



City of Hays
Hays County Hazard
Mitigation Plan Update
2017



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City of Hays Annex

Section 1: Organize and Review

This section contains a brief description of the City of Hays and its jurisdictional features. In addition, Section 1 contains the following details regarding the City's:

- participation in the Hays County HMP Update process,
- stakeholder engagement,
- public outreach strategy,
- incorporation efforts and
- plan maintenance procedures.

*Population :	198
Size of Community:	0.21 sq. miles
*Population over 65 years old	36
*Population under 16 years old	37
*Economically Disadvantaged Population (\$0-\$20k)	2
City of Hays is serviced by the following responders:	
Fire & EMS - Buda Fire Department/Buda EMS	
Law Enforcement - Hays County Sheriff's Office	

**Hanus-MH 3.2 Updated Census 2010 Population Projections*

Community Description

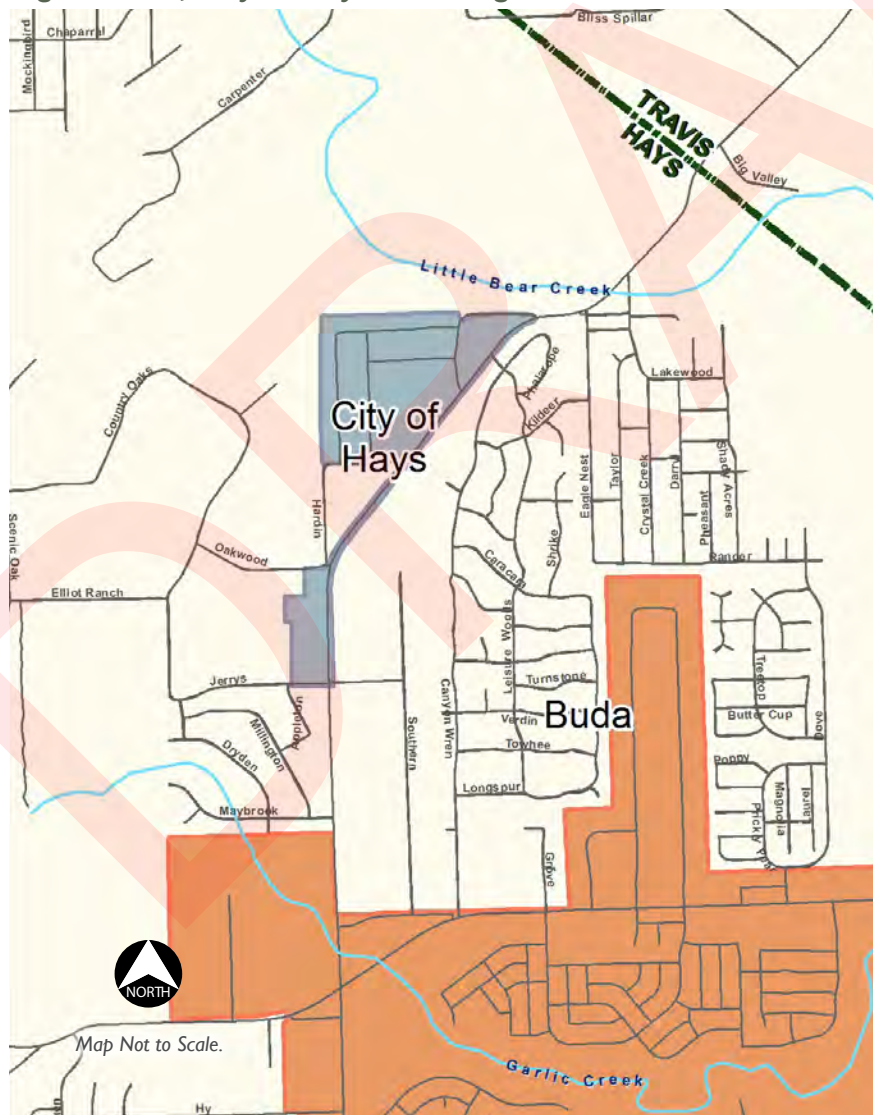
When planning, it is important to take into account the characteristics that make a community unique. Consideration of unique needs when it comes to mitigating or recovering from natural hazards ensures that all members of the community and their needs are addressed.

Hays is located west of FM 1626 and about a mile and a half from FM 967 to the south and a mile and a half from Brody Lane to the North. Located 3 miles Northwest of Buda, the City of Hays is made up of 6 streets that make up the Country Estates subdivision. Farm to Market Road 1626 serves as the jurisdiction's southeast border.

The City is purely residential and nearly fully developed. There are 90 homes in 1 subdivision that make up the community that is served by Hays Consolidated Independent School District.

Hays is governed by a Mayor and 4 City Council members. The community is a General Law City. This provides a limit on tax rates. General Law cities can only take actions allowed by the State legislature, similar to County level enforcement.

Figure HA.1, City of Hays Planning Area



Hays County Hazard Mitigation Plan, City of Hays Annex

City of Hays is 100% residential and does not have any employers besides home-based operations run and operated by community members. The City's major utility providers are listed in Table HA.1.

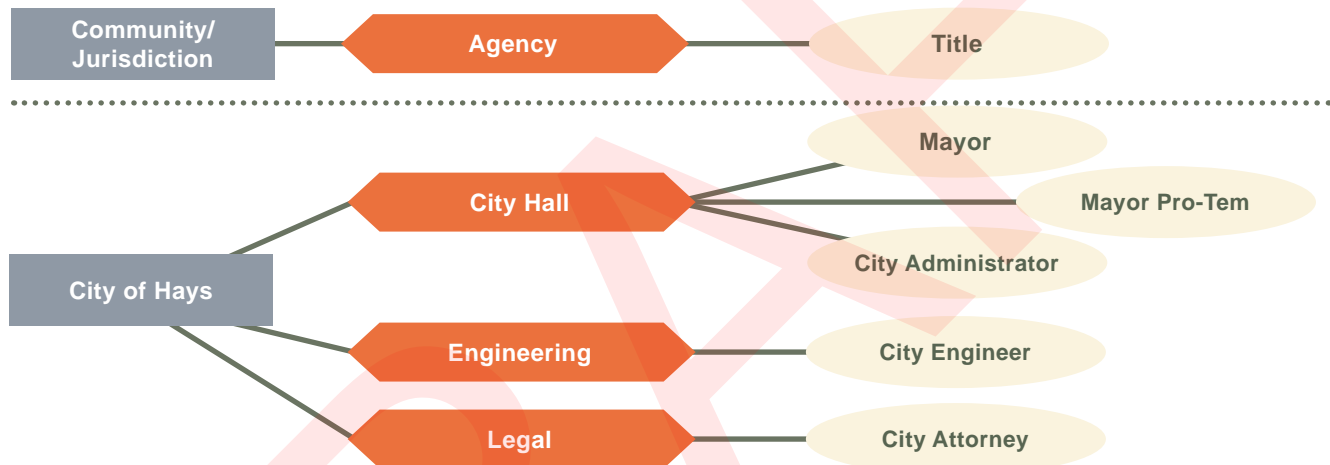
Table HA.1, Utility Providers

Type	Provider
Electric	Pedernales Electric Cooperative (PEC)
Natural Gas	No natural gas service
Water	Edwards Aquifer through City of Hays Water System
Cable	Spectrum

Planning Committee

Planners who represented the City for the update process are collectively known as the City of Hays Mitigation Planning Committee (MPC) and are shown in Figure HA.2.

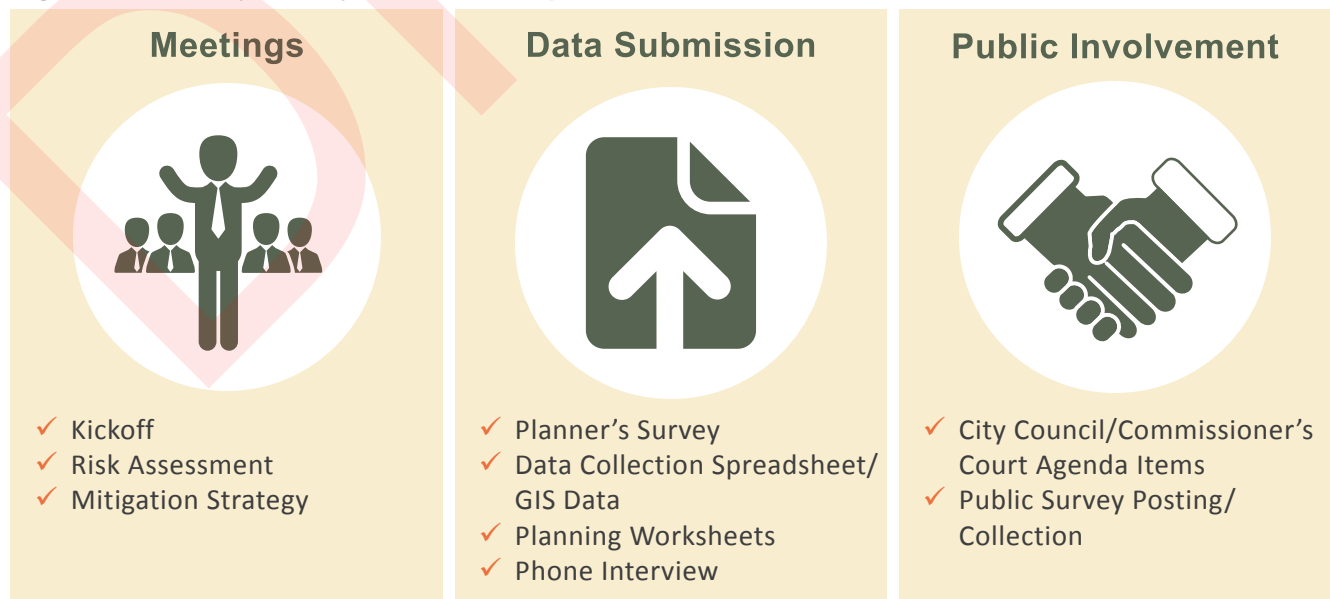
Figure HA.2, Planning Committee Membership



Community Planning Involvement

MPC planning activities for the Hays County Hazard Mitigation Plan (HMP) Update are captured in Figure HA.3, which utilizes check-marks to indicate each of the activities that were completed by the City of Hays MPC.

Figure HA.3, City of Hays Plan Participation





Stakeholders

During the Phase 1 Kick-Off Meeting, planners were provided with a Planner/Stakeholder worksheet, referred to in Chapter 1, the Plan Process portion of the Hays County HMP Update. This document allowed planners to identify stakeholders for inclusion in the Risk Assessment and Mitigation Strategy Meetings. Table HA.2 identifies the stakeholders that were invited to participate by the following email:

Good Morning,

You or your organization has been identified by a local community planner as a stakeholder (interested/affected party) for the Hays County Hazard Mitigation Plan Update process. The planning team, made up of community officials from throughout Hays County, is working to update this plan that identifies actions for reducing and mitigating the risk from natural hazards (flood, tornado, severe winter, etc...) affecting Hays County and the communities within it. If your schedule allows, your insight would be valuable at a meeting being held on Thursday, January 12, 2017, from 1 p.m. to 4 p.m. at

Wimberley Community Center
14068 Ranch Road 12
Wimberley, TX 78676

Please register for the Hazard Mitigation Plan Update- Risk Assessment Meeting. <https://www.eventbrite.com/e/hays-county-hazard-mitigation-plan-update-risk-assessment-meeting-registration-30892049953>

If unable to complete registration on the Eventbrite site, please reply to this email and indicate who will attend from your organization so that the meeting facility can be prepared for the proper number of attendees.

JWSA and Halff Associates are providing coordination and facilitation support for this process for Hays County and participating communities utilizing FEMA mitigation grant funding. Any questions regarding this meeting can be directed to Paloma Alaniz at palaniz@halff.com.

Thank you.

Table HA.2, Plan Stakeholders

Organization	Agency	Title
Hays County	Sheriff's Office	Lieutenant
City of Buda	Public Works	Director/Emergency Management Coordinator
Pedernales Electric Cooperative	Utilities	Chief Executive Officer
Buda	Economic Development Corporation	President
Hays Consolidated ISD	School District	Director
Spectrum Cable	Telecommunication	Government Affairs Manager

Outreach Strategy

The City of Hays was very active in their Outreach Activities used to inform the public of their participation in the Hays County Hazard Mitigation Plan Update.

Public Survey Promotion

The City of Hays advertised the Hays County Hazard Mitigation Plan Update Public Survey through a newsletter that goes out with the community utility bill.

As of March 10, 2017, the City of Hays had 19 residents respond to the public survey. A copy of the survey questions can be found in Appendix A of the Hays County HMP Update. Details on how the survey data was directly incorporated into the Risk Ranking process for hazards is included in Chapter 2, the Risk Assessment portion of the Hays County HMP Update.

City Council Meeting Announcement

On February 13, 2017, the Mayor presented information on the Hays County Hazard Mitigation Plan Update to the Hays City Council. The council agenda and item report for this presentation is included in Appendix A of the Hays County HMP Update.



Plan Phase Newsletters

Hays was provided with newsletters at each phase of the planning process in order to be able to share updates on the planning process with stakeholders, elected officials, City staff and the public. Copies of the newsletters can be found in Plan Appendix A.

Plan Draft Public Review and Comment Period

The link to the draft Hays County HMP (hosted on the Hays County Office of Emergency Services page) was posted on the City of Hays website from **July 12, 2017 until July 26, 2017**. A hard copy was placed in the City Hall building. Comments were collected via email to the City Secretary.

Incorporation of Sources

In addition to stakeholder and public input, the MPC also reviewed other planning resources that could provide useful information to the plan update process. Table HA.3 lists the documents reviewed and how they were considered for incorporation in the updated plan.

Table HA.3, Review/Incorporation of Sources

Name of Document	Type	How Incorporated
2013 State of Texas Hazard Mitigation Plan	Plan	Utilized hazard definitions and hazard classification names.
Flood Insurance Study	Study	Incorporated best available hydraulic and hydrologic study results for flood hazard profile.
Natural and Cultural Resources Assessment Report: Drainage Improvement Project, City of Hays, Texas	Plan	Review for incorporation of drainage project as action in Mitigation Strategy
City of Hays Municipal Code	Regulations	Review for possible enhancement to existing laws for mitigation purposes (City of Hays, Texas, 2014)

Continued Public Participation in Maintenance Process

The strategy for updates at the local level for the City will include opportunities for public involvement as shown in Table HA.4.

Table HA.4, Public Involvement for Updates

Activity	Public Involvement	Method Available
Monitoring	The public will be given notice when items will be reviewed and receive the opportunity to review the notes from any notable developments.	Newspaper/Website
Evaluation	The public will be given a means to voice their opinion on the completed actions.	SurveyMonkey/Paper Survey
Updates	Once updates are made, the changes will be recorded in a public revision history document.	Newspaper/Council Meeting Announcements/Utility Bill/Newsletter "Hays Happenings"

Maintenance

Table HA.5 lists the method, schedule, and responsible agent for the monitoring, evaluation, and updating of the adopted 2017 HMP within the Plan's 5-year update cycle.

Table HA.5, Hays County Hazard Mitigation Plan Maintenance Schedule, City of Hays

Task	Scope	Method	Schedule	Responsible Agent
Monitoring	Jurisdictional	Reviews of mitigation action items using Mitigation Action Progress Report Worksheets (Appendix C of the Hays County HMP Update).	Every 12 months	City of Hays, City Hall, Mayor
Evaluation	Jurisdictional	Complete Online Planner Survey (using SurveyMonkey) with evaluation of plan process.	Every 12 months	City of Hays, City Hall, Mayor
Updates	Jurisdictional	<p>Perform updates to Mitigation Strategy to edit/add/omit actions identified during monitoring activities.</p> <p>Conduct post-disaster review of community annex in order to update for significant occurrences, construction of new critical infrastructure or facilities, changes in jurisdictional boundaries and development.</p> <p>Participate in MPC for 5 year HMP update process.</p>	As needed	City of Hays, City Hall, Mayor





Section 2: Risk Assessment

City of City of Hays Jurisdictional Hazards

This section contains the City of Hays' hazard profiles for each natural hazard included in the Hays County HMP Update. Profiles include:

- Location - the area where the hazard is known to occur
- Previous Occurrences - a history of reported events for the hazard
- Significant Previous Occurrences (when applicable) - notable hazard events within the community
- Extent - the strength or magnitude of the hazard
- Probability - the likelihood of the hazard event occurring in the future
- Impact - the consequence or effect (or possible effect) of hazard events
- Vulnerability Summary - identification of structures, systems, populations or assets susceptible to loss or damage

Hazard descriptions and extent scales for hazard magnitudes, are found in Chapter 2, the Risk Assessment portion of the Hays County HMP Update.

When available, data specific to the City of Hays was used for hazard analysis. When no instances were reported specifically for the jurisdiction for regional hazards, County level data was applied.

State and national datasets were used to determine occurrence, extent, and the respective probabilities, rather than verbal testimonies, in an effort to retain data consistency. For some hazards, the National Oceanic and Atmospheric Administration (NOAA) Storm Events Database was used as the most comprehensive data available for hazards. As a result, fatality, injury and damage amounts shown for previous hazard occurrences do not always reflect the most recent totals. The Previous Occurrences paragraphs identify instances in which this may occur. Verbal testimony, when available, was integrated into impact or vulnerability summaries, when applicable.

Hazards profiled within the Risk Assessment include:

Drought

Extreme Heat

Severe Winter Storms

Lightning

Hailstorms

Windstorms

Tornadoes

Expansive Soils

Floods

Land Subsidence

Hurricanes/Tropical Storms

Earthquakes

Dam/Levee Failure

Wildfires



Drought

Drought: Location

Drought occurs on a regional scale, therefore, all of the City of Hays is equally at risk as it can occur anywhere in the planning area.

Drought: Previous Occurrences

NOAA Storm Events Database documents 27 drought events for Hays County since the year 1996 (see Table HA.6). Although there were no drought events reported specifically for the City of Hays, the jurisdiction would have been affected by the events that were reported for the surrounding County area.

Fatality, injury and damage amounts are shown in Table HA.6, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HA.6, Reported Drought Occurrence, Hays County

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
HAYS (ZONE)	4/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	5/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	6/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	7/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	7/1/2000	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/2000	Drought	0	0	0.00	0.00
HAYS (ZONE)	9/1/2000	Drought	0	0	0.00	0.00
HAYS (ZONE)	10/1/2000	Drought	0	0	0.00	0.00
HAYS (ZONE)	5/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	6/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	7/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	9/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	10/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	11/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	12/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	1/1/2012	Drought	0	0	0.00	0.00
HAYS (ZONE)	6/1/2012	Drought	0	0	0.00	0.00
HAYS (ZONE)	12/1/2012	Drought	0	0	0.00	0.00
HAYS (ZONE)	2/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	3/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	4/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	6/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	7/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/2014	Drought	0	0	0.00	0.00
Total					\$0.00	\$0.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)



Drought: Significant Past Events

Several significant regional drought events have previously impacted the City. Refer to the *Drought: Significant Past Events* paragraph within Section 2, Risk Assessment of the Hays County Annex, for narratives discussing these events.

Drought: Extent

The US Drought Monitor Drought Intensity scale classifies drought by 5 categories, D0 through D4. According to the reported previous drought occurrences in the jurisdiction, the maximum drought extent experienced is a Category D4 drought. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of US Drought Monitor Drought Intensity Index.

Drought: Probability

Based on 6 years with reported drought events from the NOAA Storm Events Database within 20 years, a drought event occurs approximately once every 3 years on average in Hays County. Since drought events can happen anywhere throughout the HMP update area and occur on a regional scale, the City of Hays' future probability is assumed to be similar to the surrounding County areas and therefore, can expect a drought event approximately once every 3 years on average with up to a Category D4 Drought.

Number of Years with Reported Event (Drought Year)	Number of Years in Dataset	Probability
6	20	0.30

Drought: Impact

Table HA.7 lists the impact of drought from 1996 to 2016 for Hays County according to the Drought Impact Reporter (DIR). The DIR is the nation's first comprehensive database of drought impacts. This database contains information from multiple Federal agencies, such as NOAA and United States Geological Survey (USGS), related to drought impacts from a national to city level by category and extent of impact. As the effects of drought are not confined to jurisdictional boundaries and occur on a regional scale, impacts reported on the Hays County level are applicable in illustrating impact to the City of Hays.

Table HA.7, Reported Drought Impacts, Hays County

Hays County Drought Impacts 1996-2016	
Category	# of Incidents Reported
Agriculture	45
Business & Industry	3
Energy	2
Fire	24
Plants & Wildlife	33
Relief, Response & Restrictions	48
Society & Public Health	7
Tourism & Recreation	3
Water Supply & Quality	53

(University of Nebraska-Lincoln, 2016)





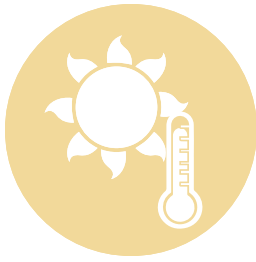
Drought: Vulnerability Summary

The City of Hays utilizes water services that draw from the Edwards Aquifer. In the past, there have been periods when the Edwards Water District has had to issue water usage guidance due to low water levels.

It is estimated that 2 to 3 residents have private wells. The community is directly impacted during periods of low levels for the aquifer.

Hays has fire hydrants in the community that could experience periods of low pressure in the event of water shortage. This could impact the ability of firefighters to suppress a fire in the community.





Extreme Heat

Extreme Heat: Location

Extreme heat occurs on a regional scale; therefore, all of the City of Hays is equally at risk as it could occur anywhere in the planning area.

Extreme Heat: Previous Occurrences

NOAA's Online Weather Data (NOWData) provides temperature data ranging from 2000 to 2016. NOAA's National Weather Service (NWS) Heat Index (located in Chapter 2, the Risk Assessment portion of the Hays County HMP Update) indicates that temperatures meeting or exceeding 90°F are designated with an "Extreme Caution" or greater warning classification. According to Canyon Dam Station, the closest local weather data collection center with comprehensive data, the mean number of days with a daily max temperature equal or greater to 90°F is 94 days. Currently, the greatest number of days during which the jurisdiction experienced extreme heat is 119 in 2008 while the highest temperature experienced was 109°F in August 2011 (a "Danger" NWS Heat Index classification). Canyon Dam Station is the closest reporting NOWData station to the jurisdiction and applies equally to the City of Hays due to the regional nature of extreme heat occurrence.

Extreme Heat: Extent

Extreme heat extent is classified by temperatures as well as levels, within the NWS Heat Index. The extent of extreme heat that the City of Hays has experienced can be derived from the data provided from NOWData at Canyon Dam Station since the year 2000. The highest daily mean temperature experienced was 109°F in August 2011. This event is classified by the NWS Heat Index as "Danger". Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of heat extent scale, NOAA's NWS Heat Index.

Extreme Heat: Probability

The probability of future events can be determined by assessing historical averages. Since extreme heat events occur on a regional scale, the City of Hays' future probability is assumed to be similar to the area surrounding Canyon Dam Station. Based on NOWData, the City can expect, on average, approximately 94 days a year with temperatures equal or greater to 90°F, and up to a "Danger" warning classification per the NOAA NWS Heat Index. As extreme heat events have occurred every year since 2000, the probability of extreme heat affecting the community is 100% in any given year.

Extreme Heat: Impact

Extreme heat has physical impacts on the public and the infrastructure that supports them. According to the Texas Health Care Information Collection and Trauma Registry from the Texas Department of State Health Services' Injury Epidemiology & Surveillance Branch, the following number of patients were received in Hays County medical facilities for Heat Related Injuries and Trauma, as shown in Tables HA.8 and HA.9.

Table HA.8, Hays County Hospital Inpatient Data, Extreme Heat

Description	2010	2011	2012	2013	2014
Accidents caused by excessive heat due to weather conditions	1	3	5	0	0
Accidents due to excessive heat of unspecified origin	1	0	0	0	0

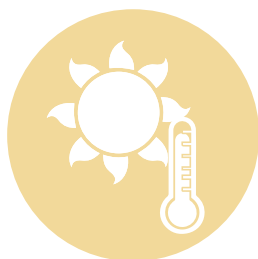
(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)



Table HA.9, Hays County Trauma Data, Extreme Heat

Description	2010	2011	2012	2013	2014
Accidents due to excessive heat of unspecified origin	0	1	0	0	0

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)



In addition to the physical impacts, an excessive heat event can also be the cause of cascading incidents. Electrical outages could occur due to the high demands of electricity needed to power cooling systems. A loss of critical resources, such as power, has significant impact on the entire population, with higher impacts to those with vulnerabilities to such conditions. The following portion of the City of Hays's population, according to HAZUS-MH 3.2 updated Census 2010 population estimates, would be greatly impacted by the severe temperatures related to excessive heat and/or the loss of electrical energy in their dwellings.

Population over 65 years old:	36
Population under 16 years old:	37
Economically Disadvantaged Population (\$0-\$20k):	3

An organization called Inside Energy (<http://insideenergy.org>) provided a compiled database outlining 15 years of power outages across the United States from annual data available at the Department of Energy. Within the database, the following excessive heat events affected electrical availability in the areas in or near Hays County (Table HA.10).

Table HA.10, Extreme Heat Affecting Electrical Availability

Event Description	Year	Start Date	Start Time	End Date	Respondent	Location	Customers Affected
Declared Energy Emergency Alert2/Heat Wave	2007	8/14/2007	2:00 p.m.	8/14/2007	American Electric Power (CSWS)	CSWS Control Area of Southwest Power Pool Parts of Oklahoma, Texas, Louisiana, Arkansas	N/A

(Wirfs-Brock, 2014)

Extreme Heat: Vulnerability Summary

The City of Hays does not have a cooling station plan for the community but could use their City Hall as a location to provide a cool place for vulnerable residents. City Hall has no generator back-up for electricity, so they cannot provide cooling if an electrical outage occurs.



Severe Winter Storms



Severe Winter Storms: Location

Severe winter storms occur on a regional scale; therefore, all of the City of Hays is equally at risk.

Severe Winter Storms: Previous Occurrences

NOAA Storm Events Database documents 13 winter storm events for Hays County since the year 1996 (see Table HA.11). Although there were no winter storm events reported specifically for the City of Hays, the jurisdiction would have been affected by the events that were reported for the surrounding County area.

Fatality, injury and damage amounts are shown in Table HA.11, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HA.11, Winter Weather Occurrences, Hays County

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
HAYS (ZONE)	2/1/1996	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	1/7/1997	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	1/11/1997	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	12/23/1998	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	12/12/2000	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	11/28/2001	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	2/24/2003	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	12/7/2005	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	1/15/2007	Winter Storm	0	0	125,000.00	0.00
HAYS (ZONE)	2/3/2011	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	11/26/2013	Winter Weather	0	0	0.00	0.00
HAYS (ZONE)	1/23/2015	Winter Weather	0	0	0.00	0.00
HAYS (ZONE)	2/16/2015	Winter Weather	0	0	0.00	0.00
Total			0	0	\$125,000.00	\$0.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Severe Winter Storms: Significant Past Events

Regionally, there were significant winter weather events reported as Hays (Zone) that may have impacted the City, as shown in Table HA.11. Refer to the *Severe Winter Storms: Significant Past Events* section within the Hays County Annex for narratives discussing these events.

Severe Winter Storms: Extent

Ice accumulation is captured and measured with the Regional Snowfall Index (RSI) and the Sperry-Piltz Ice Accumulation (SPIA) Index, as detailed in Chapter 2, the Risk Assessment portion of the Hays County HMP Update. According to the reported previous winter weather occurrences in the jurisdiction, the maximum winter weather extent experienced is a RSI Category 1 snowfall event or SPIA Ice Index Category 2 ice event.





Severe Winter Storms: Probability

Based on 13 reported events from the NOAA Storm Events Database in 20 years, a winter weather event occurs approximately every 2 years on average in Hays County. There were no events reported specifically for the City of Hays. Since these events can happen anywhere throughout the HMP update area and occur on a regional scale, the City's future probability is assumed to be similar to the surrounding county area. The planning area can expect a winter weather event approximately once every 2 years on average in the future of up to RSI Category 1 snowfall event or SPIA Ice Index Category 2 ice event.

Number of Reported Events	Number of Years in Dataset	Probability
13	20	0.65

Severe Winter Storms: Impact

Severe winter weather has physical impacts upon the public and the infrastructure that supports them. According to the Texas Health Care Information Collection and Trauma Registry from the Texas Department of State Health Services' Injury Epidemiology & Surveillance Branch, the following number of patients were received in Hays County medical facilities for Cold Related Injuries and Trauma (shown in Tables HA.12 and HA.13).

Table HA.12, Hays County Hospital Inpatient Data, Severe Winter Storms

Description	2010	2011	2012	2013	2014
Accidents caused by excessive cold due to weather conditions	2	0	0	0	0
Accidents due to excessive cold of unspecified origin	1	0	0	0	1

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)

Table HA.13, Hays County Trauma Data, Severe Winter Storms

Description	2010	2011	2012	2013	2014
Accidents due to excessive cold due to weather conditions	1	0	0	0	0

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)

In addition to the physical impacts, a severe winter storm event can also be the cause of cascading incidents. Electrical outages could occur due to the high demands of electricity needed to power heating systems. A loss of critical resources, such as power, has significant impact on the entire population, with higher impacts to those with vulnerabilities to such conditions. The following portion of the City's population, according to HAZUS-MH 3.2 updated Census 2010 population estimates, would be greatly impacted by the extreme temperature conditions related to severe winter storms and/or the loss of electrical energy in their dwellings.

Population over 65 years old:	36
Population under 16 years old:	37
Economically Disadvantaged Population (\$0-\$20k):	3





An organization called Inside Energy (<http://insideenergy.org>) provided a compiled database outlining 15 years of power outages across the United States from annual data available at the Department of Energy. Within the database, the following winter storm events affected electrical availability in the areas in or near Hays County.

Table HA.14, Severe Winter Storms Affecting Electrical Availability

Event Description	Year	Start Date	Start Time	End Date	Respondent	Location	Customers Affected
Cold Weather Event	2011	2/9/2011	4:30 PM	2/10/2011	ERCOT ISO	Texas	N/A
Public Appeal due to Severe Weather - Cold	2014	1/6/2014	7:01 AM	1/7/2014	ERCOT	Texas	N/A
Public Appeal due to Severe Weather - Cold	2014	3/2/2014	7:00 PM	3/4/2014	ERCOT	ERCOT Region Texas	N/A

**Electrical Reliability Council of Texas (ERCOT)*

(Wirfs-Brock, 2014)

In addition, severe winter storms and the icy roads that accompany them lead to dangerous driving conditions. Although there were no reports specifically for the City of Hays, data available from the Texas Department of Transportation's Crash Records Information System shows that between the years of 2010 and (May) 2017, rural Hays County experienced 42 crashes related to sleet/hail and snow conditions (shown in Table HA.15). Injuries sustained from these crash events included 12 incapacitating injuries, 6 non-incapacitating injuries, and 2 possible injuries. Since winter weather occurs on a regional scale, it is assumed that weather related crashes in the surrounding County area would be similar to those experienced in these conditions within the City.

Table HA.15, Severe Winter Storms, Vehicle Accidents, Hays County

City	Fatality	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	Crash Year	Street Name	Surface Condition	Weather Condition
Rural Hays County	0	0	1	0	2010	US0290	Slush	Snow
Rural Hays County	0	0	1	0	2010	US0290	Slush	Snow
Rural Hays County	0	0	0	0	2010	W FITZHUGH RD	Slush	Snow
Rural Hays County	0	0	0	0	2010	US0290	Slush	Snow
Rural Hays County	0	0	0	0	2010	RM0012	Slush	Snow
Rural Hays County	0	0	0	0	2010	RM0012	Slush	Snow
Rural Hays County	0	0	0	0	2011	RM0967	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2011	US0290	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2011	MCGREGOR LN	Ice	Sleet/Hail
Rural Hays County	0	1	0	0	2011	RM0012	Ice	Sleet/Hail



Table HA.15, Severe Winter Storms, Vehicle Accidents, Hays County (cont.)

City	Fatality	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	Crash Year	Street Name	Surface Condition	Weather Condition
Rural Hays County	0	1	0	0	2011	RM0012	Ice	Sleet/Hail
Rural Hays County	0	1	0	0	2011	RM0012	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2011	MCGREGOR LN	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2011	HILLIARD RD	Snow	Snow
Rural Hays County	0	0	0	1	2011	FM1626	Snow	Snow
Rural Hays County	0	0	0	0	2011	IH0035	Snow	Snow
Rural Hays County	0	0	0	0	2011	IH0035	Snow	Snow
Rural Hays County	0	0	0	0	2011	US0290	Ice	Snow
Rural Hays County	0	0	0	0	2011	US0290	Ice	Snow
Rural Hays County	0	3	0	0	2014	RM0012	Wet	Sleet/Hail
Rural Hays County	0	3	0	0	2014	RM0012	Wet	Sleet/Hail
Rural Hays County	0	3	0	0	2014	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2014	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	1	0	2014	DOVE DR	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	US0290	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	US0290	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	US0290	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	STAPLES RD	Ice	Sleet/Hail
Rural Hays County	0	0	0	1	2014	RM0165	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	1	0	2015	RM0150	Ice	Sleet/Hail
Rural Hays County	0	0	1	0	2015	RM0150	Ice	Sleet/Hail
Rural Hays County	0	0	1	0	2015	RM0150	Ice	Sleet/Hail

Crash Records Information System Query for Accidents in Hays County from 2010-2017 from non-Clear Weather Conditions (Texas Department of Transportation, 2017)





Severe Winter Storms: Vulnerability Summary

A majority of the City of Hays' powerlines are on poles. During extreme winter weather, an accumulation of ice and snow on branches could result in them falling upon exposed lines. The resulting impact on electricity to homes and businesses during cold temperatures would pose vulnerability to residents who would then be unable to obtain heat.





Lightning

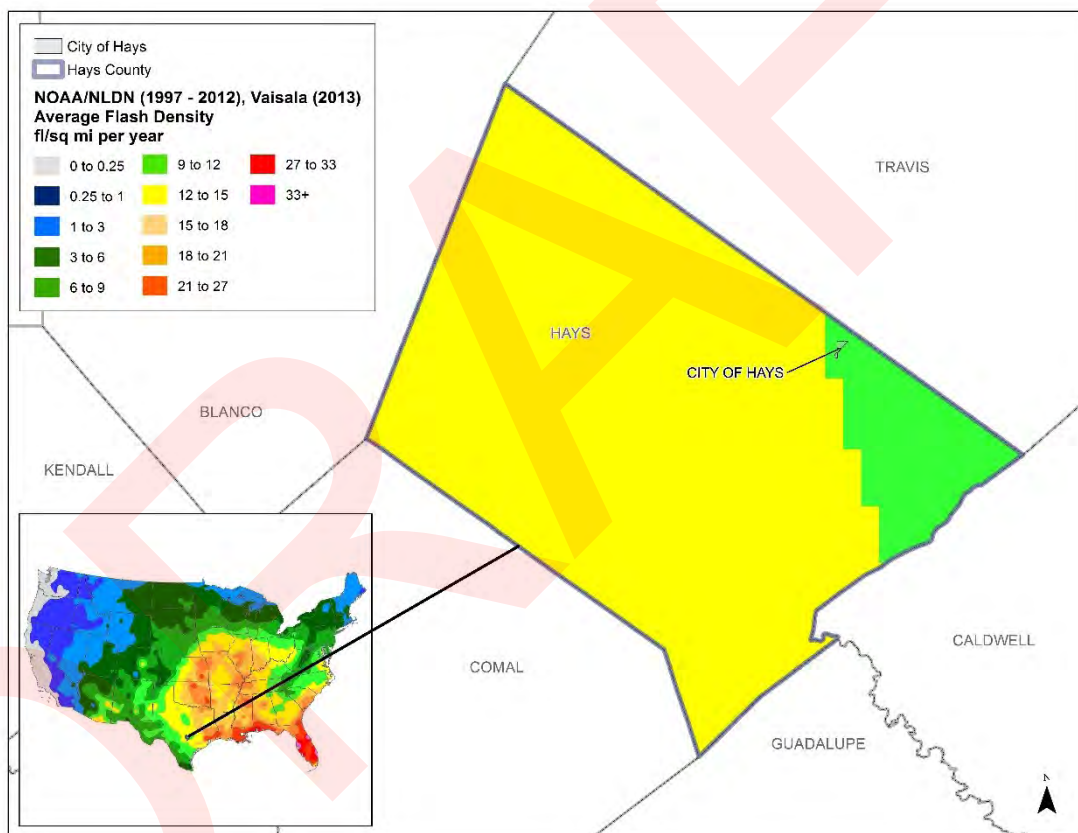
Lightning: Location

The entire extent of the City of Hays is exposed to some degree of lightning hazard, though exposed points of high elevation have a significantly higher frequency of occurrence. Since lightning can occur at any location, lightning events could be experienced anywhere within the planning area.

Lightning: Previous Occurrences

Figure HA.4 reflects the City of Hays within the area that was calculated to receive approximately 9 to 12 lightning strikes per square mile per year according to National Lightning Detection Network (NLDN) data for the years 1997 to 2012. There were no lightning events reported specifically for the jurisdiction in the NOAA Storm Events Database.

Figure HA.4, Average Annual Lightning Density, City of Hays



(Vaisala NLDN, 2016)

Lightning: Extent

Due to the lack of reported occurrences, there is not sufficient data to determine the maximum LAL for the planning area, refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update for a description of the lightning extent scale Lightning Activity Levels (LAL) Grids. However, with the data available, the extent of lightning events that the City of Hays has experienced can be derived from the NOAA/NLDN data in Figure HA.4, up to 9 to 12 strikes per square mile per year where the City is approximately 0.21 square miles.



Lightning: Probability



Since lightning can occur at any location, lightning events could be experienced anywhere within the planning area. Based on the data provided in Figure HA.4, the City of Hays can expect future events to fall in line with NLDN data from previous years with an average occurrence of up to approximately 9 to 12 lightning strikes per square mile per year.

Lightning: Impact

The National Lightning Detection Network (NLDN) reported 217 lightning fatalities within the State between the years 1959 and 2013. According to the Texas Health Care Information Collection and Trauma Registry from the Texas Department of State Health Services' Injury Epidemiology & Surveillance Branch, the following number of patients were received in Hays County medical facilities for Lightning Related Trauma (shown in Table HA.16).

Table HA.16, Hays County Trauma Registry Data, Lightning Events

Description	2010	2011	2012	2013	2014
Accidents due to lightning	0	1	0	0	1

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)

In addition to the physical impacts, a lightning event can also be the cause of cascading incidents. Electrical outages could occur due to the impact that lightning strikes can have on electrical utility infrastructure. A loss of critical resources, such as power, has significant impact on the entire population, with higher impacts to those with vulnerabilities to such conditions. The following portion of the City of Hays' population, according to HAZUS-MH 3.2 updated Census 2010 population estimates, would be greatly impacted by the loss of electrical energy in their dwellings.

Population over 65 years old:	36
Population under 16 years old:	37
Economically Disadvantaged Population (\$0-\$20k):	3

An organization called Inside Energy (<http://insideenergy.org>) provided a compiled database outlining 15 years of power outages across the United States from annual data available at the Department of Energy. Within the database, the following thunderstorm/severe storm events affected electrical availability in the areas in or near Hays County (Table HA.17).

Table HA.17, Lightning Affecting Electrical Availability

Event Description	Year	Start Date	Start Time	End Date	Respondent	Location	Customers Affected
Severe Weather	2008	4/9/2008	4:00 p.m.	4/13/2008	Oncor Electric Delivery Company LLC	North, Central and East Texas	488,689
Severe Thunderstorms	2008	6/17/2008	9:01 a.m.	6/19/2008	Oncor Electric Delivery Company LLC	North, Central and East Texas	234,393



**Table HA.17, Lightning Affecting Electrical Availability (cont.)**

Event Description	Year	Start Date	Start Time	End Date	Respondent	Location	Customers Affected
Severe Thunderstorms	2008	8/3/2008	1:30 a.m.	8/3/2008	Entergy Corporation	Mississippi, Louisiana, Texas	59,500
Severe Storms	2009	6/10/2009	6:00 p.m.	6/14/2009	Oncor Electric Delivery Company, LLC	North and Central Texas	800,000
Thunderstorms	2010	6/8/2010	11:00 a.m.	6/8/2010	Centerpoint Energy	Southeastern Texas	79,741

(Wirfs-Brock, 2014)



Lightning strikes also cause wildfire ignitions. According to the National Fire Protection Association (NFPA), “during 2007-2011, U.S. local fire departments responded to an average of 22,600 fires per year that were started by lightning. These fires caused an average of 9 civilian deaths, 53 civilian injuries and \$451 million in direct property damage per year.” The source also cites that the fires are more common in June through August and in the late afternoon and evening.

Although there are no documented lightning events on record for City of Hays from which impact can be detailed, according to community testimony, a lightning strike once affected a water pump station and disabled the water supply during a period of time in 2013. The damage cost was \$50,000, which had to be covered by the City of Hays, with the help of some insurance reimbursement.

Lightning: Vulnerability Summary

The City of Hays has many mature trees, as much of the City is wooded and has an abundance of brush. This type of landscape faces vulnerability to lightning strike that could lead to wildfire ignition. Many of the homes in this community are surrounded by this vegetation and could be engulfed by the resulting blaze. In addition, certain critical infrastructure, such as water pump stations, are vulnerable for loss of service due to a lack of redundancy in systems.

Hailstorm

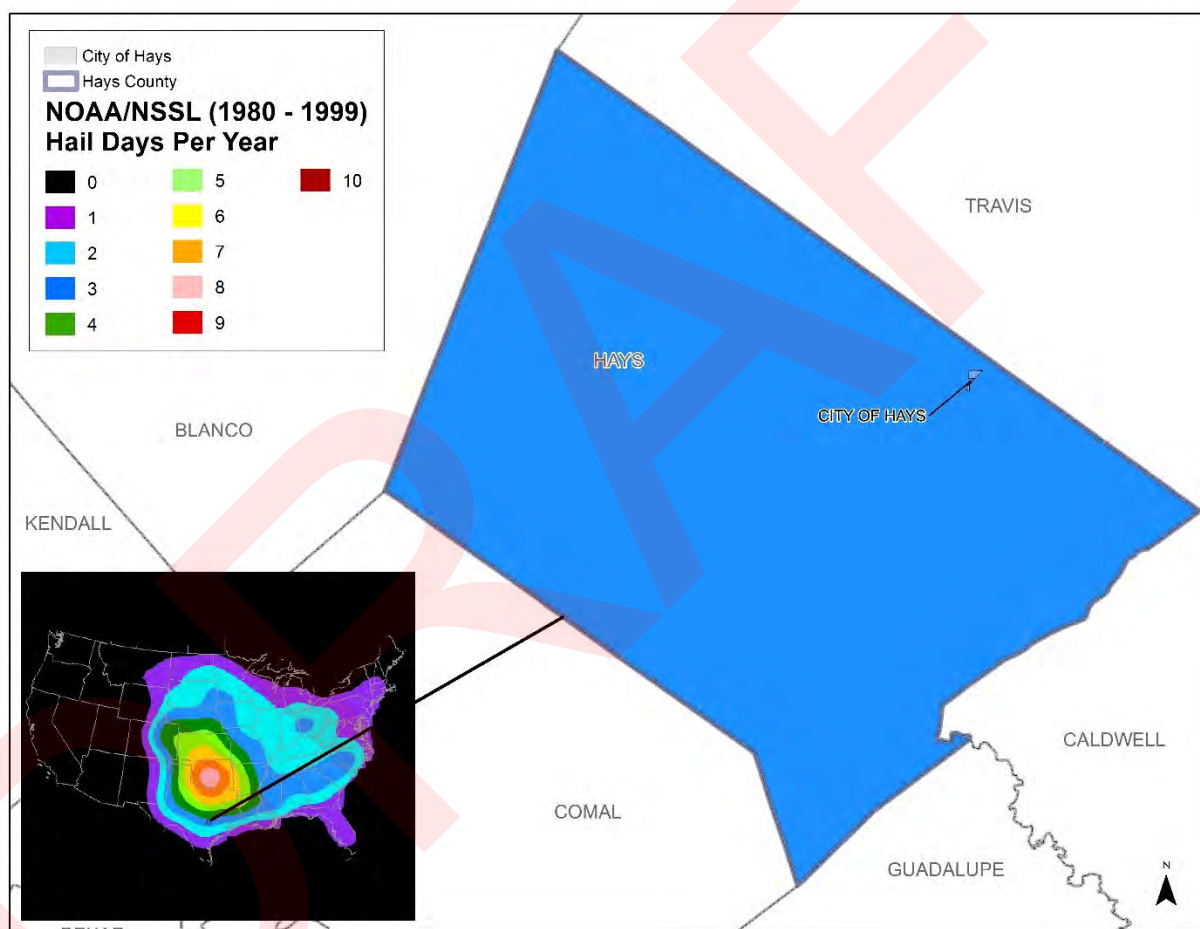


Hailstorms: Location

The entire extent of the City of Hays is exposed to some degree of hail hazard. NOAA's National Severe Storms Laboratory used historical data from 1980-1999 to estimate the daily probability of hail occurrences across the U.S., of at least 0.75-inch diameter hail. Figure HA.5 shows the average number of hail days per year determined from this analysis and the corresponding location of the City.

The density hail days per year in the map's legend indicates the probable number of hail days for each 25-square-mile cell within the contoured zone that can be expected per year. It should be noted that the density number does not indicate the number of events that can be expected within each cell, rather the average number of days per year with 1 or more events occurring within each cell.

Figure HA.5, National Hail Days per Year, City of Hays



(National Severe Storms Laboratory, 2016)

Hailstorms: Previous Occurrences

Since hail can occur at any location, hail events could be experienced anywhere within the planning area. While the City of Hays has not had any previous occurrences reported through the NOAA Storm Events Database, if an event were to occur, it would be similar in size and magnitude to events within the surrounding county area. Table HA.18 lists the 57 hail events reported for Hays County and its unincorporated jurisdictions from year 1967. Note that multiple listings for the same dates are the result of reports from different affected parts of the County for the given event.





Fatality, injury and damage amounts are shown in Table HA.18, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HA.18, Hail Events, Hays County

Location	Date	Type	Extent (mm)	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	5/20/1967	Hail	76.20	0	0	0.00	0.00
Hays County	5/8/1969	Hail	25.40	0	0	0.00	0.00
Hays County	10/27/1970	Hail	25.40	0	0	0.00	0.00
Hays County	2/25/1971	Hail	57.15	0	0	0.00	0.00
Hays County	3/12/1971	Hail	76.20	0	0	0.00	0.00
Hays County	5/29/1975	Hail	44.45	0	0	0.00	0.00
Hays County	3/30/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	5/5/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/3/1977	Hail	25.40	0	0	0.00	0.00
Hays County	4/14/1977	Hail	50.80	0	0	0.00	0.00
Hays County	4/14/1977	Hail	50.80	0	0	0.00	0.00
Hays County	4/18/1979	Hail	25.40	0	0	0.00	0.00
Hays County	1/17/1980	Hail	44.45	0	0	0.00	0.00
Hays County	1/17/1980	Hail	25.40	0	0	0.00	0.00
Hays County	2/29/1980	Hail	44.45	0	0	0.00	0.00
Hays County	4/11/1980	Hail	25.40	0	0	0.00	0.00
Hays County	5/8/1980	Hail	25.40	0	0	0.00	0.00
Hays County	5/9/1981	Hail	25.40	0	0	0.00	0.00
Hays County	4/20/1982	Hail	25.40	0	0	0.00	0.00
Hays County	5/13/1982	Hail	25.40	0	0	0.00	0.00
Hays County	3/30/1983	Hail	25.40	0	0	0.00	0.00
Hays County	5/20/1983	Hail	25.40	0	0	0.00	0.00
Hays County	5/20/1983	Hail	31.75	0	0	0.00	0.00
Hays County	5/20/1987	Hail	50.80	0	0	0.00	0.00
Hays County	5/5/1989	Hail	19.05	0	0	0.00	0.00
Hays County	5/5/1989	Hail	38.10	0	0	0.00	0.00
Hays County	5/10/1989	Hail	19.05	0	0	0.00	0.00
Hays County	5/10/1989	Hail	38.10	0	0	0.00	0.00



Table HA.18, Hail Events, Hays County (cont.)

Location	Date	Type	Extent (mm)	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	2/1/1990	Hail	38.10	0	0	0.00	0.00
Hays County	4/14/1991	Hail	19.05	0	0	0.00	0.00
Hays County	4/28/1991	Hail	19.05	0	0	0.00	0.00
Hays County	4/19/1992	Hail	38.10	0	0	0.00	0.00
Hays County	5/12/1992	Hail	44.45	0	0	0.00	0.00
Hays County	5/12/1992	Hail	19.05	0	0	0.00	0.00
Hays County	5/27/1992	Hail	19.05	0	0	0.00	0.00
Hays County	5/27/1992	Hail	25.40	0	0	0.00	0.00
Henly	11/1/1995	Hail	44.45	0	0	0.00	0.00
Henly	3/7/1998	Hail	19.05	0	0	0.00	0.00
Henly	2/10/2009	Hail	25.4	0	0	0.00	0.00
Driftwood	5/11/2011	Hail	44.45	0	0	0.00	0.00
Mt Gainor	5/20/2011	Hail	19.05	0	0	0.00	0.00
Driftwood	5/20/2011	Hail	25.40	0	0	0.00	0.00
Driftwood	5/20/2011	Hail	25.40	0	0	0.00	0.00
Mt Gainor	5/20/2011	Hail	25.40	0	0	0.00	0.00
Driftwood	5/20/2011	Hail	25.40	0	0	0.00	0.00
Driftwood	5/20/2011	Hail	22.35	0	0	0.00	0.00
Fitzhugh	1/24/2012	Hail	25.40	0	0	0.00	0.00
Fitzhugh	3/19/2013	Hail	38.10	0	0	0.00	0.00
Driftwood	4/27/2013	Hail	44.45	0	0	0.00	0.00
Driftwood	5/27/2014	Hail	25.40	0	0	0.00	0.00
Fitzhugh	5/27/2014	Hail	19.05	0	0	0.00	0.00
Driftwood	4/16/2015	Hail	22.35	0	0	0.00	0.00
Total				0	0	\$0.00	\$0.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Hailstorms: Extent

The Tornado and Storm Research Organization (TORRO) created a hail extent index to measure hail called the Hailstorm Intensity Scale. According to the reported previous hail occurrences in the planning area, the maximum hail extent experienced is hail up to 3 in., or 76.20 mm. in diameter, TORRO Hailstorm Intensity Scale classification of a "Super Hailstorm." Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for hail extent scale descriptions.

Hailstorms: Probability

Figure HA.5 reports 3 hail days per year as a result of NLDN's nationwide analysis. Since this calculation is based off of national data, a more specific calculation based on local-level NOAA reports was utilized to calculate probability. Based on 57 reported events in 49 years, a hail event occurs approximately once a year on average in Hays County. Since hail events can happen anywhere throughout the HMP update area, the City of Hays' future probability is assumed to be similar to the surrounding county area. The City can expect a hail event approximately once every year on average in the future with hail up to 3 in., or 76.20 mm. in diameter, TORRO Hailstorm Intensity Scale classification of a "Super Hailstorm."



Number of Reported Events	Number of Years in Dataset	Probability
57	49	1.16



Hailstorms: Impact

Although there are no specific occurrences for which hailstorm damages are captured, based on the maximum hail extent experienced in the surrounding county area (76.20 mm), the TORRO Hailstorm Intensity Scale (found in Chapter 2, the Risk Assessment portion of the Hays County HMP Update) indicates that impact can be expected to include any of the following:

- Varying degrees of damage to vegetation and crops
- Damage to plastic structures
- Varying degrees of damage to glass
- Paint and wood scored
- Vehicle bodywork damage
- Varying degrees of roof damage
- Varying degrees of risk of injuries
- Varying degrees of aircraft damage
- Brick walls pitted
- Risk of severe or even fatal injuries to persons caught in the open

Hailstorms: Vulnerability Summary

Although undocumented and unavailable for data analysis purposes, community testimony indicates that there have been past hail events in the community that have affected vehicles and roofs. City Hall is a residential structure with a composite shingle roof that houses all city records. This archive could potentially experience water damage if a hailstorm led to a leak through the roof.

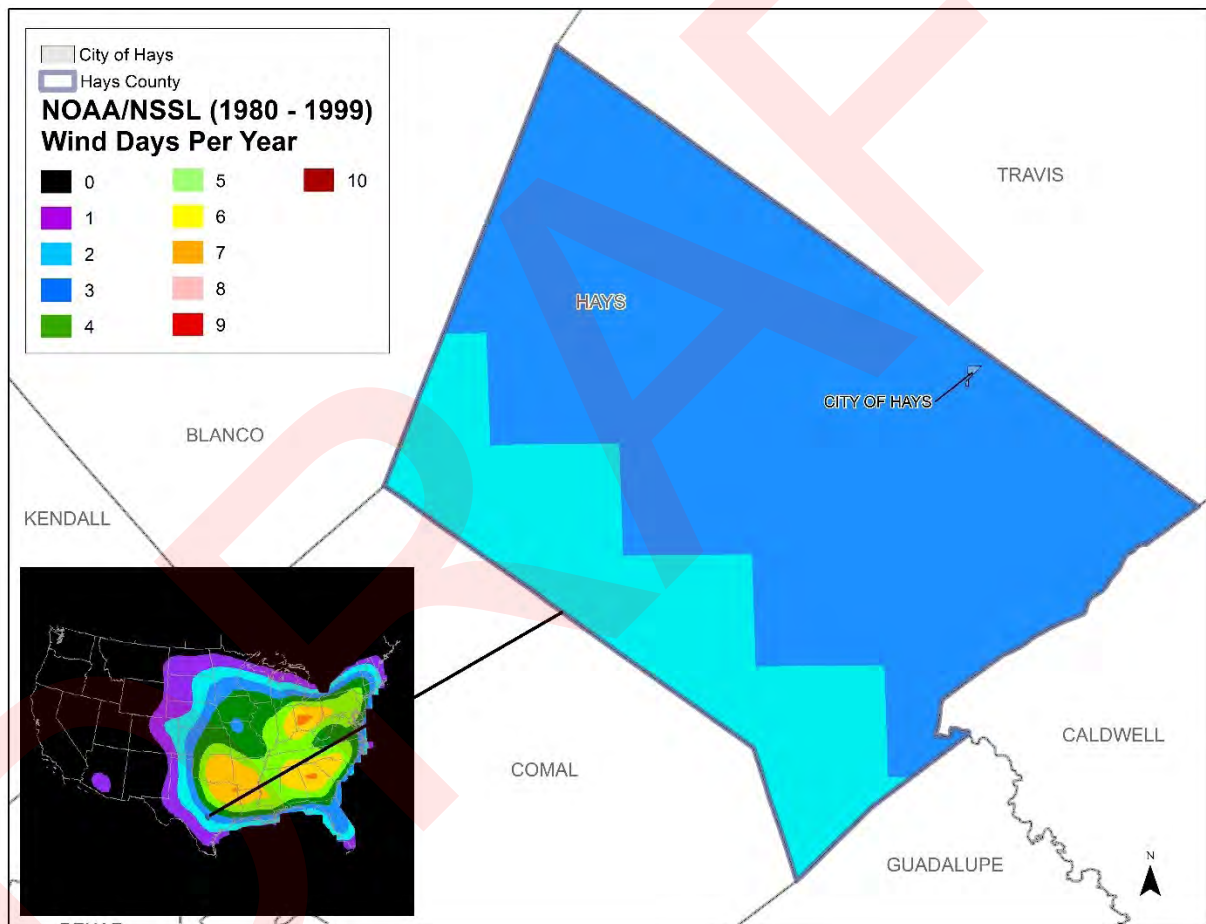


Windstorms

Windstorms: Location

The entire extent of the City of Hays is exposed to some degree of wind hazard. Since wind can occur at any location, wind events could be experienced anywhere within the planning area. NOAA's National Severe Storms Laboratory used historical data from 1980 - 1999 to estimate the daily probability of wind occurrences across the U.S., with gusts of at least 58 mph. Figure HA.6 shows the estimates for wind days determined from this analysis and the corresponding location of the City. The density of wind days per year in the map's legend indicates the probable number of wind days for each 25-square-mile cell within the contoured zone that can be expected per year. It should be noted that the density number does not indicate the number of events that can be expected within each cell, rather the average number of days per year with 1 or more events occurring within each cell.

Figure HA.6, National Wind Days Per Year, City of Hays



(National Severe Storms Laboratory, 2016)

Windstorms: Previous Occurrences

Since windstorms can occur at any location, wind events can be experienced anywhere within the planning area. While the City of Hays has not had any previous occurrences reported through the NOAA Storm Events Database, if an event were to occur, it would be similar in size and magnitude to events within the surrounding county area. Table HA.19 lists the 38 wind events reported for Hays County and its unincorporated jurisdictions from year 1974.

Fatality, injury and damage amounts are shown in Table HA.19, per the NOAA Storm Events Database.



Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HA.19, Wind Events, Hays County

Location	Date	Type	Extent (knots)	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	5/9/1974	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/7/1975	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/19/1975	Thunderstorm Wind	70 kts.	0	0	0.00	0.00
Hays County	5/31/1976	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/31/1976	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/11/1978	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/29/1978	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/18/1979	Thunderstorm Wind	52 kts.	0	0	0.00	0.00
Hays County	7/10/1979	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	2/29/1980	Thunderstorm Wind	55 kts.	0	0	0.00	0.00
Hays County	5/13/1980	Thunderstorm Wind	52 kts.	0	0	0.00	0.00
Hays County	7/28/1980	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/13/1982	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	6/22/1982	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	3/30/1983	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	10/21/1984	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	12/31/1984	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/8/1985	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	6/12/1986	Thunderstorm Wind	NA	0	0	0.00	0.00



Table HA.19, Wind Events, Hays County (cont.)

Location	Date	Type	Extent (knots)	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	5/5/1989	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/20/1989	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/26/1990	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/26/1990	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/18/1990	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/7/1991	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/27/1992	Thunderstorm Wind	53 kts.	0	0	0.00	0.00
Hays County	6/12/1992	Thunderstorm Wind	60 kts.	0	0	0.00	0.00
Hays County	6/12/1992	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	9/3/1992	Thunderstorm Wind	50 kts.	0	0	0.00	0.00
Hays County	9/3/1992	Thunderstorm Wind	50 kts.	0	0	0.00	0.00
Countywide	3/8/1995	Thunderstorm Wind	55 kts.	0	0	0.00	0.00
Countywide	6/11/1995	Thunderstorm Wind	NA	0	0	0.00	3,000.00
Countywide	3/19/2002	Thunderstorm Wind	NA	0	0	100,000.00	100,000.00
Driftwood	4/14/2014	Thunderstorm Wind	50 kts. EG	0	0	0.00	0.00
Driftwood	6/12/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00	0.00
Fitzhugh	6/12/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00	0.00
Fitzhugh	6/12/2014	Thunderstorm Wind	56 kts. EG	0	0	0.00	0.00
Mt. Gainor	4/30/2016	Thunderstorm Wind	61 kts. EG	0	0	0.00	0.00
Total				0	0	\$100,000.00	\$103,000.00

NA - No data available

EG = Estimated Gust

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)





Windstorms: Extent

Wind is measured by the Beaufort Wind Scale that relates wind speed to observed conditions on land and sea. According to the reported previous windstorm occurrences in the planning area, the maximum wind extent experienced was 70 knots (Beaufort Wind Scale Classification: Hurricane). Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of wind extent scales.

Windstorms: Probability

Figure HA.6 reports 3 wind days per year as a result of NLDN's nationwide analysis. Since this calculation is based on national data, a more specific calculation based on local-level NOAA reports was utilized to calculate probability. Based on 38 reported events in 42 years, a wind event occurs approximately once every year on average in Hays County. Since wind events can happen anywhere throughout the HMP update area, the City of Hays' future probability is assumed to be similar to the surrounding county area. In the future, the City can expect a wind event of up to 70 knots approximately once every year on average (Beaufort Wind Scale Classification: Hurricane).

Number of Reported Events	Number of Years in Dataset	Probability
38	42	0.90

Windstorms: Impact

Although there were no reports specifically for the City of Hays, data available from the Texas Department of Transportation's Crash Records Information System shows that between the years of 2010 and 2017, Rural Hays County experienced 5 crashes related to severe crosswind weather conditions. There were no injuries reported from these crash events. Since wind events occur on a regional scale, it is assumed that weather related crashes in the surrounding county area would be similar to those experienced in these conditions within the City of Hays.

Table HA.20, Windstorms, Vehicle Accidents, Hays County

City	Fatality	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	Crash Year	Street Name	Surface Condition	Weather Condition
Rural Hays County	0	0	0	0	2010	LIME KILN RD	Dry	Severe Crosswinds
Rural Hays County	0	0	0	0	2014	IH0035	Dry	Severe Crosswinds
Rural Hays County	0	0	0	0	2014	IH0035	Dry	Severe Crosswinds
Rural Hays County	0	0	0	0	2014	IH0035	Dry	Severe Crosswinds
Rural Hays County	0	0	0	0	2017	US0290	Wet	Severe Crosswinds

(Texas Department of Transportation, 2017)





Windstorms: Vulnerability Summary

The City's past unofficial, undocumented damage, based on community testimony, indicates that the community is susceptible to falling trees, debris in the roadway and damage to storage buildings and barns. These structures are vulnerable to high winds due to the composition of the structure materials, free span roof architecture and lack of permanent foundation of the temporary structures.



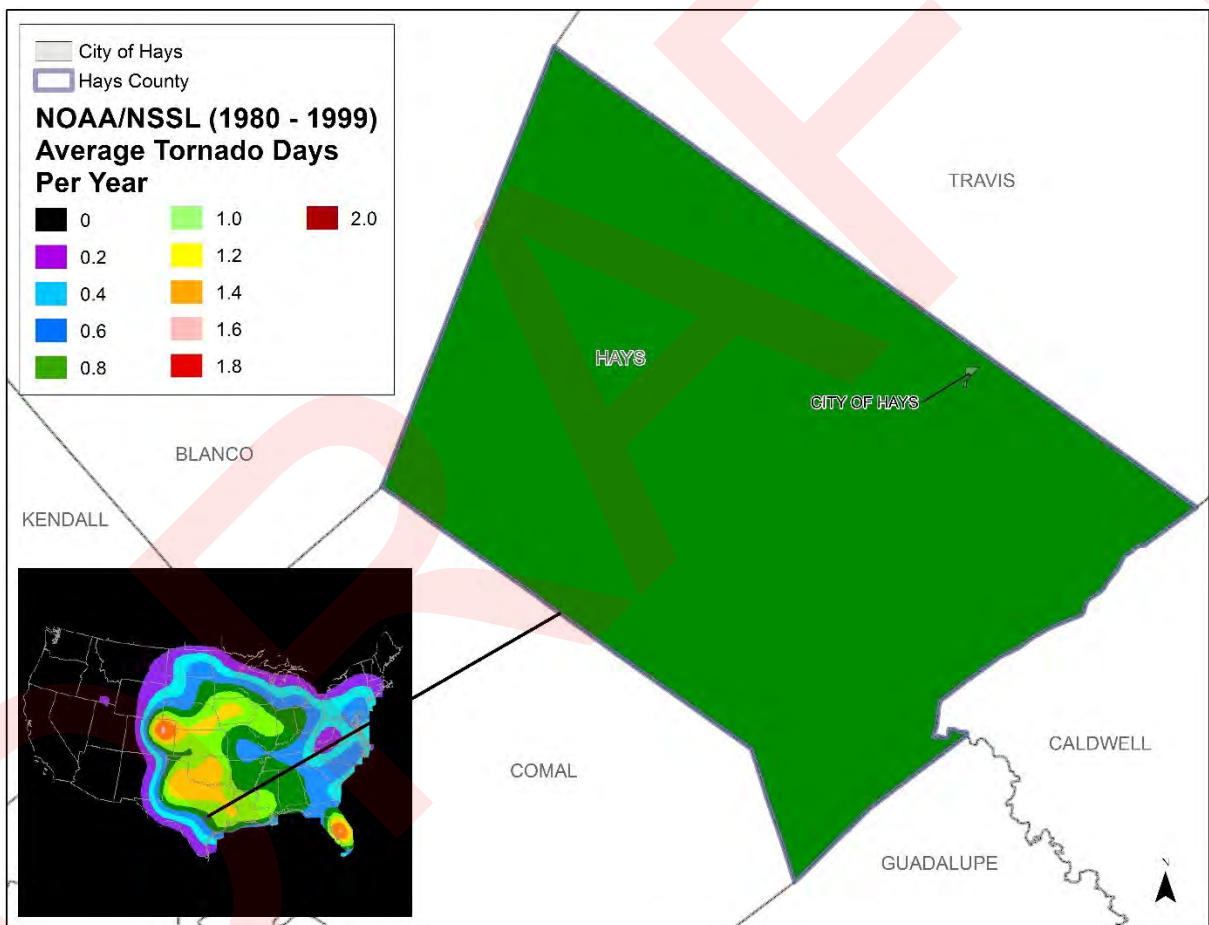


Tornado

Tornadoes: Location

The entire extent of the City of Hays is exposed to some degree of tornado hazard. Since tornadoes can occur at any location, tornado events can be experienced anywhere within the planning area. NOAA's National Severe Storms Laboratory used historical data from 1980 – 1999 to estimate the daily probability of tornado occurrences across the U.S., regardless of tornado magnitude. Figure HA.7 shows the average number of tornado days resulting from this analysis and the respective location of the City. The density of average tornado days per year in the map's legend indicates the probable number of tornado days for each 25-square-mile cell within the contoured zone that can be expected per year. This density number does not indicate the number of events that can be expected within each cell, rather the average number of days per year with 1 or more events occurring within each cell.

Figure HA.7, National Tornado Days Per Year, City of Hays



(National Severe Storms Laboratory, 2016)

Tornadoes: Previous Occurrences

Since tornadoes can occur at any location, tornado events can be experienced anywhere within the planning area. While the City of Hays has not had any previous occurrences reported through the NOAA Storm Events Database, if an event were to occur, the event would be similar in size and magnitude to events within the surrounding county area. Table HA.21 lists the 16 tornado events reported for Hays County and its unincorporated jurisdictions from year 1953.





Fatality, injury and damage amounts are shown in Table HA.21, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HA.21, Tornado Events, Hays County

Location	Date	Type	Extent	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	4/28/1953	Tornado	F3	1	5	250,000.00	0.00
Hays County	4/30/1954	Tornado	F1	0	0	250,000.00	0.00
Hays County	5/2/1958	Tornado	F1	0	0	30.00	0.00
Hays County	11/12/1961	Tornado	F2	0	0	2,500.00	0.00
Hays County	9/20/1967	Tornado	NA	0	0	250.00	0.00
Hays County	9/20/1967	Tornado	NA	0	0	30.00	0.00
Hays County	5/10/1975	Tornado	F1	0	0	25,000.00	0.00
Hays County	3/30/1976	Tornado	F2	0	0	25,000.00	0.00
Hays County	3/30/1976	Tornado	F2	0	1	250,000.00	0.00
Hays County	8/10/1980	Tornado	F2	0	0	25,000,000.00	0.00
Hays County	4/22/1985	Tornado	F2	0	0	250,000.00	0.00
Hays County	8/22/1991	Tornado	F1	0	0	2,500.00	0.00
Countywide	5/13/1994	Tornado	F0	0	0	500.00	500.00
Henly	11/15/2001	Tornado	F0	0	1	50,000.00	0.00
Driftwood	10/8/2002	Tornado	F0	0	0	70,000.00	0.00
M. Gainor	5/23/2015	Tornado	EFO	0	0	0.00	0.00
Total				1	7	\$26,175,810.00	\$500.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Tornadoes: Extent

Tornadoes are measured by severity on the Enhanced Fujita Scale, with a range from 0-6. According to the reported previous tornado occurrences in the planning area, the maximum tornado extent experienced was a category F3. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update for a description of tornado extent scales, Fujita (F) Scale and Operational Enhanced Fujita (EF) Scale.

Tornadoes: Probability

Figure HA.7 reports 0.8 tornado days per year as a result of NLDN's nationwide analysis. Since this calculation is based on national data, a more specific calculation based on local-level NOAA reports was utilized to calculate probability. Based on 16 reported events in 63 years, a tornado event occurs approximately every 4 years on average in Hays County. Since tornado events can happen anywhere throughout the HMP update area, the City of Hays' future probability is assumed to be similar to the surrounding county area. The City can expect a tornado event approximately once every 4 years on average in the future up to an F3 magnitude.



Number of Reported Events	Number of Years in Dataset	Probability
16	63	0.25



Tornadoes: Impact

There is not specific event data available for the City of Hays, from which impacts would be calculated. However, it can be assumed that impacts would be similar to those that the surrounding County area experiences.

Hays County has experienced tornadoes between F0 and F3 levels in the past. If similar events were to happen in the future in the City, the type of impacts that the planning area could expect associated with those magnitudes would include (from least severity to greatest):

- Light Damage - Broken branches; shallow rooted trees pushed over; some chimney damage.
 - Moderate Damage - Surface damage to roofs; mobile homes pushed off foundation; moving vehicles pushed off the road.
 - Significant Damage - Frame houses have roof torn off; mobile homes completely destroyed; train boxcars overturned; large trees snapped or uprooted; smaller debris turned into missiles.
 - Severe Damage - Roofs completely torn off well-constructed buildings, along with some walls; majority of trees uprooted, trains overturned, vehicles lifted off the ground.
- (Tornado Facts, 2016)

Additional impacts from tornado events could include downed utility poles, communication towers, street signals, and debris created from residential and commercial property.

Critical infrastructure could be disrupted, resulting in periods of impact to service due to the lack of back-up utility resources. See Lightning Impact section for more information on utility interruption.

Tornadoes: Vulnerability Summary

A community made up entirely of residential structures, the City of Hays has only 1 public facility that could only provide temporary shelter for a small number residents affected by tornado damage. In addition, there are no back-up generators to provide continuity of operations for City Hall after a tornado event. The time period immediately following a disaster event is critical for local government resilience, as citizens count on the ability to provide help. A lack of resources for electricity for City Hall could lead to delays in getting assistance for members of the community.





Expansive Soils

Expansive Soils: Location

Areas within the City of Hays with structures that are underlain by soils containing clays with swelling potential are most affected by expansive soils. Figure 2.4 within Chapter 2 (the Risk Assessment portion of the Hays County HMP Update) shows the location of expansive soil areas for the City. The planning area has the same expansive soil composition throughout the area.

Expansive Soils: Previous Occurrences

There was no documentation of site-specific past events of structural damage due to expansive soils from local, state, or national datasets found.

Expansive soils cannot be documented as a time-specific event, except when leads to structural and infrastructure damage. There are no specific damage reports or historical records of events in the City, however future events can occur.

Expansive Soils: Extent

According to the USGS Expansive Soils Regions, Figure 2.4 within Chapter 2 (the Risk Assessment portion of the Hays County HMP Update), less than 50% of the City of Hays is underlain with soils with clayey textures that have high shrink-swell properties.

Expansive Soils: Probability

Considering the amount of swelling potential within the planning area as well as the lack of reported events, the probability of a future event is low, (unlikely in the next 10 years) for the planning area.

Expansive Soils: Impact

Although there have been no reported impacts of expansive soils with the City of Hays, possible impacts could include foundation damage, concrete damage, and yard damage. Any infrastructure resting upon soil could be at risk for damage as the soil expands and contracts.

Expansive Soils: Vulnerability Summary

The lack of impact at present time leads to lessened concern for the issue. As most structures in the community are residential homes, there could be future effects on home foundations if the expansive soils worsen.



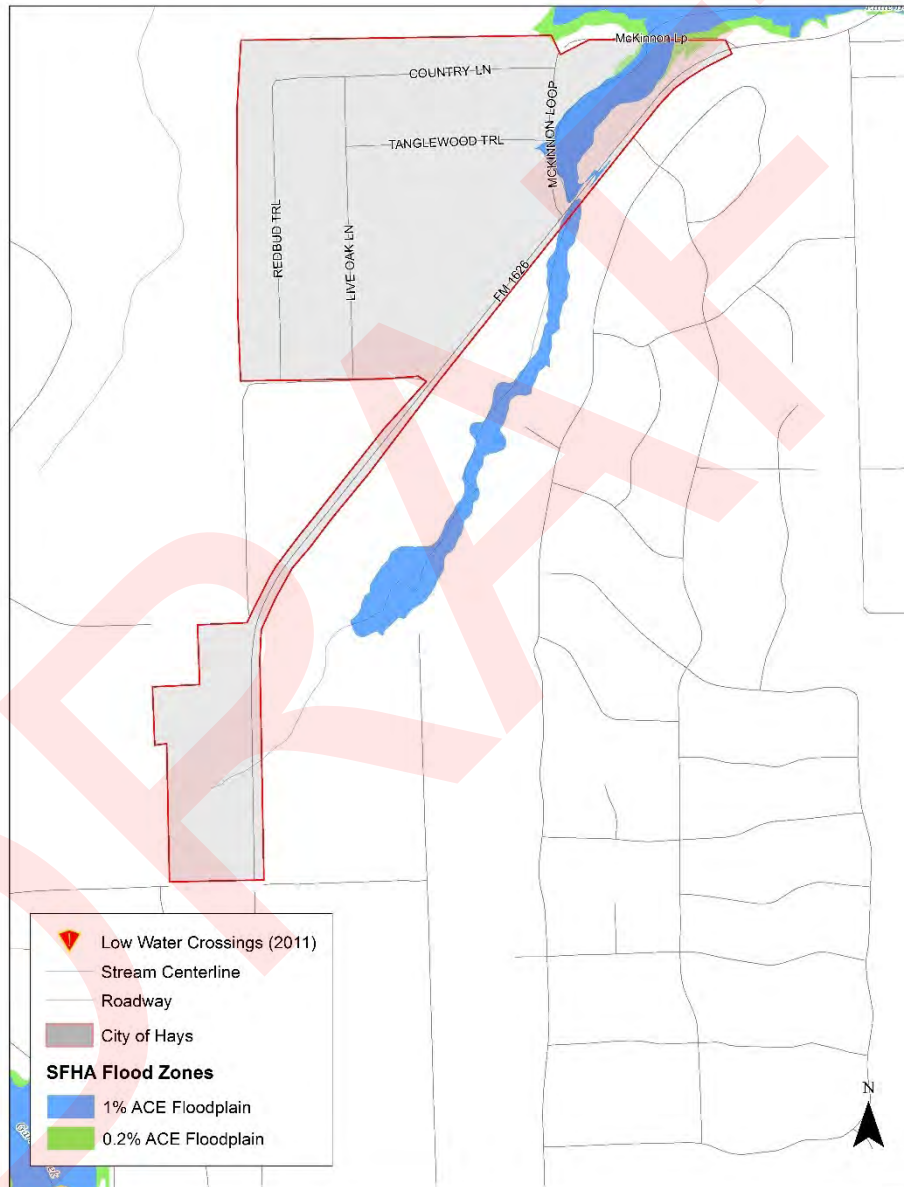


Floods

Floods: Location

The location of low water crossings as well as the 1% (100 year) and 0.2% (500 year) Annual Chance Event (ACE) floodplains for the City of Hays are shown in Figure HA.8 and are the locations within the planning area that are most affected by flooding. This figure is based upon newly developed hydrologic and hydraulic analysis and is the best information available to date. Table HA.22 provides the total acreage in the jurisdiction that is located in the 1% and 0.2% floodplains.

Figure HA.8, Special Flood Hazard Areas, City of Hays



(Texas Natural Resources Information System, 2011)




Table HA.22, City of Hays Floodplain Acreage

Jurisdiction	100yr (1%) Floodplain Acres (Includes Floodway)	500yr (0.2%) Floodplain Acres (Includes 100yr)
City of Hays	6.02	6.77

Floods: Previous Occurrences

The County received 3 disaster declarations for flooding since October of 2013. Aside from the October 2015 event reported under the unincorporated jurisdiction of Driftwood, these events are not reflected in Table HA.23. Due to the nature of NOAA's reporting, the other events described below were reported under incorporated jurisdictions. These events did, however, substantially affect Hays County and its unincorporated areas. Narratives detailing these significant events are included below. Although there were no flood events reported specifically for the City of Hays in the NOAA Storm Events Database, Table HA.23 lists the 69 documented events reported for Hays County and its unincorporated jurisdictions from the years 1997 to 2016. Due to the size and extent of some flood occurrences as well as the regional or zonal nature of reports in the NOAA Storm Events Database, the City of Hays may have been affected by many of the events that were reported for the surrounding areas.

Fatality, injury and damage amounts are shown in Table HA.23, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HA.23, Flood Events, Hays County

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
Countywide	5/23/1997	Flash Flood	0	0	10,000.00	0.00
Countywide	6/6/1997	Flash Flood	0	0	10,000.00	0.00
Countywide	6/7/1997	Flash Flood	0	0	15,000.00	0.00
Countywide	6/8/1997	Flash Flood	2	7	2,500,000.00	50,000.00
Countywide	6/21/1997	Flash Flood	0	0	5,000.00	0.00
Countywide	6/22/1997	Flash Flood	0	0	50,000.00	50,000.00
Countywide	2/21/1998	Flash Flood	0	0	5,000.00	0.00
Countywide	7/3/1998	Flash Flood	0	0	20,000.00	0.00
Countywide	8/22/1998	Flash Flood	0	0	20,000.00	10,000.00
Countywide	8/23/1998	Flash Flood	0	0	10,000.00	0.00
Countywide	10/17/1998	Flash Flood	0	100	500,000.00	50,000.00
HAYS (ZONE)	10/17/1998	Flood	0	25	4,000,000.00	50,000.00
HAYS (ZONE)	10/17/1998	Flood	0	25	4,000,000.00	50,000.00
Countywide	6/21/1999	Flash Flood	0	0	3,000.00	0.00
Countywide	6/9/2000	Flash Flood	0	0	15,000.00	0.00
Countywide	11/2/2000	Flash Flood	0	0	20,000.00	0.00
HAYS (ZONE)	11/4/2000	Flood	0	0	0.00	0.00
North Portion	8/26/2001	Flash Flood	0	0	10,000.00	0.00
Countywide	8/31/2001	Flash Flood	0	0	20,000.00	0.00
Countywide	8/31/2001	Flash Flood	0	0	30,000.00	20,000.00
Countywide	11/15/2001	Flash Flood	0	20	200,000.00	50,000.00
HAYS (ZONE)	11/15/2001	Flood	0	0	0.00	0.00
West Portion	6/30/2002	Flash Flood	0	0	10,000.00	0.00



Table HA.23, Flood Events, Hays County (cont.)

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
HAYS (ZONE)	7/1/2002	Flood	0	0	0.00	0.00
South Portion	7/1/2002	Flash Flood	0	0	0.00	0.00
Countywide	7/2/2002	Flash Flood	0	0	0.00	0.00
West Portion	7/3/2002	Flash Flood	0	0	0.00	0.00
West Portion	7/5/2002	Flash Flood	0	0	0.00	0.00
South Portion	9/19/2002	Flash Flood	0	0	0.00	0.00
South Portion	10/24/2002	Flash Flood	0	0	0.00	0.00
Countywide	11/4/2002	Flash Flood	0	0	0.00	0.00
Countywide	2/20/2003	Flash Flood	0	0	10,000.00	0.00
West Portion	6/13/2003	Flash Flood	0	0	5,000.00	0.00
South Portion	9/11/2003	Flash Flood	0	0	3,000.00	0.00
Northwest Portion	1/16/2004	Flash Flood	0	0	3,000.00	0.00
East Portion	6/5/2004	Flash Flood	0	0	0.00	0.00
Countywide	6/9/2004	Flash Flood	0	0	350,000.00	0.00
Driftwood	6/26/2004	Flash Flood	0	0	0.00	0.00
West Portion	6/27/2004	Flash Flood	0	0	0.00	0.00
West Portion	6/28/2004	Flash Flood	0	0	0.00	0.00
Countywide	6/29/2004	Flash Flood	0	0	0.00	0.00
South Portion	6/30/2004	Flash Flood	0	0	0.00	0.00
Hays (Zone)	6/30/2004	Flood	0	0	0.00	0.00
West Portion	7/25/2004	Flash Flood	0	0	0.00	0.00
Countywide	10/2/2004	Flash Flood	0	0	0.00	0.00
Countywide	10/23/2004	Flash Flood	0	0	0.00	0.00
HAYS (ZONE)	10/23/2004	Flood	0	0	0.00	0.00
HAYS (ZONE)	10/24/2004	Flood	0	0	0.00	0.00
Countywide	11/16/2004	Flash Flood	0	0	0.00	0.00
HAYS (ZONE)	11/17/2004	Flood	0	0	0.00	0.00
Countywide	11/21/2004	Flash Flood	0	0	0.00	0.00
Countywide	11/22/2004	Flash Flood	0	0	0.00	0.00
Countywide	11/22/2004	Flash Flood	0	0	0.00	0.00
Southeast Portion	11/23/2004	Flash Flood	0	0	0.00	0.00
South Portion	5/6/2006	Flash Flood	0	0	0.00	0.00
Henly	3/30/2007	Flash Flood	0	0	0.00	0.00
Driftwood	3/30/2007	Flood	0	0	0.00	0.00
Henly	5/2/2007	Flash Flood	0	0	0.00	0.00
Henly	7/2/2007	Flash Flood	0	0	0.00	0.00
Henly	5/17/2010	Flash Flood	0	0	0.00	0.00
Driftwood	9/7/2010	Flash Flood	0	0	0.00	0.00
Driftwood	5/10/2012	Flash Flood	0	0	0.00	0.00
Driftwood	5/11/2012	Flash Flood	0	0	0.00	0.00
Fitzhugh	5/17/2015	Flash Flood	0	0	0.00	0.00
Henly	5/30/2015	Flash Flood	0	0	0.00	0.00
Fitzhugh	6/14/2015	Flash Flood	0	0	0.00	0.00
Driftwood	10/30/2015	Flash Flood	0	0	10,000,000.00	0.00



Table HA.23, Flood Events, Hays County

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
Fitzhugh	5/19/2016	Flash Flood	0	0	0.00	0.00
Driftwood	8/16/2016	Flash Flood	0	0	0.00	0.00
Totals			2	177	\$21,824,000.00	\$330,000.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Floods: Significant Past Events



Although there were no flood events reported specifically for the City of Hays in the NOAA Storm Events Database, due to the size and extent of some flood occurrences as well as the regional or zonal nature of reports in the NOAA Storm Events Database, the City may have been affected by many of the events that were reported for the surrounding areas. Refer to the Significant Past Events within the Hays County Annex for descriptions.

Floods: Extent

As there are some mapped floodplains within the City (6.02 acres) along Little Bear Creek Tributary 1A, flood depths and Base Flood Elevations (BFE's) are unknown for the area. Localized flooding along Little Bear Creek Tributary 1A and Little Bear Creek (located north of the City) could still occur. However, the extent, water depth and corresponding Water Depth Extent Scale designation, is unknown. The current approximate overbank elevation range of Little Bear Creek Tributary 1A within the City according to LiDAR data is 695 – 705 feet.

Little Bear Creek, located approximately 400 feet north of the City of Hays, has an approximate normal in-channel elevation of 683 feet (per LiDAR and USGS data) and an intersecting 100 year WSE of approximately of 690'. Here, flood depths would be 7 feet. Such an event is categorized as a "Action Stage." Refer to the Water Depth Extent Scale in Chapter 2 (the Risk Assessment portion of the Hays County HMP Update).

Floods: Probability

Based on 69 reported events in 19 years, a flood event occurs approximately 3 to 4 times per year on average in Hays County and its unincorporated jurisdictions. Due to the size and extent of some flood occurrences, as well as the regional or zonal nature of reports in the NOAA Storm Events Database, the City of Hays' future probability is assumed to be similar to the surrounding county area. The City can expect a flood event approximately 3 to 4 times per year on average in the future, with flood water depths in the category of "Major Flood Stage."

Number of Reported Events	Number of Years in Dataset	Probability
69	19	3.63

Floods: Impact

The following describes the inventory counts and building replacement values for the jurisdictional area.

City of Hays Building Counts			
Residential	Commercial	Other	Total
83	5	0	88





City of Hays Building Replacement Value		
Building (\$)	Content (\$)	Total (\$)
38,567,392	19,993,430	58,560,822

A Probabilistic 100-year Return Period HAZUS-MH 3.2 analysis was run on the participating communities. HAZUS results are calculated to census blocks. This analysis utilized the best available LiDAR (COA 2012 and CAPCOG 2008) and Depth Grids. These blocks were then intersected with the participating community to run a weighted area analysis to get jurisdictional results. The following describes results of the 100-year Return (1% Annual Chance Event) weighted area analysis.

HAZUS-MH Results

General Building Stock Damage

HAZUS estimates that 1 building will be at least moderately damaged in the City of Hays. "At least moderately damaged" is defined by HAZUS as greater than 10% damage to a building.

Residential Buildings	Commercial Buildings	Other Buildings	Total Buildings
1	0	0	1

Building-Related Losses

Exposed Value is the total building and content values for structures within the community. The exposed value for the community is \$58,560,822. The total building-related losses were \$255,417 for this scenario. This represents 0.4% of the total replacement value of the community. Loss values are divided into building and content loss dollars.

Building Loss (\$)	Content Loss (\$)	Total Loss (\$)
162,515	92,903	255,417

Essential Facility Damage

HAZUS does not estimate any critical facilities or infrastructure to be out of service for more than 1 day on the day of the event. Additionally, the model estimates that 100% of available hospital beds are ready for use by patients already in the hospital and for those injured by an event.

Debris Generation

HAZUS estimates the amount of debris that will be generated in this scenario. The model estimates that a total of 11 tons of debris will be generated. If the building debris tonnage is converted to an estimated number of truckloads, it will require 1 truckload (with 1 to 25 tons per truck) to remove the building debris generated in this scenario.

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates those people displaced that will require accommodations in temporary public shelters. The model estimates 7 people will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1 person will seek temporary shelter in public shelters.



Floods Vulnerability Summary

The entire community of the City of Hays is considered Pre-FIRM, meaning that all structures were constructed before the adoption of the FEMA Flood Insurance Rate Maps, and before participating in the National Flood Insurance Program. This means that structures were not constructed to minimum flood damage prevention standards, because the standards had not been adopted at the time of construction.

National Flood Insurance Program Repetitive Loss (RL)

The City of Hays is a current participant in the National Flood Insurance Program (NFIP). As of September of 2016, the City does not have any listed Repetitive Loss (RL) or Severe Repetitive Loss (SRL) properties according to FEMA RL/SRL data.





Land Subsidence

Land Subsidence: Location

Karst features are a landscape formed from the dissolution of soluble rocks, such as limestone, that can cause sinkholes and caves. Locations within the City of Hays that are underlain by karst features or that are experiencing extensive groundwater depletion, are most at risk. Figures HA.9 and HA.10 illustrate the planning area's location in conjunction with the karst regions of Texas and USGS Groundwater Depletion Zones. According to Figure HA.9, the City is located within the Balcones Fault Zone.

Figure HA.9, Karst Regions of Texas, City of Hays

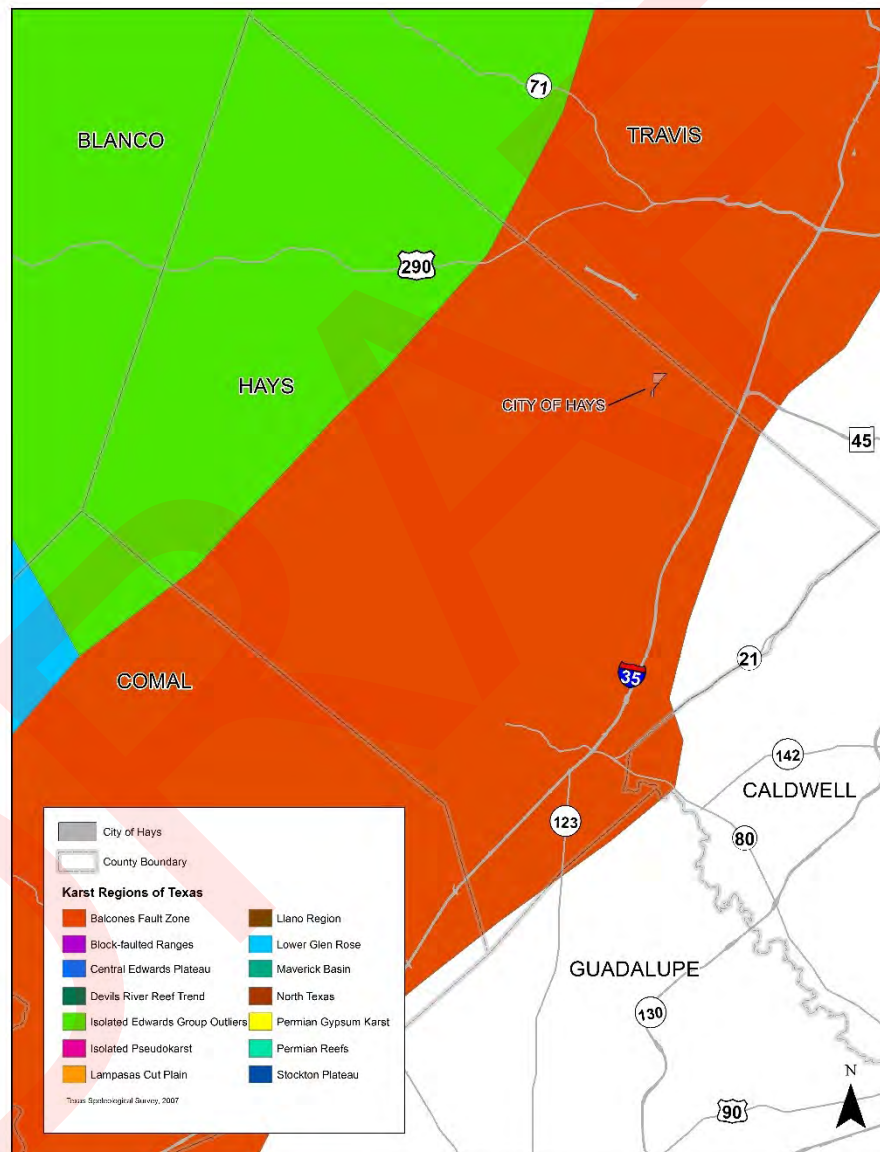
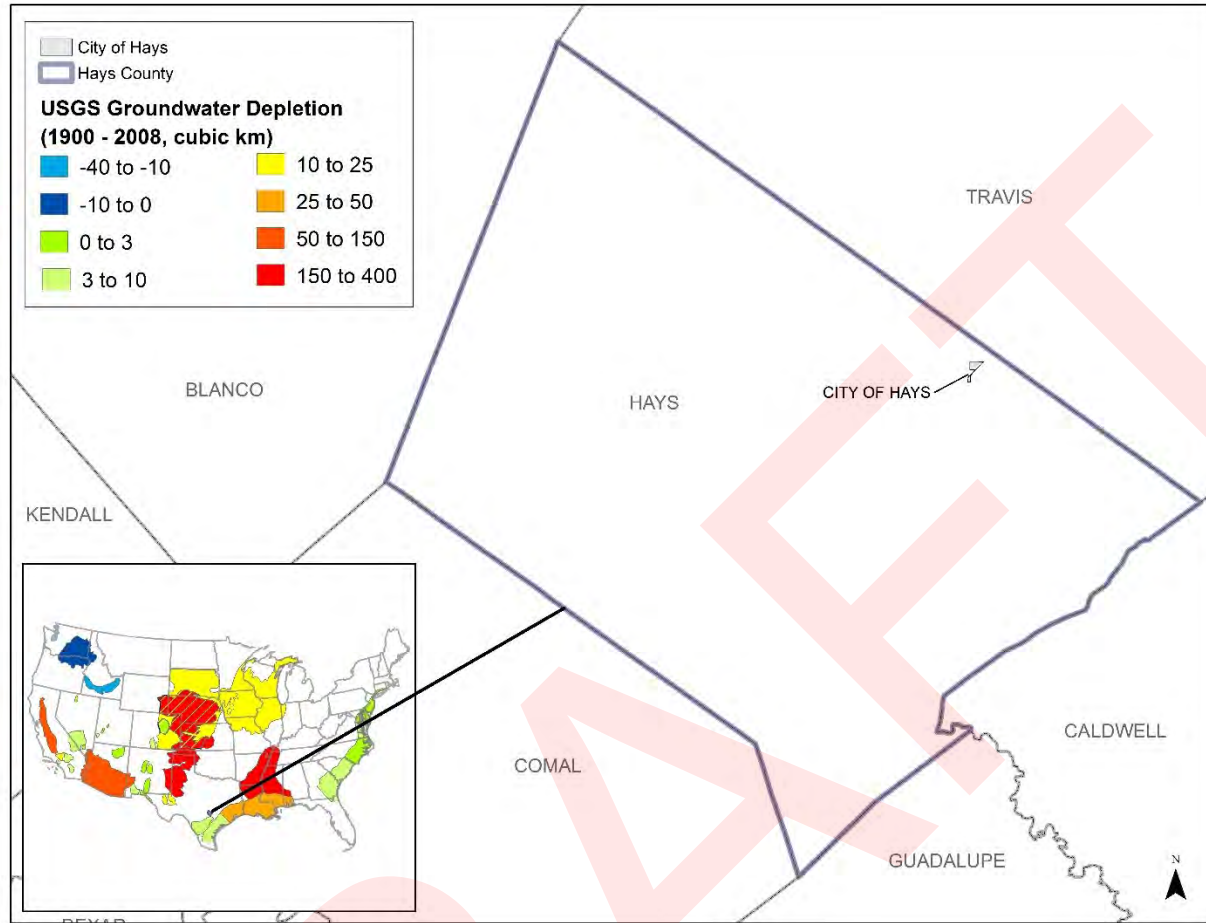


Figure HA.10, Groundwater Depletion Zones, City of Hays



(Groundwater depletion in the United States (1900–2008), 2013)

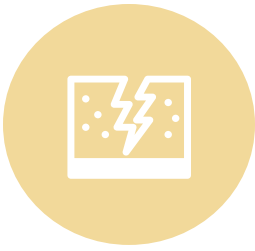
Land Subsidence: Previous Occurrences

There were no sinkhole or land subsidence events documented specifically for the City of Hays. As the data displayed in Figure HA.10 illustrates, the HMP update area does not have a significant history of groundwater depletion.

However, land subsidence can occur in the Central Texas Hill Country Area. Recently, a small event occurred in Travis County (located ~ 20 miles north of the study area) when a 25-foot-wide and 12-foot-deep sinkhole opened up at a Costco parking lot in Austin, Texas (Mashhood, 2012). The area could potentially experience an event of similar depths, widths, and impact as the event described above, but conditions would vary depending on the location and geography of the event. Since future events cannot be predicted, the estimated extents previously described are hypothetical.

Land Subsidence: Extent

Due to the lack of reported occurrences, there is not sufficient data to determine the maximum extent of land subsidence for the planning area. However, if a future event were to occur, it can be assumed it would be similar in extent to previous events in the area. This includes the aforementioned sinkhole in Austin, Texas measuring 25-feet-wide and 12-feet-deep.



Land Subsidence: Probability

The occurrence of subsidence is an ongoing process resulting from natural and human-induced causes. As seen in Figure HA.9, the entire City of Hays is located within a known karst region. However, with no documented history of subsidence, the probability of a future land subsidence event for the City is low (unlikely in next 10 years). If a future event were to occur, however unlikely, it can be assumed it would be similar in extent to previous events in the region. This includes the previously mentioned sinkhole documented in Austin, Texas.

Land Subsidence: Impact

When considering the impact of land subsidence, it is important to note that many areas within the karst zone have structures and infrastructure and could be affected by a collapsed area. The possible impact of isolated incidents within the karst region could include damage to any, but not all, of the 88 structures located in the zone in the unlikely event of a future occurrence. All structures are cumulatively valued at approximately \$58,560,822 based on HAZUS building and content values.

Land Subsidence: Vulnerability Summary

Although the City of Hays does not have any notable land subsidence impacts or history from which to draw a vulnerability analysis, there have been events of drought that could lend to an increased chance for the depletion of groundwater that could create an increase in land subsidence. City of Hays utilizes service from a company that draws from the Edwards Aquifer as their primary source for water.



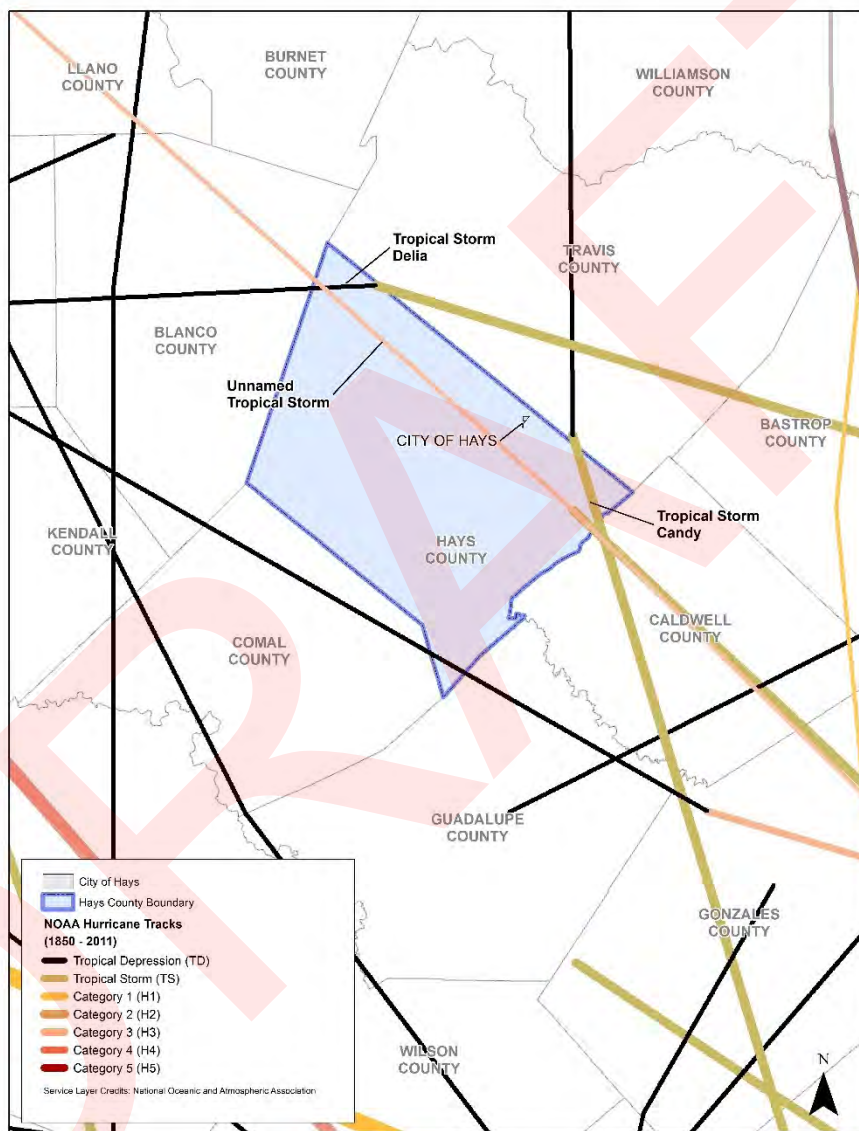


Hurricanes/Tropical Storms

Hurricanes/Tropical Storms: Location

Due to the regional nature of a hurricane or tropical storm event, the entire extent of the City of Hays is equally exposed to a hurricane or tropical storm. Figure HA.11 illustrates the location of the planning area with historical hurricane and tropical storm paths documented by NOAA's Hurricane Tracker from 1850 to 2011.

Figure HA.11, Historical Hurricane/Tropical Storm Paths, City of Hays



(National Oceanic and Atmospheric Administration, 2016)

Hurricanes/Tropical Storms: Previous Occurrences

Previous events are listed below from NOAA Storm Events Database for Tropical Storm Hermine and NOAA Hurricane Tracker for all other events. By the time most hurricanes reach the County, they are tropical storms, depressions or thunderstorms. Because hurricane and tropical storm events occur on a regional scale, all events listed for Hays County have been included as they would impact the City of Hays.





July 13 to July 22, 1909 – An unnamed storm made landfall near Freeport, as a Category 3 Hurricane. This storm impacted Hays County and participating communities as a tropical depression with wind speeds up to 30 knots. No significant damages, injuries, or fatalities were reported for the City.

June 22 to June 26, 1968 – Tropical Storm Candy made landfall near Port Aransas. This storm impacted Hays County and participating communities as a tropical storm with wind speeds slowing to 30 knots as a tropical depression just after leaving the County. No significant damages, injuries, or fatalities were reported for the

jurisdiction.

September 1 to September 7, 1973 – Tropical Storm Delia made landfall near the border of Brazoria and Matagorda Counties. This storm impacted Hays County and participating communities as a tropical storm with wind speeds slowing to 30 knots as a tropical depression just after leaving the County. No significant damages, injuries, or fatalities were reported for the jurisdiction.

September 6 to September 8, 2010 – According to the NOAA Storm Events Database, Tropical Storm Hermine made landfall near the Texas/Mexico border on the night of September 6. South Central Texas was hit very hard with widespread rains of 8 to 12 inches across much of the IH-35 corridor from Austin down to San Antonio.

Hurricanes/Tropical Storms: Extent

The Saffir-Simpson Scale measures pressure, wind speed, and storm surge in 5 categories. According to the reported previous hurricane occurrences in the jurisdiction, the maximum hurricane extent experienced was categorized as a Tropical Storm. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of storm extents.

Hurricanes/Tropical Storms: Probability

Based on 4 reported events in 107 years, a hurricane or tropical storm event occurs approximately every 27 years on average in Hays County. Since hurricane and tropical storm events can happen anywhere throughout the HMP update area, the City of Hays' future probability is assumed to be similar to the surrounding County area. In the future, the City can expect an event approximately once every 27 years on average, of up to a magnitude of a Tropical Storm based on historical extents for the planning area.

Number of Events Reported	Number of Years in Dataset	Probability	100yr Max Wind Speed (mph)
4	107	0.04	70

Hurricanes/Tropical Storms: Impact

HAZUS is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery. A Probabilistic 100-year Return Period HAZUS-MH 3.2 analysis was run on the participating community. The following describes the results of this analysis.



HAZUS-MH Results

General Building Stock Damage

The total property damage losses were \$9,136. The majority of damage can be expected to impact residential areas (98%). The remaining damages (2%) are for commercial, industrial, agriculture and religious buildings. While some building damage is experienced, it is estimated that no buildings will be completely destroyed or experience severe damage. Exposed Value is the total building and content value (\$) for structures within the community. Loss values are divided separately for building and content loss in dollars.

Exposed Value (\$) (Building + Content)	Building Loss (\$)	Content Loss (\$)	Total Loss (\$)
58,560,822	9,136	0	9,136

Essential Facility Damage

HAZUS does not estimate any critical facilities or infrastructure to be out of service for more than 1 day on the day of the event. Additionally, the model estimates that 100% of available hospital beds are ready for use by patients already in the hospital and for those injured by the hurricane.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the hurricane at a total of 1 ton. Of the total amount, Brick/Wood comprises 100% of the total. If the building debris tonnage is converted to an estimated number of truckloads, it will require 1 truckload (with 1 to 25 tons per truck) to remove the building debris generated by the hurricane.

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates no households to be displaced due to the hurricane. Therefore no temporary shelter is needed.

Hurricanes/Tropical Storms: Vulnerability Summary

Similar to the impacts of windstorms, hailstorms, and lightning, City of Hays can expect to be impacted with debris and possible interruptions of critical infrastructure. In addition, the community's proximity to IH-35 could lead to traffic delays caused by major evacuation efforts if the highway is used as an evacuation route for coastal residents.



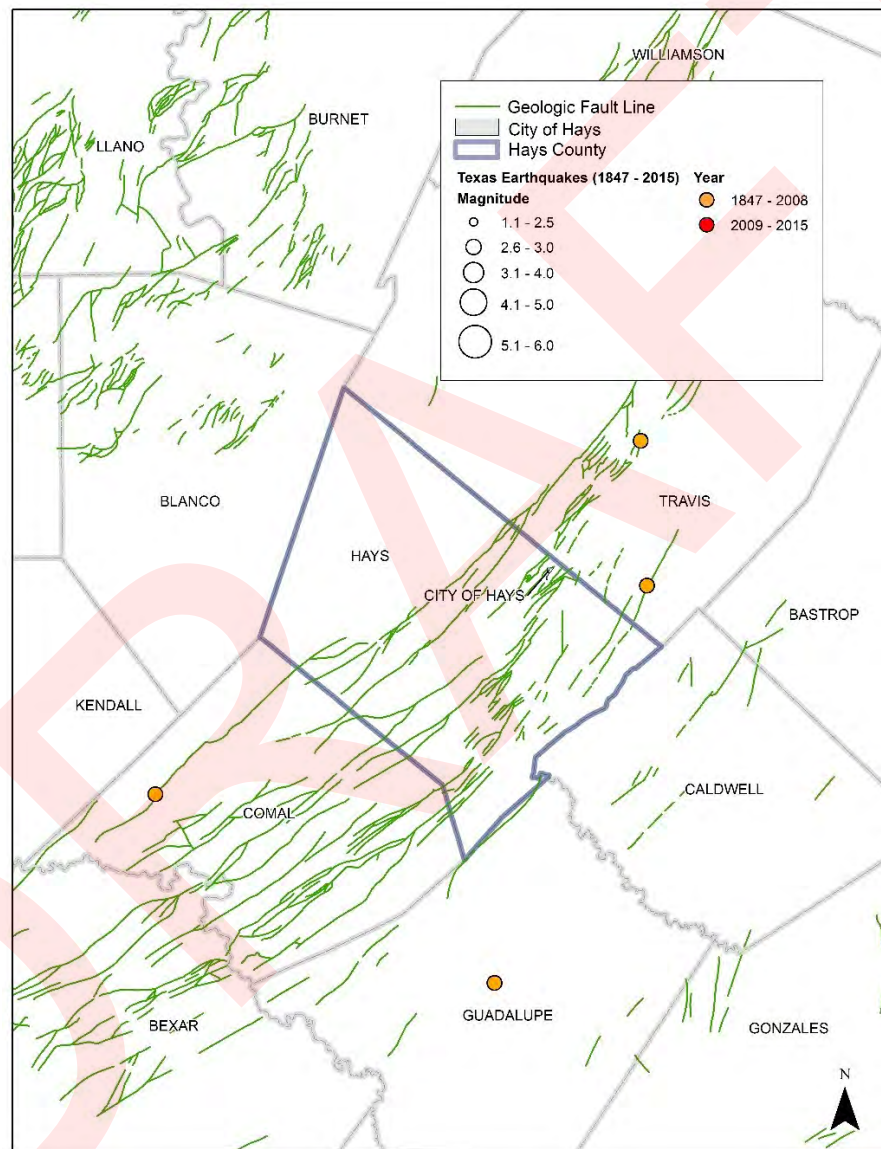


Earthquakes

Earthquakes: Location

Locations within proximity to fault lines are typically the areas most at risk for earthquakes. Figure HA.12 shows USGS documented fault lines and the locations of earthquakes from 1847 to 2015 in relation to the City of Hays.

Figure HA.12, Texas Earthquakes, 1847 – 2015, City of Hays



(USGS Earthquake Hazard Program, 2015)



Earthquakes: Previous Occurrences

There have been no documented earthquake events for the City of Hays according to USGS 1847-2015 data as illustrated in Figure HA.12.



Earthquakes: Extent

The HAZUS Peak Ground Acceleration (PGA) for the planning area is 1.57% (see City of Hays Earthquakes: Impact Section for a description of the HAZUS Analysis). This corresponds to the Modified Mercalli Scale Category IV, with light perceived shaking and no potential structure damage. HAZUS measures PGA on a census tract level. Cities within more than 1 census tract were assigned the highest PGA level to reflect the maximum possible extent. Refer to Chapter 2 for extent scale descriptions (the Risk Assessment portion of the Hays County HMP Update).

Earthquakes: Probability

As there have been no recorded previous occurrences of earthquakes for the City of Hays and the PGA is less than 2% for the area the probability of an earthquake in the City in the future is low (unlikely within the next 10 years).

Number of Reported Events	Number of Years in Dataset	500yr PGA
0	170	1.57

Earthquakes: Impact

The FEMA How-To Guidance, Understanding Your Risks (FEMA 386-2, page 1-7), suggests the earthquake hazard should be profiled if the PGA is greater than 3%g, where PGA is measured in the acceleration of gravity (g). The City’s PGA is less than 3%g (0.03) and there have been no recorded earthquakes in or near the jurisdiction. Therefore, only a minimum level-1 HAZUS analysis was profiled using the 500-year probability event scenario. The HAZUS analysis produced a PGA of 1.57%. HAZUS also produced \$0 in building damages (Residential, Commercial, Agriculture, Religious and Government) from an event. Critical facilities and infrastructure did not experience any loss of service. There were no critical facilities or infrastructure that experienced moderate to complete damage. No debris were generated from this event and no people or households required temporary housing. There were no moderate, extensive or completely damaged buildings by this event. HAZUS estimates no households are expected to be displaced from their homes or will require accommodations in temporary public shelters due to the earthquake. Additionally, there were no casualties or fatalities from this event.

Earthquakes: Vulnerability Summary

While the probability of an earthquake in the City is low, with no significant prior events on file, there is a fault line located within the jurisdiction according to USGS data. This could cause impact if there were to be an increase in seismic activity. The City of Hays could expect to be impacted with debris and possible interruptions if an event were to occur in this unlikely and unprecedented scenario. If an event were to incapacitate a roadway, emergency responders would be hindered from responding, thus leaving the residents who were affected at risk. The following local roadways are crossed by the USGS fault lines displayed on Figure HA.12: McKinnon Loop, Country Lane, Live Oak Lane, and Redbud Trail.





Page 47, Dam/Levee Failure has been redacted from this copy of the plan.

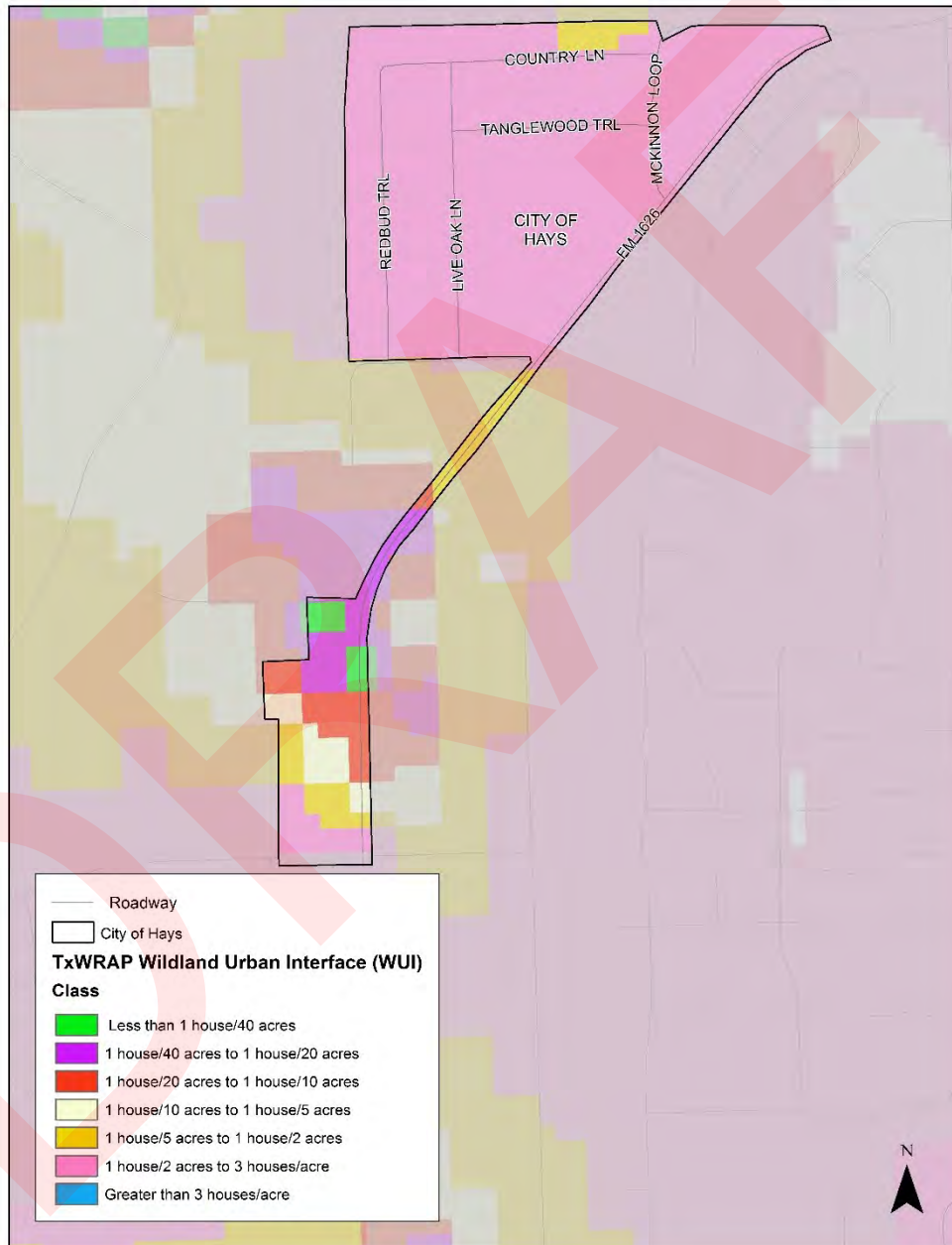


Wildfires

Wildfires: Location

The Texas A&M Forest Service Texas Wildfire Risk Assessment Portal (TxWRAP) can be used to help communities understand their wildfire risk. Figure 16 below shows the location of TxWRAP's Wildland Urban Interface (WUI) classifications within the City of Hays. The WUI illustrates areas of development that are abutting natural areas. Here, communities and the built environment have an increased vulnerability to a wildfire event. Wildfires can be ignited from a variety of sources including lightning or human activity such as campfires, smoking, arson, or equipment use.

Figure HA.13, Wildland Urban Interface (WUI), City of Hays



(Texas A&M Forest Service, 2016)

Wildfires Previous Occurrences

There were no reported wildfire ignitions within the City of Hays according to TxWRAP and USGS Federal Fire Occurrence data from the years 1980 to 2015.





Wildfires: Extent

Table HA.24 lists the Fire Intensity Acreage for the City according to the Texas A&M Forest Service TxWRAP Community Summary Report. For a description of the Characteristic Fire Intensity Scale (FIS), refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update.

Table HA.24, TxWRAP Fire Intensity Acreage, City of Hays

Class	Acres	Percent
Non-Burnable	80	59.60%
1 (Very Low)	7	5.50%
1.5	10	7.30%
2 (Low)	3	2.50%
2.5	0	0.20%
3 (Moderate)	17	12.70%
3.5	4	2.60%
4 (High)	8	6.10%
4.5	5	3.50%
5 (Very High)	0	0.00%
Total	134	100.00%

Wildfires: Probability

There were no reported ignitions from TxWRAP and USGS Federal Fire Occurrence data in 35 years for the City of Hays. However, a wildfire can be ignited from a variety of sources including lightning or by human activity such as campfires, smoking, arson, or equipment use. When considering the lack of reported previous events for the City of Hays, a wildfire event in the future is moderate, (possible in the next 10 years) with up to a potential fire intensity of 4.5, or “High” classification on the TxWRAP Characteristic Fire Intensity Scale.

Wildfires: Impact

Impact on the community can be measured using TxWRAP Housing Density levels within the WUI. Areas with a higher housing and population density would be affected to a greater extent than more rural areas, and especially areas near burnable fuels. Table HA.25 below lists the population, percent of total population, WUI acreage and percent of WUI acreage for the City of Hays, according to the Texas A&M Forest Service TxWRAP Community Summary Report. See Figure HA.13 for the location of WUI areas within the jurisdiction.

Table HA.25, WUI Acreage, City of Hays

Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	5	1.4 %	3	2.0 %
1hs/40ac to 1hs/20ac	0	0.0 %	5	3.5 %
1hs/20ac to 1hs/10ac	0	0.0 %	6	4.5 %
1hs/10ac to 1hs/5ac	0	0.0 %	4	3.1 %
1hs/5ac to 1hs/2ac	3	0.8 %	10	7.5 %
1hs/2ac to 3hs/1ac	345	97.7 %	107	79.5 %
GT 3hs/1ac	0	0.0 %	0	0.0 %
Total	353	100.0 %	134	100.0 %





Wildfires: Vulnerability Summary

The City of Hays is a community known for its mature trees and abundance of natural vegetation. The presence of brush and growth can serve as fuel for wildfire and put many of the structures that exist within the WUI at risk. While the community does have fire hydrants present for firefighting purposes, the community is supported by an Emergency Services District that serves various communities within its assigned boundaries. Response time is fast, averaging at 4 minutes, however in the occasion of widespread fires occurring within different jurisdictions,

that time may differ.



Risk Ranking Result

On January 12, 2017, planning representatives from the City of Hays completed a questionnaire as part of the Hays County Hazard Mitigation Plan Update: Risk Assessment. The questions covered the risk associated with the hazards that affect each community based on the level of concern over each profiled hazard, the hazards' impact on health and safety as well as property damage and business continuity. The answers from this questionnaire were combined with public survey results on perception of risk, and the values from both sources were analyzed using the Halff Risk Ranking Tool (details regarding the risk ranking tool are in Chapter 2, the Risk Assessment portion of the Hays County HMP Update). The results provided a quantified ranking of risk with values ranging from 0 to 100. The results for the City are shown below (hazard values shown from highest risk to lowest):

Ranking Order	Hazard	Risk Ranking Value
1	Floods	96.3
2	Wildfire	94.1
3	Lightning	94.1 (Exact Same Value as Wildfire)
4	Extreme Heat	92.2
5	Wind Storms	91.0
6	Drought	90.4
7	Hail Storms	70.4
8	Land Subsidence	69.9
9	Tornadoes	69.6
10	Severe Winter Storms	69.4
11	Expansive Soils	62.7
12	Earthquakes	40.0
13	Hurricanes/Tropical Storms	37.5
14	Dam/Levee Failure	36.3



Section 3: Mitigation Strategy

This section examines the community's ability to perform mitigation (review of existing capabilities, shown in Table HA.26) and identifies specific mitigation actions to address vulnerabilities for each hazard profiled in the Hays County HMP Update. The mitigation strategy is the application of actions into an approach for performing structural and non-structural mitigation efforts within the jurisdiction. Actions are also prioritized and considered for incorporation into other community programs, regulations, projects or plans.

Completed and canceled actions are also included in a separate section for future reference.

Table HA.26, Existing Capabilities

Capability Name	Capability Type	How it can Accomplish Mitigation
Mayor/Emergency Management Coordinator	Elected Official	Political support and funding for mitigation actions./ Management of City-level HMP updates.
City Secretary	City Staff	Support for implementation of mitigation actions.
Engineer/Floodplain Administrator	Staff - Consultant	Expertise in structural mitigation projects and compliance with flood damage prevention ordinance./Responsibility for continued participation in the NFIP.
Sales Tax	Funding	Provides potential funding for Hazard Mitigation items.
Property Tax	Funding	Provides potential funding for Hazard Mitigation items.
Permitting and Licensing Fees	Funding	Provides potential funding for Hazard Mitigation items.
Chapter 211 of the Local Government Code: Zoning	Authority	Authorizes the City to regulate zoning. (State of Texas, 1987)
Chapter 213 of the Local Government Code: Municipal Comprehensive Plans	Authority	Authorizes the City to adopt a comprehensive plan for the long-range development of the City. (State of Texas, 1997)
Chapter 214 of the Local Government Code	Authority	Authorizes the City to have regulatory authority as it related to building code. (such as structural integrity and plumbing) (State of Texas , 1995)
City of Hays Municipal Code	Regulations	Code of ordinances that City of Hays uses to enforce control for safe development and a good environment for residents.

National Flood Insurance Program Participation

The City of Hays currently participates in the National Flood Insurance Program. Currently, there are not any Certified Floodplain Managers on staff, due to a lack of resources and staff. The amount of mapped floodplain in the City of Hays is very small. The City has adopted minimum standards in their flood damage prevention ordinance, and as the community is nearly fully developed, there are not many permits for any development being submitted for approval. The City will continue to explore options for higher standards. The City of Hays has a total of 3 NFIP policies in force, as of June 2016. This totals \$735,000.00 in insurance coverage.

Mitigation Goals

The plan-level Mitigation Goals can be found in Chapter 3: The Mitigation Strategy portion of the Hays County Hazard Mitigation Plan. These mitigation goals apply to each community and were mutually decided upon as the guiding goals for the development of actions in each planning area.

Mitigation Actions

*E= Actions reducing risk to existing buildings and infrastructure

*F= Actions reducing risk to new development and redevelopment

Number/Title	Hazard	Item Description	Implementation Agency
1 Attend Certified Floodplain Management Training (previously action 3 in 2011 plan)	Flood	Attend FEMA based training for floodplain management administration.	City of Hays City Hall
Cost Estimate/Funding		Schedule	Status as of 2017
Less than \$100 for local training registration, fuel		3 months	In progress
*Risk Focus:			
E/F			
Cost and Benefit Considerations			
This low cost project for training will allow the City officials to continue to adhere to the standards adopted by the floodplain damage prevention ordinance and in turn ensure that structures are built or repaired within Federal minimum standards. This would benefit all citizens near and in the floodplain.			

Number/Title	Hazard	Item Description	Implementation Agency
2 Improve Emergency Communication Capabilities through Social Media and Calling Tree Capabilities (previously action 4 in 2011 plan)	All hazards, except expansive soils and land subsidence	Ensure that community members register for/follow social media and calling tree in order to ensure the ability to contact them quickly-in addition to procedures for utilizing county resources.	City of Hays City Hall
Cost Estimate/Funding		Schedule	Status as of 2017
Existing Staff Resources		6 months	In progress
*Risk Focus:			
N/A			
Cost and Benefit Considerations			
The ability for the local community to make rapid contact to provide their citizens messaging when hazard conditions are dangerous. This would benefit all citizens in the community.			

Number/Title	Hazard	Item Description	Implementation Agency
3 Storm Ready Designation for Community (previously action 6 in 2011 plan, modified)	Flood, Tornadoes, Windstorm, Hurricanes/ Tropical Storms, Hailstorms	Applying for National Weather Service as a community that has taken preparedness actions to ensure the community is able to receive emergency notifications.	City of Hays City Hall
Cost Estimate/Funding		Schedule	Status as of 2017
Existing Staff Resources		9 months	Not started
*Risk Focus:			
N/A			
Cost and Benefit Considerations			
This free application would lead to the increase of communication from officials to citizens and local government during times of disaster. This would benefit every member of the community in City of Hays.			



Hays County Hazard Mitigation Plan, City of Hays Annex

Number/Title	Hazard	Item Description	Implementation Agency	
4 Cooling Plan for Reducing the Impacts of Extreme Heat to Vulnerable Populations (previously action 7 in 2011 plan, modified)	Extreme Heat	Developing plans for providing a cool location for vulnerable populations to seek cool conditions during times of extreme heat.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		9 months	Not started	N/A
Cost and Benefit Considerations				
Creation of this type of plan would benefit not only vulnerable populations, but also any other population that becomes vulnerable during circumstances that accompany extreme heat, such as power outage. This would be a low cost project that would benefit many.				

Number/Title	Hazard	Item Description	Implementation Agency	
5 Promote Flood Insurance (previously action 8 in 2011 plan, modified)	Flood, Dam Levee Failure	Using FEMA resources that are available for free for promoting flood insurance through National Flood Insurance Program pamphlets placed in City Hall.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		3 months	Not started	N/A
Cost and Benefit Considerations				
By enhancing existing verbal campaign of promoting flood insurance, the use of free FEMA resources for informing all citizens of the existence of flood insurance benefits for those in and out of the Special Flood Hazard Area. This would cost nothing but the time it takes to order the resources and place them in City Hall. This would also mitigate the flooding that could result from a dam/levee failure.				

Number/Title	Hazard	Item Description	Implementation Agency	
6 Public Information Campaign on Natural Hazards (previously action 9 in 2011 plan, modified)	All Hazards	Creating resource page on City of Hays website to promote information about the hazards that exist in the community and how to take mitigation actions at the individual level.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		6 months	In progress	N/A
Cost and Benefit Considerations				
This free enhancement to the City's existing website would benefit all with internet access at little to know cost, except the staff resources required to do so.				

Hays County Hazard Mitigation Plan, City of Hays Annex

Number/Title	Hazard	Item Description	Implementation Agency	
7 Annual Brush Clean-up Event Marketing (previously action 10 in 2011 plan, modified)	Wildfire, Severe Winter Weather, Lightning	Cross marketing of existing brush collection efforts from Texas Disposal Systems in order to promote mitigation.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		3 months	Not Started	N/A
Cost and Benefit Considerations				
At only the cost of the staff for coordination, the community cross-marketing existing resources for collecting/ accepting brush in order to promote cleaning brush and dead trees in order to decrease fuel for wildfire, potential debris that could fall on power lines during freezing conditions and that could ignite during lightning strike. This would benefit any citizen that resides in a location with vegetation and trees.				

Number/Title	Hazard	Item Description	Implementation Agency	
8 Adding Water Conservation to Ordinances/institution of Drought Monitor as part of operations (previous action 11 in 2011 plan, modified)	Drought, Land Subsidence	Adding drought conservation levels to ordinance to increase resiliency to drought conditions and also provide a method for monitoring drought trends on a local, regional and state level.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		6 months	Not started	E/F
Cost and Benefit Considerations				
With the sole cost of writing and adopting new ordinance language and publication of the Drought Monitor on the website, all citizens in the City of Hays would benefit from actions that would reduce the impact of drought and in turn reduce the impact of land subsidence that is caused by the depletion of groundwater.				

Number/Title	Hazard	Item Description	Implementation Agency	
9 Rain Harvesting Information Promotion (previously action 12 in 2011 plan, modified)	Drought/ Land Subsidence	Creating and distributing information sheets to public that encourage and provide guidance on how to build rain water harvesting systems on their home structures.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing staff resources, possible volunteer hours		6 months	In progress	N/A
Cost and Benefit Considerations				
This free creation of a resources sheet for citizens to get the information that would encourage them to harvest a secondary source of water to serve as back up during periods of drought. This project could benefit all citizens within the community who do not already harvest rain.				



Hays County Hazard Mitigation Plan, City of Hays Annex

Number/Title	Hazard	Item Description	Implementation Agency	
10 Energy Prioritization Collaboration with Pedernales Electric Cooperative (previously 13 in 2011 plan, modified)	Extreme Heat, Severe Winter Storms, Lightning, Windstorms, Tornadoes, Hurricanes/ Tropical Storms	Working with PEC to create a citizen registration system for requesting prioritization for power restoration according to special need or circumstance during hazards that could affect access to electricity.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		6 months	Not started	N/A
Cost and Benefit Considerations				
This low cost project for prioritizing energy restoration for those with special needs within the community that would be impacted by hazards that are known for affecting impact to electrical power. All those with special needs from electrical resources would benefit.				

Number/Title	Hazard	Item Description	Implementation Agency	
11 Sanding Plans for Roads (previously action 14 in 2011 plan, modified)	Severe Winter Weather	The establishment of preparatory plans and publication of agreements for private sanding of roads in order to protect citizens and maintain access to emergency responders.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		6 months	Not started	N/A
Cost and Benefit Considerations				
This low cost project for making agreements and pre-set rates for sanding services for roads that are critical for entering the City of Hays to maintain the ability of first responders to be able to access all citizens from the community.				

Number/Title	Hazard	Item Description	Implementation Agency	
12 12.Floodplain/ Floodway Audit (previously action 18 in 2011 plan, modified)	Flood, Dam/ Levee Failure	Quarterly efforts to ensure that unauthorized encroachments, such as private dams, are not allowed in the floodway.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		9 months	Not started	E
Cost and Benefit Considerations				
For the cost of writing a procedure and doing quarterly audits, the community can ensure that all citizens downstream of the floodplain are further protected from the instability of possible private dams and encroachments.				


Number/Title	Hazard	Item Description	Implementation Agency	
13 Creation of Community Evacuation Plans (previously action 19 in 2011 plan, modified)	Flood, Wildfire, Dam/ Levee Failure	Create evacuation plans for quick exit from the community.	City of Hays City Hall	
Cost Estimate/Funding		Schedule	Status as of 2017	*Risk Focus:
Existing Staff Resources		9 months	Not started	N/A
Cost and Benefit Considerations				
This would be a low cost project for establishing evacuation route procedures and possible coordination with county level government that would benefit all citizens that would need to get out of the City of Hays during a disaster event that would affect their safety.				

Capabilities Assessment


Evaluation/Prioritization of Actions

Each action added to the plan was developed using the Mitigation Action Summary Worksheet shown in Figure HA.14. The cost/benefit calculation occurred on this document. Non-cost effective projects were not included in prioritization activity. Risk Ranking Score used a high water mark effort of utilizing the highest score from the hazards that the action will mitigate impact from.

Figure HA.14, Mitigation Action Summary Worksheet


Hays County Hazard Mitigation Plan Update Process
Mitigation Action Summary Worksheet
Community Name: _____
Person completing questionnaire: _____

Mitigation Action/Project Title	
Background/Issue	
Opportunities for Integration	
Responsible Agency	
Partners	
Strategy for Existing Structures	


Hays County Hazard Mitigation Plan Update Process
Mitigation Action Summary Worksheet

Strategy for Future Development	
Potential Funding	
Cost Estimate (Values from "Measuring Costs" fields from Benefit and Cost Review Worksheet)	
Benefits (Statements from the "Difference" fields on the Benefit and Cost Review Worksheet)	
Timeline	
Priority (Based off Priority worksheet)	



Table HA.27, Mitigation Action Prioritization Tool, City of Hays

Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community	Risk Ranking Score	Total Score
1. Attend Certified Floodplain Management Training	1	1	1	1	0	0	1	1	0	1	96	103
6. Public Information Campaign on Natural Hazards	1	1	1	1	0	0	1	1	0	1	96	103
12. Floodplain/Floodway Audit	1	1	1	1	-1	1	1	1	0	1	96	103
13. Creation of Community Evacuation Plans	1	0	1	1	1	0	1	1	0	1	96	103
7. Annual Brush Clean-up Event Marketing	1	1	1	1	0	1	1	1	0	1	94	102
2. Improve Emergency Communication Capabilities through Social Media and Calling Tree Capabilities	1	0	0	1	0	0	1	1	0	1	96	101
3. Storm Ready Designation for Community	1	0	1	1	0	0	1	-1	0	1	96	100
5. Promote Flood Insurance	0	1	1	0	0	0	0	1	0	1	96	100
10. Energy Prioritization Collaboration with Pedernales Electric Cooperative	1	0	0	1	-1	0	1	1	1	1	94	99
9. Rain Harvesting Information Promotion	1	1	1	0	0	1	1	1	1	1	90	98
4. Cooling Plan for Reducing the Impacts of Extreme Heat to Vulnerable Populations	1	0	1	0	0	0	1	-1	0	1	92	95
8. Adding Water Conservation to Ordinances/ Institution of Drought Monitor as part of operations	1	1	1	-1	1	1	-1	1	1	0	90	95
11. De-icing Plans for Roads	1	0	1	1	0	0	1	-1	0	0	69	72

Mitigation Actions by Hazard

The mitigation actions in Table HA.28 are shown with the corresponding hazards.

Table HA.28, Mitigation Action Impact, City of Hays

Action Number	Drought	Extreme Heat	Severe Winter Storms	Lightning	Hailstorms	Windstorms	Tornadoes	Expansive Soils	Floods	Land Subsidence	Hurricanes/Tropical Storms	Earthquakes	Dam/Levee Failure	Wildfire
1									X					
2	X	X	X	X	X	X	X		X		X	X	X	X
3					X	X	X		X		X			
4		X												
5									X				X	
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7			X	X										X
8	X									X				
9	X									X				
10		X	X	X		X	X				X			
11			X											
12									X				X	
13									X				X	X

Integration Efforts

Table HA.29 captures ways that the Risk Assessment, Goals and Actions developed in the HMP can be integrated into other City of Hays documents, programs and regulations.

Table HA.29, Plan Integration Efforts, City of Hays

Name of Document	Type	Item Type	Opportunity for Integration
Natural and Cultural Resources Assessment Report: Drainage Improvement Project, City of Hays, Texas	Plan	Action	Integrate efforts to ensure evacuation routes receive special consideration during efforts to ensure flood measures also lend to public safety.
City of Hays Municipal Code	Regulations	Action	Integrate enforcement of water conservation stages to existing municipal code.
TWDB Flood Protection Planning (FPP) Grant	Funding	Action	Identify actions that can be funded through new and existing grant awards.
TWDB Clean Water State Revolving Fund (CWSRF)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
Texas Water Development Fund (DFund)	Funding	Action	Identify actions that can be funded through new and existing loans.
TWDB Flood Protection Planning (FPP) Grant	Funding	Action	Identify actions that can be funded through new and existing grant awards.
TWDB Clean Water State Revolving Fund (CWSRF)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
Texas Water Development Fund (DFund)	Funding	Action	Identify actions that can be funded through new and existing loans.

Section 4: Finalize Plan Update (Review, Evaluation and Implementation)

As the City of Hays is a purely residential community that is close to being fully developed, there are not any significant changes of development that have occurred within the past 5 years within the City limits.

Past Mitigation Action Progress Reports Summary - Completed Canceled

2011 Action Number	Hazard	Title	Lead Department
1	Flood	Increase the number of Hays County communities that participate in the NFIP.	City of Hays
Cost Estimate/Funding		Schedule	Status as of 2017
Existing Staff resources, no other cost		2006-2007	Complete. Shown as complete in 2011 plan.
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Title	Lead Department
2	Flood	Adopt "Higher Standard" Flood Damage Prevention Ordinances	City of Hays
Cost Estimate/Funding		Schedule	Status as of 2017
Existing staff resources, no other cost		Completed September 2011	Complete. Shown as complete in 2011 plan.
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Title	Lead Department
15	Wildfire	Various Mitigation Actions to Reduce Wildfire Risk	City of Hays
Cost Estimate/Funding		Schedule	Status as of 2017
Existing staff resources		TBD/as need is identified	Canceled. The measure was removed and replaced by others that were modified to address wildfire.
Cost Effectiveness			
Cost-effective, as measures tend to be inexpensive and prevent fires			



Hays County Hazard Mitigation Plan, City of Hays Annex

2011 Action Number	Hazard	Title	Lead Department
16	Floods, Thunderstorms, High Winds, Tornadoes, Seismic	Upgrades to At-Risk Structures	City of Hays
Cost Estimate/Funding		Schedule	Status as of 2017
Varies depending on measure. Funding from General Fund or FEMA grant program/s		TBD based on study	Canceled. There is only 1 public structure in City of Hays and at this time this item is not feasible.
Cost Effectiveness			
Cost-effectiveness will vary with level of risk and project cost			

2011 Action Number	Hazard	Title	Lead Department
17	Floods, Thunderstorms, High Winds, Tornadoes, Seismic	Structural/Engineering Study of public facilities for soundness	City of Hays
Cost Estimate/Funding		Schedule	Status as of 2017
To be determined, but if initiated will probably be from General Fund		Not yet established- to be commenced only if funding is available	Canceled. As the City of Hays only has 1 public structure that is not likely to be upgraded in the near future.
Cost Effectiveness			
Not independently cost-effective, but the initial step in identifying appropriate mitigation actions			

Changes in Priorities

Changes in priorities for the City of Hays include an interest in focusing on road resurfacing and culvert maintenance in order to reduce the impacts of flooding in the community. With the amount of water on the roads during recent flooding events, the community is concerned for the safety of residents while on the roads.



Section 5: Approval and Adoption

Table HA.30, Municipal Jurisdiction Adoption Date

Municipality	APA Date	Adoption Date
City of Hays		





Jurisdiction Adoption Documentation Placeholder

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