, a detailed written statement describing the cause of the discharge and the measures taken to prevent any future occurrence.
- (g) *Right to hearing.* Upon notification or issuance of an administrative order, proposed termination of discharge, or notice of suspension, a user will be offered an opportunity to a hearing and determination under Subsection 50.60-196(h) of this Section, why the proposed action should not be taken. The hearing shall be conducted in accordance with Subsection 50.60-196(h).
- (h) *Hearing and determination.*
 - (1) An environmental appeals committee is hereby established and authorized to hear and decide appeals from any order issued by the city manager, or their designee, pursuant to this Section. The committee shall be composed of three (3) members appointed by the city manager. No individual appointed to the committee shall be employed in the chain of command of the city manager, or their designee.
 - (2) The committee may call and hold hearings, administer oaths, receive evidence at the hearing, and make findings of fact with respect to administering its powers in this chapter.
 - (3) Upon the hearing, the committee shall determine if there is substantial evidence to support the city manager, or their designee, determination and order. The decision of the committee shall be in writing and contain findings of fact. If the committee determines that there is substantial evidence to support the determination and order of the city manager, or their designee, the committee, shall, in addition to its decision issue an Order:
 - a. Requiring discontinuance of such violation or condition;
 - b. Requiring compliance with any requirement to correct or prevent any condition or violation; or
 - c. Suspending or revoking any permit issued under this Section.
 - (4) In any decision and order issued by the committee, the order shall specify the time in which the compliance with the order must be taken. A copy of the decision and order shall be delivered to the appellant or person to whom the order is directed in person or sent to him by registered or certified mail.
 - (5) Should the appellant fail to comply with the order of the committee within the time specified therein, if any, the city manager, or their designee, in addition to any other remedy provided for in this Section, may terminate sewer service to the appellant.
- (i) *Other steps.* If a person fails to comply with a notice or order issued under this Section, the city manager, or their designee, shall take such steps as deemed necessary to prevent or minimize damage to the storm sewer, POTW or waters of the state, or to minimize danger to persons. Such steps may include immediate severance of a person's sanitary sewer connection.
- (j) *Reinstatement of suspended or revoked permit.*
 - (1) The city manager, or their designee, shall reinstate a wastewater discharge permit upon satisfactory proof to the city manager, or their designee, of corrective action of the permittee of the conditions or discharge for which the permit was suspended.
 - (2) A user whose wastewater discharge permit has been revoked must, apply for a new permit and comply with all provisions and conditions required as though a permit had not been issued for such user.

Sec. 50.60-197. Judicial enforcement remedies.

- (a) *Injunctive relief.* When the city manager, or their designee, finds that a user has violated, or continues to violate, any provision of this article, an individual wastewater discharge permit, or order issued hereunder,

or any other pretreatment standard or requirement, the city manager, or their designee, may petition the court of proper jurisdiction and venue in Denton County, Texas through the city attorney's for the issuance of a temporary or permanent injunction, as appropriate, which restrains or compels the specific performance of the individual wastewater discharge permit, order, or other requirement imposed by this article on activities of the user. City manager, or their designee, may also seek such other action in a court of proper jurisdiction and venue, as is appropriate for legal and/or equitable relief, including a requirement for the user to conduct environmental remediation. A petition for injunctive relief shall not be a bar against, or a prerequisite for, the City, Texas taking any other action against a user.

(b) *Civil penalties.*

- (1) The city attorney is authorized to commence an action for appropriate legal or equitable relief in a court of competent jurisdiction. Such relief may include:
 - a. An injunction to prevent a violation of this chapter;
 - b. Recovery for damages to the POTW or storm sewer resulting from a violation of this chapter;
 - c. Recovery for expenses incurred by the city in responding to a violation of this chapter;
 - d. A daily civil fine of up to the maximum provided by V.T.C.A., Local Government Code § 54.017 for a violation of Subsections 50.60-151 through 50.60-208 hereof; and
 - e. Any and all other damages, costs and remedies to which the city may be entitled.
- (2) Filing a suit for civil penalties shall not be a bar against, or a prerequisite for, taking any other actions against a user, as such a civil action brought against the user is non-exclusive.

Sec. 50.60-198. Remedies non-exclusive.

The remedies provided for in this article are not exclusive. The city manager, or their designee, may take any, all, or any combination of these actions against a noncompliant user. Enforcement of pretreatment violations will generally be in accordance with the city's enforcement response plan. However, the city manager, or their designee, may take other action against any user when the circumstances warrant. Further, the city manager, or their designee, is empowered to take more than one enforcement action against any noncompliant user.

DIVISION 11. SUPPLEMENTAL ENFORCEMENT ACTIONS

Sec. 50.60-199. Water or sewer service severance.

Wherever a user has violated or continues to violate any provision of this article, an individual wastewater discharge permit, or order issued hereunder, or any other pretreatment standard or requirement, service to the user may be severed. Service will recommence, at the user's expense, after the user has satisfactorily demonstrated its ability to comply.

Sec. 50.60-200. Public nuisances.

A violation of any provision of this article, an individual wastewater discharge permit, or order issued hereunder, or any other pretreatment standard or requirement is hereby declared a public nuisance and shall be corrected or abated as directed by the city manager, or their designee. A public nuisance is also created by all sewage, human excreta, wastewater, or other potential instrument or medium in the transmission of disease to or between any person(s). Any person(s) or user(s) creating a public nuisance shall be subject to the provisions of this

chapter governing such nuisances, including reimbursing the city for any costs incurred in removing, abating, or remedying said nuisance.

DIVISION 12. AFFIRMATIVE DEFENSES TO DISCHARGE VIOLATIONS

Sec. 50.60-201. Act of God.

If a person can establish that an event that would otherwise be a violation of a statute within the commission's jurisdiction or a rule adopted or an order or a permit issued under such a statute was caused solely by an Act of God, war, strike, riot or other catastrophe, the event is not a violation of that statute, rule, order or permit.

Sec. 50.60-202. Bypass.

- (a) For the purposes of this Subsection:
 - (1) *Bypass* means the intentional diversion of wastestreams from any portion of a user's treatment facility.
 - (2) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- (b) A user may allow any bypass to occur which does not cause pretreatment standards or requirements to be violated, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of paragraphs (c) and (d) of this Subsection.
- (c) Bypass notifications.
 - (1) If a user knows in advance of the need for a bypass, it shall submit prior notice to the city manager, or their designee, at least ten (10) days before the date of the bypass, if possible.
 - (2) A user shall submit oral notice to the city manager, or their designee, of an unanticipated bypass that exceeds applicable pretreatment standards within twenty-four (24) hours from the time it becomes aware of the bypass. A written submission shall also be provided within five (5) days of the time the user becomes aware of the bypass. The written submission shall contain a description of the bypass and its cause; the duration of the bypass, including exact dates and times, and, if the bypass has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass. The city manager, or their designee, may waive the written report on a case-by-case basis if the oral report has been received within twenty-four (24) hours.
- (d) Bypass.
 - (1) Bypass is prohibited, and the city manager, or their designee, may take an enforcement action against a user for a bypass, unless:
 - a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

- c. The user submitted notices as required under paragraph (c) of this Subsection.
- (2) The city manager, or their designee, may approve an anticipated bypass, after considering its adverse effects, if the city manager, or their designee, determines that it will meet the three conditions listed in paragraph (d)(1) of this Subsection.

DIVISION 13. FEES, CHARGES, AND RECOVERY OF COSTS INCURRED

- (a) In addition to civil and criminal liability, the permittee violating any of the provisions of a discharge permit issued pursuant to this article, or causing damage to or otherwise inhibiting the POTW, shall be liable to the city for any expense, loss, or damage caused by such violation or discharge. The city shall bill the permittee for the costs incurred by the city for any cleaning, repair, or replacement work caused by the violation or discharge. Refusal to pay the assessed costs shall constitute a separate violation.
- (b) If abnormal strength wastewater is acceptable for discharge into the wastewater system as determined by the city manager, or their designee, a wastewater surcharge may be added to the base charge to cover the additional cost of treating abnormal strength wastewater. Such surcharge rates shall be established and be in accordance with ordinances adopted and as from time-to-time amended by the city council.
- (c) The city may adopt reasonable fees for reimbursement of costs of setting up and operating the city's pretreatment program, which may include:
 - (1) Fees for wastewater discharge permit applications including the cost of processing such applications;
 - (2) Fees for monitoring, inspection, and surveillance procedures including the cost of collection and analyzing a user's discharge, and reviewing monitoring reports and certification statements submitted by users;
 - (3) Fees for reviewing and responding to accidental discharge procedures and construction;
 - (4) Fees for filing appeals;
 - (5) Fees to recover administrative and legal costs associated with the enforcement activity taken by the city manager, or their designee, to address user noncompliance; and
 - (6) Other fees as the city may deem necessary to carry out the requirements contained herein.

These fees relate solely to the matters covered by this article and are separate from all other fees, fines, and penalties chargeable by the city.

DIVISION 14. MISCELLANEOUS PROVISIONS

Sec. 50.60-203. Wastewater system work permit required.

- (a) It shall be unlawful for any user of the wastewater system to construct, reconstruct, modify, enlarge, or alter any equipment, device, machinery, apparatus, or facility or system or component thereof which is used or is intended to be used to treat, process, measure or convey any wastewater which is or will be discharged into the wastewater system without first obtaining a wastewater system work permit from the city manager, or their designee.
- (b) Requirements for permit. A wastewater system work permit shall be issued when all plans, drawings and specifications are submitted in such detail as the city manager, or their designee, may require and the city manager, or their designee, has determined that the work to be done will result in adequate treatment, processing, measuring and conveyance of the wastewater discharged into the wastewater system in accordance with the provision of this article.

- (c) Certificate of final inspection upon completion.
 - (1) Upon completion of the work to be done under the wastewater system work permit, the city manager, or their designee, shall inspect the work and, if done in accordance with the permit, the city manager, or their designee, shall issue a certificate of final inspection to the permit holder.
 - (2) If the completed work does not comply with the plans and specifications submitted for which the permit was issued, the city manager, or their designee, shall require such correction as necessary before a certificate of inspection is issued.
 - (3) No person receiving a wastewater system work permit shall utilize or make use of any equipment, device, machinery, apparatus or facility covered by the permit until a certificate of final inspection is issued in accordance with this article.
 - (4) Right to inspect. No person shall refuse the city manager, or their designee, the right to inspect any work done or required to be done under this article.

Sec. 50.60-204. Sanitary facilities required.

- (a) Any owner or occupant of every building where such building is within one hundred (100) feet of any city sanitary sewer and is utilized as a dwelling or residential unit shall construct or cause to be constructed a suitable water closet upon such property and shall connect or cause the water closet to be connected with the sanitary sewer in accordance with all ordinances of the city regulating such construction and shall, within thirty (30) days after written notice to do so from the city manager, or their designee, abate and cease to use any septic system, dry closet or privy upon such premises.
- (b) Any owner or occupant of every building where such building is within three hundred (300) feet of a city sanitary sewer and is utilized as a business or commercial establishment discharging wastewater exceeding the limits established by this article shall construct or cause to be constructed a suitable water closet upon such property and shall connect or cause the water closet to be connected with the sanitary sewer in accordance with all ordinances of the city regulating such construction and shall, within thirty (30) days after written notice to do so from the city manager, or their designee, abate and cease to use any septic system, dry closet or privy upon such premises.
- (c) The owner or occupant of any such property shall keep and maintain such water closet and all connections in good condition and free from any obstructions.

Sec. 50.60-205. Dry closets prohibited.

It shall be unlawful for any person to build, use, or maintain any privy or dry closet on any lot or land within the corporate limits of the city, except for portable sanitary privies utilized temporarily.

Sec. 50.60-206. Construction of sanitary sewers and connections.

The construction of sanitary sewers and connections thereto shall be as provided in the ordinances of the city.

Sec. 50.60-207. Owner responsible for maintenance of sanitary sewer lines.

The city shall not be responsible for the maintenance of any building drains or service lines, and such maintenance shall be the responsibility and duty of the owner of the premises serviced by any such service line.

Sec. 50.60-208. Compliance with building regulations required.

Sanitary sewer service shall not be furnished to any premises where the plumbing thereof has not been installed in accordance with the building regulations or any other provisions as provided in the ordinances of the city.

Sec. 50.60-209. Reserved.