CANADIAN COUNTY

City of Mustang, Oklahoma

2012 Multi-Hazard Mitigation Plan Update

Flanagan & Associates, LLC
Planning Consultants

Acknowledgements

The City of Mustang Multi-Hazards Mitigation Plan Update was made possible by a Hazard Mitigation Grant through Oklahoma Emergency Management from the Federal Emergency Management Agency, and local funding from Canadian County.

The Plan was prepared under the direction of the Canadian County Commissioner's Office, with the participation and assistance of numerous agencies, organizations, and individuals, including:

Mustang City Government

Mayor ..... Jeff Landrith

City Council

Councilor ..... Jay Adams
Councilor ..... Mark Grubbs
Councilor ..... Ben Green
Councilor ..... Terry Jones
Councilor ..... Linda Hagan
Councilor ..... Don Mount

City Administration

City Manager ..... Mike Rutledge
City Clerk ..... Trisha Winham

Hazard Mitigation Advisory Committee

Police Chief ..... Chuck Foley
Police Captain ..... Willard James
Fire Chief ..... Carl Hickman
Economic and Community Development. .... Robert Coleman
Senior City Planner ..... Melissa Helsel
Chamber of Commerce ..... Becky Julian
APM Severn Trent Services ..... Oliver R. Phipps, Sr.

F.3 Mustang

The City of Mustang is located in southeast Canadian County approximately 15 miles west southwest of downtown Oklahoma City. A Locator Map is presented in Figure F.3-1. It is one of Oklahoma's fastest growing communities. Its 2010 Census population was 17,395. Total land area in the community is 12 square miles.

Section 1 Introduction

1.1 Geography

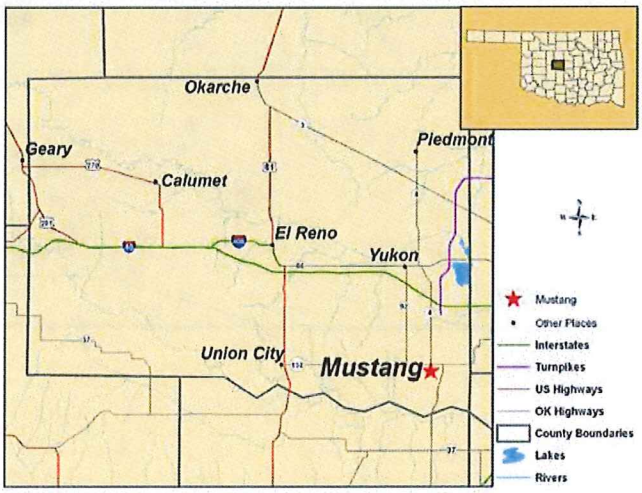
Latitude: 352303N

Longitude: 974328W

GNIS ID: 1095723

Mustang is located 15 miles west-southwest of Oklahoma City, in the southeast corner of Canadian County. Its eastern boundary is the Canadian County line, and its southern boundary is 2.5 miles north of the Canadian River, the County's southern boundary. It is situated on relatively high ground between the North Canadian and Canadian Rivers watersheds. The terrain is composed of gently rolling hills with moderate slopes. The area originally consisted of wide prairie, with cattle and horse ranches and rich farmland. In recent years the community has felt urbanization pressures from the Oklahoma City metropolitan area, and is gradually transforming itself into an upscale bedroom community with a mix of rural estates, large-lot residential and more traditional neighborhoods with houses dating from the 1960s. There is virtually no industry. The base map for the City of Mustang is shown in Figure F.3-2.

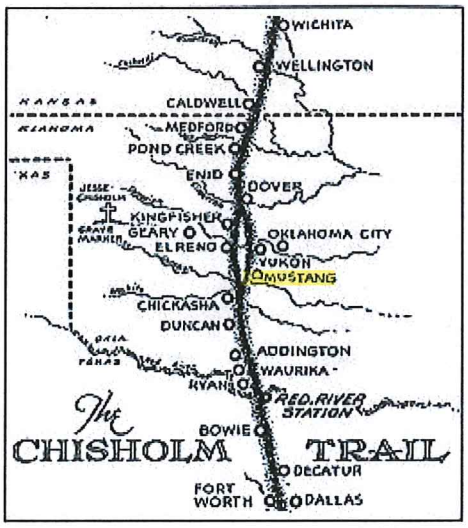
Figure F.3–1 City of Mustang Locator Map

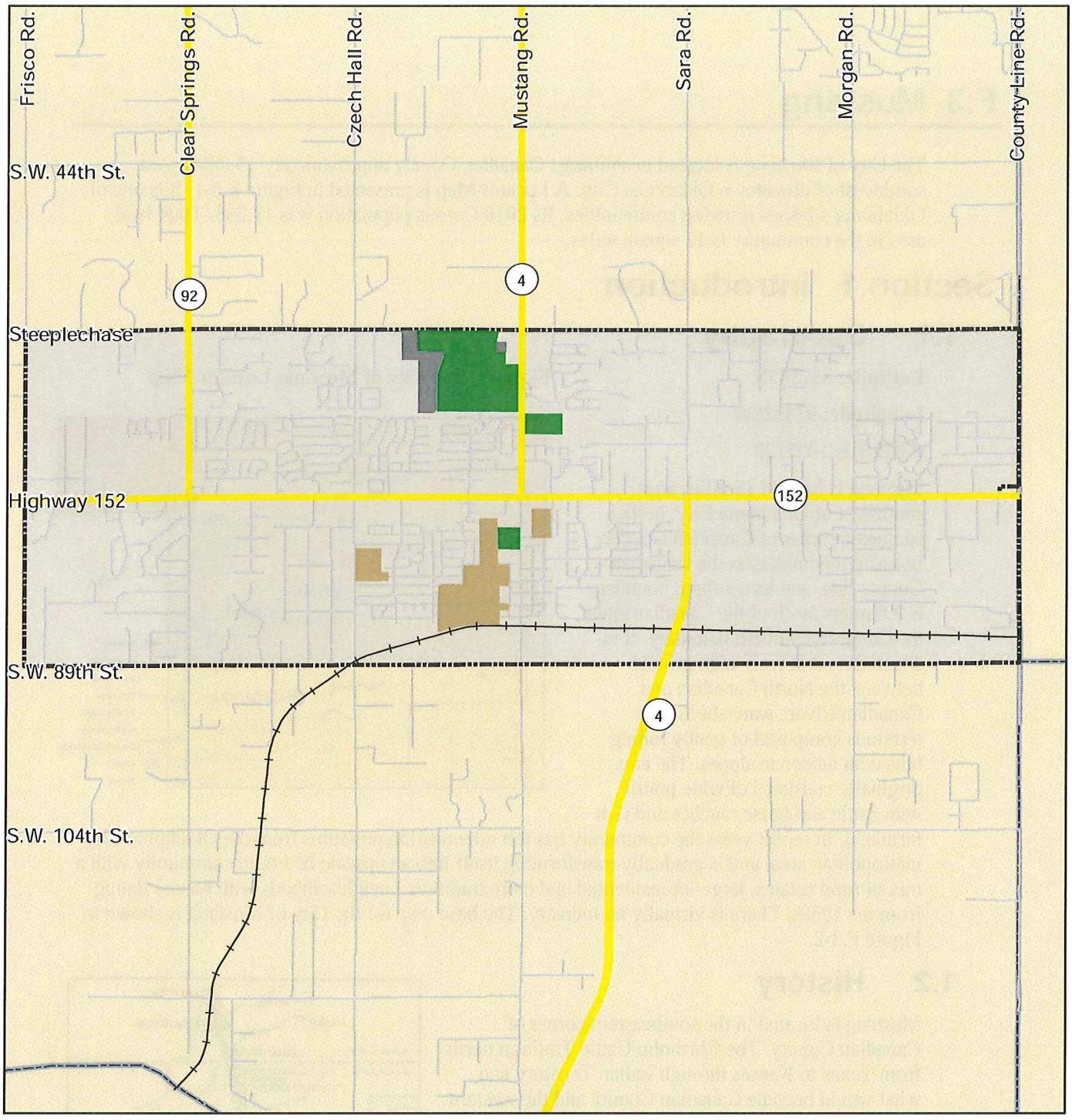


1.2 History

Mustang is located in the southeastern corner of Canadian County. The Chisholm Cattle Trail ran north from Texas to Kansas through Indian Territory and what would become Canadian County and the western edge of Mustang in the days after the Civil War and before the coming of the railroads. Over 10 million head of cattle passed over the trail.

The Mustang post office was established in 1895, but a formal community was not established until 1901. The new town was located on the Oklahoma City and Western Railroad, which eventually became part of the St. Louis and San Francisco system and finally the Burlington Northern Santa Fe.





LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- Railroads
- Water
- City Limits
- Government
- Park
- School

0 0.5 1 Miles

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Figure F.3-2

City of Mustang

Basemap

Mustang City Hall

During the first half of the twentieth century, agriculture fueled Mustang's development. A variety of crops were grown in the area, including wheat, oats, corn, cotton, sweet potatoes, watermelons, and cantaloupes. Until the 1920s peach and other fruit orchards were the primary crops. Truck farming remained dominant until the 1940s, when the dairy and beef industry gained supremacy. Beginning in the 1960s Mustang began a transition from an informal town and farming community into an incorporated city and bedroom community for Oklahoma City. Mustang formally incorporated as a chartered city in 1969. Its growth was phenomenal: in 1960 Mustang had 200 residents, but by 1970 the town had grown to 2,637. By 1990 there were 10,434 residents and 17,395 in 2010.

1.3 Demographics

The City of Mustang's population grew by 32.2% between 2000 and 2010. Approximately 15.1% of Canadian County's population lives in Mustang. Key Mustang demographic data is shown in Table F.3-1.

A map showing the persons age 65 and older is presented in Figure F.3-3. The distribution of individuals living at or below the poverty level is presented in Figure F.3-4. There appear to be no mobile home parks in Mustang.

Table F.3–1 City of Mustang Population

Group	2010	Percent
Total Population	17,395	100.0%
Persons 5 years of age and younger	1,266	7.3%
Persons 65 years of age and older	1,934	11.1%
Individuals living at or below the poverty level (2009)	1,006	6.1%

Source: US Census Bureau

Ethnicity:

White – 15,371 (88.4%)
American Indian – 674 (3.9%)
African American – 166 (1.0%)
Hispanic – 1,054 (6.1%)
Asian – 160 (0.9%)
Other race – 308 (1.8%)

The City of Mustang's Town Center.
This 59,000 square foot facility houses the City Library, the Senior Center, a huge indoor recreation area, banquet facilities, conference rooms and class rooms. The outdoor sports complex has five ball diamonds, an aquatic facility and a large playground.

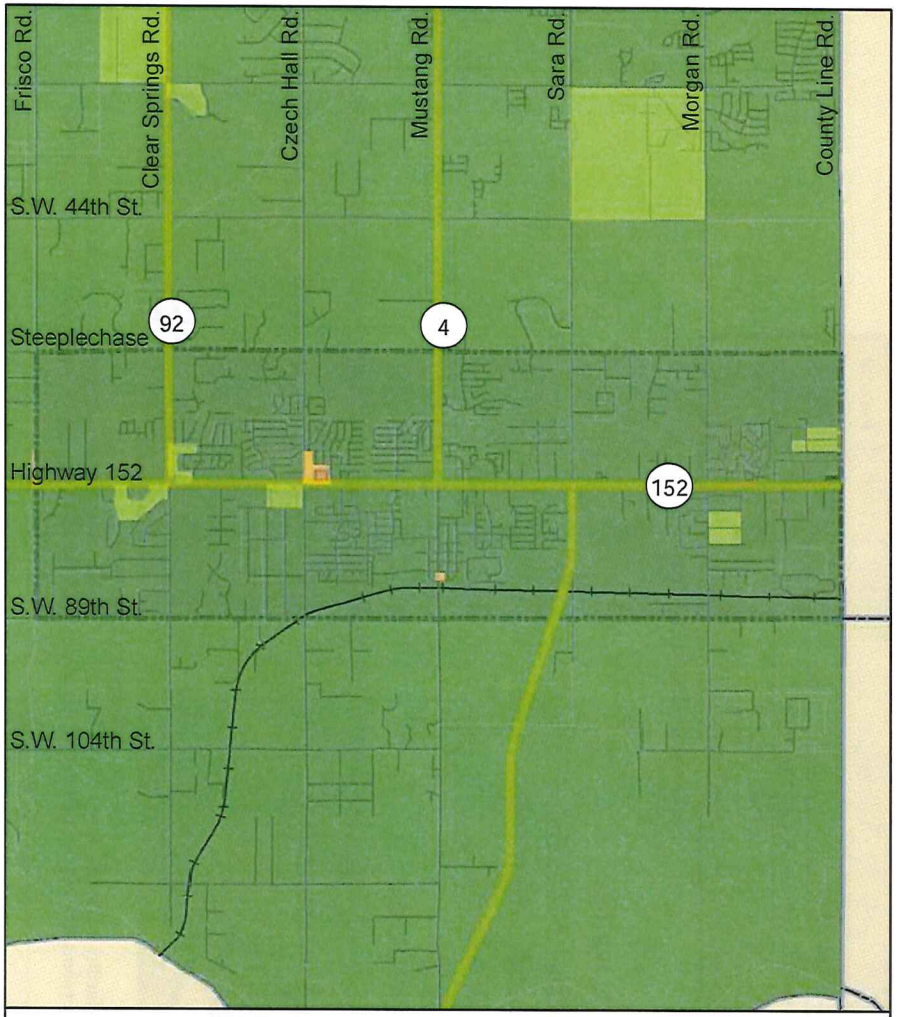


Figure F.3-3:

City of Mustang
Percent of Population
Over 65

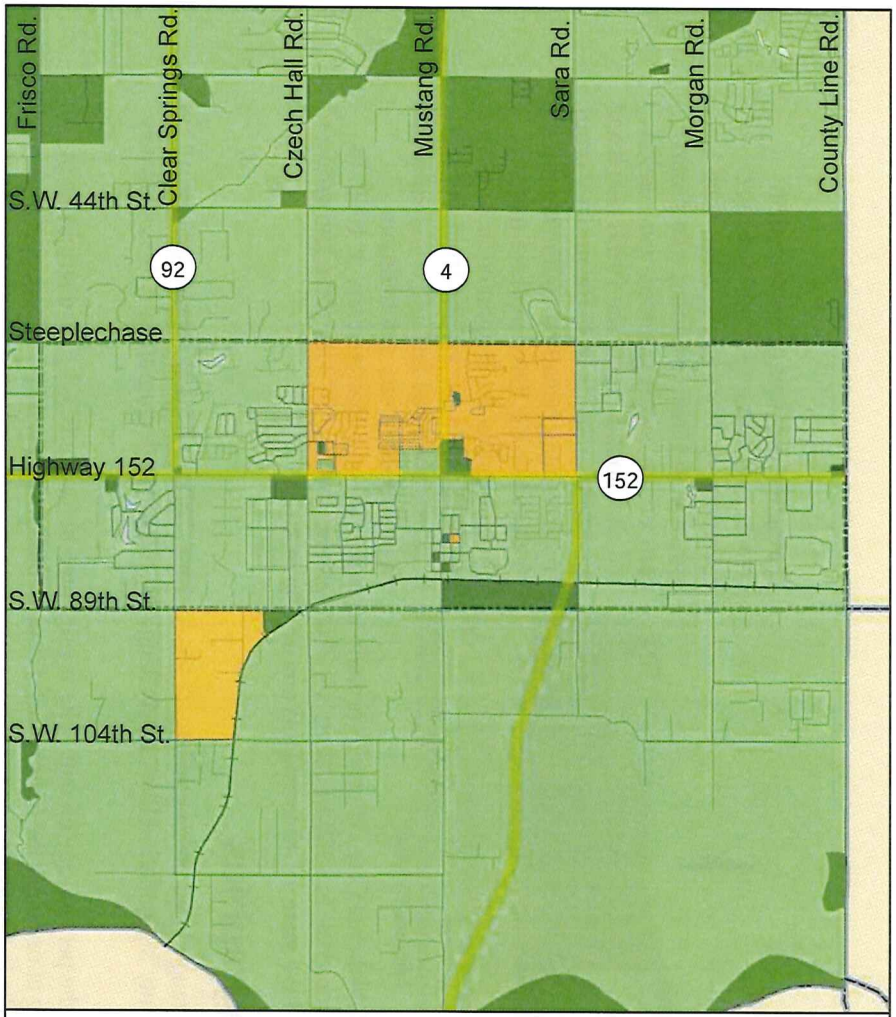


Figure F.3-4:

City of Mustang
Perrcent of Population
Under the Poverty Line

1.4 Lifelines

See Chapter 1.2.6 for a helpful description of Lifelines.

Mustang Utility Systems

Electrical System

Oklahoma Gas and Electric Company, Caddo Electric, Oklahoma Electrical Cooperative

Water Service

The City of Mustang water supply comes from connections to Oklahoma City and from 12 wells. The water system has a capacity of 9.36 million gallons a day (mgd), with a storage plant capacity of 1.4 mgd and 1.6 mgd in the distribution system.

Natural Gas

Oklahoma Natural Gas Company

Wastewater Treatment

The City has its own wastewater treatment facility with a treatment capacity of between 1.5 and 3.0 mgd. Present load is 1.2 mgd.

Telephone, Internet and Cable Television

AT&T Oklahoma and Cox Communications.

Transportation

Highways & Major Roads

- OK Highway 152 runs east-west through Mustang.
- OK Highway 4 runs north-south through Mustang and intersects with Interstate 44 about 15 miles south of the City.

Railroads

The Stillwater Central Railroad (SLWC) operates a line through Mustang with primary cargoes of fuel, minerals and industrial products. Passenger train service is available 15 miles away at the Amtrak Station in Oklahoma City. (See Chapter 1.2.6.)

Airports

- Mustang is served by Will Rogers World Airport in Oklahoma City, which is approximately four miles east.
- Wiley Post Airport is eight miles north of Mustang near Bethany, in Oklahoma City.
- Clarence E. Page Municipal Airport is nine miles north of Mustang near Yukon.
- Sundance Air Park is approximately 14 miles north of Mustang near Piedmont.

1.5 Economy

In 2010, there were 12,569 people over the age of 18 in Mustang. The employment statistics for the 2010 Census have not been released as of this writing. In 2009, 68.1% of Mustang's work force was employed, 4.0% unemployed, and 28.7% not in the labor force. A significant portion of Mustang's working population commutes to jobs in Oklahoma City; a smaller segment of the population commutes other towns in Canadian County.

Over 50% of the wage earners in Mustang work in government, education and health services, professional and business services and finance. This is the enviable picture of a modern and upscale bedroom community. Mustang's major employers are listed in Table F.3-2.

Table F.3–2 Major Employers in Mustang

Company	Product/Service	Employees
Mustang Public Schools	Education	1,249
Wal-Mart	Retail	277
Tate Publishing	Publisher	189
City of Mustang	Government	130
Lowes Home Improvement Store	Retail	107
Oklahoma National Guard Armory	Government	75
Accurate Drilling Services	Construction	67
Caldwell Banker Select	Real Estate	50
Larry's New Homeland	Grocer	45
Security Solutions	Manufacturer	35
Arbor House Assisted Living	Health Care	35
Industrial Gasket	Manufacturer	26
Wilson Ophthalmic Corp.	Manufacturer	17

1.6 Development

Canadian County has experienced a development boom in its eastern third, largely due to the expansion of the Oklahoma City Metropolitan Area. The Oklahoma City surge literally enveloped Mustang's 12 square miles. Despite its rapid growth, and perhaps due to its remaining compactness and delimitation, Mustang retained its small town feel while attracting upwardly urban refugees with its first class schools and clean, safe neighborhoods. The City's population has continued to grow, slowing only recently as the undeveloped portions of the community gradually built up with new homes, services and commercial tracts. In recent years new building permits dropped from a high of 297 in 2006 to 50 new homes in 2010. Housing units in 2010 totaled 6,851; 6,589 occupied and 262 vacant.

Past Development

In 1960, Mustang was largely undeveloped, the land within what is now the City Limits overwhelmingly devoted to agriculture and oil and gas production. In the 1960s the area began to fill with homes, at first gradually, then rapidly. Mustang formally incorporated as a chartered city in 1969, primarily to define its limits and have some control over its development in the midst of the massive Oklahoma City annexations. At first development was predominantly rural and large-lot residential, but in recent years a few more affordable small-lot residential tract homes have been platted and built with over 500 houses in a quarter section instead of 150 houses. Table F.3-3 describes Mustang housing units by type.

Table F.3–3 City of Mustang Housing Units, By Type

Housing Unit Type	2010
Single-family	6,255
Multi-family	586
Mobile homes	10
Boat, RV, van, etc.	0
Total housing units	**6,851**

Source: US Census Bureau

Mustang's development has been guided by a strong Comprehensive Plan, which has been strictly followed. Since 1982 the community has also been guided by the Mustang Economic Development Authority, the City's primary vehicle for encouraging and financing non-retail commercial and industrial growth.

According to the Canadian County Assessor's Office, there were 6,114 properties with improvements within the City of Mustang in 2010, with an independently estimated market value of $724,728,296. Table F.3-4 provides details on improved properties.

Table F.3–4 City of Mustang Property Types and Estimated Values

Improvement Type	Number	Estimated Market Value
Agricultural	42	$1,064,811
Residential	5,618	$644,437,958
Commercial	237	$66,446,337
Exempt	217	$12,779,190
Total	**6,114**	**$724,728,296**

Source: Canadian County Assessor's Office

Development Plans

Mustang's Community Development Department maintains, reviews and enforces the City's municipal zoning code. The Department is also responsible for long-range comprehensive land use planning. Mustang's Planning staff acts as advisors to the Planning Commission, Board of Adjustment and City Council.

Mustang is a rapidly growing community. New areas are being opened for development for both residential and non-residential uses. The City's Comprehensive Plan is the vehicle for planning the City's orderly growth.

Mustang's *Comprehensive Plan* and policies are directed toward making the City a recognizable and distinct place that is complete in terms of providing a wide variety of opportunities for living and working, and enjoying cultural and recreational pastimes. The Plan's overall aim is the protection of the health, safety and welfare of the community. It guiding values are balance, long-term economic and environmental sustainability, quality of life, people, neighborhoods and citizen participation in the community. An update to the Plan is expected in 2012.

1.7 Critical Facilities

The City of Mustang has 40 critical facilities that include City, County, State and Federal government facilities, public schools, financial institutions, medical or health care facilities, including nursing homes and assisted living facilities and structures of an historic nature. These are listed in Table F.3-5 and presented in Figure F.3-5.

Table F.3–5 Mustang Critical Facilities

Map ID	Name	Address
	City Government	
1	Mustang City Hall / Town Center	1501 N Mustang Rd
2	Mustang Police Dept	650 E. State Highway 152
3	Mustang Public Library	1201 N Mustang Rd
4	Mustang Fire Dept	465 W State Highway 152
5	Mustang Public Works	520 W SW 59th St

Map ID	Name	Address
6	Booster Pump	2401 E State Highway 152
7	Lakehoma Elementary School Water Tower	224 S Clear Springs Rd
8	Sewage Treatment	SW 59th St. and Public Service Way
9	Mustang Water Tower	200 S Burks Dr
10	Water Tower	925 S County Line Rd
Education		
11	Mustang Public Schools	906 S Heights Dr
12	Mustang Educational Center	400 Clear Springs Rd
13	Lakehoma Elementary School	224 S Clear Springs Rd
14	Centennial Elementary School	700 S Czech Hall Rd
15	Mustang Elementary School	400 S Mustang Rd
16	Mustang 9th Grade Center	430 W. Forster Dr.
17	Mustang Middle School	1145 S Heights Dr
18	Mustang High School	906 S Heights Dr
State Government		
19	Mustang National Guard Armory	420 Cedar Springs
Federal Government		
20	Mustang USPS	600 N Mustang Rd
Financial Institutions		
21	Cornerstone Bank	1408 N Mustang Rd
22	First Fidelity Bank	1521 N Mustang Rd
23	MidFirst Bank	835 E Highway 152
24	InTrust Bank	500 N Mustang Rd
25	All America Bank	444 W Hwy 152
26	Bank of Commerce	620 E State Hwy 152
Electric Infrastructure		
27	OG&E Electric Substation	867 N Sara Rd
Health Care Facilities		
28	Mustang Manor Assisted Living	1017 W State Highway 152
29	Arbor House Nursing Center	850 N Clear Springs Rd
30	Strawberry Fields Senior Housing	400 N Trade Center Ter.
31	Mustang Child Development Center	415 N Clear Springs
32	Bridge Kids Learning Center	1120 W Highway 152
Child Care Facilities		
33	Building Blocks	728 W Highway 152
34	Kidville	1711 1/2 E Highway 152
35	Castle Land Learning Center	819 S Mustang
36	Little Broncos Kids Club	714 S Mustang Rd
37	Ready Set Go Learning Center	126 W Highway 152
38	Little Broncos Kids Too	125 S Clear Springs
39	Country Charm Child Development Center	1712 E Highway 152
40	Kindercare Learning #976	713 N Mustang Rd

Source: City of Mustang

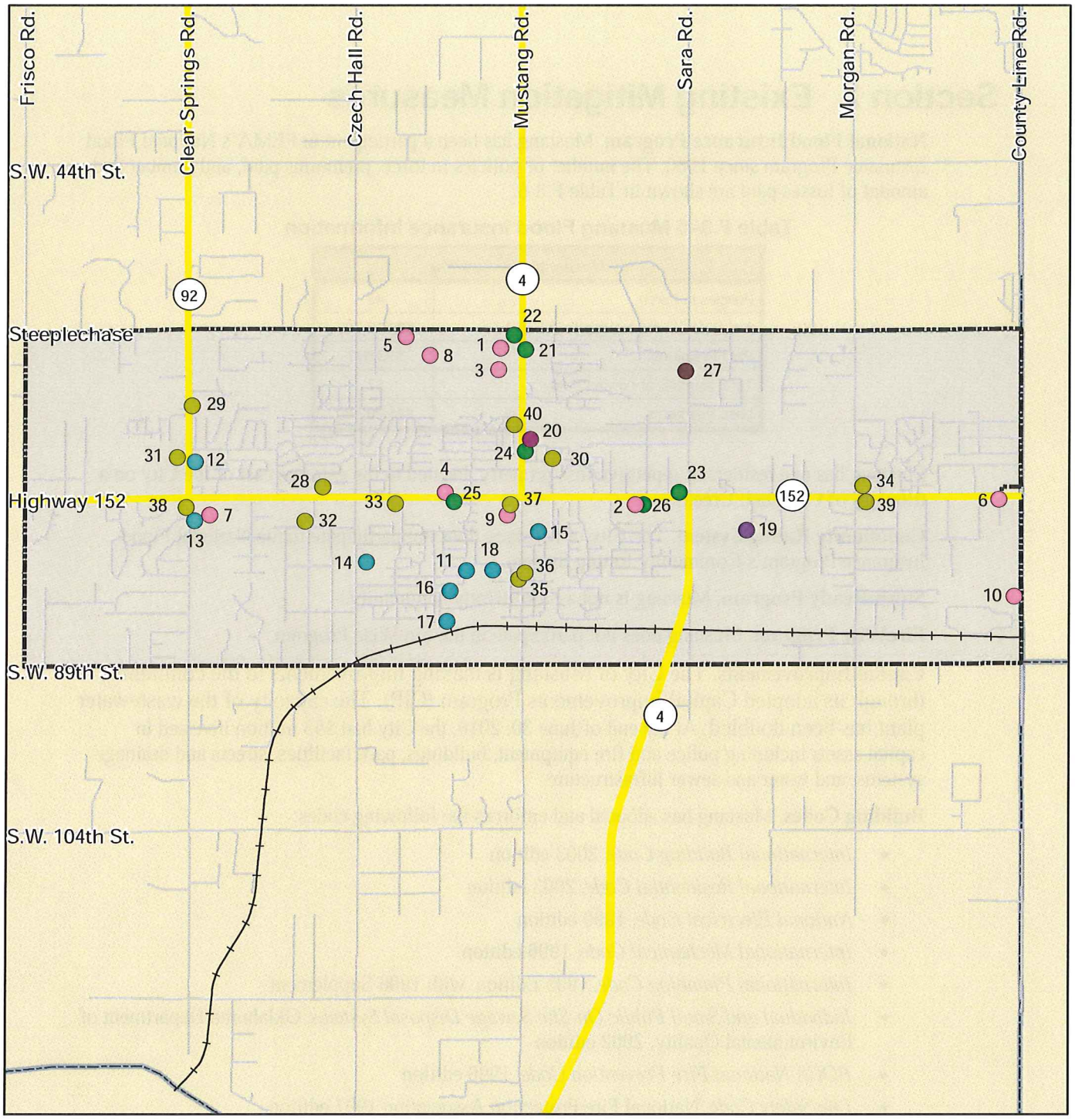


Figure F.3-5

City of Mustang

Critical Facilities

Section 2 Existing Mitigation Measures

National Flood Insurance Program. Mustang has been a participant in FEMA's National Flood Insurance Program since 1980. The number of policies in force, premiums paid, and number and amount of losses paid are shown in Table F.3-6.

Table F.3–6 Mustang Flood Insurance Information

Flood Insurance Information	
Policies in Force	43
Amount of Flood Insurance in Force	$8,918,700
Paid Premiums	$23,917
Total Number of Losses Paid	$7
Loss Payments	$45,207.60

Mustang has one residential repetitive loss property, located in the extreme east of the City on a tributary of Campbell Creek.

Community Rating System. The City of Mustang does not participate in the National Flood Insurance Program's Community Rating System.

StormReady Program. Mustang is not a StormReady community.

FireWise Program. Mustang does not participate in the FireWise Program.

Capital Improvements. The City of Mustang is making improvements to the community through its adopted Capital Improvements Program (CIP). The capacity of the wastewater plant has been doubled. At the end of June 30, 2010, the City had $53 million invested in capital assets including police and fire equipment, buildings, park facilities, streets and drainage systems, and water and sewer infrastructure.

Building Codes. Mustang has adopted and enforces the following codes:

- *International Building Code*, 2003 edition
- *International Residential Code*, 2003 edition
- *National Electrical Code*, 1999 edition
- *International Mechanical Code*, 1996 edition
- *International Plumbing Code*, 1995 Edition, with 1996 Supplement
- *Individual and Small Public On-Site Sewage Disposal Systems*, Oklahoma Department of Environmental Quality, 2002 edition
- *BOCA National Fire Prevention Code*, 1996 edition
- *Life Safety Code*, National Fire Protection Association 1997 edition.

Emergency Services

Police Department. The Mustang Police Department has 21 full-time police officers, one reserve officer. The Department operates a 23 vehicle fleet consisting of 18 patrol/ enforcement vehicles and five unmarked/administrative vehicles. The Mustang Police Department is NIMS compliant.

Fire Department. Mustang's Fire Department has 15 uniformed fire fighters and 15 volunteers. The Mustang Fire Department has one fire station. The Mustang Fire Department is not yet NIMS compliant. The Department's ISO rating is 5.

Hospitals. The nearest hospitals to Mustang are the South Community Hospital in Oklahoma City (nine miles), Integris Canadian Valley Hospital in Yukon (10 miles), Oklahoma Center for Orthopedic and Multi-Specialty Surgery in Oklahoma City (12 miles).

Ambulance Service. The Oklahoma City Emergency Medical Services Authority (EMSA) provides emergency and routine ambulance transport to Mustang as part of EMSA's primary service area.

Floodplain Management. The City of Mustang has adopted and strictly enforces FEMA's SFHA floodplain maps and standards. Mustang's City Ordinances codifies the City's Floodplain Regulations. All construction in flood hazard areas must be permitted by the City's Floodplain Manager. All new construction or substantial improvement to residential and non-residential structures are required to have the lowest floor (including basement), elevated at least one foot above the base flood elevation (BFE). A registered professional engineer, architect, or land surveyor must certify to the floodplain administrator that this standard has been satisfied. In addition, any development must result in a zero increase in the surface elevation of the BFE.

Environmental Preservation. Key values in Mustang's Long-Range Plan are improvement of health, quality of life, stability and sustainability. Sensitive environmental areas such as steep slopes, FEMA floodplains, and lands that directly impact large drainage basins are designated Development Sensitive and require a Planned Unit Development site plan (PUD).

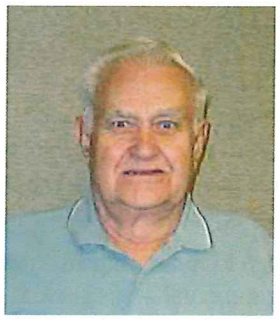
In addition, the City of Mustang operates a hazardous waste collection program in partnership with the Oklahoma Environmental Management Authority, for the disposal of batteries, motor oil, antifreeze, paint, tires and appliances.

Section 3 Planning Process

The CAC/TAC met monthly during the planning process to review progress, identify issues, receive task assignments, and advise the consultants. A list of CAC, TAC, and public meetings and dates is shown in Table F.3-7. Refer to Appendix C for meeting agendas.

City of Mustang Citizens' Advisory Committee

The CAC consists of the following members:



Kenneth Bryan
Baptist Men Disaster Relief

Studied Business Management at Central State University;
Baptist Men Disaster Relief – Leader, Chainsaw/Damage Assessment and Chaplain;
CERT CSM Pandemic Training.

Jack Price
Canadian Valley Technology Center
Business Development Coordinator

BA in Psychology from University West;
Boy Scouts of America Troop 396
Mustang Chamber of Commerce, Past President, Board Member

Supporting the CAC is the Mustang Technical Advisory Committee (TAC), which includes representatives of departments that have roles in multi-hazard planning, response, protection, and mitigation. Most of the detail work was done by management teams consisting of the following:

City of Mustang Technical Advisory Committee

Jerry Smith
Canadian County Emergency Management Director

Mike Rutledge
City Manager

International Code Council – Member;
ACOG – Member.

Amy Brandley
Canadian County
Floodplain Administrator, GIS Manager

Studies in Social relations at Cornell University;
Studies in Geography at Oklahoma University;
OFMA – Secretary;
Cameo Training; NIMS Training.

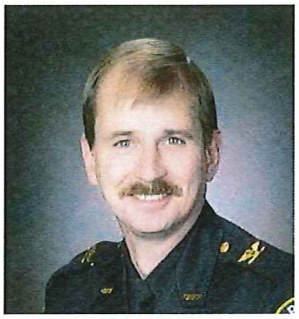
Melissa Helsel
City of Mustang, Sr. Planner

Bachelors degree in Urban Studies from College of William and Mary;
Graduate Work in Urban Planning at the University of Oklahoma;
AICP Member;
ACOG Member.

Carl Hickman
Mustang Fire Chief

AAS Degree in Municipal Fire Protection from Oklahoma State University;
Oklahoma Fire Chiefs Association, Past President.

Monte James
Former Mustang Police Chief



Associates Degree in Police Science from Oklahoma State University

Oliver R. Phipps, Sr.
A.P.M. Severn Trent Services

Full Public Services for Mustang: Streets, Parks, Wastewater Collection Systems, Water Wells, Distribution System, Animal Control, Lift Stations, Pumping Stations;
Class C Waste Water Operator;
32 Years experience in Water Systems.

Willard James
Mustang Police Department
Former Police Captain – Division Commander

Advanced Law Enforcement Certification;
NIMS Coordinator;
USDOT-TSI Associate Staff Instructor.

Becky Julian
Mustang Chamber of Commerce

Associates Degree in Computer Science from Oklahoma Junior College;
Bachelors Degree in Business from SNU;
Oklahoma Chamber of Commerce Executives – Board Member.

Ronald Martin
Mustang Public Schools
Director of Operations

Associate Degree in Sociology from Redlands Community College;
Bachelors Degree in Human Resources from Southern Nazarene University;
Masters Degree in Management from Souther Nazarene University;
Metro Fire Chiefs Association, Past President, Vice President and Secretary
Licensed Asbestos Management Planner – State of Oklahoma;
Licensed Teacher – State of Oklahoma.

Others Who Participated:

Robert Coleman, *Community and Economic Development Director*
Chuck Foley, *Chief of Police*

The TAC met periodically during the year's planning process. TAC members also attended all meetings of the CAC and meetings with elected officials.

Consultant:

Ronald D. Flanagan, CFM
Principal Planner

R.D. Flanagan & Associates
Planning Consultants
2745 E. Skelly Dr., Suite. 100
Tulsa OK 74105

Other entities involved in the development of the Mitigation Plan included:

Tulsa Partners, Inc

TPi in a Tulsa-based non-profit that has been working since 1998 to develop public / private / non-profit collaborations to help create a disaster-resistant and sustainable community and improve the community's safety and well-being by reducing deaths, injuries, property damage, environmental and other losses from natural or technological hazards. Tulsa Partners provides expertise in the areas of community education and public involvement in the planning process.

Table F.3–7 Mustang Hazard Mitigation Committee Meetings and Activities

Date	Activity
January 5, 2009	FEMA Obligation Date for Canadian County Multi-Jurisdictional Multi-Hazard Mitigation Plan Update.
February 3, 2009	Project Start Date
February 3, 2009	Introductory Meeting with Canadian County Emergency Manager/Project Manager, Jerry Smith, to discuss Project Organization.
February 18, 2009	Introductory Meeting with Canadian County Community and School Officials to discuss HM Project.
February 25 , 2009	Mustang Planning District Multi-Hazard Mitigation Team Staff Introductory/Organizational Meeting: Discuss Mustang HM Plan.
March 25, 2009	Mustang Hazard Mitigation Team Community Data/GIS Meeting: Reviewed maps and demographic data.
April 29, 2009	Meeting of TAC/CAC: Community Database – Clarification and further detail on maps and critical facilities.
May 27, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Lightning and Hail; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
October 7, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Mass Communications, Extreme Heat and Drought; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
November 4, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Fires and Wildfires; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
December 2, 2009	Meeting of TAC and CAC; Presentation, review, discussion of Severe Winter Storms and Back-Up Generators; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
January 6, 2010	Meeting of TAC and CAC; Presentation, review, discussion of Hazardous Materials and Transportation Hazards; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.

Date	Activity
February 3, 2010	Meeting of TAC and CAC; Presentation, review, discussion of Flooding and Dam Failures; Goals and Objectives; Existing Mitigation Measures, Potential additional Mitigation Measures, Hazard Priority Matrix.
October 17, 2012	Meet with Canadian County and it's jurisdictions to Prioritize Mitigation Measures

Section 4 Natural and Man-Made Hazards

Hazards

General natural hazards, such as Tornadoes, High Winds, Lightning, Hail, Winter Storms, Extreme Heat, Drought, and Earthquakes affect all communities in Canadian County randomly and equally, and are addressed in Chapter 4.

The City of Mustang has identified certain facilities as critical to the health, safety and welfare of its citizens, business and economy. Table F.3-8 indicates, generally, the exposure of the critical facilities to the15 hazards covered by this Plan.

Table F.3–8 City of Mustang Critical Facilities' Hazard Exposure

Map ID	Name	Floods	Tornadoes	High Winds	Lightning	Hail	Winter Storms	Extreme Heat	Drought	Expansive Soils	Urban Fires	Wildfires	Earthquakes	Hazardous. Material Sites	Dam Failures	Transportation Hazards
1	Mustang City Hall / Town Center		X	X	X	X	X	X	X		X	X	X			X
2	Mustang Police Dept		X	X	X	X	X	X	X		X	X	X			X
3	Mustang Public Library		X	X	X	X	X	X	X		X	X	X			X
4	Mustang Fire Dept		X	X	X	X	X	X	X		X	X	X			X
5	Mustang Public Works		X	X	X	X	X	X	X		X	X	X	X		
6	Booster Pump		X	X	X	X	X	X	X		X		X			X
7	Lakehoma Elementary School Water Tower		X	X	X	X	X	X	X		X	X	X			X
8	Sewage Treatment		X	X	X	X	X	X	X		X	X	X	X		
9	Mustang Water Tower		X	X	X	X	X	X	X		X	X	X			X
10	Water Tower		X	X	X	X	X	X	X		X	X	X			X
11	Mustang Public Schools		X	X	X	X	X	X	X		X		X			
12	Mustang Educational Center		X	X	X	X	X	X	X	X	X	X	X			X
13	Lakehoma Elementary School		X	X	X	X	X	X	X		X		X			X
14	Centennial Elementary School		X	X	X	X	X	X	X		X	X	X			
15	Mustang Elementary School		X	X	X	X	X	X	X		X	X	X			X
16	Mustang 9th Grade Center		X	X	X	X	X	X	X		X		X			X
17	Mustang Middle School		X	X	X	X	X	X	X		X	X	X			X
18	Mustang High School		X	X	X	X	X	X	X		X		X			
19	Mustang National Guard Armory		X	X	X	X	X	X	X		X	X	X	X		X
20	Mustang USPS		X	X	X	X	X	X	X		X		X			X
21	Cornerstone Bank		X	X	X	X	X	X	X		X	X	X			X
22	First Fidelity Bank		X	X	X	X	X	X	X		X	X	X			X
23	MidFirst Bank		X	X	X	X	X	X	X		X	X	X			X
24	InTrust Bank		X	X	X	X	X	X	X		X	X	X			X

Map ID	Name	Floods	Tornadoes	High Winds	Lightning	Hail	Winter Storms	Extreme Heat	Drought	Expansive Soils	Urban Fires	Wildfires	Earthquakes	Hazardous. Material Sites	Dam Failures	Transportation Hazards
25	All America Bank		X	X	X	X	X	X	X		X		X			X
26	Bank of Commerce		X	X	X	X	X	X	X		X	X	X			X
27	OG&E Electric Substation		X	X	X	X	X	X	X		X		X			
28	Mustang Manor Assisted Living		X	X	X	X	X	X	X		X	X	X			X
29	Arbor House Nursing Center		X	X	X	X	X	X	X		X	X	X			X
30	Strawberry Fields Senior Housing		X	X	X	X	X	X	X		X		X			X
31	Mustang Child Development Center		X	X	X	X	X	X	X		X	X	X			X
32	Bridge Kids Learning Center		X	X	X	X	X	X	X		X		X			X
33	Building Blocks		X	X	X	X	X	X	X		X	X	X			X
34	Kidville		X	X	X	X	X	X	X		X		X			X
35	Castle Land Learning Center		X	X	X	X	X	X	X		X		X			
36	Little Broncos Kids Club		X	X	X	X	X	X	X		X		X			
37	Ready Set Go Learning Center		X	X	X	X	X	X	X		X	X	X			X
38	Little Broncos Kids Too		X	X	X	X	X	X	X		X		X			X
39	Country Charm Child Development Center		X	X	X	X	X	X	X		X		X			X
40	Kindercare Learning #976		X	X	X	X	X	X	X		X		X			X

Table F.3-9 displays hazard information where there is community-specific data, as shown in the maps on the following pages.

Table F.3–9 Mustang Hazard Impacts

Hazard	Area (Sq. Mi.)	Improved Parcels	Value	Area Impacted	Impacted Population
Floods	0.33	242	$31,302,346	3%	30
Highly Expansive Soils	0.08	30	$4,059,034	1%	0
Very Highly Expansive Soils	0.03	15	$1,160,376	0.3%	0
Wildfire	10.25	4,717	$617,603,489	85%	13,156
Dam Failure	NA	NA	NA	NA	NA
Tier II Hazardous Materials ¼ Mile	0.52	68	$16,411,232	4%	142
Tier II Hazardous Materials ½ Mile	2.22	367	$57,837,515	19%	1,173
Transportation - Highway	3.88	2,817	$346,531,794	32%	3,910
Transportation - Railroad	1.83	448	$48,451,253	15%	NA

4.1 Flood

There are three major types of flooding in Canadian County: riverine flooding along major waterways – the Canadian and North Canadian Rivers; flash flooding from normally dry or intermittent streams, whose carrying capacity becomes overwhelmed by runoff from heavy rains; and overland flooding, due to inadequate storm drainage facilities. Being well out of the

floodplains of the Canadian and North Canadian Rivers, Mustang's flood problems stem from local storm runoff and storm drainage facilities.

Location

The City of Mustang is situated on the ridgeline separating the Canadian and North Canadian watersheds. Most of Mustang is above elevation 1,285. Streams drain northward into Mustang Creek and the North Canadian, and south into Bennett Creek, Foreman Creek, and Cow Creek, which all flow into the Canadian River. These creeks and their floodplains are mapped in Figure F.3-6 and listed in Table F.3-10.

The floodplains of Mustang's intermittent streams affect the parcels listed in Table F.3-11. Mustang has 50 residences, 17 outbuildings and 4 commercial buildings in the SFHA, but no critical facilities in flood-prone areas as shown in Table F.3-12.

Although Mustang is not subject to riverine flooding, the City does have development occurring along four streams that drain to the north and one that drains southward. According to some residents, flooding appears to be growing worse as urbanization and commercial development spreads westward along OK Highway 152.

Table F.3–10 City of Mustang Creeks and Drainage Areas

Creek	Drainage Area (Sq. Mi.)
Mustang Creek	7.39
Dry Creek	2.85
Campbell Creek	0.93
Coal Creek	0.84
Total	**12.01**

Table F.3–11 City of Mustang Parcels Touched by SFHA

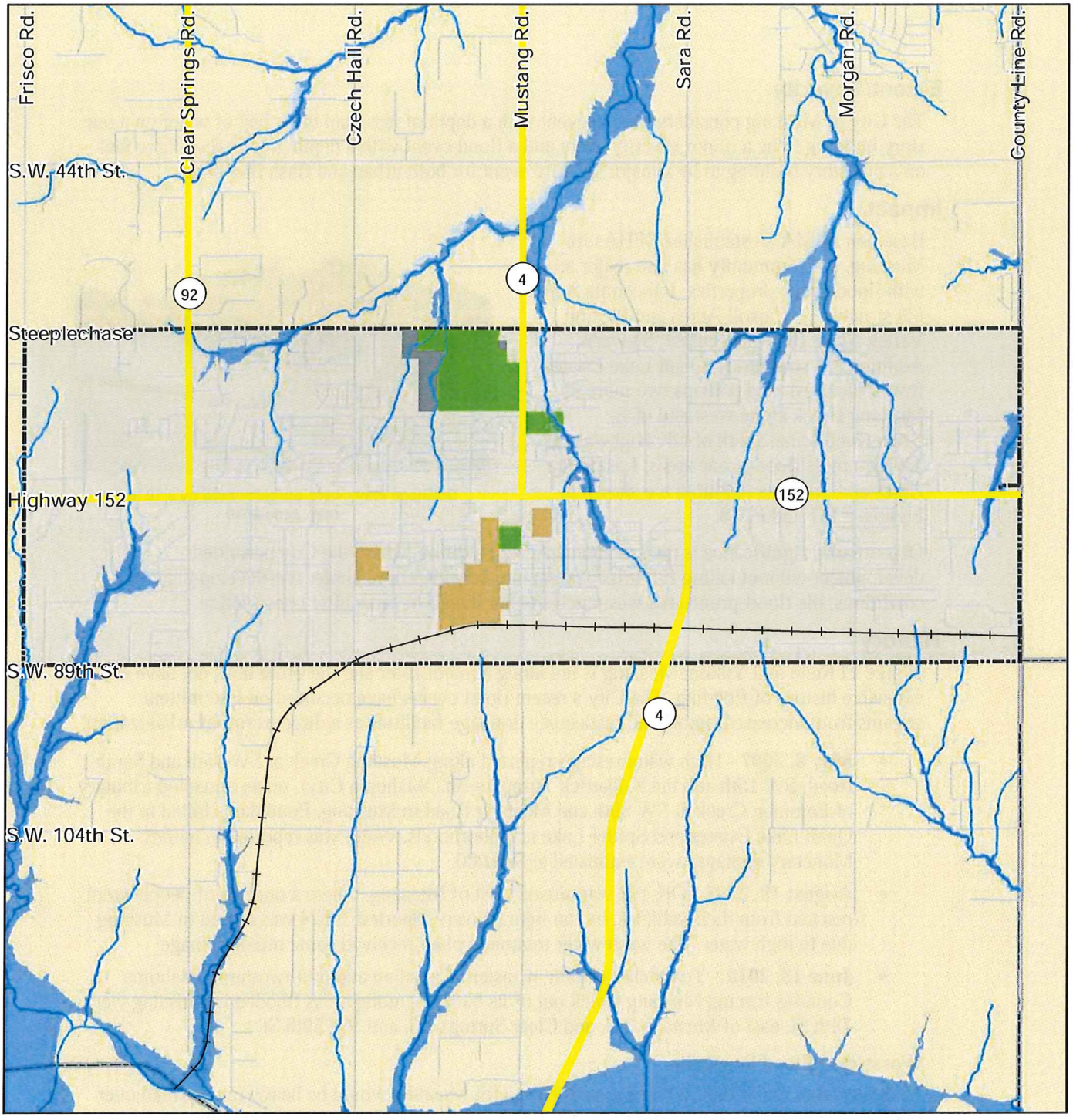
Type	No.	Estimated Value
Agricultural	8	$142,427
Residential	215	$30,065,099
Urban Commercial	6	$1,045,552
Tax Exempt	13	$49,268
Total	**242**	**$31,302,346**

Table F.3–12 Mustang Structures in the Floodplain

Type	No.
Residences	50
Commercial	4
Outbuildings	17
Total	**71**
Estimated Value	$6,000,000

Frequency

The NCDC data base reports three instances of flooding in Mustang, all of them in recent years: in May and August 2007, and in June 2010.



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- Railroads
- Streams
- 100yr Floodplain
- 500yr Floodplain
- Government
- Park
- School
- City Limits

0 0.5 1 Miles

N W E S

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Figure F.3-6

City of Mustang

Floodplains

Extent/Severity

The City of Mustang considers a flood event with a depth of less than three feet of water on a one story building to be a minor severity event and a flood event with a depth greater than three feet on a one story building to be a major severity event for both urban and flash flooding.

Impact

Based on FEMA's established SFHAs for Mustang, the community has five major areas with flood-prone properties: Lakehoma Acres (28 structures); Carroll Acres and Preston Valley Acres (nine structures); Stewarts Addition (11 structures); Quail Lake Estates (two structures), and perhaps two more on Mustang Creek at the west end of E. Greenwood Lane, south of OK Highway152. The two most flood-prone areas, Lakehoma Acres and Stewarts Addition are shown in Figures F.3-7 and F.3-8.

Drainage ways were overwhelmed by a 10 inch rain, June 2010

Of particular significance is the Lakehoma Acres Addition, where the City permitted development without taking full urbanization into consideration. Under pre-development conditions, the flood-prone area was much smaller than it became after construction.

History

Unlike El Reno and Yukon, Mustang is not along a major river and therefore does not have an extensive history of flooding. The City's recent flood events have occurred on intermittent streams from increased runoff and inadequate drainage facilities as a direct result of urbanization.

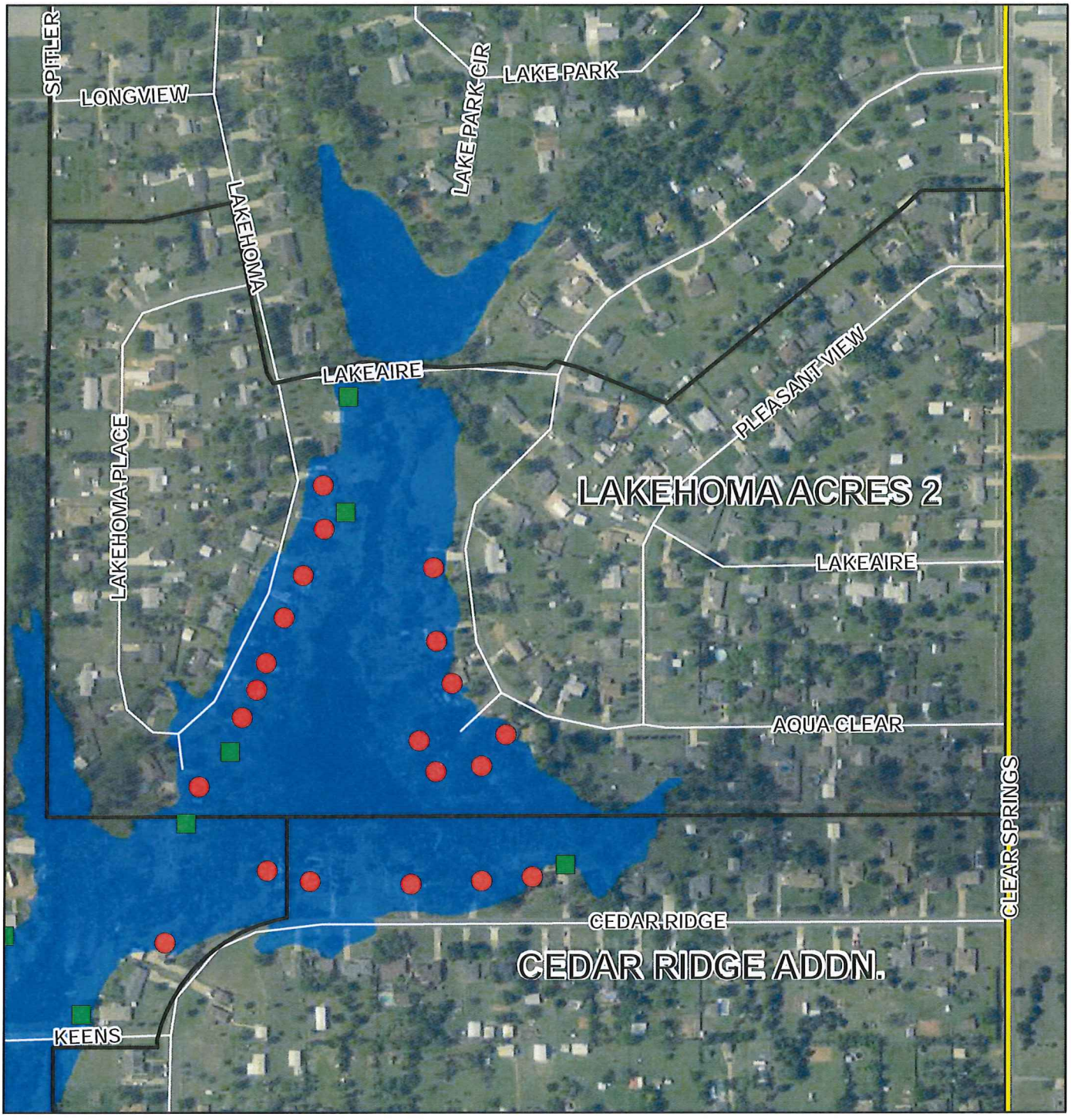
- **May 8, 2007** - High water rescues reported along Mustang Creek at SW 15th and Sarah Road, SW 15th and the Kilpatrick Turnpike (in Oklahoma City), on an unnamed tributary of Foreman Creek at SW 89th and Mustang Road in Mustang. Pond dams failed in the Quail Lake Estates and Spitler Lake neighborhoods. Water was reported in homes. Monetary damages were estimated at $20,000.
- **August 19, 2007** - OK 152 was closed west of Mustang, where a number of people were rescued from their vehicles, but no injuries were reported. OK 4 was closed in Mustang due to high water. The wastewater treatment plant received some minor damage.
- **June 13, 2010** – Ten inches of rain in eastern Canadian and northwestern Oklahoma Counties forcing Mustang Creek out of its banks. Among areas flooded in Mustang were 74th St. east of Mustang Rd., and Clear Springs Rd. and SW 59th St.

Worst-case Flood Scenario

Under existing conditions, a worst-case scenario for Mustang would be heavy rains stalled over the City, causing peak flash flooding in the Lakehoma Acres (Figure F.3-7) and Stewart Addition (Figure F.3.8) areas, potentially in the Quail Lake area, and along Mustang and Campbell Creek tributaries. In the long term, the greatest potential flood hazards are likely in the north-central part of the community, along Mustang Creek and its tributaries, where urbanization has been proceeding rapidly.

Conclusion

Mustang is at Moderate vulnerability to and High probability of the Flood hazard. Mustang is on high ground and not subject to riverine flooding. The City experienced record rains in June 2010, when up to 10 inches fell in eastern Canadian County and northwestern Oklahoma County.



LEGEND

- Outbuilding
- Residence
- 100 yr. Floodplains
- 500 yr. Floodplains
- Major Streets

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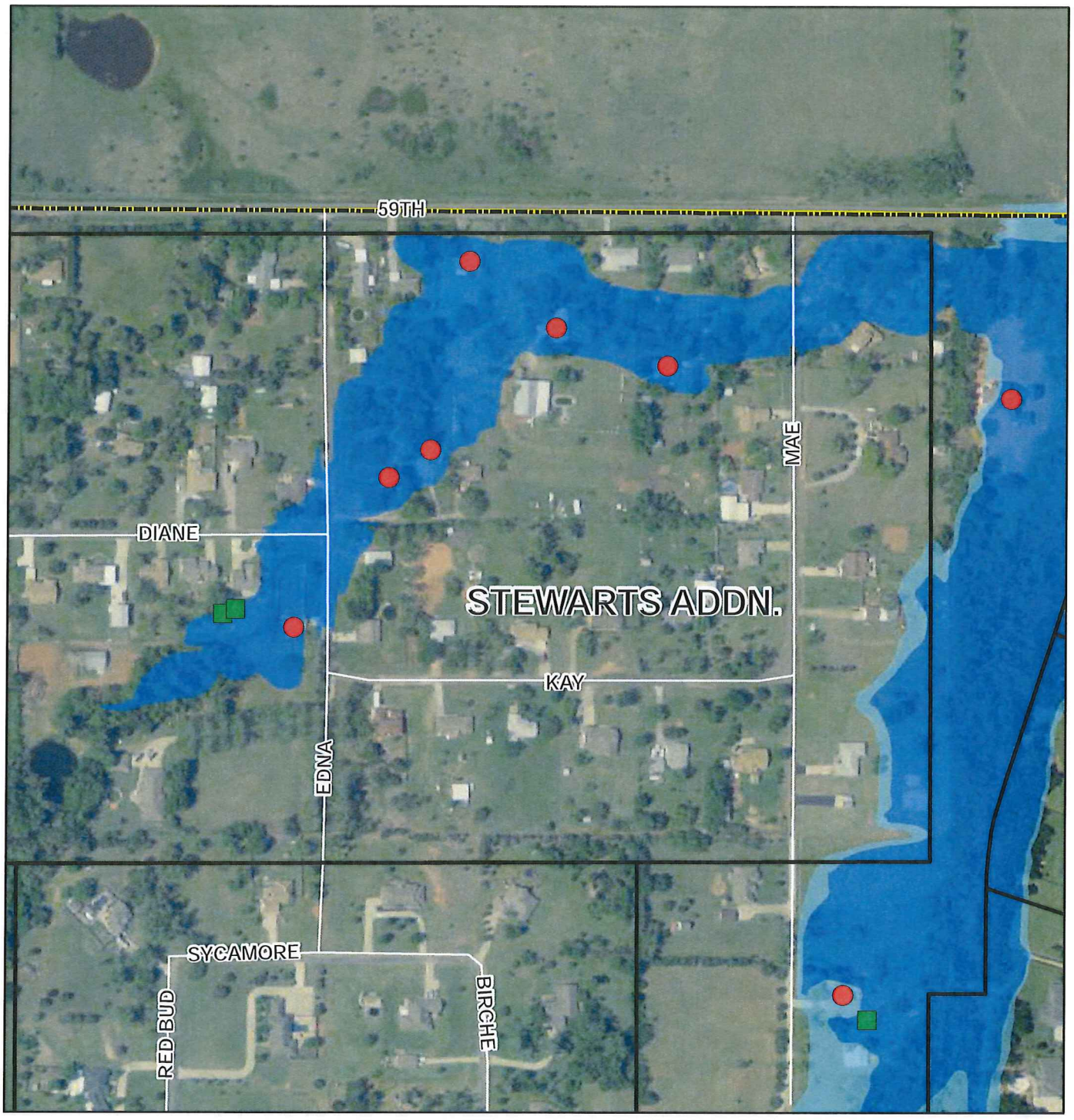
N W E S

0 200 400 Feet

Figure F.3-7

City of Mustang

Lakehoma Acres 2 Floodplains



LEGEND

- Outbuilding
- 100 yr. Floodplains
- 500 yr. Floodplains
- Residence
- Major Streets

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N W E S

0 150 300 Feet

Figure F.3-8

City of Mustang

Stewarts Addn. Floodplains

Several Mustang subdivisions were flooded principally due to local drainage problems. With careful developmental planning and drainage way maintenance, Mustang should be able to avoid the worsening of its flooding problems.

4.2 Tornado

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4-2.

Frequency

Canadian County experienced 34 tornadoes between 1995 and 2010, including an EF5 tornado in May 2011. Given these frequencies, the County can expect 2.3 tornadoes each year, any one of which could impact Mustang. Mustang, itself, has had two tornadoes pass through its corporate boundaries in the last 60 years. Based on this data, Mustang can expect a tornado every 30 years.

Extent/Severity

Mustang considers a minor severity tornado to be a tornado of EF1 or lower on the Fujita Scale, and a major severity tornado to be a tornado of EF2 or greater on the Fujita Scale.

Impact

Storms that generate tornadoes also have the ability to cause lightning, hail, high winds, and flooding damage. Tornadoes can result in the loss of lives, homes and businesses. They can also cause tremendous impact on individual and community revenues, increase the need for medical care, and result in so much damage that the community cannot recover without state and federal assistance.

History

Mustang is not reported in tornado events listed by the NCDC for Canadian County, but local research indicates that two F2 tornadoes have passed through the incorporated area. These are summarized briefly below.

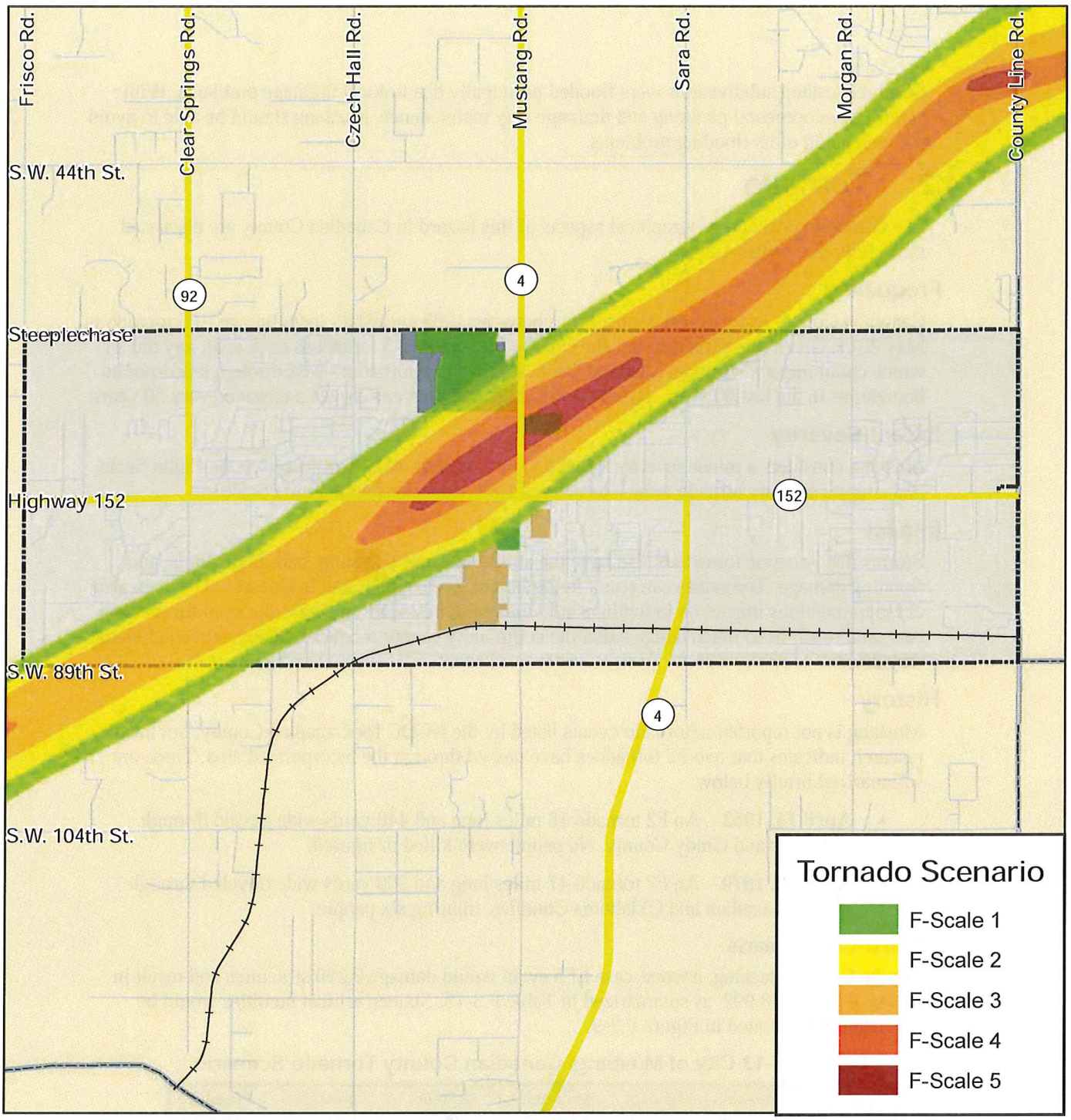
- **April 14, 1953** – An F2 tornado 16 miles long and 440 yards wide passed through Canadian and Grady County. No people were killed or injured.
- **April 30, 1970** – An F2 tornado 47 miles long and 500 yards wide traveled through Grady, Canadian and Oklahoma Counties, injuring six people.

Worst-Case Scenario

For the City of Mustang, a worst-case EF5 event would damage 2,290 structures and result in losses of $234,198,992, as summarized in Table F.3-13. Sixteen critical facilities would be impacted as illustrated in Figure F.3-9.

Table F.3–13 City of Mustang, Canadian County Tornado Scenario

EFScale	Estimated Market Value	Damage Factor	Structure Damage	Contents Value	Contents Damage	Total Damage
1	$53,199,267	.10	$5,319,927	$26,599,634	$1,329,982	$6,649,908
2	$45,985,405	.40	$18,394,162	$22,992,703	$4,598,541	$22,992,703
3	$85,193,265	.80	$68,154,612	$42,596,633	$17,038,653	$85,193,265
4	$44,097,086	1.0	$44,097,086	$22,048,543	$22,048,543	$66,145,629
5	$35,478,325	1.0	$35,478,325	$17,739,163	$17,739,163	$53,217,488
Totals	**$263,953,348**		**$171,444,112**	**$131,976,674**	**$62,754,881**	**$234,198,992**



LEGEND

- Interstate
- US Highway
- State Highway
- Turnpike
- Railroads
- Government
- Park
- School
- City Limits

0 0.5 1 Miles

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Figure F.3-9

City of Mustang

Tornado Scenario

Conclusion

Mustang has a High vulnerability to and a High probability of the Tornado hazard. Mustang has experienced two tornadoes between 1953 and 2010. Given this frequency, Mustang can expect a tornado every 30 years. Losses can range from light damage to trees and roofs (EF0) to destruction of well-built homes and buildings (EF4 and EF5). Mobile homes and houses with crawl spaces are more susceptible to lift and therefore at the greatest risk of damage.

4.3 High Wind

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4-3.

Frequency

Between 1995 and 2010, Mustang experienced eight separate high wind events, or an average of one event every 1.8 years.

Extent/Severity

Mustang considers wind force on the Beaufort Scale of 9 (55 mph) or below to be a minor severity wind force and wind force of greater than 9 on the Beaufort Scale to be a major severity wind force

Impact

The impact of this hazard can result in damage to homes, businesses and people and cause loss of income and community revenues.

History

The highest wind speed reported at Mustang – 92 mph – was on July 23, 1995. From 1995 through 2010, Mustang experienced eight separate high wind events, or an average of one event every 1.8 years, which caused a total of $261,000 in damage. Based on this data, Mustang can expect about $32,625 in damages per high wind event, or annual damages of $17,400. Wind events since 1995 are summarized below.

- **July 23, 1995** – 92-mph winds were reported in Mustang. Damage was $50,000.
- **August 2, 1996** – 64-mph winds were reported in Mustang.
- **May 27, 2001** – A large, severe line of thunderstorms caused tens of millions of dollars in damage in central Oklahoma towns. High winds partially blew the roof off of Mustang City Hall, which as a result also suffered rain damage. Losses were $100,000.
- **August 13, 2005** – Power lines were blown down. Damage $1,000.
- **August 26, 2006** – 64-mph winds severely damaged one side of a two-story home, resulting in rain damage to the inside. Losses were $100,000.
- **May 7, 2007** – The roof of the Crafts Building at Mustang High School was damaged by high winds. Losses were $9,700.

Worst Case High Wind Event

For the City of Mustang a worst-case high wind event would impact 2,956 residences, 176 businesses, and six agricultural properties, and result in total losses of $536,988. A total of 19 critical facilities would be impacted as is reflected in Table F.3-14.

Table F.3–14 Mustang High Wind Worst Case Scenario Damages

EF-Scale Equivalent Wind Speed	Parcel Count	Damage Factor	Averaged Damage	Hospital Cost Factor	Hospital Costs	Debris Factor	Averaged Debris (yds.)	Utility Loss Factor	Utility Loss
Residential Properties with Estimated Improvement Values									
0	2,239	$159.68	$357,523.52	$4.39	$9,829.21	4.77	10,680.03	$2.49	$5,575.11
1	717	$159.68	$114,490.56	$4.39	$3,147.63	4.77	3,420.09	$2.49	$1,785.33
Total	2,956	$159.68	$472,014.08	$4.39	$12,976.84	4.77	14,100.12	$2.49	$7,360.44
Commercial Properties with Estimated Improvement Values									
0	168	$159.68	$26,826.24	$4.39	$737.52	4.77	801.36	$2.49	$418.32
1	8	$159.68	$1,277.44	$4.39	$35.12	4.77	38.16	$2.49	$19.92
Total	176	$159.68	$28,103.68	$4.39	$772.64	4.77	839.52	$2.49	$438.24
Agricultural Properties with Estimated Improvement Values									
0	6	$159.68	$958.08	$4.39	$26.34	4.77	28.62	$2.49	$14.94
1	-	$159.68	$0.00	$4.39	$0.00	4.77	-	$2.49	$0.00
Total	6	$159.68	$958.08	$4.39	$26.34	4.77	28.62	$2.49	$14.94
Tax Exempt									
0	82	$159.68	$13,093.76	$4.39	$359.98	4.77	391.14	$2.49	$204.18
1	4	$159.68	$638.72	$4.39	$17.56	4.77	19.08	$2.49	$9.96
Total	86	$159.68	$13,732.48	$4.39	$377.54	4.77	410.22	$2.49	$214.14
Totals									
Totals-	**3,224**		**$514,808.32**		**$14,153.36**		**15,378.48**		**$8,027.76**

Conclusion

The City of Mustang has a High vulnerability to and High probability of the High Wind hazard. The City can expect such an event every 1.8 years that results in about $32,625 in damage. The factors that contribute most to wind-related deaths, injuries, and property damage are the structure type, quality of construction, and the state of deterioration of the buildings where people reside. Mobile homes, older homes, and poorly designed and constructed buildings are the most vulnerable. Uniform building codes for wind-resistant construction and demand for better quality construction practices would result in buildings being less vulnerable to the High Wind hazard.

4.4 Lightning

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4.4.

Frequency

Canadian County reported 12 damaging lightning events from 1993 through 2010, one of which occurred in Mustang. Given this frequency, Mustang can expect one damaging lightning strike every 13 years.

Extent/Severity

Based on the information provided by the National Weather Service, Chapter 4, Mustang considers a negative cloud-to-ground flash with multiple return strokes, that causes no loss of life or injury and less than $1,000 in property damage, to be a minor severity lightning event; and a positive cloud-to-ground flash with a continuous or high peak current, that causes loss of life and/or injury and more than $1,000 property damage, to be a major severity lightning event.

Impact

The impact of this hazard could include death or injury to people and livestock, damaged buildings, people displaced from their homes, businesses being closed, and financial loss due to urban fire, wildfire and damaged electronic equipment and data files.

History

Mustang has reported one damaging lightning strike, which is summarized below.

- May 23, 1993 - Lightning strike caused $5,000 damage in Mustang.

Worst-Case Scenario

A worst-case lightning event for Mustang would be one that knocked out the electrical system and electronics at one or more of the City's critical facilities.

Conclusion

Mustang has a High vulnerability to and High probability of the Lightning hazard. Mustang can expect to experience about nine severe thunderstorm events a year, any one of which can carry potentially damaging lightning. Electronic equipment, from personal computers to enterprise-level communications systems, can be seriously damaged by power surges from lightning strikes. Surge protection should be included in all critical facility electronic systems to minimize the risk of damage from lightning.

4.5 Hail

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4.5.

Frequency

Between 1995 and 2010 Mustang reported 16 hail events with stones ranging in size from 0.75 to 1.75 inches. There are no damage reports available for these events. Given this frequency, Mustang can expect about one hail event each year.

Extent/Severity

Mustang considers a minor severity hail storm to be a hail storm of H2 or lower on the Combined NOAA/TORRO Hailstorm Intensity Scale (See Chapter 4.5), and a major severity hail storm to be a hail storm greater than H2 on the Combined NOAA/TORRO Hailstorm Intensity Scale.

Impact

Hail can damage cars, shred roof coverings, and lead to water damaged ceilings, walls, floors, appliances, and personal possessions. Large hailstones can also cause serious bodily injury. As a general rule, hail damage increases sharply when stones reach 1.75 inches (H5) in diameter and higher, accompanied by high winds. The impact of this hazard remains mainly financial, especially during the harvest season when damage to crops can be devastating to farmers and the local economy.

History

Mustang reported 16 separate hail events from 1995 through 2010, for an average of about one event per year. Hail stones for these events ranged in size from 0.75 inches to 1.75 inches, with only two storms having stones over 1.0 inches in diameter, both of which produced hail 1.75 inches in size. No damage reports are available for any of these events.

- **May 26, 1996** – 1.75-inch hail reported at Mustang.
- **August 5, 2009** – 1.75-inch hail reported at the Mustang Police station.

Worst-Case Hail Scenario

The largest hail stone reported in Canadian County was 4.5 inches in diameter and fell at Okarche on August 17, 1994. The County's most damaging storm occurred on May 29, 2004, and involved hail 2.75 inches in diameter, also at Okarche. (See Chapter 4.5) Storms of this size are random events and are possible everywhere in the County. This particular storm caused $500,000 damage to Okarche Public Schools and Police Department. A similar storm, containing hail stones 2.75 inches in diameter and higher, driven by high winds, could do similar damage in Mustang.

Conclusion

Mustang has a High vulnerability to and High probability of the Hail hazard. The community was hit by hail 16 times from 1995 through 2010, with hail 1.75 inches in diameter falling on two occasions. As a general rule, hail damage increases sharply when stones reach 1.75 inches and higher, driven by high winds. Given this measure, Mustang can expect a potentially damaging hail event every 7.5 years.

4.6 Severe Winter Storm

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4.6.

Youths help a motorist during a February 2011 winter storm in Mustang.

Frequency

During the period 1995 through 2010, Canadian County reported 35 ice and snow events, or an average of 2.3 winter storms per year. It is assumed that Mustang has experienced the same number of storms.

Extent/Severity

Mustang considers a minor severity winter storm to be a Level 2 event or below (ice accumulation of less than ¼ inch—see Table 4-21), and a major severity event to be Level 3 and above (ice accumulation above ¼ inch) resulting in personal injury or death, water or power outages, travel disruptions, damage to private property and public infrastructure.

Impact

The impact of a winter storm can affect a region for weeks and even months. People and livestock, houses, roads, electrical poles and lines, and water systems, are all vulnerable to severe winter storms. Houses are damaged from the weight of snow or ice, roads become slick and hazardous, electrical poles and lines break, homes lose electricity and heat, water lines freeze and burst, and livestock can be left without food or water. People and livestock are susceptible to frostbite and death from exposure. Emergency vehicles may be prohibited in responding to emergencies, such as electrical fires or personal health crises.

History

During the period 1995 through 2010, Canadian County experienced a reported 35 ice and snow events, or an average of 2.3 winter storms each year. None of the Winter Storm events in the NCDC data base mentions Mustang specifically. Because of the general and widespread nature of winter storms, it can be reasonably assumed that Mustang has also experienced 35 ice and snow events.

Worst-Case Winter Storm Scenario

A worst-case winter storm for Mustang would be winter storm that begins with an ice storm that cuts electric power to the community, followed by a week of subfreezing temperatures, freezing rain or snow fall, which impede the efforts of electrical crews to restore the grid and prevent essential emergency services from operating in a timely manner..

Conclusion

Mustang has a High vulnerability to and High probability of the Winter Storm hazard. In part because Oklahoma is not a northern tier state and regularly subjected to prolonged winter storms, its communities are often unprepared for the sudden ice and snow storms which can result in widespread and lengthy power outages and other infrastructure damage which directly affect the lives of people.

4.7 Extreme Heat

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4.7.

Frequency

Canadian County reported four extreme heat events for the period 1996 through 2011, or an average of one every 3.7 years.

Extent/Severity

Mustang considers a minor severity extreme heat event to be extreme heat of 95°F or less on the NOAA Heat Index, and a major severity extreme heat event to be extreme heat of greater than 95°F on the NOAA Heat Index that lasts for more than two weeks.

Impact

The impact of extreme heat is primarily the danger to people and livestock, and the increased risk of wildfire and drought, power outages and water shortages. Muscle cramps, nausea, heat exhaustion, heat stroke, and death frequently result from extended periods of extremely high temperatures, and especially extremely high heat indexes.

History

Using the assumption that Mustang experienced the same four extreme heat events that were reported for Canadian County (no NCDC narratives mention Mustang specifically), Mustang can expect an average of one extreme heat event every 3.7 years.

Worst-Case Extreme Heat Scenario

A worst-case scenario for Mustang would be a repeat of the extreme heat event of 1980 or 2011, but lasting two months, preceded by a period of drought, and complicated by high winds, wildfire, and blackouts due to widespread power failures. The possibility of heat-related fatalities, wildfires and water shortages during such an extended period of extreme heat are significant..

Conclusion

Mustang has a High vulnerability to and High probability of the Extreme Heat hazard. Because Oklahoma summers are almost always hot and humid, heat is something the citizens of Canadian County expect. However, extreme heat summers like 2011, when the average high temperature was a record 86.8 degrees, worsened by drought and failed crops, are unusual even for Oklahomans and can result in heat-related illness, water shortages, electric grid failures and staggering economic losses. The Extreme Heat hazard can be mitigated by notifications and warnings to vulnerable populations, development of hot weather protection plans for landlords,

the establishment of cooling rooms, utility cost assistance, air conditioner loan programs, back-up electric generation for critical facilities, Medical Reserve Corps training, and similar measures.

4.8 Drought

The climatological and geographical aspects of this hazard in Canadian County are discussed more fully in Chapter 4.8.

Frequency

Mustang has experienced four droughts from 1996 through 2011.

Extent/Severity

Mustang considers a minor severity drought to be a drought greater than a -2 on the Palmer Drought Index and a major severity drought to be -2 or lower. The Index goes from -4 to +4, with lower numbers indicating greater drought.

Impact

The most direct impact of drought is economic rather than loss of life or immediate destruction of property. Drought affects water levels for use by communities, industry, agriculture, and individual consumers. During droughts crops do not mature, wildlife and livestock are undernourished, land values decrease, unemployment increases, and tax revenues decline. In addition, water shortages affect fire-fighting capabilities through reduced water flows and pressures. Drought can also affect power production and costs. Most droughts also increase the danger of wildland fires.

History

As stated, Mustang has experienced four droughts from 1996 to 2011. Agricultural photos from the 2011 drought indicate that Canadian County was severely impacted. Most communities in central Oklahoma, including Oklahoma City and Mustang, were forced to resort to some form of water rationing during the 2011 drought. See Chapter 4-8 for additional detail on this hazard.

Worst-Case Drought Scenario

Mustang draws its water from Oklahoma City and from 12 wells. Although the groundwater resource is productive, it is not enough to supply the City's needs without supplementation from the Oklahoma City water system. A worst-case scenario would be a drought as severe as that of 2011 extended over a two- or three-year period, combined with significantly reduced aquifer recharge and rising water costs.

Conclusion

Mustang has a High vulnerability to and High probability of the Drought hazard. Although Mustang's water supply has been adequate and stable, it has joint with several cities in Canadian County in the formation of the Central Oklahoma Water Resource Authority whose task is to find long-term solutions to the area's water needs.

4.9 Expansive Soils

Location

The City of Mustang is particularly favored regarding expansive soils: almost 95% of its 12 square mile area has soils that are classed as Low in shrink/swell potential. Less than 1% of the City's land is classified as High and Very High (0.60% and 0.25% respectively). Moderately expansive soils underlie about 4% of the community. Table F.3-15 presents expansive soil types, which are also illustrated in Figure F.3-10

Of all Mustangs' critical facilities, only one is located on soils with a Moderate, High or Very High rating: Lakehoma Elementary School sits on soils rated Very High in expansibility as represented in Table F.3-16. All other critical facilities are on soils with Low shrink/swell potential.

Table F.3–15 City of Mustang Expansive Soils

Expansive Potential	Area (sq. mi)	Percent of Land Area
Very High	0.03	0.25%
High	0.07	0.60%
Moderate	0.49	4.1%
Low	11.3	94.6%
Water	0.05	0.42%

Table F.3–16 Mustang Critical Facilities on Highly Expansive Soils

Map ID	Name	Address	Expansivity Classification
Education			
13	Lakehoma Elementary School	224 S Clear Springs Rd	Very High

Frequency

There is no data concerning the amount of damage that has been due to expansive soils.

Extent/Severity

The City of Mustang considers a shrink-swell level of Moderate and below based upon NRCS soil data base to be of minor severity and a shrink-swell level of High or Very High based upon NRCS soil data base to be of major severity.

Impact

Expansive soils swell when subjected to moisture and shrink during droughts or extended periods of high heat and low precipitation. Such soils usually contain clay minerals that attract and absorb water. Expansive soils can damage structures and infrastructure, such as water and sewer mains.

The impact of this hazard occurs over time and affects structures and infrastructure. As a rule, houses and one-story structures are more vulnerable to damage than multi-story buildings, as the latter have enough mass to counter swelling soils. Expansive soils can result in costly repairs and reduce the value of the buildings that are affected. Normally, expansive soils do not cause injury or death, unless a structure weakened by cracks in foundation or walls were to collapse during an earthquake or other event.

History

There have been no reports of damage from expansive soils in the community.

Worst-Case Expansive Soils Scenario

Given Mustang's lack of high and very high expansive soils, a "worst-case" scenario is speculative, at best. A worst-case would be a break of water and sewer lines at Lakehoma Elementary School during a time of prolonged drought.

Conclusion

Mustang has a Low vulnerability to and Low probability of the Expansive Soil hazard. The City of Mustang Comprehensive Plan requires that all future infrastructure development be environmentally responsible and economically sound. Although expansive soils are not given specific mention in this context, city planners, engineers and those issuing building permits should exercise particular caution in developing the small areas with highly and very highly expansive soils.

4.10 Urban Fire

Mustang's Fire Department has 15 uniformed fire fighters and 15 volunteers. The Department's ISO rating is 5. The Department has one fire station.

According to the Census Bureau, only 2.9% of Mustang's residential structures were built prior to 1939, and 0.2% were using wood heat as a source. Most of the City's older housing stock is located in its original urban core, along S. Mustang Rd. from Dolton Lane south to the Burlington Northern Santa Fe railroad tracks.

Frequency

From 2000 through 2009, Mustang had 130 single family residential fires, 17 fires in apartments, one mobile home fire, 15 office/commercial fires, and five industrial/warehouse fires. Given this data, Mustang can expect about 13 single family home fires each year, 1.7 apartment fires, 0.01 mobile home fires, 1.5 fires in office/commercial facilities, and 0.5 industrial/warehouse structure fires, that cause about $359,367 damage annually. Also from 2000 through 2009, Mustang had six fires in critical facilities that produced $30,500 in damage. Mustang can expect about 0.5 critical facility fires each year with $3,050 in damage.

Extent/Severity

Mustang considers a minor severity structure fire to be structure fire that results in no loss of life or injury and/or $5,000 or less in damages, and a major severity structure fire to be a structure fire that causes loss of life or injury and/or more than $5,000 in damages.

Impact

The impact of urban fire can be death and injury to civilians or emergency personnel, the loss of homes and businesses, and the loss of employment and local revenue streams. The loss of homes, businesses, jobs can be devastating to families and communities.

History

Table F.3-17 is a summary of urban fires experienced by the City of Mustang from 2000 through 2009. There were six fires in critical facilities that caused $30,500 in damage as shown in Table F.3-18.

Table F.3–17 Mustang Urban Fire Damages 2000-2009

Year	Single Family		Apartment		Mobile Homes		Other Residential		Office/ Commercial		Warehouse/ Industrial		Total	
	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg
2000	7	$143,700	1	$0	0	$0	0	$0	0	$0	0	$0	8	$143,700
2001	18	$128,720	1	$210	1	$0	0	$0	1	$0	0	$0	21	$128,930
2002	14	$30,000	2	$0	0	$0	0	$0	2	$0	0	$0	18	$30,000
2003	13	$97,300	2	$0	0	$0	0	$0	1	$10,000	0	$0	16	$107,300
2004	7	$6,110	4	$8,150	0	$0	0	$0	0	$0	0	$0	11	$14,260
2005	30	$1,104,750	3	$4,000	0	$0	0	$0	3	$0	2	$12,500	38	$1,121,250

2006	8	$133,500	2	$0	0	$0	0	$0	2	$0	0	$0	12	$133,500
2007	11	$234,050	0	$0	0	$0	1	$0	2	$1,400	0	$0	14	$235,450
2008	7	$201,185	2	$1,384,000	0	$0	0	$0	4	$1,510	3	$33,000	16	$1,619,695
2009	14	$59,585	0	$0	0	$0	0	$0	0	$0	0	$0	14	$59,585
Totals	**129**	**$2,138,900**	**17**	**$1,396,360**	**1**	**$0**	**1**	**$0**	**15**	**$12,910**	**5**	**$45,500**	**168**	**$3,593,670**

Source: Oklahoma State Fire Marshal

Although there is no worst-case scenario for urban fire for the City of Mustang, given the relatively young age of construction in the City and the comparatively small size of its urban core, the community is considered to have a Low vulnerability to the Urban Fire hazard.

Table F.3–18 Mustang Critical Facilities Fires 2000-2009

Year	Nursing		Childcare		Hospitals		Other Institution		School/ University		Public Assembly		Total	
	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg	No.	Dmg
2000	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
2001	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
2002	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
2003	0	$0	0	$0	0	$0	0	$0	1	$30,000	3	$500	4	$30,500
2004	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
2005	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
2006	0	$0	0	$0	0	$0	1	$0	0	$0	0	$0	1	$0
2007	0	$0	0	$0	1	$0	0	$0	0	$0	0	$0	1	$0
2008	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
2009	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0
Totals	**0**	**$0**	**0**	**$0**	**1**	**$0**	**1**	**$0**	**1**	**$30,000**	**3**	**$500**	**6**	**$30,500**

Source: Oklahoma State Fire Marshal

Conclusion

Mustang has a Moderate vulnerability to and High probability of the Urban Fire hazard. The City has a relatively dispersed, modern urban core with a very low percentage of aging housing stock, a skilled fire department and an adequate water supply with hydrants throughout the community. The Fire Department also has mutual aid agreements with surrounding fire districts.

4.11 Wildfire

Wildfires are an increasing hazard in Oklahoma due to the popularity of residential living in the wildland/urban interface. Mustang has a mixture of suburban clusters and large-lot rural residential developments. In the suburban clusters, the houses on the perimeters, bordering open, grassy lands are at the greatest risk of wildfire. This is particularly true, given the prevailing southerly winds, of those structures that have open land to their south, unbuffered by landscaping, streets or parking areas.

Wildfire destroys two homes near Sara Rd. and OK Highway 152 in Mustang

Location

The acres of undeveloped and sparsely-developed land within Mustang's City Limits, crossed by railroads and highways, can become a tinderbox from late summer into winter, especially in times of drought, as in 2005-2006 and 2010-2011. As a rule, farmland is less vulnerable than ranchland, as it is usually plowed during the worst part of the wildfire season.

Figure F.3-11 displays the areas in Mustang that are at greatest risk from wildfire, and Table F.3-20 lists critical facilities that are most vulnerable to this hazard.

Frequency

During the period 2000 through 2009, the Mustang Fire Department responded to 286 wildfires that burned 342 acres and caused $25,779 damage. Given this data, Mustang can expect 28.6 wildfires a year that burn 34 acres and result in $2,578 in damage. These events are summarized Table F.3-19.

Table F.3–19 Mustang Wildfires 2000-2009

Year	Runs	Acres Burned	Damages
2000	20	3	$50
2001	8	0	$0
2002	23	5	$0
2003	19	0	$500
2004	24	4	$910
2005	88	285	$21,820
2006	38	7	$2,499
2007	15	10	$0
2008	25	22	$0
2009	26	6	$0
Totals	**286**	**342**	**$25,779**

Source: Oklahoma State Fire Marshal

Extent/Severity

Mustang considers a reading of Moderate and below on the USDA Fire Danger Rating system to be a minor severity danger of wildfire, and a rating of above Moderate on the Fire Danger Rating System to be a of major severity danger of wildfire.

Worst Case Scenario

A worst-case wildfire event would be a wildfire that results in the injury or death of one or more persons, civilian or firefighter and/or destruction of four structures.

Impact

The impact of the Wildfire hazard can increase during times of drought, high wind and extreme heat. Wildfire can cause loss of life and livestock, homes and businesses causing devastating economic impacts to homeowners, ranchers and farmers, and to the community as a whole. Mustang as a community located on the outskirts of a major metropolitan area, Oklahoma City, is highly vulnerable to wildfires. According to GIS information, approximately 10.25 sq miles of land area in Mustang is susceptible to the Wildfire hazard. Included in this area are 4,717 improved parcels with a value, estimated for fair market, of $617,603,489. Approximately 85% of the community and 13,156 residents are at risk of being impacted. A large majority of the communities' critical facilities are located in areas of High to Very High wildfire concern. A list

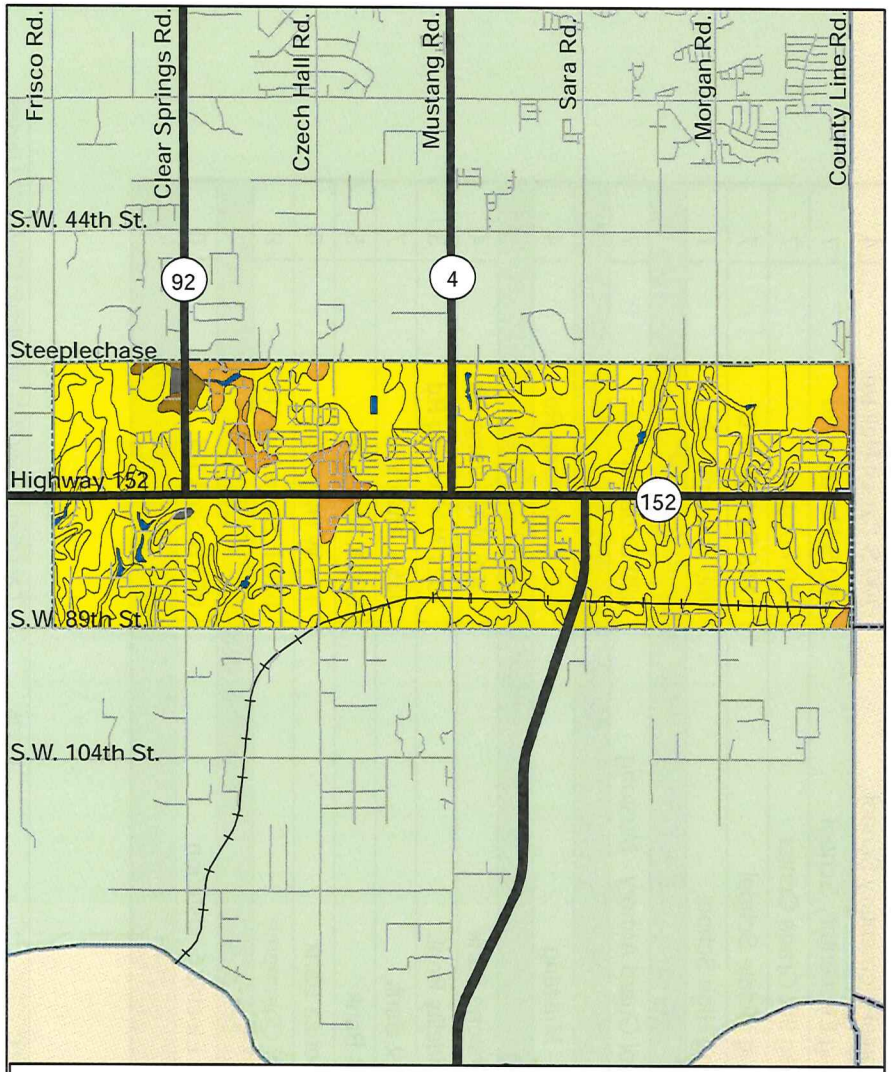

Figure F.3-10: *City of Mustang Expansive Soils*

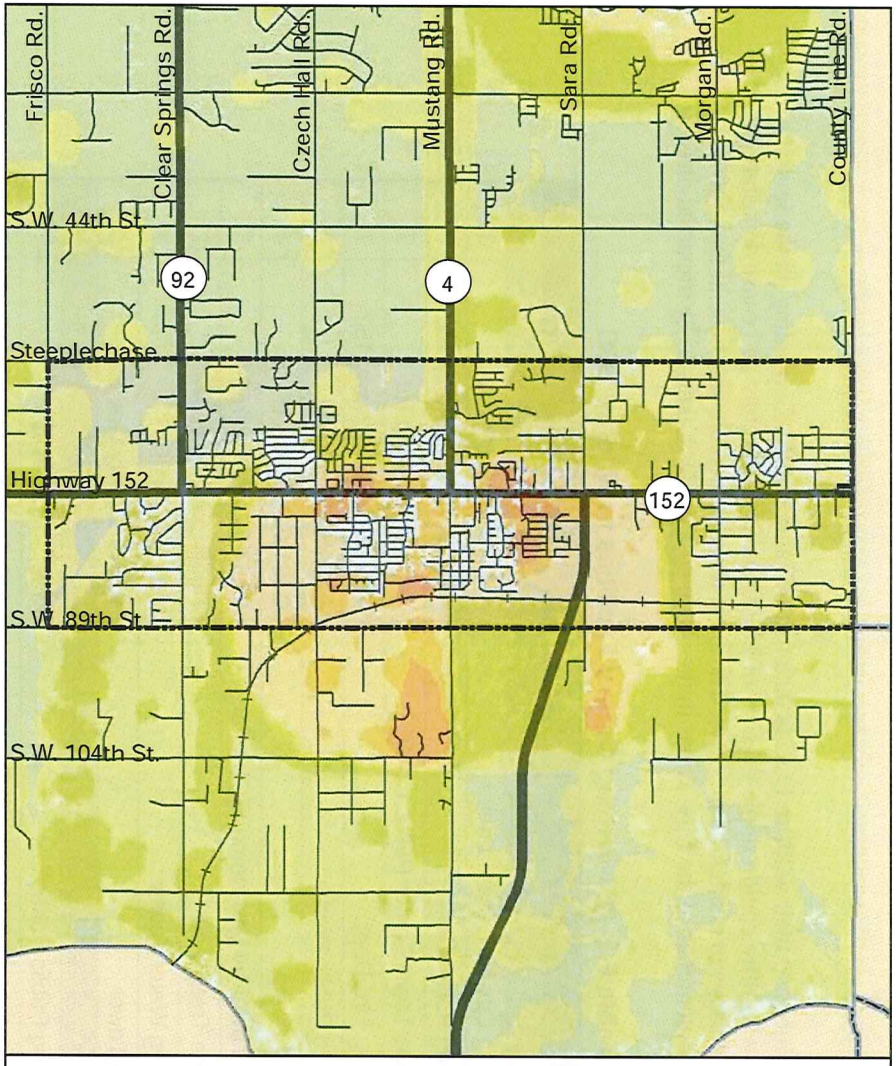

Figure F.3-11: *City of Mustang Wildfire Level of Concern*

of these facilities and their wildfire LOC is included in Table F.3-20. Depending on the severity of the event, a wildfire could cripple the City of Mustangs' infrastructure and cause devastating, and costly, damages to residential property. The areas most vulnerable are those in the urban fringe in the outer areas of the City. Areas in the urban core are less likely to be impacted directly by a wildfire.

Table F.3–20 Mustang Critical Facilities in Wildfire LOC

ID	Name	Address	LoC
City Government			
1	Mustang City Hall Town Center	1501 N Mustang Rd	3
2	Mustang Police Dept	470 W State Highway 152	8
3	Mustang Town Center Public Library	1201 N Mustang Rd	3
4	Mustang Fire Dept	465 W State Highway 152	7
5	Mustang Public Works	520 W SW 59th St	2
6	Booster Pump	2401 Oklahoma 152	4
7	Water Tower by Lakehoma Elementary	1567 Oklahoma 152	3
8	Sewage Treatment	Public Service Way	2
9	Mustang Water Tower	200 S Burks Dr	7
10	Water Tower	925 S County Line Rd	3
Public Schools			
11	Mustang Public Schools	906 S Heights Dr	7
12	Mustang Educational Center	400 Clear Springs Rd	2
13	Lakehoma Elementary School	224 S Clear Springs Rd	3
14	Centennial Elementary School	700 S Czech Hall Rd	4
15	Mustang Elementary School	400 S Mustang Rd	7
16	Mustang 9th Grade Center	430 Forster	7
17	Mustang Middle School	1145 S Heights Dr	7
18	Mustang High School	906 S Heights Dr	7
State			
19	National Guard Armory - Mustang	420 Cedar Springs	7
Federal			
20	USPS - Mustang	600 N Mustang Rd	4
Financial			
21	Cornerstone Bank	1408 N Mustang Rd	4
22	First Fidelity Bank	1521 N Mustang Rd	3
23	MidFirst Bank	835 E Hwy 152	7
24	InTrust Bank	500 N Mustang	5
25	All America Bank	444 W Hwy 152	0
26	Bank of Commerce	620 E State Hwy 152	8
Private Infrastructure			
27	OG&E Electric Substation	867 N Sara Rd	0
Health Care			

ID	Name	Address	LoC
28	Mustang Manor Assisted Living	184 W Westchester Way	6
29	Arbor House Nursing Center	850 N Clear Springs Rd	2
30	Strawberry Fields Sec 8 Senior Housing	400 N Trade Center Terrace	5
	Child Care		
31	Mustang Child Development Center	415 N Clear Springs	2
32	Bridge Kids Learning Center	1120 W Hwy 152	0
33	Building Blocks	728 W Hwy 152	8
34	Kidville	1711 1/2 E Hwy 152	0
35	Castle Land Learning Center	819 S Mustang	0
36	Little Broncos Kids Club	714 S Mustang Rd	7
37	Ready Set Go Learning Center	126 W Highway 152	7
38	Little Broncos Kids Too	125 S Clear Springs	3
39	Country Charm Child Development Center	1712 E Hwy 152	0
40	Kindercare Learning #976	713 N Mustang Rd	4

History

During the period 2000 through 2009, the Mustang Fire Department responded to 286 wildfires within the Mustang Fire District that burned 342 acres and caused $25,779 in damage. These events are summarized in Table F.3-19.

Worst-Case Wildfire Scenario for Mustang

A worst-case event for the community would be a wildfire that resulted in injury or loss of life, damage or destruction of homes, schools, businesses, farms or oil and gas industry facilities, and the huge economic impact on the City.

Conclusion

Mustang has a High vulnerability to and High probability of the Wildfire hazard. The undeveloped land within the City Limits, crossed by railroads and highways, can become a tinderbox from late summer into winter, especially in times of drought. An additional concern is the presence of Eastern Red Cedar in the Canadian River floodplain (See Chapter 4.11 for information on Eastern Red Cedar).

4.12 Earthquake

Earthquakes are considered a general hazard that occurs more or less randomly and unpredictably throughout Canadian County. Mustang's vulnerability to earthquakes is the same as the rest of the County. See Chapter 4-12 for more detail on the Earthquake hazard.

Frequency

Based on 15 years of earthquake monitoring in Canadian County, Mustang can expect a nearby tremor every 3.7 years.

Extent/Severity

Mustang considers an earthquake of 4.8 magnitude and less on the Richter Scale a minor severity earthquake and an earthquake of a 4.8 magnitude or more on the Scale to be an event of major severity.

Impact

The impact of this hazard depends on the intensity of the earthquake and the quality of construction in the area. A 5.6 magnitude earthquake in Prague, in Lincoln County, in November 2011 caused damage to St. Gregory University's campus in Shawnee, Oklahoma, 20 miles away.

History

Canadian County experienced 28 earthquakes between 1995 and 2009, followed by cluster of 11 quakes in on March 11-12, 2010.

Conclusion

Mustang has a Low vulnerability to and Low probability of the Earthquake hazard.

4.13 Hazardous Materials

Hazardous materials are chemical substances that, if released or misused, can pose a threat to the environment or human health. These chemicals are used in industry, agriculture, medicine, research, and consumer goods. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are often released as a result of chemical accidents at plant sites or transportation accidents.

Location

There are three non EHS Tier II facilities located in the City of Mustang. There is one critical facility and approximately 142 people living within a quarter-mile of these three sites. Mustang's fixed Tier II sites are listed in Table F.3-21 and illustrated in Figure F.3-12.

Table F.3–21 Mustang Tier II Sites

Facility	Address	Contains EHS	Population Within ¼ mile
Lowes Store #2903	1000 E Highway 152	N	142
AmeriGas Propane	720 S Sara Rd	N	0
BMC Oklahoma – Mustang Plant	600 SW 59th St.	N	0

Frequency

From 1995 through 2010 there was one hazardous material release in or near the City of Mustang, which involved the dumping of refrigerants by a company located about one quarter mile north of the Mustang corporate boundary. Given this data, Mustang can expect a hazardous materials release every 15 years.

Extent/Severity

Mustang considers a minor severity fixed-site hazardous materials incident to be an incident that is unlikely to cause severe casualties, or which meets the *Emergency Response Guidebook* definition of a "small spill," and a major severity fixed-site hazardous materials incident be an incident in which there is a release of a toxic chemical which has the likelihood of producing serious injury or death and/or which meets the definition of a "large spill" for a particular chemical, according to the most current edition of the *Guidebook.*

Impact

The impact on the community of this hazard can include injury and loss of life, diminished emergency response, interrupted business operations, disrupted transportation systems, and short- or long-term ecological damage or degradation.

History

As stated above, from 1995 through 2010 there was one hazardous material release in or near the City of Mustang: the dumping of refrigerants by a company located about one quarter mile north of the Mustang corporate boundary. (Other releases reported by the National Response Center were not within Mustang's City Limits, but several miles to the north, in Oklahoma City.) This event is summarized in Table F.3-22.

Table F.3–22 Hazardous Materials Events in Mustang

Date	Description	Location	Responsible Party	Material
09/19/98	Dumping refrigerants	12825 SW 58th	Allied Refrigeration	Refrigerants

Worst-Case Hazardous Materials Release Scenario

A worst-case fixed-site hazardous material incident for the City of Mustang would involve a ruptured propane tank and fire at AmeriGas Propane.

It is worth noting that AmeriGas Propane, a non-EHS Tier II facility is located less than a quarter mile from Lowe's Store #2904, which is listed also a non EHS Tier II facility. Immediately across the street from the Lowes Store is a private college preparatory school.

Conclusion

Mustang has a Low vulnerability to and Low probability of the fixed-site Hazardous Materials hazard. The City of Mustang has established a Hazardous Materials Collection Center at Public Works which is staffed by OEMA each Saturday which has had success in disposing of potential toxic and flammable materials. This program appears destined to continue to the benefit of the community.

Out of caution, hazardous materials specialists should investigate the proximity of AmeriGas, Lowe's and Golden Hall College Preparatory School to ensure that any potential hazards are within safe distances or should be subject to mitigation measures.

4.14 Dam Failure

Dams can be either high-hazard or significant-hazard dams. A high hazard dam is one that has people downstream who would be at risk if it failed. It does not mean the dam is in danger of failing. A significant hazard dam is one that has structures and infrastructure downstream that would be damaged by a failure. A dam failure is the collapse, breach, overtopping or emergency release that results in downstream flooding.

Location

There are no high hazard or significant hazard dams in the corporate limits of Mustang, or outside of the City, whose failure would endanger lives or result in significant damage to the property of its residents. The largest lakes within the City Limits are Mustang Lake No. 1 and Lakehoma Acres Lake, both in the western half of Mustang, between Frisco Rd. and Clear Springs Rd. and south of OK Highway 152, in the Lakehoma Acres addition, primarily as amenities to the subdivisions. Both are situated on a tributary of Bennett Creek. There are a number of other "mini-lakes" and ponds that are also amenities to subdivisions

Frequency

There has been one dam failure in the Mustang corporate area: Spitler Dam in the Quail Lake Estates. This was a small scenic impoundment that was washed out during very heavy rainfall. This event does not have the characteristics of the Dam Failures hazard.

Extent/Severity

Mustang considers a minor severity dam event to be an extraordinary release that results in less than three feet of flooding on a one story building, and a major severity dam event to be a breach or failure that exceeds the capacity of the Dam's downstream riverbed immediately downstream from the dam and/or equates to (or exceeds) a 100- or 500-year flood and results in a depth of three feet of flooding or more on a one story building.

Impact

A dam failure or emergency release can injure or kill people downstream, and damage or destroy homes, businesses, agriculture, and infrastructure. Failure can take place over a prolonged period, giving people time to prepare for the flood surge, or can be sudden with little to no warning time.

History

Mustang has had one dam failure.

- **May 8, 2007** – Heavy rain resulted in flash flooding in Mustang and the failure of the Spitler Dam in the Quail Lake Estates. Water was reported in several homes and caused $20,000 in damage.

Worst-Case Dam Failure

A worst-case dam failure event for Mustang would be the failure of Mustang Lake No. 1 under already flooding conditions. Damage would primarily be to property.

Conclusion

Mustang has a Low vulnerability to and Low probability of the Dam Failure hazard. Mustang is located on high ground between the North Canadian and Canadian Rivers and well out of the reach of even the highest floodwaters. The community does, however, have over a dozen small impoundments, the largest of which are Mustang Lake No. 1 and Lakehoma Acres Lake. Were either of these small dams to fail, it would result primarily in property damage, although injury and even death are always possible during flood surges of any magnitude.

4.15 Transportation

There are three hazardous transportation corridors in Mustang: Highways, Railroads and Pipelines.

Highways

The Transportation Hazard associated with highways consists of nine miles of highways. These are: six miles of OK Highway 152, which runs east-west through the center of Mustang; three miles of OK Highway 4, north-south through Mustang; and one mile of OK Highway 92 (Spring Creek Rd.), which connects OK 152 and travels north out of the City Limits.

Traffic flow on OK Highway 152 east of OK 92 junction is 15,700 vehicles per day to the junction of OK 4 where it increases dramatically to 23,212 vehicles per day. The traffic count on OK Hwy 152 west of OK 92, towards Union City is 3,805. The vehicle count on OK 4 north from OK 152 is 18,688 and OK 4 south of OK 152 is 11,727. The predominant traffic flow is clearly north and east into Oklahoma City and Yukon.

Railroads

The Stillwater Central Railroad (SLWC) operates a northeast to southwest line that passes through four miles of the City of Mustang from Czech Hall Rd. east to County Line Rd.

The worst transportation accident to have occurred in Mustang was the collision of two Frisco trains west of Mustang in September 1974. Four locomotives were destroyed, 23 cars derailed

and hazardous materials caught fire in the wreckage. One brakeman was killed, three crewmen seriously injured, and eight families evacuated from the area.

Pipelines

A crude oil gathering pipeline system draws from fields south of Mustang and the distribution network passes north along OK Highway 4, across OK Highway 152, then west along or just south of 59th St. and out of the City.

Frequency

From 1995 through 2010, there have been two accidents involving Mustang's transportation corridors. These are listed in Table F.3-24. Given this limited data, Mustang can expect a transportation accident that results in a hazardous materials release every 7.5 years.

Extent/Severity

Mustang considers a minor severity transportation event to be one where detours are less than half a mile, traffic disruption less than half an hour, hazardous materials are contained within a quarter mile, and there is no loss of life or major injury. A major severity incident is one where detours exceed half an hour, traffic disruption is more than half an hour, hazardous materials releases impact an area greater than a quarter mile, and/or there is loss of life or major injury.

Impact

The impact of transportation events include lost revenue, highway disruptions, injuries and sometimes even loss of life. Transportation accidents are frequently a "cascade" disaster, occurring more frequently during storms. Storms cause streets to become slick, which increases the risk of transportation hazards. Excessive speed, exhaustion and other causes increase the risk also. Most vulnerable to the impacts of a transportation incident involving hazardous materials are the populations with ¼ mile of the incident. According to GIS and Census data, approximately 3,910 people would be impacted by a transportation incident involving hazardous materials on OK Highway 152, OK Highway 92, or OK Highway 4. An approximation of persons located within ¼ mile of the rail lines was not made available during this plan update.

Critical Facilities in the Transportation Corridor

A quarter-mile buffer was placed around the most significant transportation corridors – highways, pipelines and railroads. The Highway buffer is four square miles (or 33%) of the City. The Railroad buffer covers two square miles (or 16.6%) of the City. The critical facilities are listed in Table F.3-23 and mapped in Figure F.3-13. A transportation incident is not likely to cause major structural damage but could result in the implementation of evacuation or shelter in place procedures at any of the facilities listed in Table F.3-23. This could pose a particular risk to the nursing homes and childcare facilities which at any time house some of Mustangs most vulnerable populations. Effort should be made to educate the public about shelter and evacuation procedures.

Table F.3–23 Critical Facilities in Mustang's Transportation Corridors

Map ID	Name	Address
City Government		
1	Mustang City Hall Town Center	1501 N Mustang Rd
2	Mustang Police Dept	650 E. State Highway 152
3	Mustang Town Center Public Library	1201 N Mustang Rd

Map ID	Name	Address
4	Mustang Fire Dept	465 W State Highway 152
6	Booster Pump	2401 E State Highway 152
7	Water Tower	County Line Rd and SW 82nd St.
	Education	
12	Mustang Educational Center	400 Clear Springs Rd
13	Lakehoma Elementary School	224 S Clear Springs Rd
16	Mustang 9th Grade Center	430 Forster
17	Mustang Middle School	1145 S Heights Dr
	Federal Government	
20	Mustang USPS	600 N Mustang Rd
	Financial Institutions	
21	Cornerstone Bank	1408 N Mustang Rd
22	First Fidelity Bank	1521 N Mustang Rd
23	MidFirst Bank	835 E Highway 152
24	InTrust Bank	500 N Mustang
25	All America Bank	444 W Highway 152
	Health Care Facilities	
28	Mustang Manor Assisted Living	415 N Clear Springs
31	Mustang Child Development Center	415 N Clear Springs
32	Bridge Kids Learning Center	1120 W Hwy 152
30	Strawberry Fields Sec 8 Senior Housing	400 N Trade Center Ter
	Child Care Facilities	
33	Building Blocks	728 W Hwy 152
34	Kidville	1711 1/2 E Hwy 152
37	Ready Set Go Learning Center	126 W Highway 152
38	Little Broncos Kids Too	125 S Clear Springs
39	Country Charm Child Development Center	1712 E Hwy 152

History

Transportation Accidents

Freight trains, tanker trucks and pipelines all carry hazardous materials through Mustang. From 1995 through 2010, there were two accidents in Mustang which are listed in Table F.3-24 involving these transportation corridors. Given this frequency, Mustang can expect one transport release every 7.5 years.

Table F.3–24 Transportation Accidents

Date	Incident	Location	Type	Material
07/07/98	Auto ran red light and crashed into 9000 gallon tanker truck carrying gasoline, which caught fire	OK Highway 152 and Morgan Rd.	Highway	Gasoline
10/20/08	Oily water spill from truck due to open vale left open by operator	OK Highway 152 and Morgan Rd.	Highway	Oily water

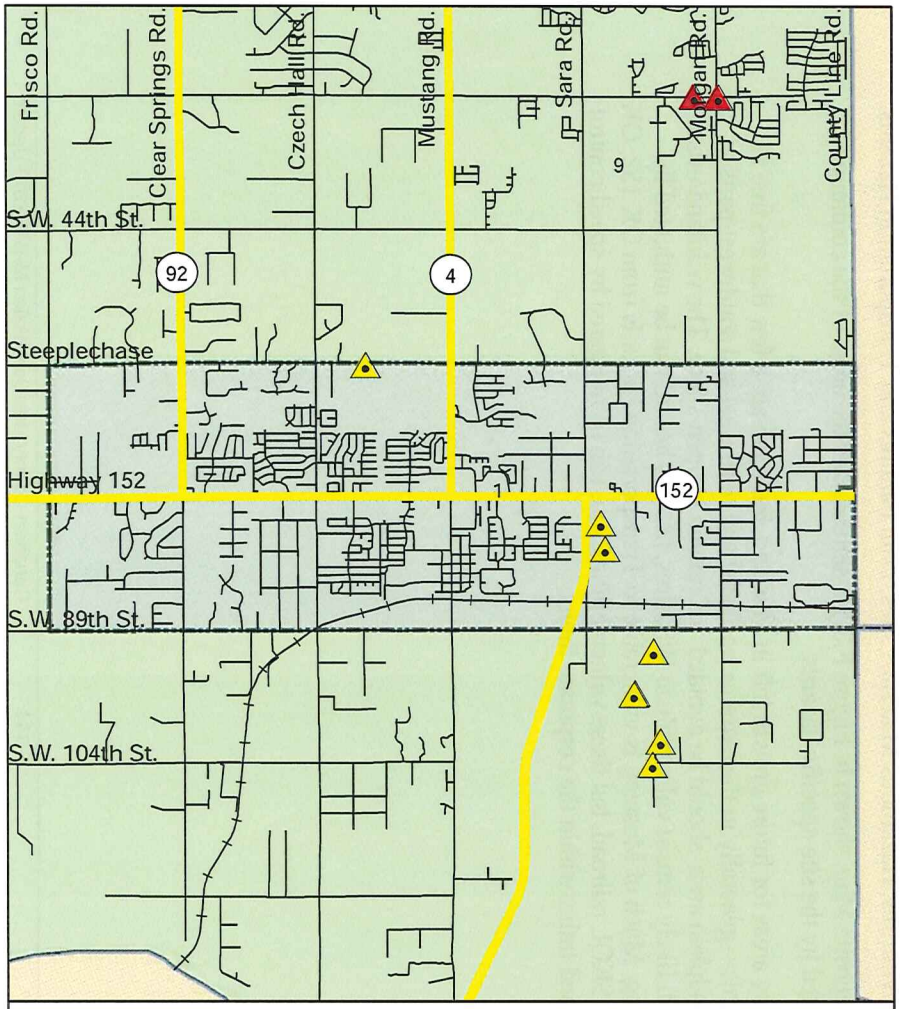

Figure F.3-12: *City of Mustang Hazardous Material SIte*s

Canadian County TierII
- 2009 EHS Tier 2
- 2009 non EHS Tier 2

Boundaries
- Mustang_City_Limits
- Canadian County
- Statewide Counties

Transportation
- Interstate
- US Highway
- State Highway
- Turnpike
- Local or Rural Road
- Railroads

Flanagan & Associates, LLC

0 0.5 1 Miles

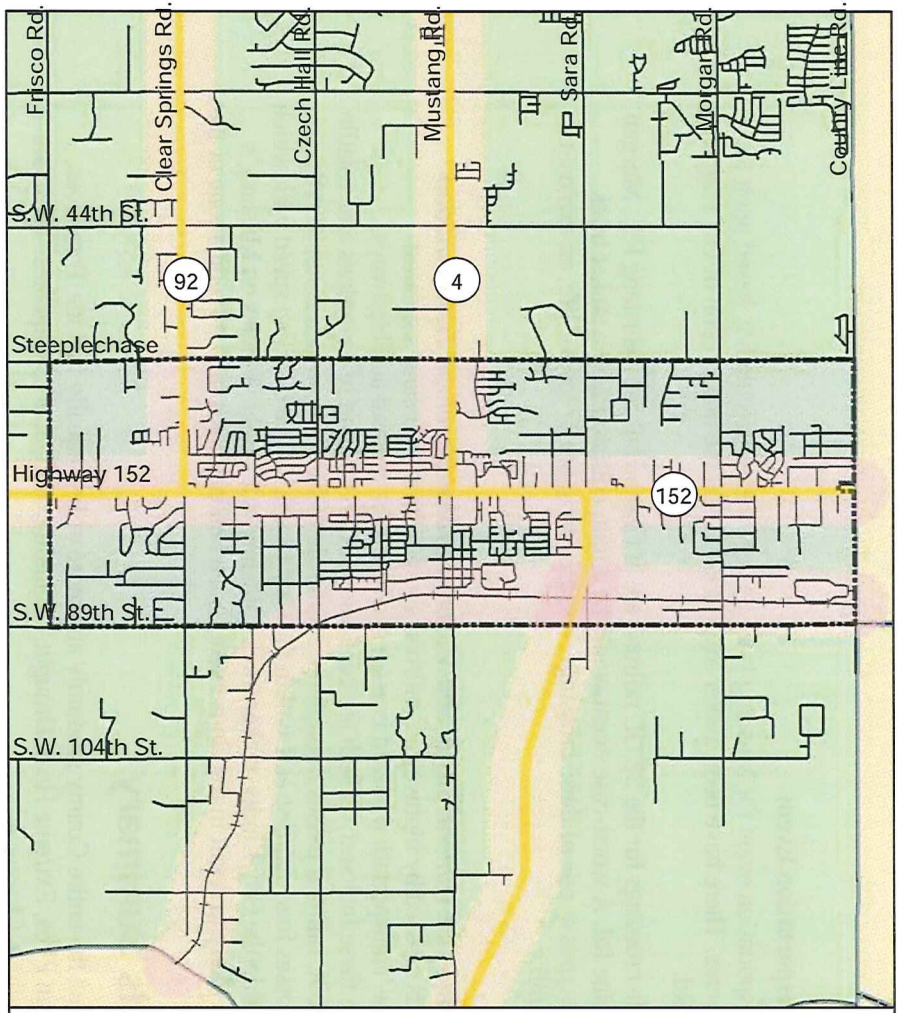

Figure F.3-13: *City of Mustang Transportation Corridors*

Transportation Corridors
- Quarter Mile Buffer

Boundaries
- Mustang_City_Limits
- Canadian County
- Statewide Counties

Transportation
- Interstate
- US Highway
- State Highway
- Turnpike
- Local or Rural Road
- Railroads
- airports

Flanagan & Associates, LLC

0 0.5 1 Miles

Worst-Case Transportation Event

A worst-case transportation event for Mustang is by its very nature speculative, based upon the scarcity of past events. There have been tanker truck accidents at the intersection of OK Highway 152 and Morgan Rd.

The major at-grade crossings for the SKOL railroad are at Czech Hall Rd., Mustang Rd., Morgan Rd. and County Line Rd. A worst-case event would be a train collision with a tanker truck carrying volatile liquids at one of these crossings, resulting in injury or loss of life, an explosion, fire and/or toxic spill.

Conclusion

Mustang has a Moderate vulnerability to and Moderate probability of the Transportation hazard. The City is crossed by highways, a railroad and pipelines. Mustang's greatest vulnerability to the Transportation hazard is associated with the railroad and highways, particularly where these intersect, as both are corridors for the transport of hazardous and volatile materials. The SKOL railroad passes through the south side of Mustang, which is not heavily populated, and crosses four major streets within the City Limits. Given the slow speed with which vehicles move within the City Limits, tanker truck collisions with other vehicles on Mustang's highways are less likely to result in a serious event than a tanker truck-train collision at one of the SKOL crossings.

4.16 Hazards Summary

Hazards that impact the entire County randomly and more or less equally include Tornadoes, High Winds, Urban Fires, Extreme Heat, Drought, Lightning, Hail, and Earthquakes. These are addressed more fully in Chapter 4.

Site-specific hazards, unique to Mustang, identified and mapped in this section, include Floods, Expansive Soils, Wildfires, Hazardous Materials sites, Dam Failures and Transportation Hazards.

The Hazards Composite Map, shown in Figure F.3-14, summarizes the areas of the community potentially impacted by the site-specific hazards.

There are not many areas for future growth left in Mustang, but there are a few that are free of site-specific hazards—generally in the extreme northeast and northwest and southwest parts of the City. The Floodplain areas should be avoided and remain in open-space. The wildland/urban interface areas will likely remain vulnerable to Wildfires, but this hazard can be mitigated by careful landscaping. Much of Mustang is vulnerable to Transportation Hazards from OK 152, OK 4, OK 92 and the SKOL railroad, but these vulnerabilities, too, can be mitigated by speed control on both vehicles and trains within the corporate limits.

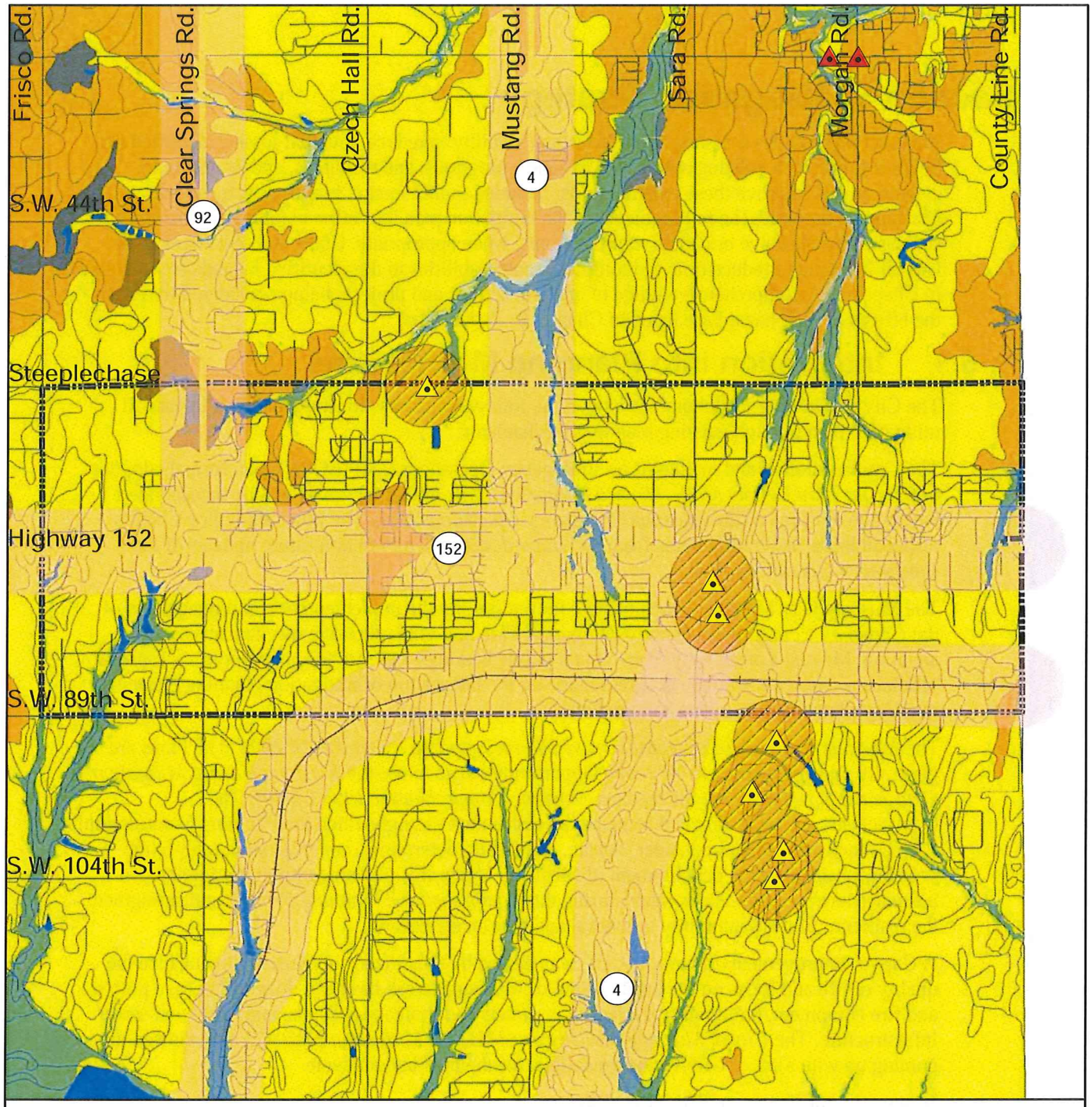

Figure F.3-14:

City of Mustang Hazard Analysis

Hazard Overlay
- 2009 EHS Tier 2
- 2009 non EHS Tier 2
- Tier2 1/4mi Buffer
- 100yr Floodplain
- 500yr Floodplain
- 1/4mi Transport Buffer

Expansive Soils
- Low
- Moderate
- High
- Very High
- Water

Boundaries
- City Limits

Transportation
- Interstate
- US Highway
- State Highway
- Turnpike
- Local or Rural Road
- Railroads

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Planning Consultants

0 1 2 Miles

N W E S

Section 5 Mitigation Strategy

This section provides a description of Mustang's ability to reduce potential losses, identified in Section 4, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. Included in this section is a process by which Mustang incorporates the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate. Goals and objectives of the City of Mustang to reduce or avoid long-term vulnerabilities to the identified hazards are included in Chapter 5. A comprehensive range of specific actions and projects being considered to reduce the effects of each hazard are listed in Chapter 6, *Action Plan.*

5.1 Integration into Planning Mechanisms

The City of Mustang, Oklahoma described the following process for implementing its hazard mitigation plan through existing planning mechanisms:

The City has drafted and maintains an Emergency Operations Plan (EOP). Upon formal adoption of the *Canadian County Multi- Hazard Mitigation Plan,* mitigation goals will be incorporated into future versions of the *Mustang Emergency Operations Plan.* The Mustang Police Chief is responsible for integrating items from the *Hazard Mitigation Plan* into future updates of the *Emergency Operations Plan.*

The Mustang City Manager is responsible for overseeing the implementation and integration of the *Canadian County Multi-Hazard Mitigation Plan* into other planning mechanisms upon adoption. Meetings of the City Council and public hearings will provide an opportunity for local officials to report back on the progress made on the integration of mitigation planning elements into City planning documents and procedures.

The *Mustang Vision 20/20 Comprehensive Plan* was updated in the fall of 2003. The Plans are generally updated every 5 to 10 years. Opportunity exists to use the *Mustang Hazard Mitigation Plan* as a tool and resource for the next *Mustang Comprehensive Plan Update.* The Comprehensive Plan is first and foremost an instrument through which the Planning Commission, City Council and citizens consider, debate, and finally determine a set of general, long-range policies for the physical development of Mustang. Under this planning option, mitigation can influence and guide decisions made during the *Comprehensive Planning Process* and strengthen the resilience of the community to natural and man-made hazards.

A Capital Improvements Program "CIP" was passed by the citizens of Mustang to enhance the quality of life and focus on the bright future of Mustang. Work has been done to improve police and fire equipment, buildings, park facilities, streets and drainage systems, and water and sewer infrastructure. The *City of Mustang Multi-Hazard Hazard Mitigation Plan* will be reviewed in coming up with a set of CIP recommendations for the next budget cycle.

Integration of Previous Mitigation Plan

The *City of Mustang Multi-Hazard Mitigation Plan* (2003) incorporated all pertinent existing plans during the update process. The plan was reviewed when looking for mitigation items to integrate into the *City of Mustang Capital Improvements Plan* in order to prioritize funding for projects. In addition, the *Multi-Hazard Mitigation Plan* has also been integrated with the following plans and codes:

- City of Mustang Building Code
- *Canadian County Emergency Operations Plan*
- *Mustang Public Schools Emergency Operations Plan*

Integration Highlights:

Ensuring consistency between the *Multi-Hazard Mitigation Plan* and existing plans.

Updating mitigation strategy goals and objectives to incorporate ideas from the *Mustang Capital Improvement Plan* and *Vision 20/20 Comprehensive Plan.*

5.2 Prioritization Process of Mitigation Measures

The City of Mustang identified 42 mitigation measures, specific to their jurisdiction, during the *Canadian County Multi-Hazard Mitigation Plan Update* process. The mitigation measures will be prioritized using the STAPLEE process as recommended by FEMA, included in Chapter 5, Table 5-1. Complete detailed information for each mitigation measure is included in Chapter 6.

Changes in Hazard Mitigation Priorities

The City of Mustang identified and prioritized mitigation measures in the previously adopted *City of Mustang Hazard Mitigation Plan (2003).* In the previous plan Mustang identified mitigation measures addressing hazardous material events to be at highest priority. Since 2003, Mustang has been impacted by multiple natural and man-made hazard events. Based on this information, priorities have changed to account for a multitude of hazards that impact Mustang on a frequent basis. Descriptions of hazard events that have occurred since the last plan update are addressed in Section 4, *Hazards.*