City of Mansfield*

JURISDICTIONAL ANNEX WITHIN THE TARRANT COUNTY HAZARD MITIGATION ACTION PLAN

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Chapter 1: Introduction

The City of Mansfield is a new participant in the Tarrant County Hazard Mitigation Action Plan (HazMAP); however, the city has a previous mitigation plan that was approved in 2010.

1.1 Planning Process Point of Contact

The point of contact during the Tarrant County HazMAP planning process for the City of Mansfield, a new participant in the HazMAP, was the Emergency Management Coordinator.

1.2 Annex Organization

This annex has five chapters that satisfy mitigation requirements in 44 CFR Part 201:

Chapter 1: Introduction
Chapter 2: Planning Process
Chapter 3: Hazard Identification and Risk Assessment
Chapter 4: Capabilities Assessment
Chapter 5: Mitigation Strategy

The information provided in this annex is for the City of Mansfield alone. All pertinent information that is not identified in this annex is identified in the other sections of this HazMAP or within the respective appendices.

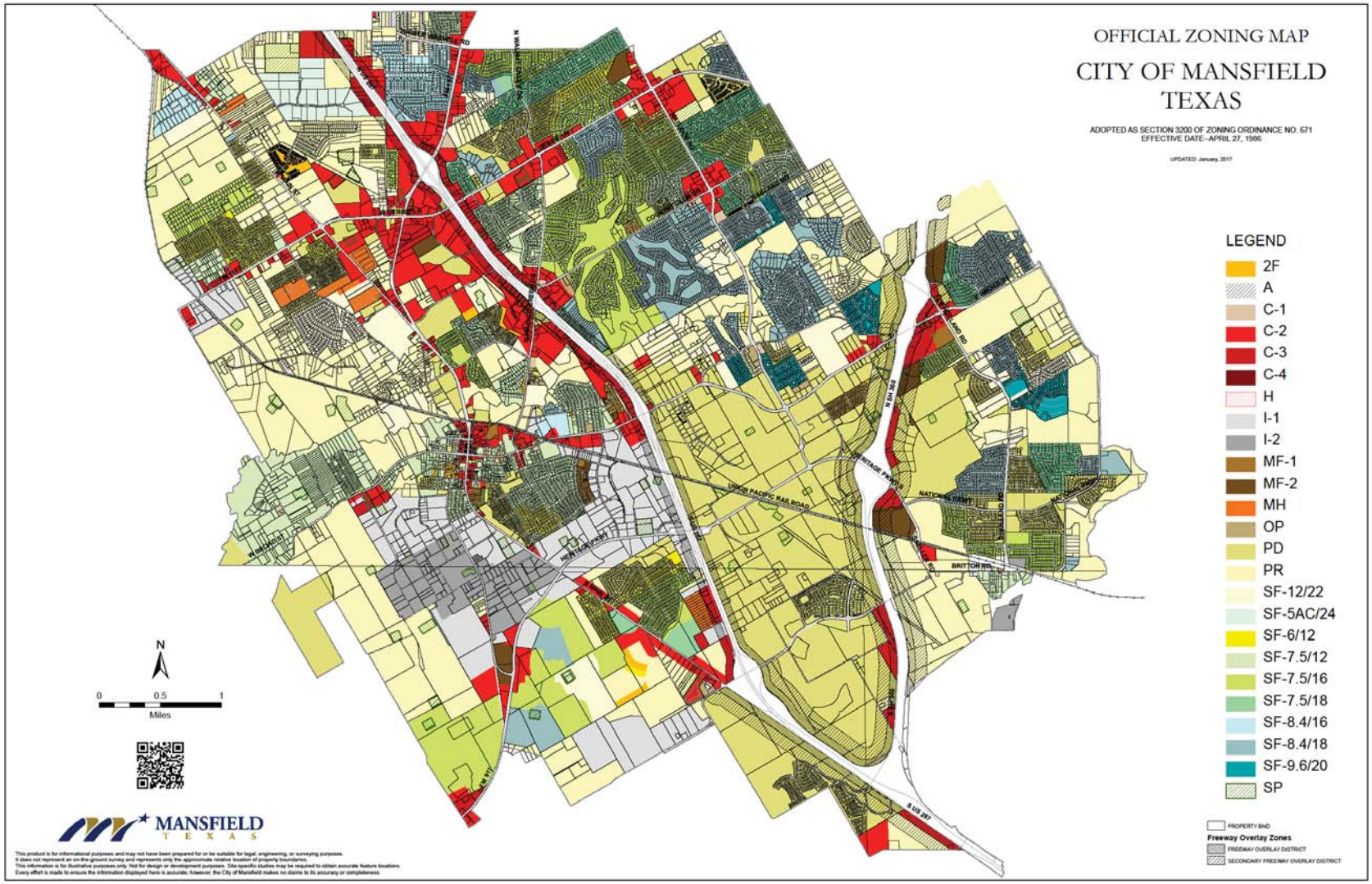
1.3 Hazard Mitigation Action Plan (HazMAP) Adoption

Once the Tarrant County HazMAP has received the designation "Approved Pending Local Adoption" from the Federal Emergency Management Agency (FEMA), the City of Mansfield will take the HazMAP to City Council for final public comment and local adoption. A copy of the resolution will be inserted into the HazMAP and held on file at the North Central Texas Council of Governments (NCTCOG).

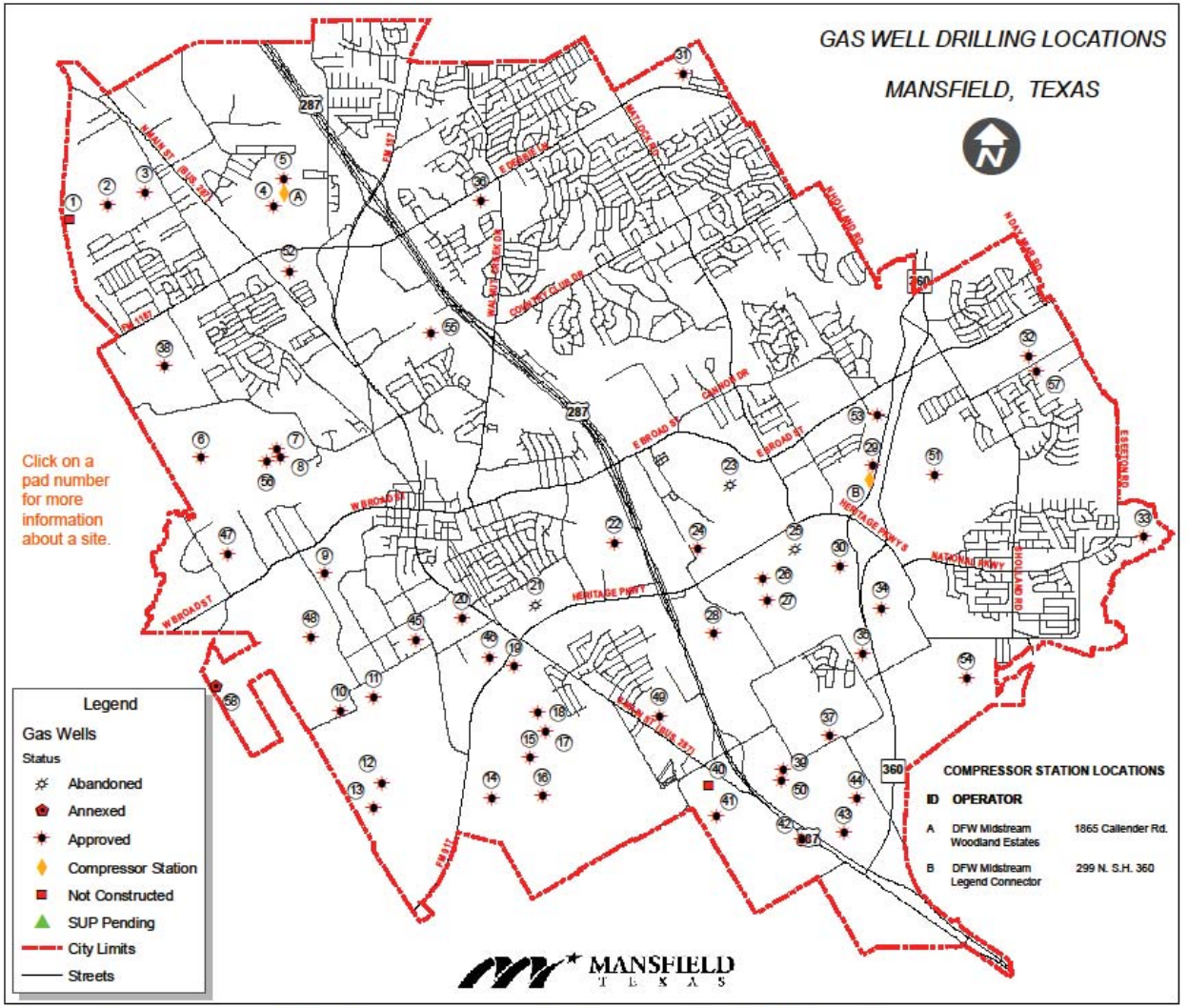
1.4 Supporting Maps

The following maps provide an overview of the City of Mansfield:

- Official Zoning Map
- Gas Well Drilling Locations


OFFICIAL ZONING MAP
CITY OF MANSFIELD
TEXAS
ADOPTED AS SECTION 3200 OF ZONING ORDINANCE NO. 671
EFFECTIVE DATE--APRIL 27, 1986
LEGEND
2F
A
C-1
C-2
C-3
C-4
H
I-1
I-2
MF-1
MF-2
MH
OP
PD
PR
SF-12/22
SF-5AC/24
SF-6/12
SF-7.5/12
SF-7.5/16
SF-7.5/18
SF-8.4/16
SF-8.4/18
SF-9.6/20
SP
PROPERTY BND
Freeway Overlay Zones
FREEWAY OVERLAY DISTRICT
SECONDARY FREEWAY OVERLAY DISTRICT
N
0
0.5
1
Miles
MANSFIELD
TEXAS

ID	PAD NAME	OPERATOR	PAD ADDRESS
1	Knapp West	XTO Energy	2401 Gertie Barrett Rd. #1 2401
2	Knapp Central	XTO Energy	Gertie Barrett Rd. #2 2401
3	Knapp East	XTO Energy	Gertie Barrett Rd. #3 1865
4	Woodland Estates South Pad	EagleRidge	Callender Rd.
5	Woodland Estates North Pad	EagleRidge	1867 Callender Rd.
6	Flashback	XTO Energy	1671 Newt Patterson Rd.
7	Rochlin Unit	XTO Energy	1671 Newt Patterson Rd. #3
8	Southern Rochlin	Atlas	1671 Newt Patterson Rd. #4
9	Cain Unit	Atlas	205 S. 6th Ave.
10	Brown-Johnson Unit 1H	EnerVest	401 Hanks Dr.
11	Luttrell Unit	EnerVest	300 Easy Dr.
12	Kimbrough Unit	EnerVest	2101 Jessica Dr. #1
13	Set/Back A Unit 2H, Set/Back D 2H	EnerVest	2101 Jessica Dr. #2
14	Set/Back D Unit 1H	EnerVest	2001 FM 917 #6
15	Set/Back B Unit 2H	EnerVest	2001 FM 917 #4
16	Set/Back C Unit 1H	EnerVest	2001 FM 917 #5
17	Casstevens 4H	EnerVest	2001 FM 917 #3
18	Casstevens Unit 1H	EnerVest	2001 FM 917 #2
19	Casstevens 7H	EnerVest	2001 FM 917 #1
20	Kennedy	Atlas	101 Airport Dr.
21	Flowers	XTO Energy	1201 Heritage Pkwy.
22	Premier	Atlas	1739 Commerce Dr.
23	Lockwood North (site abandoned)	Total E&P	2000 E. Broad St.
24	Regency	Total E&P	101 S. Mitchell Rd.
25	Lockwood South (site abandoned)	Total E&P	2401 Heritage Pkwy.
26	MEDC	Total E&P	2301 Heritage Pkwy.
27	Mathis Coal Car	XTO Energy	839 S. Mitchell Rd.
28	Copper Car	XTO Energy	840 S. Mitchell Rd.
29	Mansfield Partners North Pad	EagleRidge	301 N. SH 360
30	Mansfield Partners South Pad	EagleRidge	151 S. SH 360
31	Erving Unit	Saddle Operating	1751 E. Debbie Ln.
32	Keep A Steppin	Total E&P	4444 E. Broad St.
33	Lester Levy	Atlas	5300 Shelter Point Ct.
34	Westerfeld Mathis	Total E&P	698 Heritage Parkway S.
35	Walking T Unit 3H-5H	EnerVest	3000 Mathis Rd.
36	Debbie Lane Unit 1V	Edge Resources	300 E. Debbie Ln.
37	Walking T Ranch 11H	EnerVest	3001 Harmon Rd.
38	Rockerfeller Unit	XTO Energy	1201 N. Hywlew Rd.
39	Walking T Ranch 16H-23H	EnerVest	1700 Johnson St.
40	Eagle Ford B Unit 1H	EnerVest	1800 S. Main St. (Bus Hwy 287)
41	Eagle Ford B Unit 2H	EnerVest	2201 Chambers St.
42	Eagle Ford C Unit 2H-5H, 11H	EnerVest	2901 Ellis St.
43	Eagle Ford A Unit 4H-5H	EnerVest	2100 Matlock Rd. #2
44	Eagle Ford A Unit 6H-8H	EnerVest	2100 Matlock Rd Dr. #1
45	Trinity Forge	Total E&P	950 S. 2nd Ave.
46	Shioleno	Total E&P	1101 FM 917
47	Washington	Total E&P	373 Retta Rd.
48	Brown-Johnson Unit 2H	EnerVest	401 Hanks Dr. #2
49	Freight Train	XTO Energy	1299 S. Main St. (Bus Hwy 287)
50	Eagle Ford A 1H	EnerVest	1700 Johnson St. #2
51	Mansfield Sports Complex 1H-5H	XTO Energy	450 N SH 360
52	Dalton	XTO Energy	1640 N. Main St. (Bus Hwy
53	360/Broad Site	Total E&P	287) 3200 Conifer St.
54	Britton Unit	EagleRidge	1600 S. SH 360
55	Overstreet Unit	GHA Barnett	500 Mouser Way
56	Rawdon Unit	FDL Energy	1671 Newt Patterson Rd. #2
57	SE Mansfield Unit	GHA Barnett	4500 Grand Meadow Blvd.
58	Buford Tindle #2H Unit	FDL Energy	1301 Lillian Rd.



This information is for illustrative purposes only. Not for design or development purposes. Site-specific studies may be required to obtain accurate feature locations. Every effort is made to ensure the information displayed here is accurate; however, the City of Mansfield makes no claims to its accuracy or completeness.

Updated: January 11, 2016

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Chapter 2: Planning Process

(In compliance with 201.6(c)(1))

2.1 Development and Adoption Process

To apply for federal aid for technical assistance and post-disaster funding, local jurisdictions must comply with Part 201.3 of the Disaster Mitigation Act of 2000 (DMA 2000) implemented in the Federal Code of Regulations 44 CRF Part 201.6. While the City of Mansfield has historically implemented measures to reduce vulnerability to some hazards, passage of DMA 2000 helped city officials recognize the benefits of a long-term approach to hazard mitigation. This approach is achieved by a gradual decrease of hazard-associated impacts through the implementation of a hazard mitigation action plan (HazMAP). The city's involvement in the Tarrant County HazMAP represents the collective efforts of the Hazard Mitigation Planning Team (HMPT) members, all participating Local Planning Team (LPT) members, the public, and stakeholders.

The city developed this annex in accordance with Part 201.6(c)(5) of DMA 2000. This HazMAP and annex identifies hazards and mechanisms to minimize damages associated with these hazards.

2.2 Organizing the Planning Effort

A comprehensive approach was taken in developing the HazMAP. An open involvement process was established for the public and all stakeholders, which provided an opportunity for everyone to be involved in the planning process and make their views known. The public meeting was advertised with notices in the local newsletter and on social media.

Two teams worked simultaneously on this Tarrant County HazMAP:

1. **Hazard Mitigation Planning Team (HMPT):** This team consisted of points of contact from each participating jurisdiction. The HMPT met to discuss county-wide topics, including hazards and mitigation strategies. The points of contact were the leads of their Local Planning Team (LPT).
2. **Local Planning Team (LPT):** Each jurisdiction had a LPT that consisted of the Emergency Management Coordinator for that jurisdiction as well as designated representatives from within the jurisdiction. This team met to assess capabilities, hazards, and mitigation strategies within the jurisdiction.

2.2.1 Local Planning Team (LPT)

This annex within the Tarrant County HazMAP was developed by the City of Mansfield's Local Planning Team (LPT), with support from the North Central Texas Council of Governments (NCTCOG). The efforts of the LPT were led by the city's Emergency Management Coordinator.

The LPT was assembled in 2017 with representatives from the City of Mansfield. The city acted as the plan development consultant, providing hazard mitigation planning services.

City of Mansfield Local Planning Team (LPT) Members for the 2020 HazMAP

Jurisdiction	Agency/Organization	Position	Role in LPT
City of Mansfield	Office of Emergency Management	Emergency Management Coordinator	General oversight, hazard identification, and plan development
City of Mansfield	Public Works Department	Director	Hazard identification and plan development
City of Mansfield	Water Utilities Department	Director	Hazard identification and plan development
City of Mansfield	Fire Department	Assistant Fire Chief	Hazard identification and plan development
City of Mansfield	Street Department	Assistant Director of Public Works	Hazard identification and plan development
City of Mansfield	Environmental Services Department	Environmental Manager	Hazard identification and plan development
City of Mansfield	Planning Department	Acting Director of Planning	Hazard identification and plan development
City of Mansfield	Geographic Information Systems (GIS) Department	GIS Manager	Hazard identification and plan development
City of Mansfield	Engineering Department	City Engineer	Hazard identification and plan development
City of Mansfield	Parks and Recreation Department	Parks Director	Hazard identification and plan development

In addition, NCTCOG's Emergency Preparedness Department participated in the following activities associated with development, approval, and adoption of the plan:

1. Prepared, based on community input and LPT direction, the first draft of the plan and provided technical writing assistance for review, editing, and formatting.
2. Submitted proposed plan to the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) for review and approval and completed any edits requested by these organizations.
3. Coordinated plan adoption processes with the city, TDEM, and FEMA.

Chapter 3: Hazard Identification and Risk Assessment

(In compliance with 201.6(c)(2)(i), 201.6(c)(2)(ii), 201.6(c)(2)(ii)(A), 201.6(c)(2)(ii)(B), 201.6(c)(2)(ii)(C), 201.6(c)(2)(iii), and 201.6(c)(3)(ii))

This chapter provides a factual basis for the action items described in Chapter Five. The following information serves to assist the city in determining and prioritizing appropriate mitigation action items to reduce losses from identified hazards.
The City of Mansfield had an individual hazard mitigation plan from 2010, thus they has marked changes in development and historical events since that year.

3.1 Changes in Development since 2010

(In compliance with 201.6(d)(3))

Increasing Vulnerability
New development in hazard-prone areas: The city is in an expansion phase with new subdivisions and businesses being built in the wildland-urban interface (WUI), increasing the number of people at risk to hazards and possibly changing areas that flood.
Decreasing Vulnerability
Mitigation actions implemented to reduce risk or adopted codes to protect future development: Portions of Walnut Creek have been reinforced with gabion walls and new concrete aprons have been poured around utilities crossing the creek channel. The city is currently using the 2006 building and fire codes. A full list of completed mitigation action items are described in Chapter 5 of this annex.

Declared Disaster Code	Incident Period	Date Declared	Description	Impact
DR-4223	May 4-June 23, 2015	May 29, 2015	Severe storms, tornadoes, straight-line winds, and flooding.	The City of Mansfield suffered from several flooding events during this time which caused damage to parks and utilities. The city received a Public Assistance Grant to offset some of the cost.

3.2 Community Profile

The following tables reflect the community profile, vulnerable facilities in the jurisdiction, and the critical facilities and infrastructure that are exposed to the identified hazards and have the potential to be impacted. This information was gathered from the United States Census and from the City of Mansfield.

Community Profile from US Census Bureau Quick Facts (Source-www.census.gov)	
Population Estimates (V2016)	68,928
Persons under 5 years (%)	6.8
Persons 65 years and over (%)	9.1
Language other than English spoken at home (%)	15.5
With a disability, under age 65 (%)	5.9
Persons without health insurance, under age 65 (%)	10
Persons in poverty (%)	5.7
Median household income	$90,216
Households, 2012-2016	21,069
Median value of owner-occupied housing units, 2012-2016	$204,800

The critical and vulnerable facilities listed below are potentially exposed to all the hazards identified in the City of Mansfield.

City of Mansfield Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
City Hall 1200 East Broad Street	Government Facility
Public Safety Building 1305 East Broad Street	Emergency Services
Fire Station 1 202 South Main Street	Emergency Services
Fire Station 2 1711 Country Club Drive	Emergency Services
Fire Station 3 3100 East Broad Street	Emergency Services
Fire Station 4 1954 North Main Street	Emergency Services
Mansfield Law Enforcement Center 1601 Heritage Parkway	Government Facility
Mansfield Activity Center 106 South Wisteria	Community Facility
Chris W. Burkett Service Center 620 South Wisteria Street	Government Facility
Downtown Mansfield Main Street	Historic District

City of Mansfield Critical and Vulnerable Facility/Asset Inventory	
Facility/Asset Name or Description and Address	**Type of Asset**
Mansfield Historic Museum and Heritage Center 102 North Main Street	Historic Property
StarCenter 1715 East Broad Street	Entertainment
Walnut Creek Country Club 1151 Country Club Drive	Entertainment
Mansfield National Golf Club 3750 National Parkway	Entertainment
Vernon Newsome Stadium 3700 East Broad Street	Entertainment
The Lot Amphitheatre 110 South Main Street	Entertainment
Hawaiian Falls Water Park 490 Heritage Parkway South	Entertainment
Mansfield Methodist Medical Center 2700 East Broad Street	Hospital
Kindred Hospital 1802 Highway 157 North	Hospital
MISD Transportation Fuel Depot 1910 North Main Street	Fuel Depot

*The capacity, square footage, and structure value of these assets are unavailable.

Klein Tools, Mouser Electronics, Methodist Mansfield Medical Center, and Hoffman Cabinets are some of the major employers within the city. A list of schools in the Mansfield Independent School District and other critical or vulnerable facilities in the city can be obtained by contacting the Mansfield Emergency Management Coordinator.

3.3 Natural Hazard Profiles

The City of Mansfield's Local Planning Team (LPT) ranked potential hazards in order of risk, with 1 being the highest. Risk, for the purposes of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with community assets. If a natural hazard does not and could not impact the City of Mansfield in any way, not applicable (N/A) is used as its rank and its reasoning is noted in the hazard profile section of this chapter.

Rank of Risk	Natural Hazard
1	Thunderstorm (includes hail, wind, lightning)
2	Flooding
3	Expansive Soils
4	Tornado
5	Winter Storms
6	Drought
7	Extreme Heat
8	Wildfire
9	Earthquake

The following terms are used to describe the geographic area affected, probability of future occurrence, and the maximum probable extent of each hazard.

Geographic Area Affected

- Negligible: Less than 10 percent of planning area.
- Limited: 10 to 25 percent of planning area.
- Significant: 25 to 75 percent of planning area.
- Extensive: 75 to 100 percent of planning area.
    - Planning area refers to the entire City of Mansfield.

Probability of Future Occurrence

- Unlikely: Event possible in next 10 years.
- Occasional: Event possible in next 5 years.
- Likely: Event probable in next 3 years.
- Highly Likely: Event probable in next year.

Maximum Probable Extent (Magnitude/Strength of Hazard using the following extent scale)

- Minor: Limited classification on scientific scale, slow speed of onset or short duration of event.
- Medium: Moderate classification on scientific scale, moderate speed of onset or moderate duration of event.
- Major: Severe classification on scientific scale, fast speed of/immediate onset or long duration of event.

Extent Scale			
	Minor	**Medium**	**Major**
Drought	PDSI -1.99 to 1.99+	PDSI -2.00 to -2.99	PDSI -3.00 to -5.00
Earthquake	Mercalli Scale: I-V Richter Scale: 0-4.8	Mercalli Scale: VI-VII Richter Scale: 4.9-6.1	Mercalli Scale: VIII-XII Richter Scale: 6.2-8.1+
Expansive Soils	EI Expansion Potential: 21-50 (Low) EI Expansion Potential: 0-21 (Very Low)	EI Expansion Potential: 51-90 (Medium)	EI Expansion Potential: 91-130 (High) EI Expansion Potential: >130 (Very High)
Extreme Heat	Heat Index 80F-105F	Heat Index 105F-129F	Heat Index >130F
Flooding	Outside of 100yr and 500yr Flood Zones, Zone A, AE, X	500yr Flood Zone, Zone X	100yr Flood Zone, Zone AE, A
Thunderstorm	Hail: H0-H4, 5-40mm Wind Force: 0-3 Knots: <1-10 LAL: 1-2	Hail: H5-H6, 30-60mm Wind Force: 4-6 Knots: 11-27 LAL: 3-4	Hail: H7-H10, 50->100mm Wind Force: 8-12 Knots: 28-64+ LAL: 5-6
Tornado	EF0	EF1-EF2	EF3-EF5
Wildfire	KBDI 0-200	KBDI 200-400	KBDI 600-800
Winter Storms	Temperatures 40F to 35F Wind chill 36F to 17F	Temperatures 30F to 20F Wind chill 25F to -4F	Temperatures 15F to -45F Wind chill 7F to -98F

The full description of each hazard identified is provided in Section 3 of this HazMAP.

Location: Drought, earthquakes, expansive soils, extreme heat, thunderstorms, tornadoes, and winter storms do not have geographic boundaries and can impact the entire county equally, which includes all participating jurisdictions. Wildfires can be expected to threaten rural and urban jurisdictions with undeveloped land. Flooding is a severe threat to jurisdictions containing 100-year floodplains or bodies of water.

The following hazards are listed in alphabetical order and describe the location and extent of each hazard, details of previous occurrences, probability data on future events, and vulnerability to each hazard.

3.3.1 Drought

Hazard Profile: Drought	
Category	**Response**
Risk Ranking	6
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Property damage Loss of water supply Increase of grassfire potential and intensity Negative impact on citizens, to include water restrictions and lack of drinkable water supply Impact on car washes, parks, and pools
Vulnerabilities	There is no historical data for drought damage in the city. All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard. Affected areas include all city recreational parks including the Oliver Nature Park, Hawaiian Falls, and two 18-hole golf courses.

Jurisdiction's ground-water supply: Mansfield utilizes surface water treatment and does not rely on any ground-water for potable water supply to its residents or wholesale customers. The Tarrant Regional Water District (TRWD) contractually supplies raw water to Mansfield as part of the TRWD system.

Any zoning districts which allow for agricultural uses such as commercial stables and barns, farms, and animal lots, which could be impacted by drought: No.

Describe any water restrictions used in your jurisdiction: The City of Mansfield has adopted year-round, outdoor watering restrictions between the hours of 10AM and 6PM. This measure is consistent with the majority of cities in North Texas and is considered a long term water conservation strategy. During times of drought conditions, the following restrictions are implemented as adopted by the City of Mansfield Drought Contingency Plan and are consistent with the Tarrant Regional Water District Water Conservation and Drought Contingency Plan.

Details of outdoor watering restrictions by drought stage:

- At 75% capacity (Stage 1, Water Watch) landscape watering reduced to twice per week.
- At 60% capacity (Stage 2, Water Warning) landscape watering reduced to once per week.
- At 45% capacity (Stage 3, Emergency Water Use) landscape watering banned.

3.3.2 Earthquake

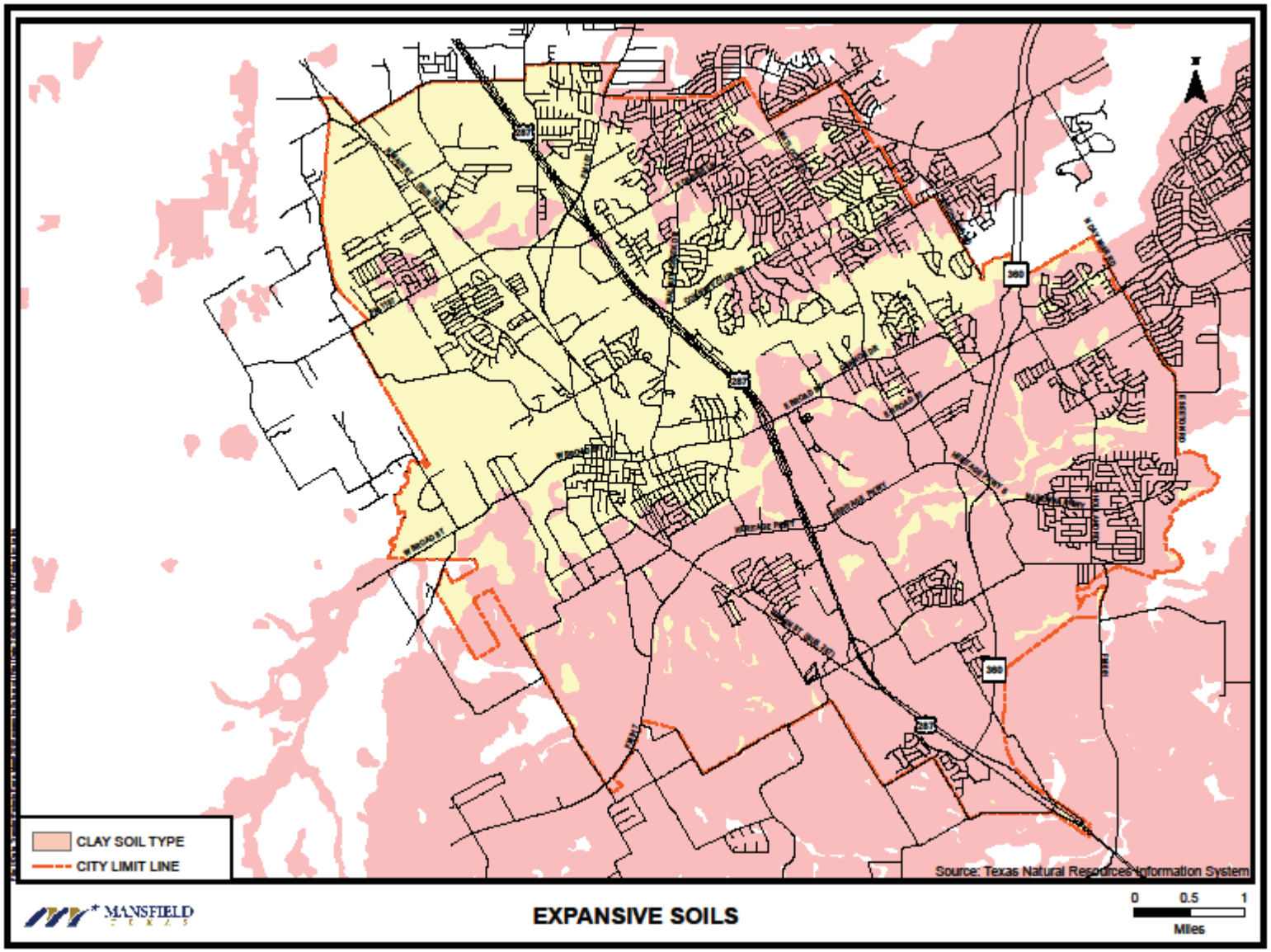
Hazard Profile: Earthquake	
Category	**Response**
Risk Ranking	9
Geographic Area Affected	Significant
Probability of Future Occurrence	Unlikely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and infrastructure damage Water contamination or loss via broken pipes Transportation and communication disruption or damage Increase in traffic accidents Building collapse Natural gas leak Misplaced residents Power outages Natural environments damage, to include protected species and critical habitats
Vulnerabilities	All populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard, though impacts are undetermined due the lack of historical data. Building codes have not required construction techniques to mitigate against this hazard and it can be assumed that a sizable earthquake could cause a great deal of damage.

Past damage done to jurisdictional roads and critical infrastructure due to earthquakes, including where the damage occurred and how much it cost to fix: A 2.7 magnitude earthquake, at a depth of 9.3 km, occurred February 4, 2016. The epicenter was located approximately 4.5 miles southwest of downtown Mansfield, outside the city limits in Johnson County. A 2.4 magnitude earthquake occurred less than 5 miles southeast of Mansfield June 15, 2015. No damage was reported for either event.

3.3.3 Expansive Soils

Hazard Profile: Expansive Soils	
Category	**Response**
Risk Ranking	3
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage due to foundation damage Water contamination or loss via broken pipes Building and infrastructure damage Road damage Transportation delays due to road condition Damage to utility lines
Vulnerabilities	Expansive soils are a major consideration to all existing and future structures. The city has incurred substantial cost in rebuilding and repairing roadways and underground utilities due to expansive soils over the years. There have been 76 main breaks costing $179,000 and roadway repairs costing approximately $1 million a year.

Past damage done to jurisdictional roads and critical infrastructure due to expansive soils, including in what part of your jurisdiction the damage occurred: Approximately 90% of street repairs are due to expansive soils. Mansfield's soil structure consists of approximately 54% clay soils, which are located mainly in the southern and eastern parts of the city- see the included map. Each year, approximately $1 million of the Street Department's $2 million budget is spent repairing roadways.


CLAY SOIL TYPE
CITY LIMIT LINE
Source: Texas Natural Resources Information System
MANSFIELD
TEXAS
EXPANSIVE SOILS
0 0.5 1
Miles

3.3.4. Extreme Heat

Hazard Profile: Extreme Heat	
Category	**Response**
Risk Ranking	7
Geographic Area Affected	Extensive
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Heatstroke or death Property damage Loss of water supply Increases grassfire potential and intensity Impact on logistics Power outages Road buckling Disruption in critical infrastructure operations Vehicle engine failure
Vulnerabilities	While extreme temperatures pose a serious threat to any population, issues with housing and mobility could make it difficult for the elderly to seek shelter in response to such a threat. The elderly, homeless, and outdoor laborers need to take proper precautions. People should stay indoors to prevent heatstroke; elderly people who cannot afford air conditioning are at greatest risk.

Most vulnerable populations to extreme heat in your jurisdiction and their location within your jurisdiction: The most vulnerable populations within the community would be those participating in outdoor activities and the elderly.

Are there cases of extreme heat exposure resulting from special events held in your jurisdiction? Each year there are cases of people at the Pickle Parade and fireworks show who need medical attention or hydration for heat related issues.

Have any critical facilities in your jurisdiction experienced any impacts from extreme heat (e.g., power failure due to heat)? No.

3.3.5 Flooding

Hazard Profile: Flooding	
Category	**Response**
Risk Ranking	2
Geographic Area Affected	Limited
Probability of Future Occurrence	Likely
Maximum Probable Extent	Medium
Potential Impact	Loss of electricity Loss of, or contamination of, water supply Loss of property Damage to pump stations Structure and infrastructure damage – flooded structures and eroded roads Misplaced residents Snakes migrate and mosquitoes increase Fire – as a result of loss of water supply Debris in transportation paths Emergency response delays Disruption of traffic can lead to impacts to the economy Natural environments damage, to include protected species and critical habitats
Vulnerabilities	92 structures are currently located within the floodplain. Three properties are commercial- one church and two apartments. Although these properties are elevated, the maps indicate the structures are affected by the floodplain. The floodplain includes 1 lift station at 1600 Moody Lane. Of the total assessed value improvement in the city, 21.62% is at risk from a 100-year flood event. Flooding causes soil erosion along the banks of Walnut Creek and Hogpen Branch and over time causes directional changes in the flow of water in the creek channel and surrounding areas. $1 million in repairs was done to the aerial sewer lines crossing Walnut Creek to fix damage done by streambank erosion caused by flooding.

Past damage done to jurisdictional roads and critical infrastructure due to flooding, including where in your jurisdiction the damage occurred: Flooding events have caused damage to the railroad tracks halting all railway traffic. Additionally, these flooding events have caused damage to the city's sewer collection infrastructure. Several sewer lines were damaged on Walnut Creek, and one sewer main break occurred on a tributary to Walnut Creek to the east of North Street causing sewage to flow into the creek. Nichols Branch has the potential to flood the street crossing at Newt Patterson Road. An emergency repair to a damaged sewer line that occurred during the November 2015 flooding cost $187,104.64. Damage that occurred during the flows of 2015 to four aerial sewer crossings on Walnut Creek were repaired for a total cost of $1,038,098. $178,734.49 in additional funds were used to design the project.

Does your jurisdiction require a permit for foundation repairs? If so, approximately how much money has been spent by citizens to repair properties damaged by flooding? A remodel permit is required, under which foundation repairs can be done but the city does not track foundation repairs specifically.

Intersections or traffic routes impacted by flooding: Walnut Creek has the potential to flood the following street crossings from west to east: Retta Road, Wilson Drive, North Street, South Parkridge Drive, North Walnut Creek Drive, Palm Street, Palm Court, Carlin Road, and a section of North Holland Road.

Hogpen Branch has the potential to flood the following street crossings from upstream to downstream: Country Meadow Drive, the intersection of the United States Route (US) 287 Frontage Road and Callender Road, Farm to Market (FM) 157, North Walnut Creek Drive, and Country Club Drive.

Low Branch has the potential to flood the following street crossings from upstream to downstream: FM 917, South Main Street/Business 287, and South Mitchell Road.

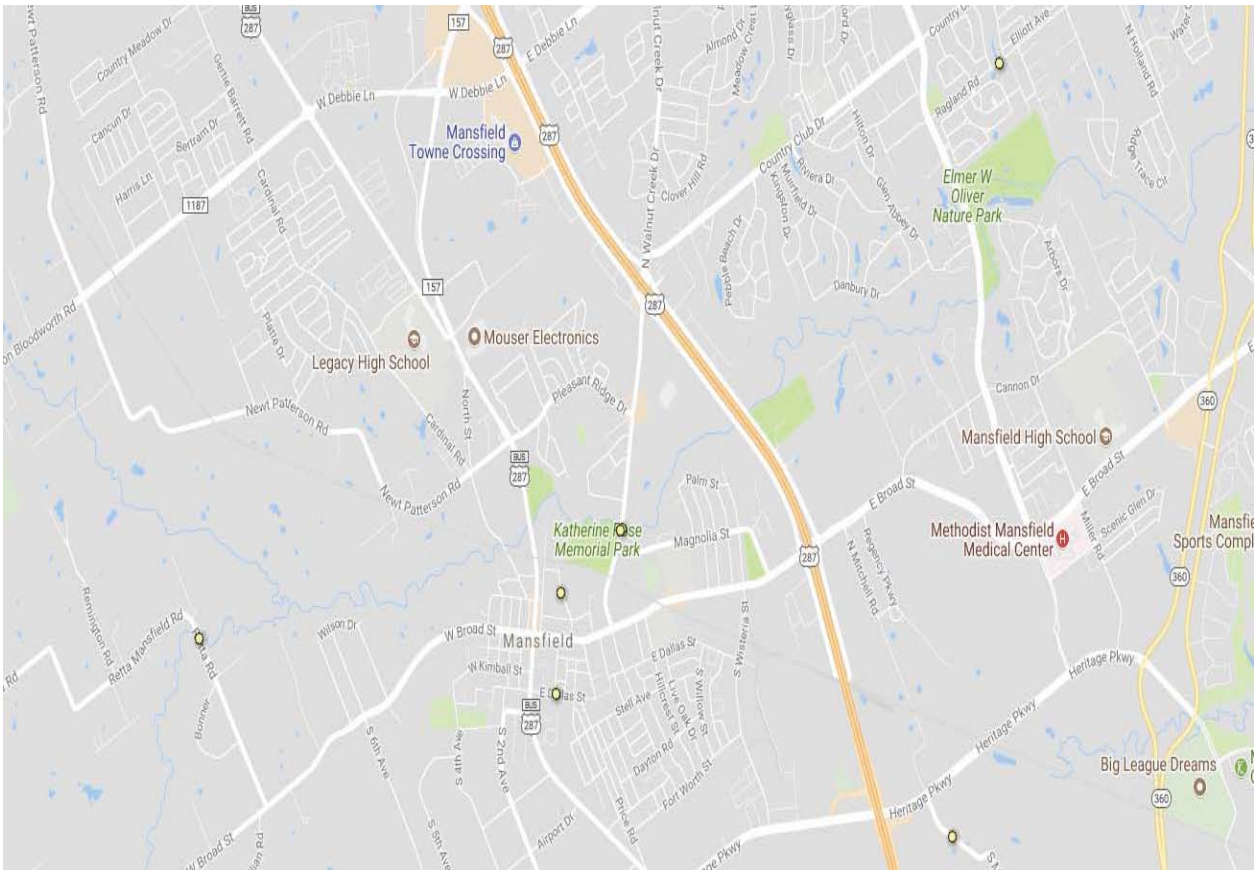
Pond Branch has the potential to flood the following street crossings from upstream to downstream: South Main Street/Bus 287, East Dallas Street, East Broad Street, Elm Street, and Sycamore Street.

Reece Branch has the potential to flood the street crossing at FM 917.

Watson Branch has the potential to flood the following street crossings from upstream to downstream: Russel Lane and FM 157. See low water crossings below. These roads have the potential to flood.

Names of any creeks or rivers that flood: Walnut Creek, Hogpen Branch, Low Branch, Nichols Branch, Reece Branch, and Watson Branch.

Low Water Crossings: A low water crossing provides a type of bridge when water flow is low. Under high-flow conditions, water runs over the roadway and precludes vehicular and pedestrian traffic. These crossings can be dangerous when flooded. Crossings are identified with a yellow dot.



Road	Flooding Source	Low Water Crossing Type
Walnut Creek Drive, Southbound (1.0 mile south of US 287)	Walnut Creek	Bridge Class
Walnut Creek Drive, Northbound (1.0 mile south of US 287)	Walnut Creek	Bridge Class
Mitchell Road	Low Branch	Vented Ford
Sycamore Street	Pond Branch	Vented Ford
Dallas Street And Pond Street	Pond Branch	Vented Ford
Ragland Road	Ragland Branch	Vented Ford
Retta Road	Walnut Creek	Vented Ford

Low Water Crossing Types Defined:

Bridges are open-bottom structures with elevated decks. They may be designed with one or several piers. Low water bridges generally have greater capacity and are able to pass higher flows underneath the driving surface than most vented and unvented fords.

Vented fords have a driving surface elevated some distance above the streambed with culverts (vents) that enable low flows to pass beneath the roadbed. The vents can be one or more pipes, box culverts, or open-bottom arches. In streams carrying large amounts of debris, the driving surface over the vent may be removable, permitting debris to be cleared after a large flow event.

According to the City of Mansfield Geographic Information Systems (GIS) Department, the only critical facility located in the 100-year floodplain is one school.

Land Cover Type	Total Area in Jurisdiction (Acres)	Total Area in the 100-year Floodplain (Acres)	Percentage (%) of Area in the 100-year Floodplain
Commercial	4,230.49	563.41	13.32%
Industrial	529.01	8.78	1.66%
Residential	8,610.62	571.86	6.64%
Total	**13,370.12**	**1,144.05**	**21.62%**

Source: City of Mansfield Geographic Information Systems (GIS) Department.

National Flood Insurance Program Compliance

Participation in the National Flood Insurance Program (NFIP) is based on a voluntary agreement between a community and the Federal Emergency Management Agency (FEMA). For communities that adopt a floodplain management ordinance to reduce flood risks to new construction, federally backed flood insurance is made available to property owners in the community. Compliance with the NFIP, however, extends beyond mere participation in the program. The three basic components of the NFIP include: 1) floodplain identification and mapping risk, 2) responsible floodplain management, and 3) flood insurance. The City of Mansfield is a participant in the NFIP and provides details about the community and their participation below. The following information was requested:

CID	480606#
Community Name	City of Mansfield
Counties	Johnson/ Ellis/ Tarrant
Initial FHBM Identified	2/22/74
Initial FIRM Identified	12/18/85
Current Effective Map Date	6/3/13
Reg-Emer Date	12/18/85
Tribal	No

Source: http://www.fema.gov/cis/TX.html.

Who acts as your floodplain administrator/manager? Director of Public Works.

What specific flooding ordinances and plans does your jurisdiction have? Flood Damage Prevention Ordnance.

What are the building requirements for properties located in a Special Flood Hazard Area (SFHA)? 3 feet above Federal Emergency Management Agency (FEMA) study base flood elevation (BFE) and 2 feet above BFE for ultimate condition study.

What building restrictions, in regards to floodplains, does your jurisdiction enforce? All permitted activities in a special flood hazard area are required to submit a Floodplain Development Permit as part of permitting process.

Repetitive and Severe Repetitive Loss Properties: Known repetitive loss properties and severe repetitive loss properties within the City of Mansfield are listed below. **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. **Severe repetitive loss properties** are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

Repetitive Loss Properties		
Type (residential, commercial, institutional, etc.)	**Location (N,E,S,W in jurisdiction)**	**Claim Amount ($)**
Residential	West	$7,426.12
Residential	Central	$21,901.08
Residential	Central	$84,595.83
Residential	Central	$30,841.13
Residential	Central	$128,430.41
Residential	Central	$4,081.15
Total		**$277,275.72**

Source: Federal Emergency Management Agency (FEMA) Flood Claims Database, as of February 17, 2016.

Residential Parcels Located in 100-year Floodplain	Percentage of Total Residential Parcels Located in 100-year Floodplain	Commercial and Industrial Parcels in 100-year Floodplain	Percentage of Commercial and Industrial Parcels in 100-year Floodplain
775	3.67%	182	12.18%

Source: City of Mansfield Geographic Information Systems (GIS) Department.

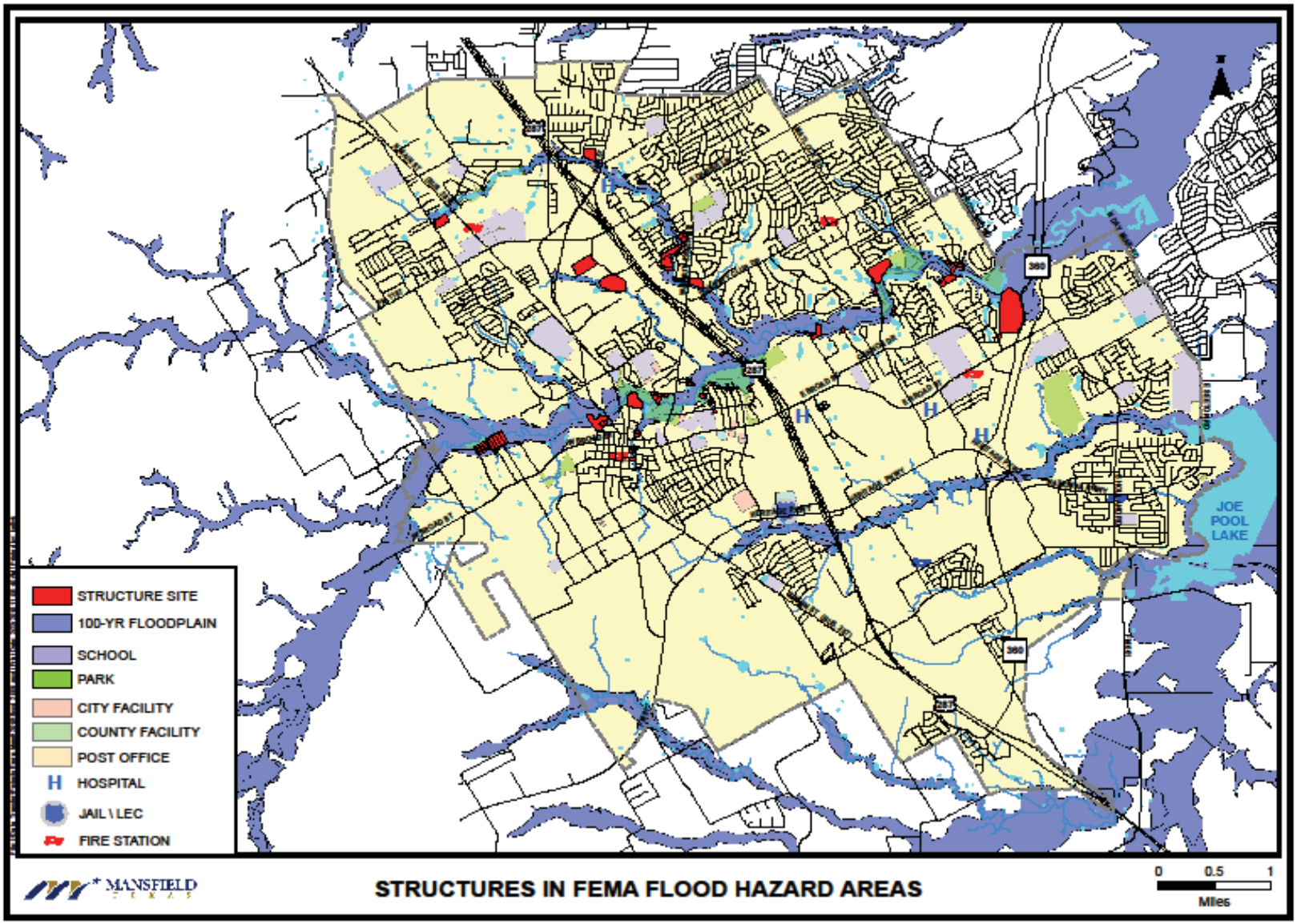
The following National Flood Insurance Program (NFIP) questions were answered to the best of the City of Mansfield's ability.

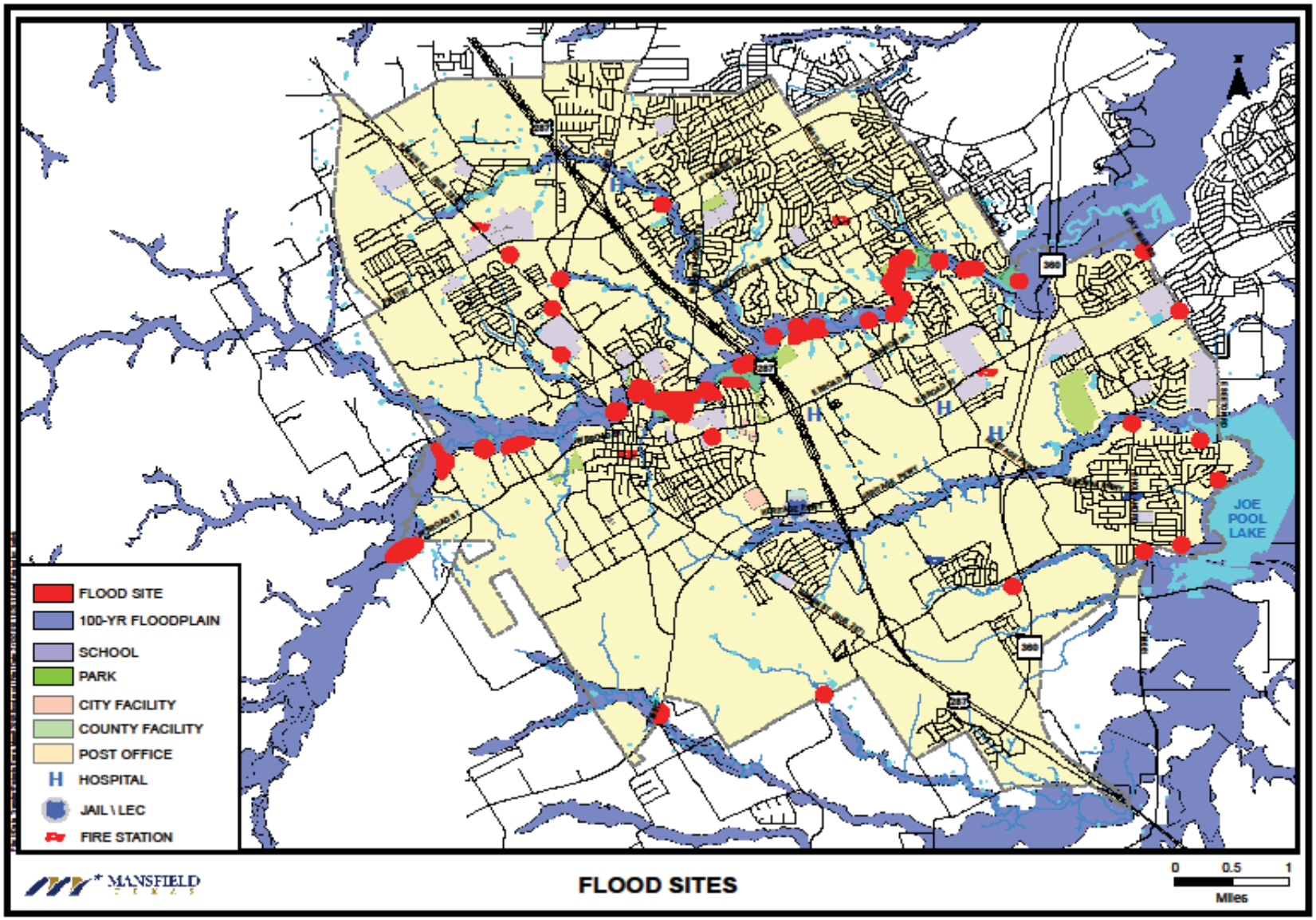
Insurance Summary		
NFIP Topic	**Source of Information**	**Comments**
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist Flood Claims Database Dated 2/17/16	Policies in-force: 216 Insurance in-force: $63,277,300 Written premium in-force: $109,461
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist Flood Claims Database dated 2/17/16; Property Purchase records	Since 1978: 123 claims have been filed, but 22 have closed without payment. $3,792,120.40 has been paid.

NFIP Topic	Source of Information	Comments
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	92.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	Areas within the city limits exist where limited overflow capacity or underground system size result in water flowing over the curb and into structures.
Staff Resources		
NFIP Topic	**Source of Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Community FPA	Yes, 2 staff members have Certified Floodplain Manager (CFM) certifications.
Is floodplain management an auxiliary function?	Community FPA	Yes.
Provide an explanation of NFIP administration services (e.g. permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	All permitted activities that occur within a special flood hazard area are required to submit a Floodplain Development Permit for review. All new development adjacent to drainage ways are required to elevate structures 2 feet above ultimate drainage study Base Flood Elevations (BFEs) or 3 feet above current effective BFEs. FEMA elevation certificates are required to be submitted for new construction where a minimum finished floor elevation is specified in proximity to a SFHA. All street crossings with a potential to overtop have high water signs. Some streets are able to be closed with gates when flooded. The city has a specialist on staff who is able to evaluate submitted studies.
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Staff time, development resistance, public understanding of full flood risk
Compliance History		
NFIP Topic	**Source of Information**	**Comments**
Is the community in good standing with the NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes.
Are there any outstanding compliance issues (i.e. current violations)?		No.

When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Community Official	9/15/16
Is a CAV or CAC scheduled or needed?	Community Official	No.
Regulation		
NFIP Topic	**Source of Information**	**Comments**
When did the community enter the NFIP?	Community Status Book https://www.fema.gov/national-flood-insurance-program-community-status-book	12/18/85
Are the FIRMs digital or paper?	Community FPA	Digital.
Do floodplain development regulations meet or exceed FEMA or state minimum requirements? If so, in what ways?	Community FPA	Yes.
Provide an explanation of the permitting process.	Community FPA, State, FEMA NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance-manual. Community FPA, FEMA CRS Coordinator, ISO representative CRS Manual: https://www.fema.gov/media-library/assets/documents/8768?id=2434	All permitted construction activities are handled through our permitting department under Development Services. The permit intake personnel receive the paperwork and distribute to the other departments for their review. A component of the Engineering Department review is to check for proximity to SFHA or other drainage concerns. All new construction is required to meet the elevation requirements in the Flood Damage Prevention Ordinance.
Community Rating System (CRS)		
NFIP Topic	**Source of Information**	**Comments**
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	No.

The following maps illustrate structures in the City of Mansfield that are in FEMA flood hazard areas and flood sites within the city.


STRUCTURE SITE
100-YR FLOODPLAIN
SCHOOL
PARK
CITY FACILITY
COUNTY FACILITY
POST OFFICE
HOSPITAL
JAIL \ LEC
FIRE STATION
JOE POOL LAKE
MANSFIELD
STRUCTURES IN FEMA FLOOD HAZARD AREAS
0 0.5 1
Miles


FLOOD SITE
100-YR FLOODPLAIN
SCHOOL
PARK
CITY FACILITY
COUNTY FACILITY
POST OFFICE
HOSPITAL
JAIL \ LEC
FIRE STATION
JOE POOL LAKE
MANSFIELD
TEXAS
FLOOD SITES
0 0.5 1
Miles

3.3.6 Thunderstorm

Hazard Profile: Thunderstorm	
Category	**Response**
Risk Ranking	1
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Medium
Potential Impact	Property damage to fences, vehicles, equipment, and roofs Transportation delays Injuries and deaths Debris from trees and damaged property Electrical grid problems Communication problems – phone and internet lines down Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Due to the dynamic nature of thunderstorms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage due to thunderstorms, and specifically, which hazard within the thunderstorm (hail, high wind, and lightning): Many rooftops in Mansfield have been damaged due to high winds and hail, trees blowing down into houses, and power lines. Since 2010, high wind and hail has caused the most significant damages to homeowners, with winds measuring from 50-74 knots and hail measuring .88-1.25" in diameter.

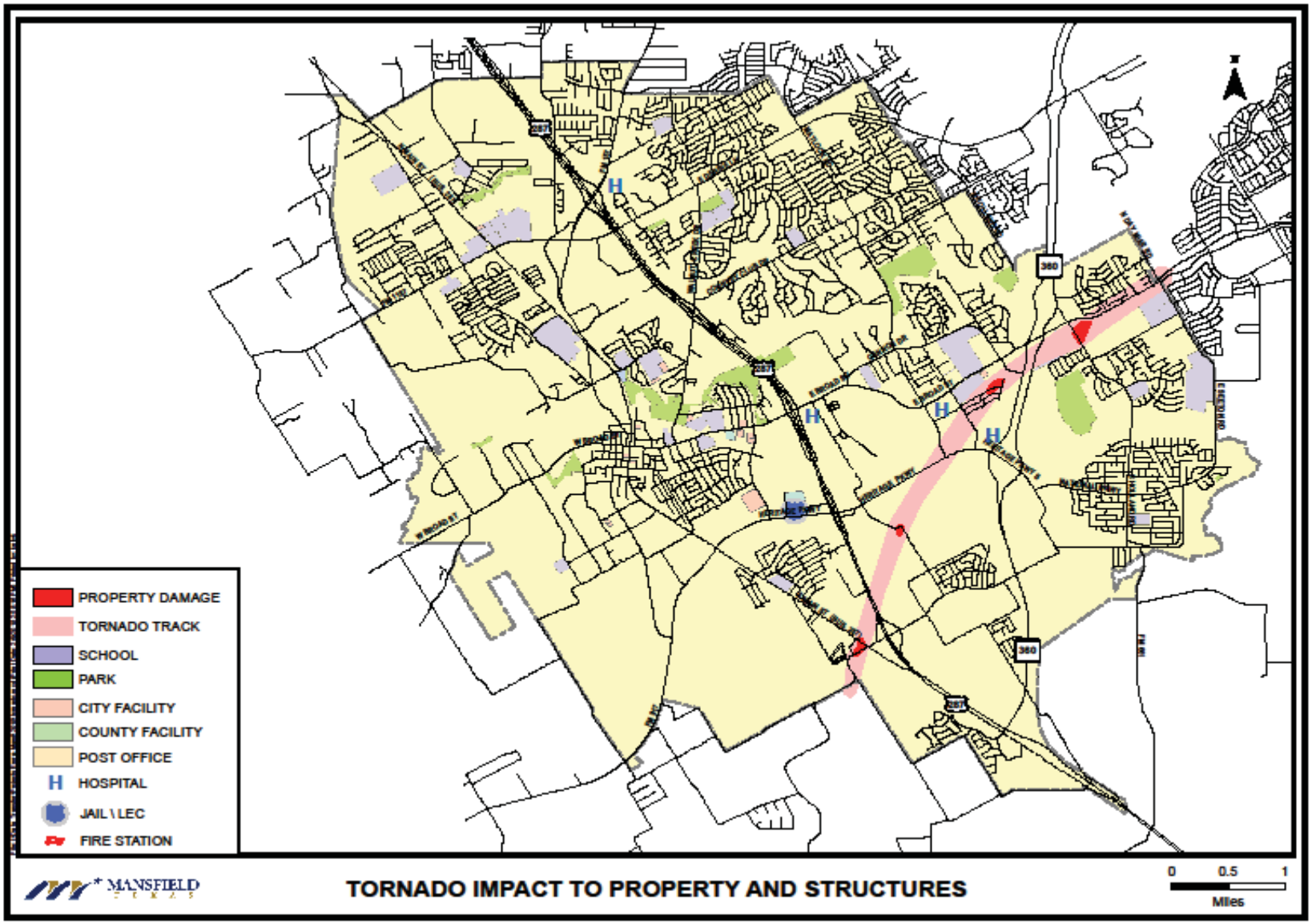
Number of homes lost due to lightning-induced fires: This information is not tracked.

3.3.7 Tornado

Hazard Profile: Tornado	
Category	**Response**
Risk Ranking	4
Geographic Area Affected	Limited
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Major
Potential Impact	Injury or death Power outage Blocked roadways from trees and damaged property Natural gas pipeline breaks – fire injuries, possible deaths Transportation disruption Rerouting traffic Loss of property Structure and infrastructure damage Misplaced residents Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Due to the dynamic nature of tornadoes, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments are exposed to this hazard.

Past damage done to your jurisdiction's roads and critical infrastructure due to tornadoes, including where the damage occurred and how much it cost to repair: Mansfield experienced an EF0 tornado in January of 2015 which caused approximately $75,000 in damages. This tornado and all previous tornadoes have started in the southwest part of the city and travelled to the northwest.

Is there an area of the town that is the most vulnerable to tornadoes? The most vulnerable areas of town would include a diagonal path from the southwest to northeast part of the city and would include the industrial sector in southwest Mansfield, a water treatment plant, public safety building, public works service center, and dispatch and the law enforcement center, which are all located in close proximity to each other. Mansfield Methodist Hospital is also in the possible path and was almost struck by the January 2015 tornado. The following map shows the path of the 2015 tornado and the damaged locations.


PROPERTY DAMAGE
TORNADO TRACK
SCHOOL
PARK
CITY FACILITY
COUNTY FACILITY
POST OFFICE
HOSPITAL
JAIL \ LEC
FIRE STATION
MANSFIELD
TORNADO IMPACT TO PROPERTY AND STRUCTURES
0 0.5 1
Miles

3.3.8 Wildfire

Hazard Profile: Wildfire	
Category	**Response**
Risk Ranking	8
Geographic Area Affected	Significant
Probability of Future Occurrence	Highly Likely
Maximum Probable Extent	Minor
Potential Impact	Injury or death Property and fence damage Road closure Traffic accidents Loss of power – burning utility poles Loss of property Structure and infrastructure damage Misplaced residents Loss of resources Natural environments damage, to include protected species and critical habitats
Vulnerabilities	Given the dynamic nature of wildfires, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Most vulnerable location (North, East, South, West) of your jurisdiction? The most vulnerable locations for wildfires are the unoccupied portions of land bordering Mansfield's west, east and southern boundaries. These are the areas where new home construction is occurring and creating a wildland-urban interface (WUI). There has been $144,825 of damage based off of fire department reporting estimates from previous years.

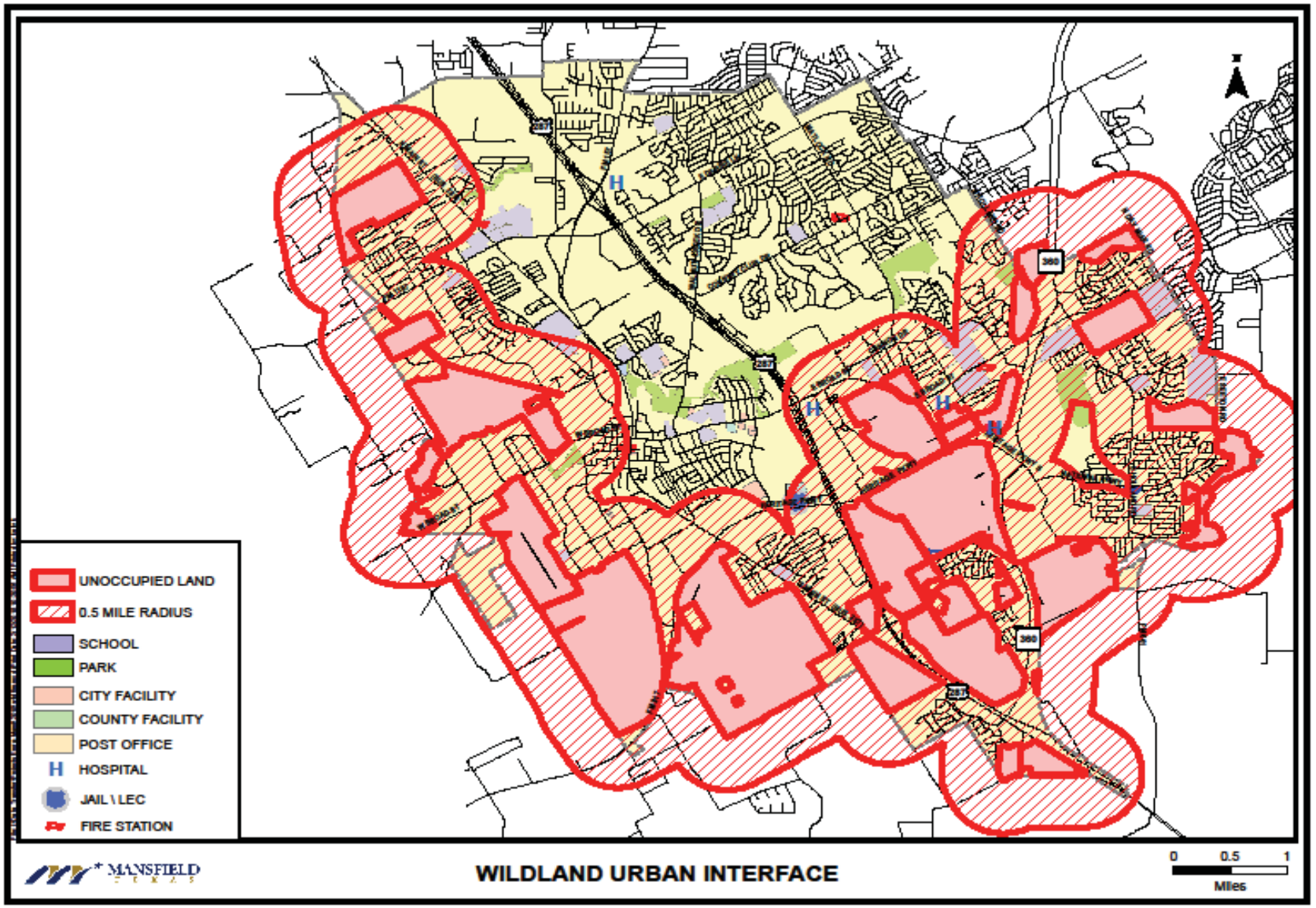
Assessed Value of Improvements	
In the WUI	**Percentage in the WUI**
$2,326,207,373	42.03%

Source: Mansfield Fire Department.

Residential		Commercial		Industrial	
Residential Parcels Within WUI	Percentage (%) Within WUI	Commercial Parcels Within WUI	Percentage (%) Within WUI	Industrial Parcels Within WUI	Percentage (%)Within WUI
9,088	43.26%	508	37.49%	94	78.99%

Source: Mansfield Fire Department.

The following map reflects the WUI within the city.


UNOCCUPIED LAND
0.5 MILE RADIUS
SCHOOL
PARK
CITY FACILITY
COUNTY FACILITY
POST OFFICE
H HOSPITAL
JAIL \ LEC
FIRE STATION
MANSFIELD
TEXAS
WILDLAND URBAN INTERFACE
0 0.5 1
Miles

3.3.9 Winter Storm

Hazard Profile: Winter Storm	
Category	**Response**
Risk Ranking	5
Geographic Area Affected	Extensive
Probability of Future Occurrence	Occasional
Maximum Probable Extent	Minor
Potential Impact	Structural damage Injuries or death Power outages Loss of ability to use roads for driving Increased traffic accidents Loss of heat Stranded travelers / motels at full capacity Tree debris create fuel load for fire hazard Delayed emergency response time Frozen/ busted pipes leading to loss of water Disruption of traffic Impacts to the economy Communication capabilities decrease
Vulnerabilities	Given the dynamic nature of winter storms, all populations, economy, structures, improved property, critical facilities and infrastructure, and natural environments in the city are exposed to this hazard.

Bridges and overpasses that can be impacted by a winter storm, including street names and their location within your jurisdiction: There are many bridges and overpasses within the city, including but not limited to those connected to the Highway 360 Tollway project. See map of areas in Mansfield that are vulnerable to icing during winter storms.

What impacts are caused when these bridges and/or overpasses are impacted by winter storms? Major traffic issues and accidents have and will occur due to iced over bridges and limited visibility.