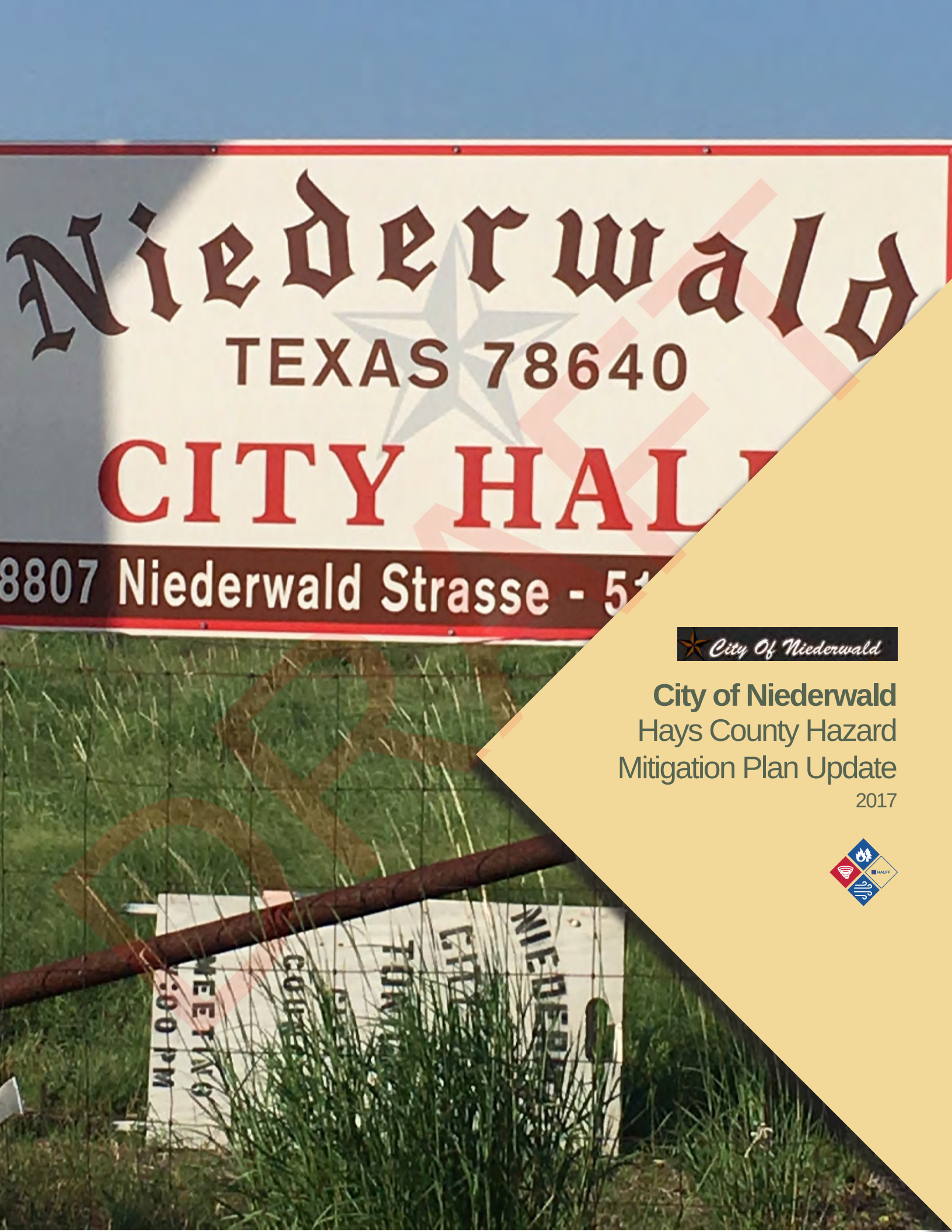


City Of Niederwald

City of Niederwald

Hays County Hazard Mitigation Plan Update

2017

Table of Contents

Section 1: Organize and Review 1

Section 2: Risk Assessment 7

Drought 8
Extreme Heat 10
Severe Winter Storms 12
Lightning 17
Hailstorms 20
Windstorms 23
Tornadoes 26
Expansive Soils 29
Floods 30
Land Subsidence 34
Hurricanes/Tropical Storms 37
Earthquakes 40
Dam/Levee Failure 42
Wildfires 46
Risk Ranking Result 49

Section 3: Mitigation Strategy 50

Section 4: Finalize Plan Update 60

Section 5: Approval and Adoption 61

References 63

Tables

Table NW.1, Major Employers 2
Table NW.2, Utility Providers 2
Table NW.3, Plan Stakeholders 4
Table NW.4, Review/Incorporation of Sources 5
Table NW.5, Public Involvement for Updates 6
Table NW.6, Hays County Hazard Mitigation Plan Maintenance Schedule, City of Niederwald 6
Table NW.7, Reported Drought Occurrence, Hays County 8
Table NW.8, Reported Drought Impacts, Hays County 9
Table NW.9, Hays County Trauma Data, Extreme Heat 10
Table NW.10, Hays County Trauma Data, Extreme Heat 11
Table NW.11, Extreme Heat Affecting Electrical Availability 11
Table NW.12, Winter Weather Occurrences, Hays County 12
Table NW.13, Hays County Hospital Inpatient Data, Severe Winter Storms 13
Table NW.14, Hays County Trauma Data, Severe Winter Storms 13
Table NW.15, Severe Winter Storms Affecting Electrical Availability 14
Table NW.16, Severe Winter Storms, Vehicle Accidents, Hays County 14
Table NW.17, Hays County Trauma Registry Data, Lightning Events 18
Table NW.18, Lightning Affecting Electrical Availability 18
Table NW.19, Hail Occurrences, City of Niederwald 21
Table NW.20, Reported Wind Events, City of Niederwald 24
Table NW.21, Windstorms, Vehicle Accidents, Hays County 25
Table NW.22, Tornado Events, Hays County 27
Table NW.23, City of Niederwald Floodplain Acreage 30
Table NW.24, Flood Events, City of Niederwald 31
Table NW.25, Dams Upstream of the City of Niederwald 42
Table NW.26, Wildfire Ignitions, City of Niederwald 47
Table NW.27, TxWRAP Fire Intensity Acreage, City of Niederwald 47
Table NW.28, WUI Acreage, City of Niederwald 48
Table NW.29, Existing Capabilities 50
Table NW.30, Mitigation Action Prioritization 57
Table NW.31, Mitigation Action Impact, City of Niederwald 58
Table NW.32, Plan Integration Efforts, City of Niederwald 59
Table NW.33, Municipal Jurisdiction Adoption Date 61

Figures

Figure NW.1, City of Niederwald Planning Area 1
Figure NW.2, Planning Committee Membership 2
Figure NW.3, City of Niederwald Plan Participation 3
Figure NW.4, Average Annual Lightning Density, City of Niederwald 17
Figure NW.5, National Hail Days Per Year, City of Niederwald 20
Figure NW.6, National Wind Days Per Year, City of Niederwald 23
Figure NW.7, National Tornado Days Per Year, City of Niederwald 26
Figure NW.8, Special Flood Hazard Areas and Low Water Crossings, City of Niederwald 30
Figure NW.9, Karst Regions of Texas, City of Niederwald 34
Figure NW.10, Groundwater Depletion Zones, City of Niederwald 35
Figure NW.11, Historical Hurricane/Tropical Storm Paths, City of Niederwald 37
Figure NW.12, Texas Earthquakes, 1847 – 2015, City of Niederwald 40
Figure NW.13, Dams Upstream of the City of Niederwald 42
Figure NW.14, Downstream Impact Buffers and Mapped Inundation Areas, City of Niederwald 45
Figure NW.15, Wildland Urban Interface (WUI) and Reported Wildfire Ignitions, City of Niederwald 46
Figure NW.16, Mitigation Action Summary Worksheet 56

City of Niederwald Annex
Section 1: Organize and Review

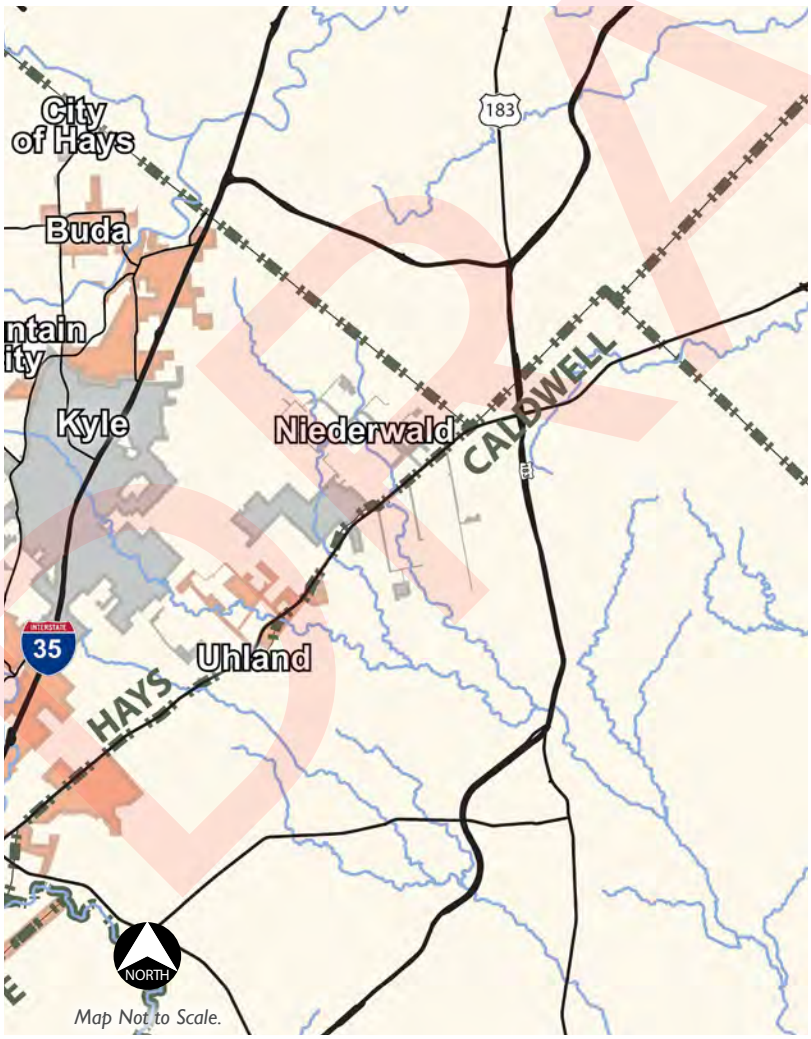
This section contains a brief description of the City of Niederwald and its jurisdictional features. In addition, Section 1 contains the following details regarding Niederwald's:

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

*Population :	399
Size of Community:	3.55 sq. miles
*Population over 65 years old	36
*Population under 16 years old	110
*Economically Disadvantaged Population ($0-$20k)	32
Niederwald is serviced by the following responders:	
Fire/EMS - Chisholm Trail Fire Rescue / ESD #1, Niederwald Volunteer Fire Department	
Law Enforcement - Hays County Sheriff's Office	

**HAZUS-MH 3.2 Updated Census 2010 Population Estimates*

Figure NW.1, City of Niederwald Planning Area



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.

Located in Hays and Caldwell Counties, Niederwald is located on Highway 21, known as the Camino Real. Niederwald faces the challenges of having to conduct business in 2 separate County jurisdictions with a small staff and limited operating budget. The community is a General Law Type A Municipality and is governed by a Mayor, Mayor Pro-tem and 4 Council Members. These officials are supported by 1 member of the City Staff, the dual-role City Administrator/Secretary.

Served by the Hays Consolidated Independent School District and Lockhart Independent School District, Niederwald has 3 subdivisions (2 of which is a mobile home community) within the City limits and is in the process of developing 6 more that will be a combination of site-built and mobile homes. The population will likely quadruple in the next 5 years,

with subdivisions making up about 40% of the community. The overall community development goal is to increase retail development by 400% and residential by 400%. There is currently only 1 convenience store and 2 restaurants that support the tax base. Outside of subdivisions, the remainder of the community is made up of approximately 40% manufactured/mobile homes, a small percentage of farmland and 10-15% of undeveloped tracts. The remainder of the community is made up of ranchettes.

Niederwald incorporated in 1987 and currently is among the communities with the most farmland in Hays County.

Niederwald's major employers are listed in Table NW.1 and major utility providers are listed in Table NW.2.

Table NW.1, Major Employers

Business Type	Name of Employer
Retail	Valero (convenience store/gas station)
Restaurant	H & Aleyda's Mexican Restaurant
Restaurant	El Camino Restaurant

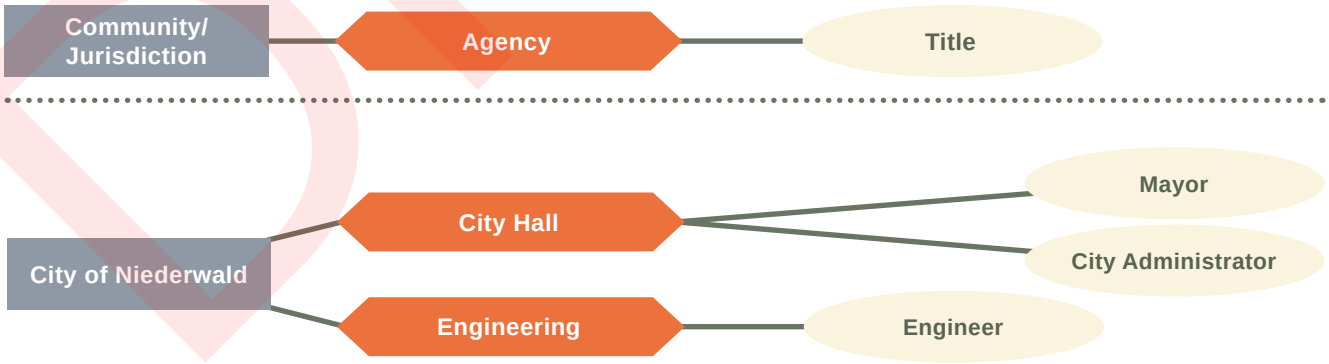
Table NW.2, Utility Providers

Type	Provider
Electric	Bluebonnet Electric Cooperative/ Pedernales Electric Cooperative (PEC)
Natural Gas	CenterPoint (only customer is the elementary school)
Water	Goforth Special Utilities District
Cable	Spectrum

Planning Committee

Planners who represented Niederwald for the update process are collectively known as the Niederwald Mitigation Planning Committee (MPC) and are shown in Figure NW.2.

Figure NW.2, Planning Committee Membership



Community Planning Involvement

MPC planning activities for the Hays County Hazard Mitigation Plan (HMP) Update are captured in Figure NW.3, which utilizes checkmarks to indicate each of the activities that were completed by the Niederwald MPC.

Figure NW.3, City of Niederwald Plan Participation

Meetings

- ✓ Kick-Off
- ✓ Risk Assessment
- ✓ Mitigation Strategy

Data Submission

- ✓ Planner's Survey
- ✓ Data Collection Spreadsheet/ GIS Data
- ✓ Planning Worksheets
- ✓ Phone Interview

Public Involvement

- ✓ City Council/Commissioner's Court Agenda Items
- ✓ Public Survey Posting/ Collection

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 NW.3 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 NW.3, Plan Stakeholders

Jurisdiction	Agency	Title
City of Niederwald	Legal	City Attorney
Pedernales Electric Cooperative	Electricity Provider	Chief Executive Officer
Bluebonnet Electric Cooperative	Electricity Provider	Chief Executive Office
Spectrum (Charter)	Cable	Government Relations Officer
Goforth Water	Water Company	General Manager
Hays Consolidated Independent School District	School District	Superintendent
Lockhart Independent School District	School District	Superintendent
Caldwell County	Emergency Services	Emergency Management Coordinator
City of Niederwald	Government	Mayor
Hays County	Emergency Management	Emergency Management Coordinator
Hays County	Sheriff's Office	Lieutenant
Chisholm Trail Fire Rescue	Fire Department/EMS	Fire Chief
Hays/Caldwell ESD #1	Emergency Services District	Fire Chief

Outreach Strategy

The City of Niederwald was very active in the outreach activities used to request the public participation in the Hays County Hazard Mitigation Plan Update.

Public Survey Promotion

Niederwald advertised the Hays County Hazard Mitigation Plan Update Public Survey on the homepage of http://niederwaldtx.com.

As of March 10, 2017, Niederwald had 0 residents respond to the public survey, this was despite the fact that the survey was advertised to the public. 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 January 23, 2017, the City Administrator presented information on the Hays County Hazard Mitigation Plan Update to the Niederwald City Council and public attendees. The Council agenda and item report for this presentation is included in Appendix A of the Hays County HMP Update.

Plan Phase Newsletters

Niederwald 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 Niederwald website from July 12, 2017 until July 26, 2017. A hard copy was placed in the City Hall. Email comments were collected by the City Administrator or written and given to City Hall.

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 NW.4 lists the documents reviewed and how they were considered for incorporation in the updated plan.

Table NW.4, 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.
City of Niederwald Ordinance 120406-B Zoning	Regulations	Reviewed to seek opportunities for mitigation enhancement. Ordinance currently includes FP designation to identify floodplains. (Niederwald, TX, 2006) Reviewed for Floodplain Reference, the ordinance includes: • Floodplain Setback Lines requiring a setback, also requires proposed lots to have at least 1 acre out of the floodplain for an unsewered lot and at least 1/2 acre out of the floodplain for a sewered lot. • It also indicates that the City Engineer may require a hydrologic/ hydraulic study to be performed by the developer's engineer and approved by the City to determine the floodplain. • It requires the 100 year floodplain to be shown on the preliminary plat and plans. (Niederwald, Tx, 2000)
City of Niederwald Ordinance 12605-A Subdivision	Regulations	Reviewed to seek opportunities for mitigation enhancement. Included • Consideration of the ordinance's "…desires to protect the creeks and waterways in the City of Niederwald and limit flooding of adjacent property." • Ordinance also establishes Critical Water Quality Zones and requires site plans consider respect to the "protection and conservation of watercourses and areas subject to flooding." (Niederwald, TX, 2006)
City of Niederwald Ordinance 71706 Site Development	Regulations	Reviewed for mitigation measures: • Adopts the standards of the City of Austin Drainage Criteria Manual • Establishes drainage easements • Regulation of peak runoff rates • Design requirements to minimize erosion • Requires runoff computations and establishes standards • Addresses stormwater conveyance and stormsewer standards Numerous other flood-related considerations are addressed. None are presented as actionable items for the plan, yet do set the standard for floodplain consideration in the community development. (Niederwald, TX, 2017)
City of Niederwald Building Permit Application	Form	Reviewed for possible enhancements/improvements to document/ process • Found necessity for clarification of floodplain review for building and need to address requirement for elevation certificates for development in the Special Flood Hazard Area.

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 NW.5.

Table NW.5, 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.	Website/Agenda Item for City Council
Evaluation	The public will be given a means to voice their opinion on the completed actions.	Website/Agenda Item for City Council
Updates	Once updates are made, the changes will be recorded in a public revision history document.	Website/Agenda Item for City Council

Maintenance

Table NW.6 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 NW.6, Hays County Hazard Mitigation Plan Maintenance Schedule, City of Niederwald

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 Niederwald, City Hall, City Administrator
Evaluation	Jurisdictional	Complete Online Planner Survey (using SurveyMonkey) with evaluation of plan process.	Every 12 months	City of Niederwald, City Hall, City Administrator
Updates	Jurisdictional	Perform updates to Mitigation Strategy to edit/add/omit actions identified during monitoring activities. 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. Participate in MPC for 5 year HMP update process.	As needed	City of Niederwald, City Hall, City Secretary

Section 2: Risk Assessment
City of Niederwald Jurisdictional Hazards

This section contains Niederwald's 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 Niederwald 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 Niederwald 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 NW.7). Although there were no drought events reported specifically for the City of Niederwald, 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 NW.7, 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 NW.7, 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 Niederwald's 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 NW.8 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 Niederwald.

Table NW.8, 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 Niederwald uses the Goforth Special Utility District for water services. The source has proven to be resilient, with little detectable impact during the drought periods occurring from 2011 to 2013. Although the community has not experienced past water availability issues associated with drought, they could experience some degree of water supply impact during an exceptional drought event. With Niederwald farmers and ranchers depending on the water supply for their livelihood, a severe drought would negatively impact their profitability.

Extreme Heat

Extreme Heat: Location

Extreme heat occurs on a regional scale; therefore, all of the City of Niederwald 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 Niederwald 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 Niederwald 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 Niederwald's 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 shown in Tables NW.9 and NW.10 (Texas Department of State Health Services - Injury Epidemiology & Surveillance Branch, 2017).

Table NW.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)

Table NW.10, 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 Niederwald'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	110
Economically Disadvantaged Population ($0-$20k)	32

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 NW11).

Table NW.11, 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

Niederwald does not have a formal cooling station plan for the community but could possibly utilize City Hall in order to cool people. A drawback to the use of City Hall is the lack of generator back-up to provide cooling if there is an electrical outage. A partnership could be pursued with Hays CISD for use of the elementary school within the City limits, in the event of disaster-level extreme heat.

Severe Winter Storms

Severe Winter Storms: Location

Severe winter storms occur on a regional scale; therefore, all of the City of Niederwald 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 NW.12). Although there were no winter storm events reported specifically for the City of Niederwald, 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 NW.12, 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 NW.12, 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 NW.12. 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 Niederwald. Since these events can happen anywhere throughout the HMP planning 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 NW.13 and NW.14.)

Table NW.13, 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 NW.14, 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 that severe winter storms can directly have on human beings, a severe winter weather event can also be the cause of cascading incidents, such as electrical outage events, 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 Niederwald's population, according to HAZUS-MH 3.2 updated Census 2010 population projections, 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 110

Economically Disadvantaged Population ($0-$20k) 32

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 NW.15).

Table NW.15, 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 Niederwald, 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 NW.16). 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 Niederwald.

Table NW.16, Severe Winter Storms, Vehicle Accidents, Hays County

City	Fatality	Incapacitating Injury	Non-Incapacitating	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 NW.16, Severe Winter Storms, Vehicle Accidents, Hays County (cont.)

City	Fatality	Incapacitating Injury	Non-Incapacitating	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 Niederwald's powerlines are on poles, this poses a vulnerability due to the impact on electricity to homes and businesses during cold temperatures when an accumulation of ice and snow on lines could cause them to be weighed down and damaged.

Although there are only 2 city streets that are under the responsibility of Niederwald for maintenance and care, the community does not currently have the resources to ensure the removal of ice from roads in the event of an exceptional severe winter storm. (Between 2017 and 2018, the City will have an additional 6-7 roads.) There is a dependence on the ability to travel over a bridge on State Highway 21 in order to reach hospitals or emergency services.

Lightning

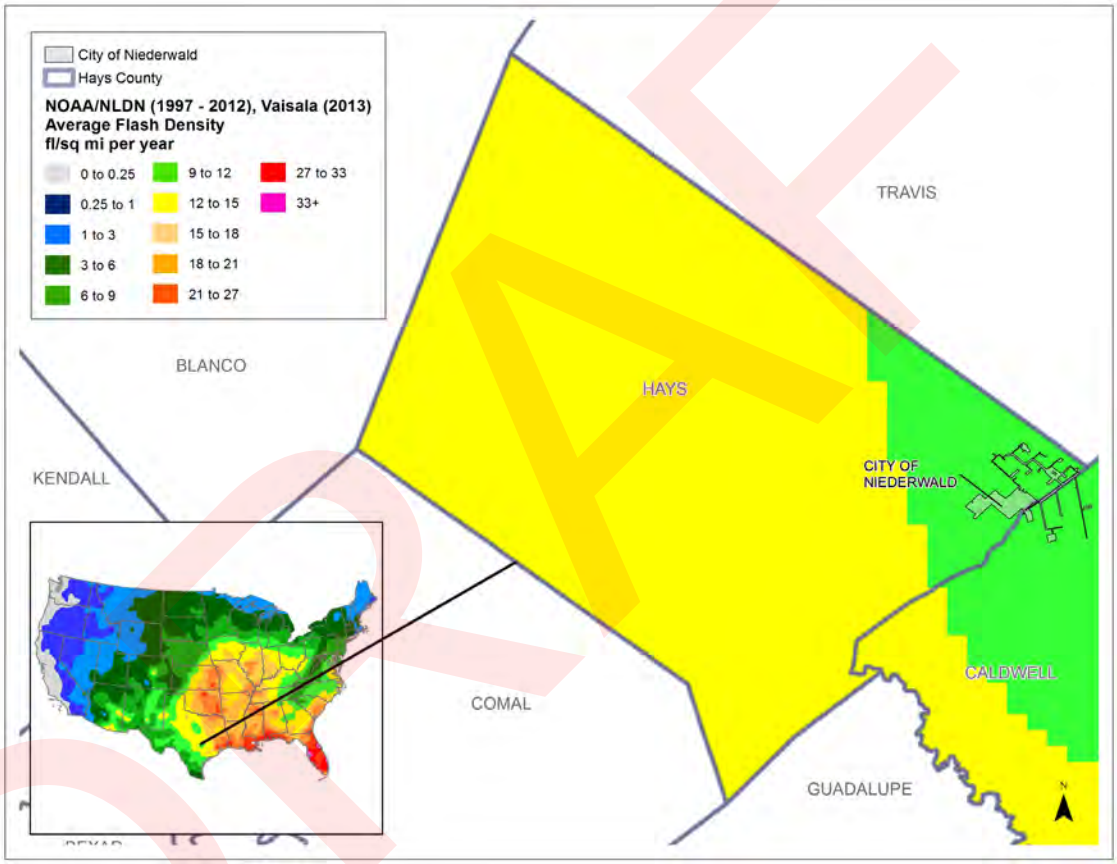
Lightning: Location

The entire extent of the City of Niederwald is exposed to some degree of lightning hazard. Since lightning can occur at any location, lightning events could be experienced anywhere within the planning area.

Lightning: Previous Occurrences

Figure NW.4 reflects the City of Niederwald 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 NW.4, Average Annual Lightning Density, City of Niederwald



(Vaisala NLDN, 2016)

Lightning: Extent

Due to the lack of reported occurrences, there is not sufficient data to determine the maximum Lightning Activity Levels (LAL) for the planning area (refer to Chapter 2 for a description of the lightning extent scale LAL Grids.) However, with the data available, the extent of lightning events that the City of Niederwald has experienced can be derived from the NOAA/NLDN data seen in Figure NW.4. There were up to 9 to 12 strikes per square mile per year within the City of approximately 3.55 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 NW.4, the City of Niederwald 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 NW.17).

Table NW.17, 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 Niederwald's 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	110
Economically Disadvantaged Population ($0-$20k)	32

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 NW.18).

Table NW.18, 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
Severe Thunderstorms	2008	8/3/2008	1:30 a.m.	8/3/2008	Entergy Corporation	Mississippi, Louisiana, Texas	59,500

Table NW.18, Lightning Affecting Electrical Availability (cont.)

Event Description	Year	Start Date	Start Time	End Date	Respondent	Location	Customers Affected
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.

Lightning: Vulnerability Summary

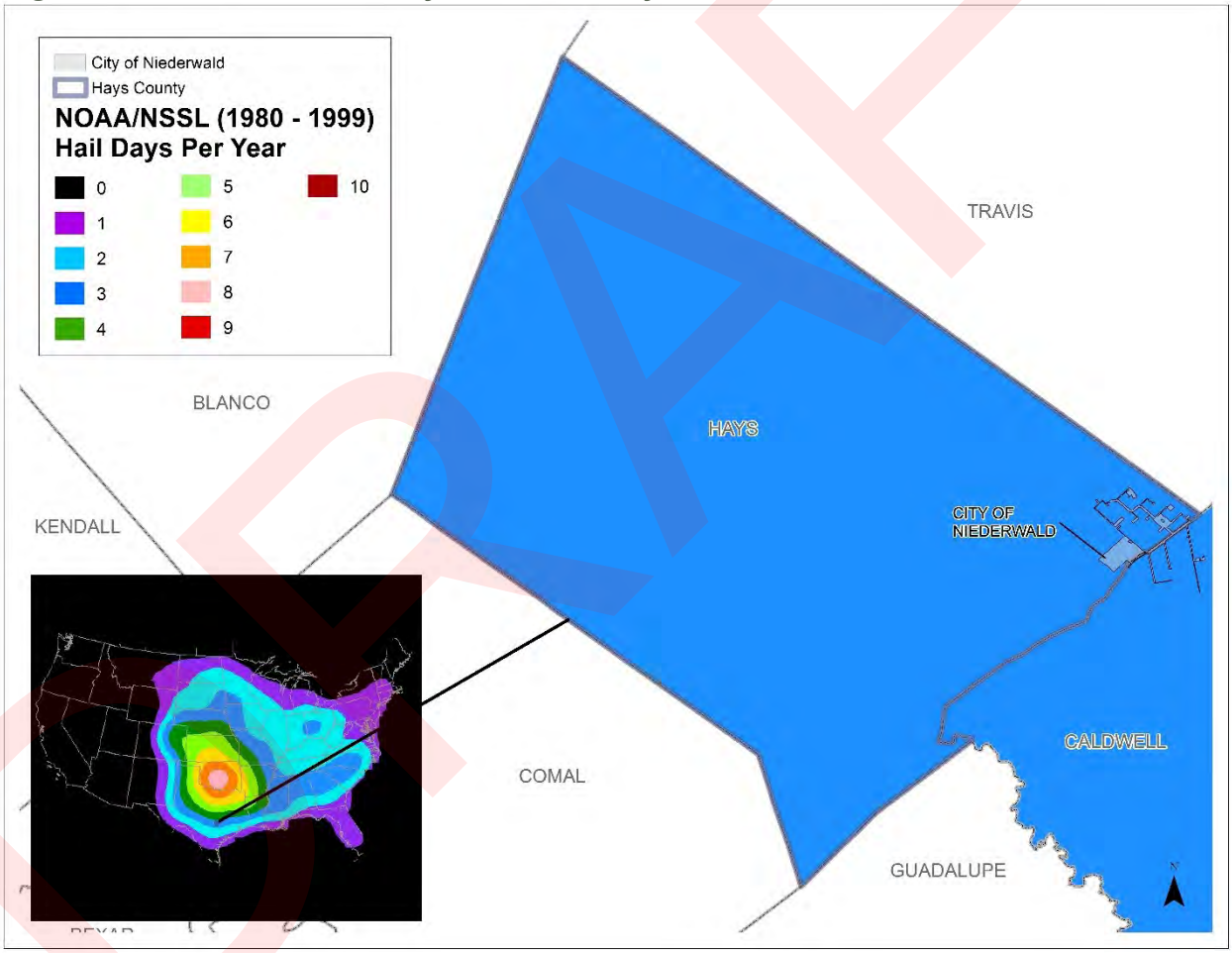
Niederwald is a community with undeveloped tracts that can develop large amounts of brush that could become vegetative fuel that ignites due to lightning strike. Due to the intermingling of residences with undeveloped areas, there is a risk to structures and those who reside within them. Periods of drought can also increase the dryness of the vegetation, also increasing the chance of ignition during lightning strikes.

Hailstorms

Hailstorms: Location

The entire extent of the City of Niederwald is exposed to some degree of hail hazard. Since hail can occur at any location, hail events could be experienced anywhere within the planning area. NOAA's National Severe Storms Laboratory used historical data from 1980 to 1999, to estimate the daily probability of hail occurrences of at least 0.75-inch diameter hail across the U.S. Figure NW.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 NW.5, National Hail Days Per Year, City of Niederwald



(National Severe Storms Laboratory, 2016)

Hailstorms: Previous Occurrences

According to the NOAA Storm Events Database, there was 1 documented hail event listed for the City of Niederwald and 57 documented events listed for Hays County and its unincorporated jurisdictions from year 1967. While the NOAA Storm Events Database lists events since the year 1967 for the County, events were not documented per jurisdiction until 1993. The hail event reported for the City of Niederwald is shown in the Table NW.19.

Fatality, injury and damage amounts are shown in Table NW.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 NW.19, Hail Occurrences, City of Niederwald

Location	Date	Type	Extent (mm)	Fatalities	Injuries	Property Damage	Crop Damage
NIEDERWALD	5/27/1996	Hail	44.45	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 1.75 inches, or 44.45 millimeters, in diameter, corresponding to a TORRO Hailstorm Intensity Scale classification of "Destructive." Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for hail extent scale descriptions.

Hailstorms: Probability

Figure NW.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 1 reported events in 23 years, the City of Niederwald can expect a hail event approximately once every 23 years on average in the future with hail up to 1.75 inches, or 44.45 millimeters in diameter, TORRO Hailstorm Intensity Scale classification of "Destructive."

Number of Reported Events	Number of Years in Dataset	Probability
1	23	0.04

Hailstorms: Impact

Although there are no specific occurrences for which hailstorm damages are captured, based on the maximum hail extent experienced (44.45 millimeters), 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

Hailstorms: Vulnerability Summary

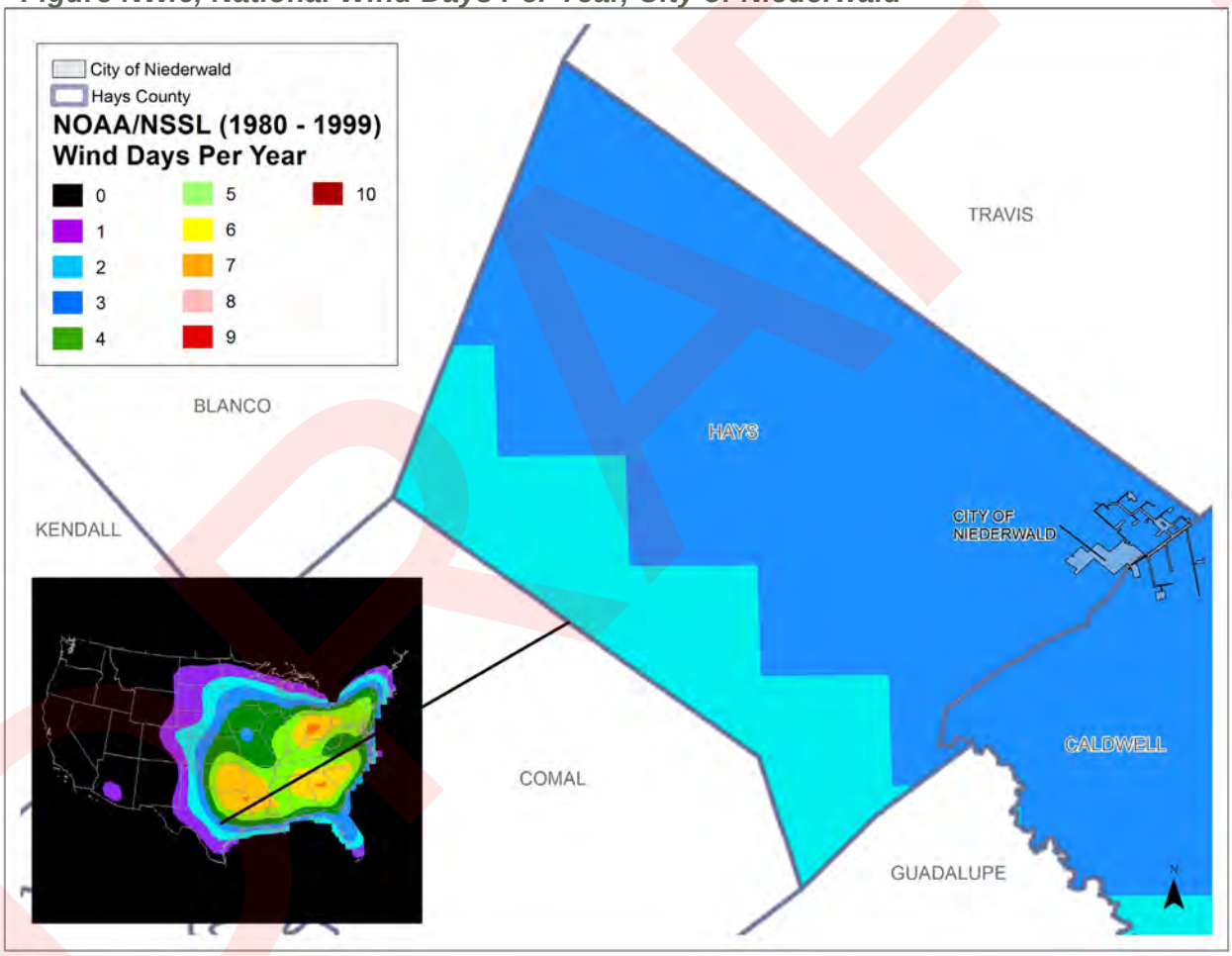
Although the City has not experienced significant damage to public property due to hail stones, the City Hall could be susceptible to hail. City Hall is currently a modular building with a metal roof.Besides a zero turn mower, there are no other vehicles or equipment that need protecting. Future purchases of equipment is likely, as development continues. The City will consider storage options for these purchases as they are made.

Windstorms

Windstorms: Location

The entire extent of the City of Niederwald 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 to 1999 to estimate the daily probability of wind occurrences across the U.S., with gusts of at least 58 mph. Figure NW.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 NW.6, National Wind Days Per Year, City of Niederwald



(National Severe Storms Laboratory, 2016)

Windstorms Previous: Occurrences

According to the NOAA Storm Events Database, there were 2 documented wind events listed for the City of Niederwald and 38 documented events listed for Hays County and its unincorporated jurisdictions since the year 1974. While the NOAA Storm Events Database lists events since 1974 for the County, events were not documented per jurisdiction until 1994. The wind events reported for the City of Niederwald are shown in Table NW.20.

Fatality, injury and damage amounts are shown in Table NW.20, 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 NW.20, Reported Wind Events, City of Niederwald

Location	Date	Type	Extent (knots)	Fatalities	Injuries	Property Damage	Crop Damage
NIEDERWALD	4/2/2013	Thunderstorm Wind	43 kts. EG	0	0	500.00	0.00
NIEDERWALD	6/13/2013	Thunderstorm Wind	43 kts. EG	0	0	5,000.00	0.00
Total				**0**	**0**	**$5,500.00**	**$0.00**

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 43 knots (Beaufort Wind Scale Classification: Strong Gale). Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of wind extent scales.

Windstorms: Probability

Figure NW.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 2 reported events in 22 years, the City of Niederwald can expect a wind event of up to 43 knots approximately once every eleven years on average in the future (Beaufort Wind Scale Classification: Strong Gale).

Number of Reported Events	Number of Years in Dataset	Probability
2	22	0.09

Windstorms: Impact

Although there were no reports specifically for the City of Niederwald, 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 Niederwald (see Table NW.21).

Table NW.21, Windstorms, Vehicle Accidents, Hays County

City	Fatality	Incapacitating Injury	Non-Incapacitating	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

Niederwald has previously experienced debris accumulation on roadways during past windstorm events. Such incidents can cause impact on the ability of public safety officials to access emergency calls.

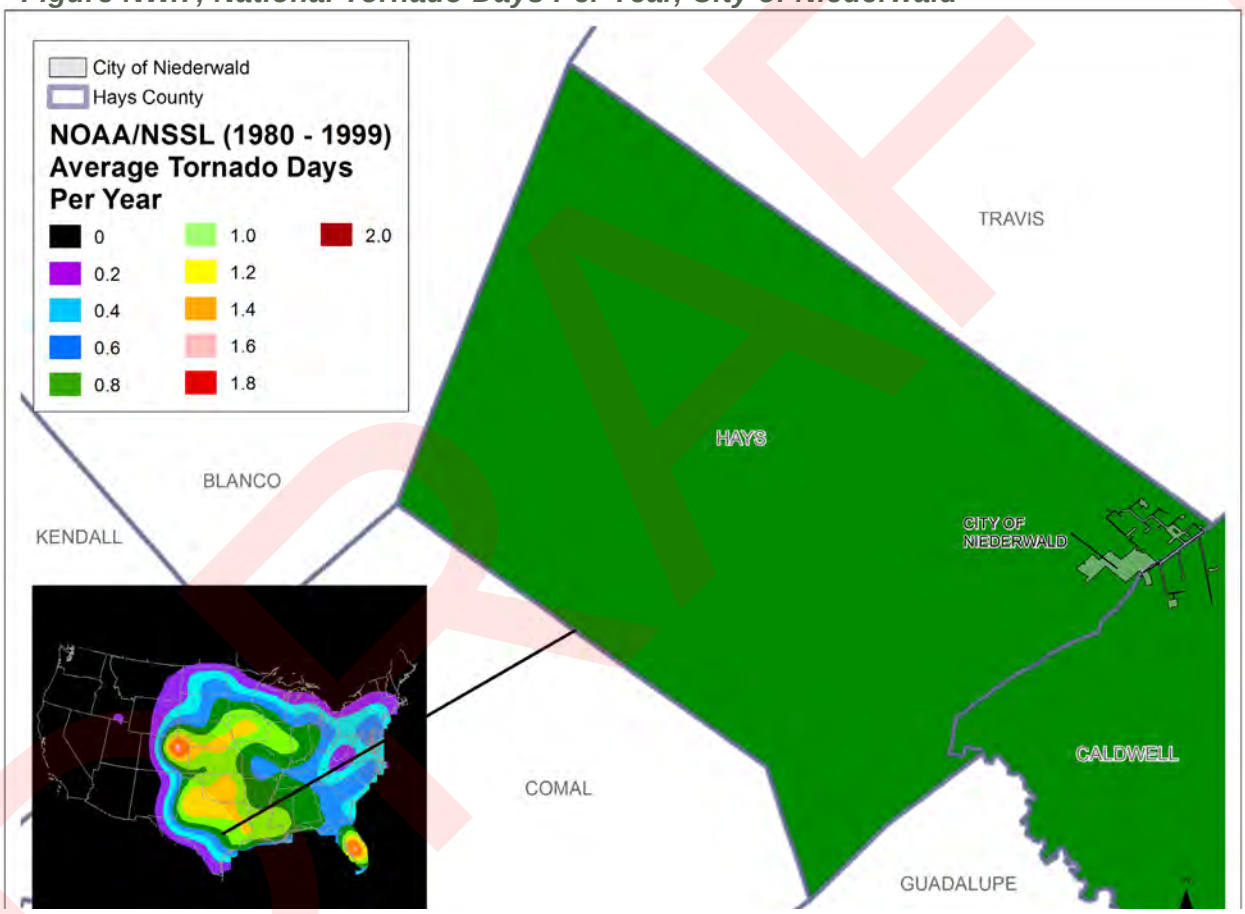
In addition, drivers swerving to avoid debris in the road could damage their vehicles or experience physical harm during a collision. There are not many trees in the community however other loose items or non-permanent structures could be at risk. Modular buildings, manufactured and mobile homes make up approximately 40% of the structures within Niederwald. These structures are more vulnerable to wind damage than site-built structures.

Tornadoes

Tornadoes: Location

The entire extent of the City of Niederwald 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 to 1999 to estimate the daily probability of tornado occurrences across the U.S., regardless of tornado magnitude. Figure NW.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 NW.7, National Tornado Days Per Year, City of Niederwald



(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 Niederwald 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 NW.22 lists the 16 tornado events reported for Hays County and its unincorporated jurisdictions since the year 1953.

Fatality, injury and damage amounts are shown in Table NW.22, 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 NW.22, 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
Mt. Gainor	5/23/2015	Tornado	EF0	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 NW.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 planning area, the City of Niederwald's 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, with up to an F3 magnitude.

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

Tornadoes: Impact

The City is comprised of approximately 40% factory-built housing to include modular, manufactured and mobile homes. Due to their permanent attachment to a chassis and transportability, these structures are more susceptible from impact from the extreme conditions caused by a tornado event.

There is not specific event data available for the City of Niederwald, 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 to greatest severity):

- 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

As approximately 40% of the structures in the community are modular, manufactured and mobile homes, the vulnerability to these residents is higher than those who reside in site-built structures if a tornado event were to occur.

There are no outdoor warning sirens, nor are there designated structures that can house residents that wish to seek shelter from severe tornado conditions. In addition, there is not a locally-run system or tool that can be utilized to contact residents with emergency notifications or information. Coordination can be made to use County reverse-9-1-1 and other communication resources available.

Expansive Soils

Expansive Soils: Location

Areas within the City of Niederwald 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 state or national datasets found.

Expansive soils cannot be documented as a time-specific event, except when they lead to structural and infrastructure damage. There are no specific damage reports or historical records of events in the City, beside the community testimony that was offered without data. These accounts can be used for vulnerability summary purposes, however the lack of data for these instances does not allow for the incorporation of this information for the extent and probability determinations.

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), over 50% of the City of Niederwald is underlain with soils with abundant clays of high swelling potential.

Expansive Soils: Probability

When using State and Federal datasets as the basis for calculations, the probability of a future event is low, (unlikely in next 10 years) for the planning area. However, local community testimony indicates that the instances of expansive soils are frequent and that the effects are evident throughout the community. With this in mind, the probability of events occurring within the planning area is more accurately reported as high (likely in next 10 years).

Expansive Soils: Impact

The large areas of expansive soils within the Niederwald City Limits puts the structures and infrastructure within the community at risk to the damage caused by the hazard. The impact includes the cracking of foundations, the shifting of homes and the potential damage to modular, manufactured and mobile home structures.

Expansive Soils: Vulnerability Summary

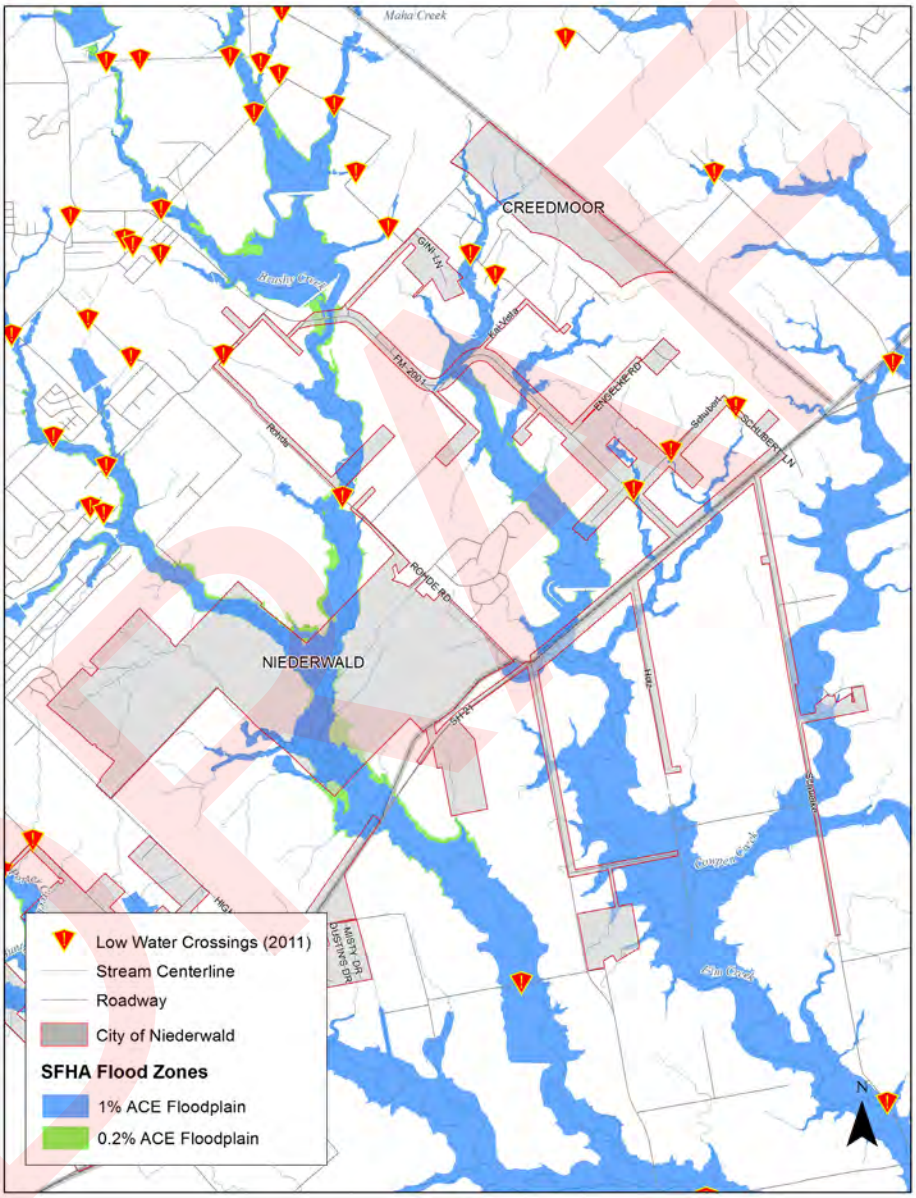
The large amount of development expected in Niederwald, estimated to be a 400% increase within the next 5 years, necessitates the assurance of responsible development within the planning area, so as to reduce the amount of impact to the structures that are built within expansive soils areas. The City promotes mitigation thorugh requiring foundation designs that are based on geotechnical survey data.

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 Niederwald are shown in Figure NW.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 NW.23 provides the total acreage in the jurisdiction that is located in the 1% and 0.2% floodplains.

Figure NW.8, Special Flood Hazard Areas and Low Water Crossings, City of Niederwald



(Texas Natural Resources Information System, 2011)

Table NW.23, City of Niederwald Floodplain Acreage

Jurisdiction	100yr (1%) Floodplain Acres (Includes Floodway)	500yr (0.2%) Floodplain Acres (Includes 100yr)
City of Niederwald	393	449

Floods: Previous Occurrences

According to the NOAA Storm Events Database, there was 1 documented flood events listed for the City of Niederwald and 69 documented events listed for Hays County since the year 1997. While NOAA Storm Events Database lists events since 1997 for the County, events were not documented per jurisdiction until 2004. The flood event reported for the City of Niederwald is shown in Table NW.24.

Fatality, injury and damage amounts are shown in Table NW.24, 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 NW.24, Flood Events, City of Niederwald

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
Niederwald	2/4/2012	Flash Flood	0	0	0.00	0.00

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

Floods: Extent

Flood extent is described by a combination of ground elevation, river heights, 100 year Water Surface Elevations (WSE's) and HAZUS depth grids. An example of flooding within the jurisdiction is the area along Brushy Creek downstream of its confluence with a tributary, in the southern part of the jurisdiction. This area is exposed to some of the greatest flood extents. This location has an approximate overbank ground elevation of 548 feet with an intersecting 100 year WSE of 552 feet. For a 100 year event, water depth of approximately 4 feet can be expected within this area. A further analysis of the Brushy Creek is described below.

With Brushy Creek having an approximate normal in-channel elevation of 537 feet (per Light Detection and Ranging [LiDAR] data/through the community area mentioned above) and an intersecting 100 year WSE of approximately of 552 feet, flood depths would be up to 15 feet. Such an event is categorized as a "Flood Stage." Refer to the Water Depth Extent Scale in Chapter 2 (the Risk Assessment portion of the Hays County HMP Update).

Floods: Probability

Probability has been calculated on the basis of NOAA reported events, as a standard, consistent calculation method for all hazards profiled with the Hays County HMP. Based on 1 reported event in 12 years, the City of Niederwald can expect a flood event approximately once every 12 years on average in the future with flood water depths in the category of "Flood Stage."

Number of Reported Events	Number of Years in Dataset	Probability
1	12	0.08

Floods: Impact

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

Niederwald Building Counts			
Residential	Commercial	Other	Total
134	7	2	143

Niederwald Building Replacement Value		
Building ($)	Content ($)	Total ($)
23,931,397	13,751,357	37,682,753

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 where 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 about 2 buildings will be at least moderately damaged in Niederwald. "At least moderately damaged" is defined by HAZUS as greater than 10% damage to a building. For this scenario, only residential buildings were at least moderately damaged.

Residential Buildings	Commercial Buildings	Other Buildings	Total Buildings
2	0	0	0

Building Related Losses

Exposed Value is the total building and content values for structures within the community. The exposed value for the community is $37,682,753. The total building related losses were $41,000 for this scenario. This represents 0.10% of the total replacement value of the community. Loss values are divided into building and content loss dollars.

Building Loss ($)	Content Loss ($)	Total Loss ($)
28,000	13,000	41,000

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 100.0% 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 1 ton 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 1 person will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 0 people will seek temporary shelter in public shelters.

Floods: Vulnerability Summary

As many of the homes in the community were built or placed before adoption of the flood damage prevention ordinance, there are many Pre-FIRM (structures built before the adoption of FEMA Flood Insurance Rate Maps) homes that are more vulnerable than those that were built within the standards of the ordinance. According to community verbal testimony (accounts used for vulnerability summary purposes, however the lack of data for these instances does not allow for the incorporation of this information for the extent and probability determinations, when NOAA reports are utilized), minimal flood damage was experienced to City property in 2015 when the only convenience store in the community experienced flooding. Impacts to this store affect not only the community access to fuel and groceries, but also decreases the tax revenue earned for the period of closure.

Additionally, verbal testimony indicated that flooding has impacted the State-owned Highway 21 bridge, which was washed out as a result. There was an alternate route that members of the community and those passing through could utilize, but the routing through a residential area was inconvenient. The detouring of traffic through this area was also harmful to the residential streets because of the large trucks that passed through.

National Flood Insurance Program Repetitive Loss (RL)

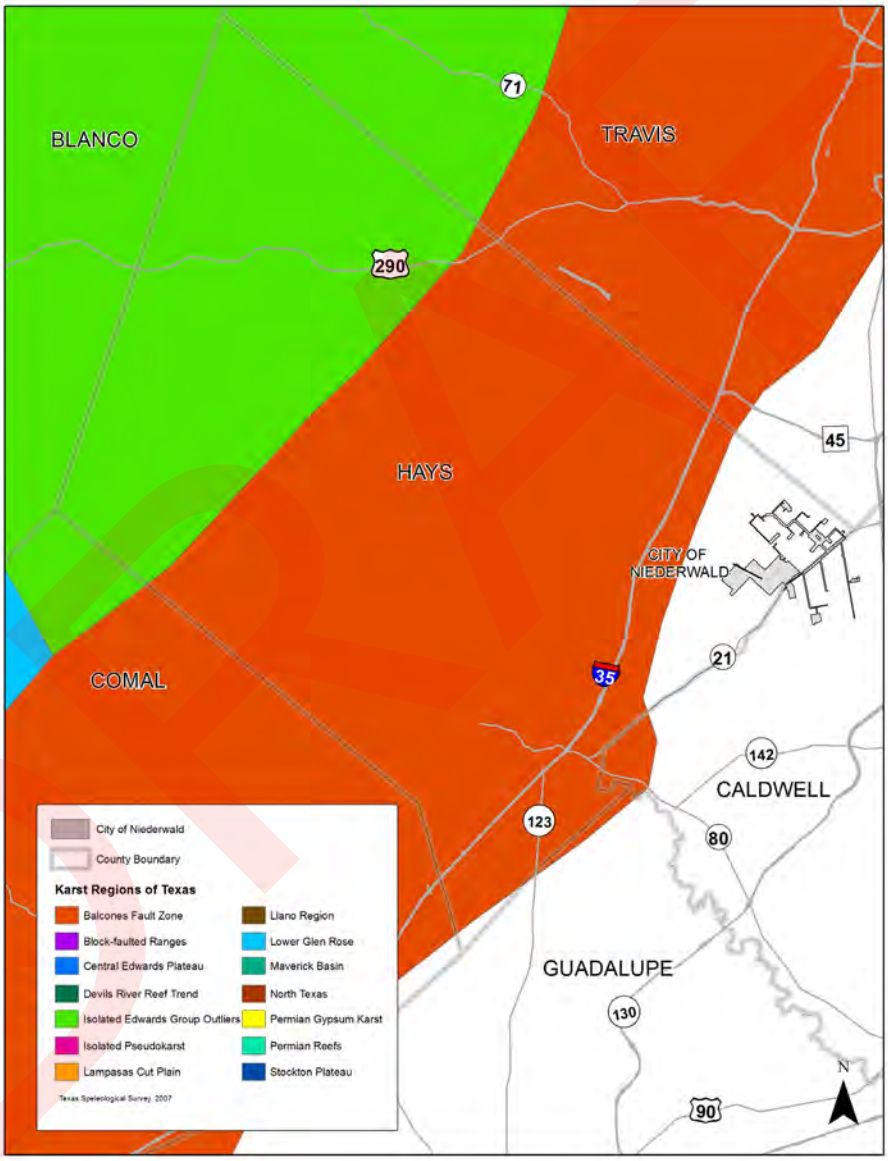
The City of Niederwald is a current participant in the National Flood Insurance Program (NFIP). As of September of 2016, the City of Niederwald does not have any listed RL or SRL properties according to FEMA RL/SRL data.

Land Subsidence

Land Subsidence: Location

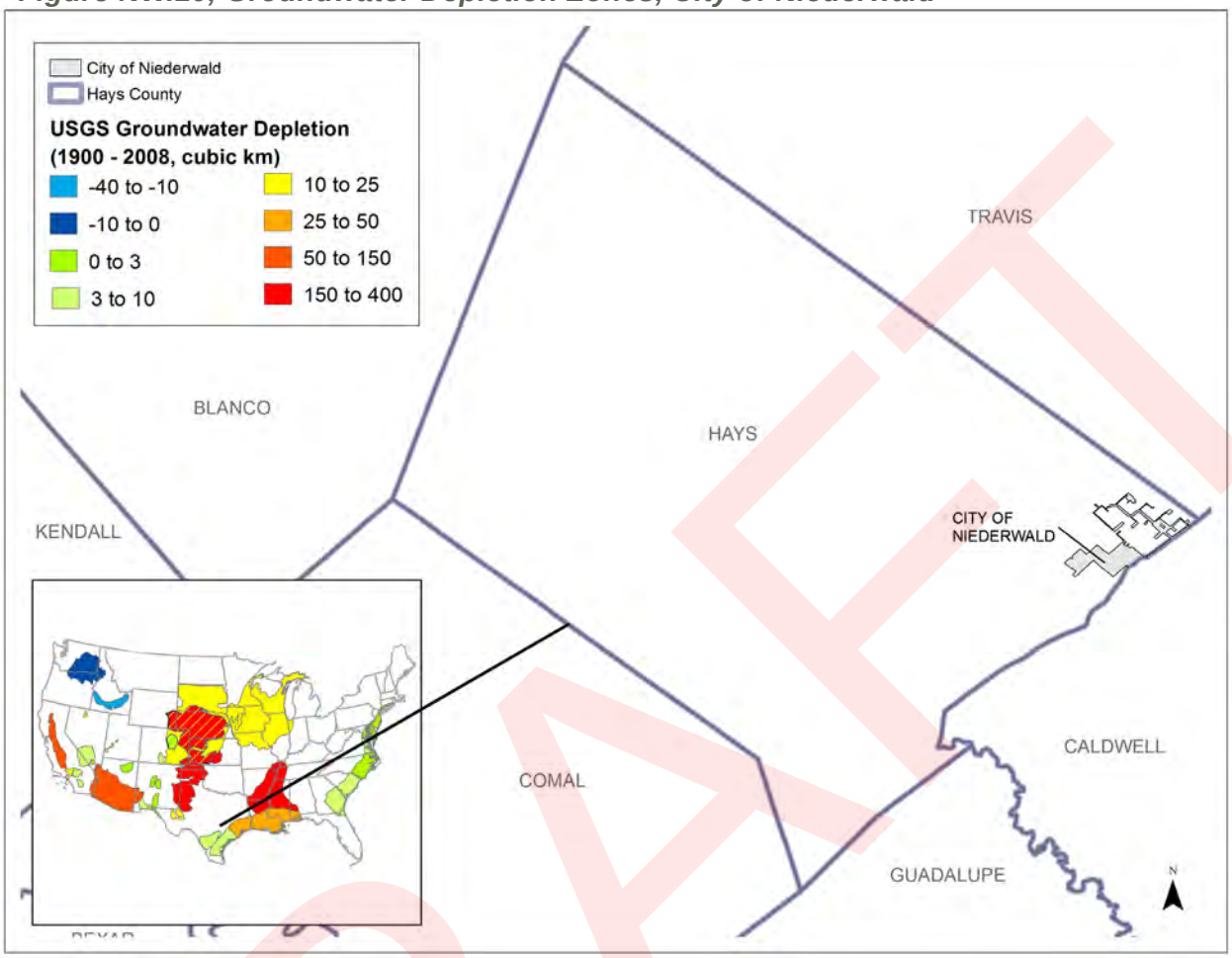
Karst features are a landscape formed from the dissolution of soluble rocks, such as limestone, that can cause sinkholes and caves. Locations within Niederwald that are underlain by karst features or that are experiencing extensive groundwater depletion, are most at risk. Figures NW.9 and NW.10 illustrate the City of Niederwald's location in conjunction with the karst regions of Texas and USGS Groundwater Depletion Zones. As seen in these figures, the City is not within a karst region or documented USGS groundwater depletion area. Therefore, if a land subsidence event were to occur, however unlikely, the entire jurisdiction is equally at risk.

Figure NW.9, Karst Regions of Texas, City of Niederwald



(Texas Speleological Survey, 2007)

Figure NW.10, Groundwater Depletion Zones, City of Niederwald



(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 Niederwald. As the data displayed in Figure NW.10 illustrates, the HMP planning area does not have a significant history of groundwater depletion.

Land subsidence can occur in the Central Texas Hill County Area. Recently, a small event occurred in Travis County (located ~ 15 miles northwest 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 condition 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 could be assumed it would be similar in extent to previous events in the region. 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 Figures NW.9 and NW.10, the entire City of Niederwald is not located within a known karst region and has no documented history of subsidence. Therefore, 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. However, the City of Niederwald is not in a karst zone, but could still be affected by a sinkhole or land subsidence event as a result of unnatural events. For example, water main breaks can erode the subsoil and cause the ground above to collapse. This could cause damage to the structures above or near the collapse area.

Land Subsidence: Vulnerability Summary

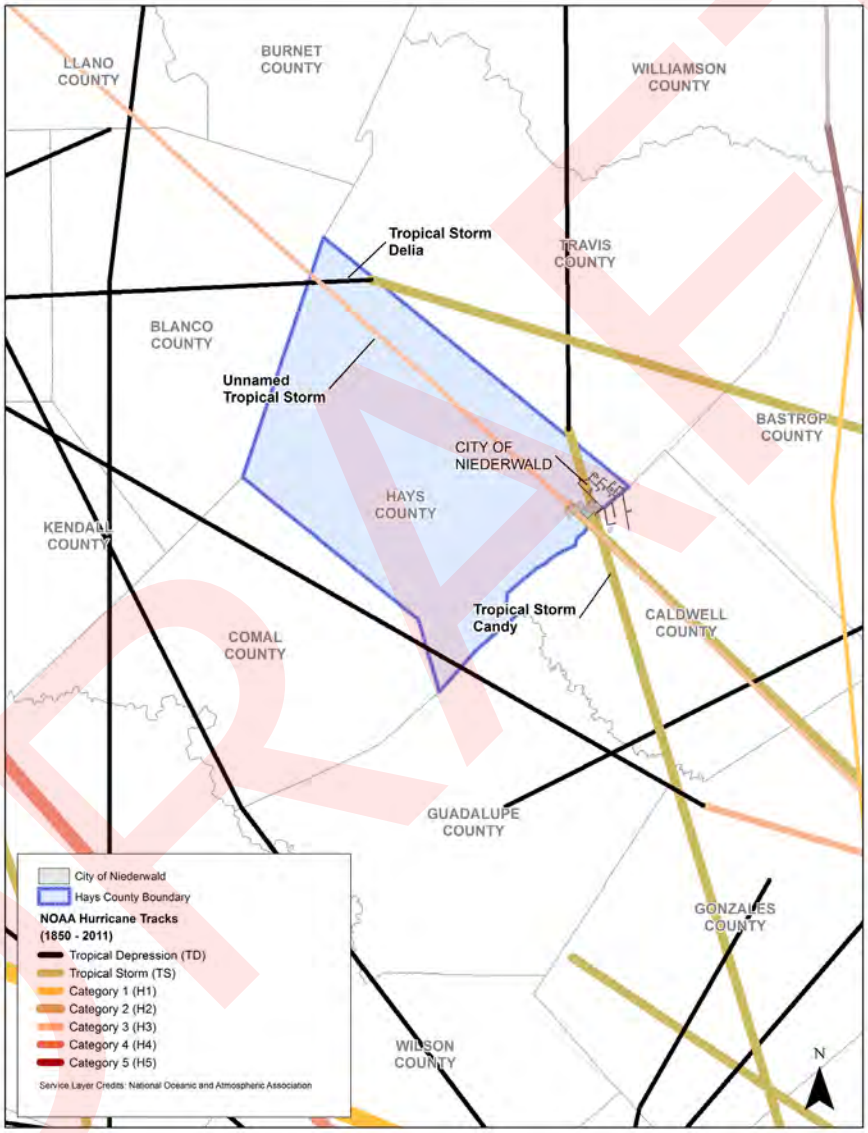
Although the areas within the city limits are not near the escarpment or a karst zone, the erosion of subsoil could impact structures and infrastructure. The future growth and development of residential and retail outlets in areas that were previously undeveloped could result in unexpected risk.

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 Niederwald is equally exposed to a hurricane or tropical storm. Figure NW.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 NW.11, Historical Hurricane/Tropical Storm Paths, City of Niederwald



(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 Niederwald.

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 I-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 planning area, the City of Niederwald's 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	75

Hurricanes/Tropical Storms: Impact

A Probabilistic 100-year Return Period HAZUS-MH 3.2 analysis was run on the participating communities. The following describes the results of this analysis.

HAZUS-MH Results

General Building Stock Damage

The total property damage losses were $156,245. The majority of damage can be expected to impact residential areas (98%). The remaining damages (2%) are for commercial, industrial, agricultural 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 values 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 ($)	Total Loss ($)
37,682,753	156,245	66	156,311

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 100.0% 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 13 tons. 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. While there is an estimation of over $156,000 in property damages expected, it is aforementioned that “no buildings would be completely destroyed or experience severe damage.” Residents would likely remain in their homes as damages were repaired, therefore no temporary shelter is needed.

Hurricanes/Tropical Storms: Vulnerability Summary

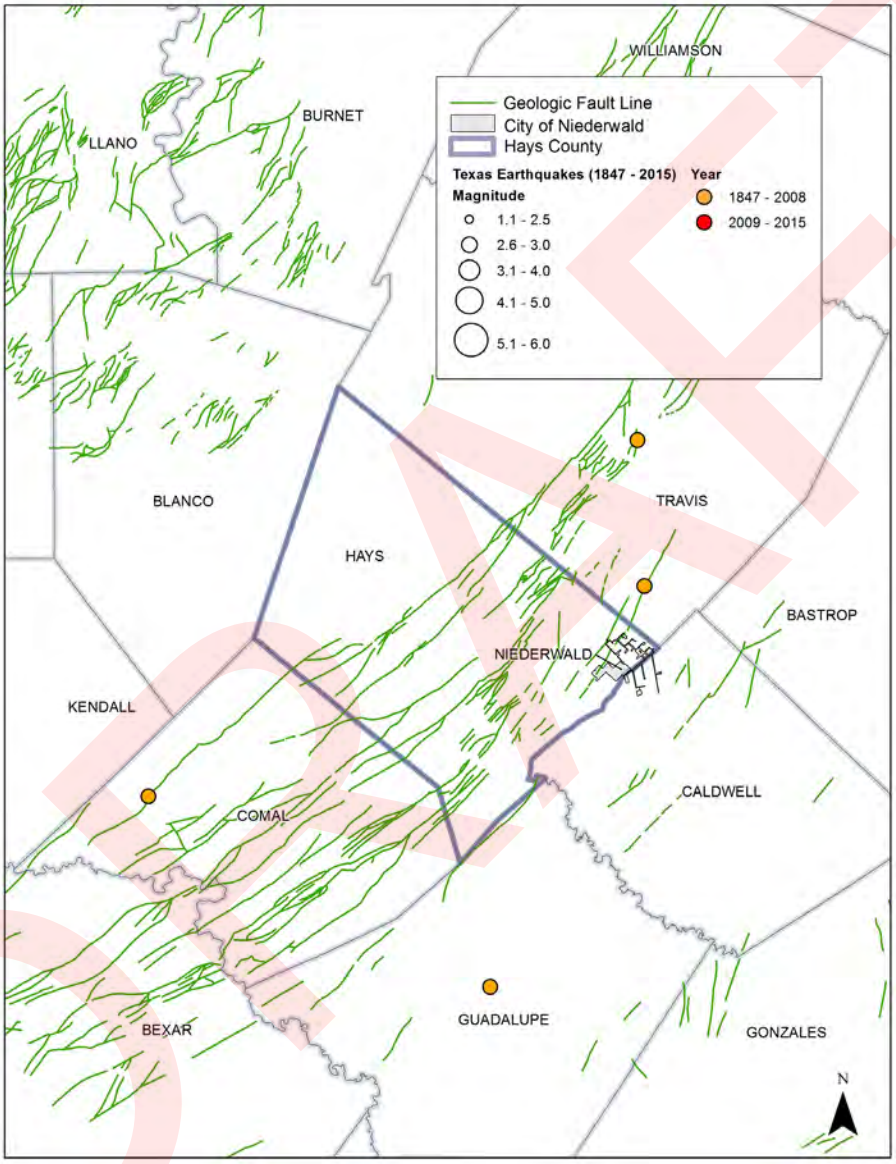
Similar to the impacts of windstorms, hailstorms, and lightning, Niederwald can expect to be impacted with debris and possible interruptions of critical infrastructure. In addition, the community’s proximity to IH 35 and State Highway 21 could lead to traffic delays caused by major coastal evacuation efforts.

Earthquakes

Earthquakes: Location

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

Figure NW.12, Texas Earthquakes, 1847 – 2015, City of Niederwald



(USGS Earthquake Hazard Program, 2015)

Earthquakes: Previous Occurrences

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

Earthquakes: Extent

The HAZUS Peak Ground Acceleration (PGA) for the planning area is 1.59% (see 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 Niederwald and the PGA is Less than 2% for the area, the probability of an earthquake for the City in the future is low (unlikely within the next 10 years).

Number of Events Reported	Number of Years in Dataset	500yr PGA %
0	170	1.59

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 measures 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 1.59%. 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 was 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 causalities or fatalities from this event.

Earthquakes: Vulnerability Summary

While the probability of an earthquake in Niederwald is low, with no significant prior events on file, there are fault lines within the community that could cause impact if there were to be an increase in seismic activity in the area. There are 3 fault lines located within the jurisdiction according to USGS data. Niederwald 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 NW.12: FM 2001, Rhode Road, and Gini Lane.

Pages 42-45, Dam/Levee Failure have been redacted from this copy of the plan.

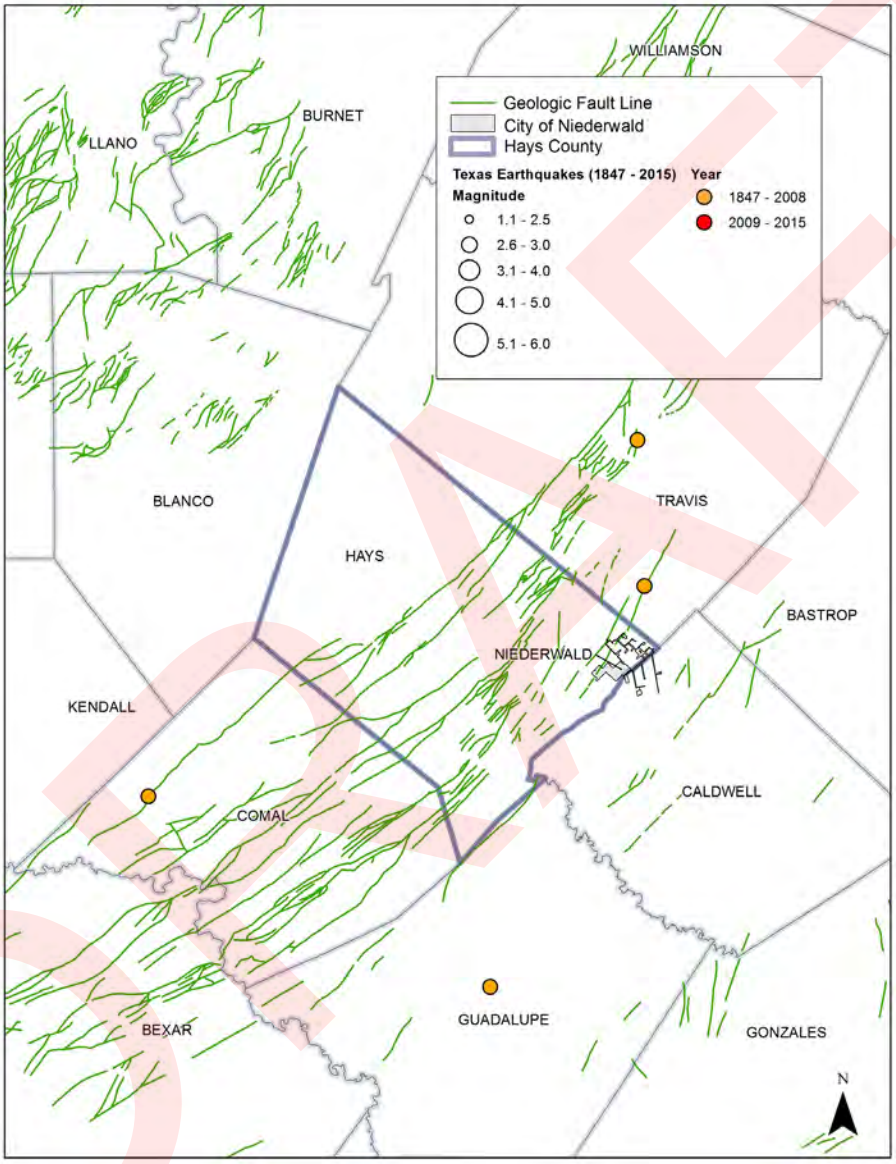
Pages 42-45, Dam/Levee Failure have been redacted from this copy of the plan.

Earthquakes

Earthquakes: Location

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

Figure NW.12, Texas Earthquakes, 1847 – 2015, City of Niederwald



(USGS Earthquake Hazard Program, 2015)

Earthquakes: Previous Occurrences

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

Earthquakes: Extent

The HAZUS Peak Ground Acceleration (PGA) for the planning area is 1.59% (see 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 Niederwald and the PGA is Less than 2% for the area, the probability of an earthquake for the City in the future is low (unlikely within the next 10 years).

Number of Events Reported	Number of Years in Dataset	500yr PGA %
0	170	1.59

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 measures 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 1.59%. 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 was 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 causalities or fatalities from this event.

Earthquakes: Vulnerability Summary

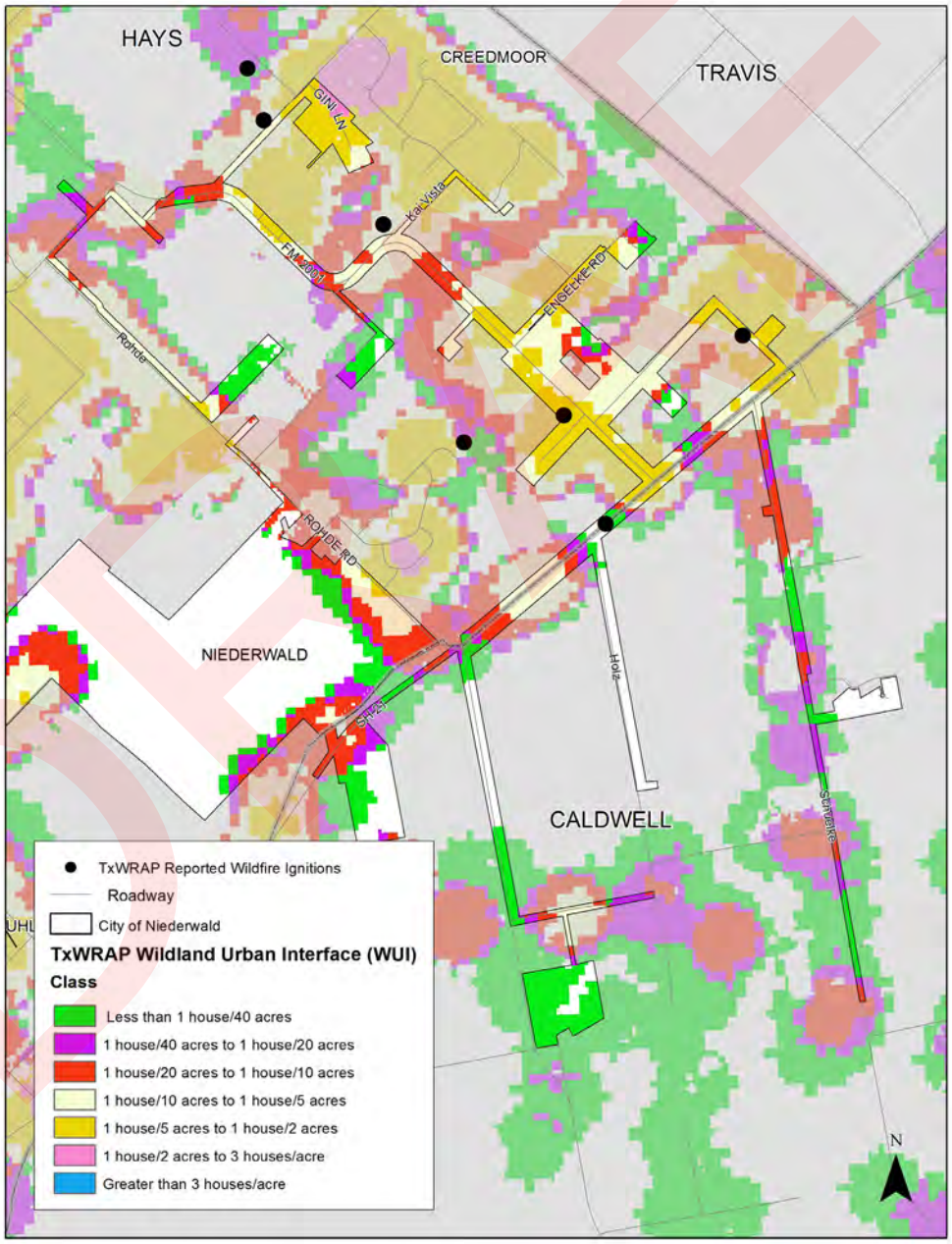
While the probability of an earthquake in Niederwald is low, with no significant prior events on file, there are fault lines within the community that could cause impact if there were to be an increase in seismic activity in the area. There are 3 fault lines located within the jurisdiction according to USGS data. Niederwald 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 NW.12: FM 2001, Rhode Road, and Gini Lane.

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 NW.15 below shows the location of TxWRAP's documented wildfire occurrences with Wildland Urban Interface (WUI) classifications within the City of Niederwald. 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 NW.15, Wildland Urban Interface (WUI) and Reported Wildfire Ignitions, City of Niederwald



(Texas A&M Forest Service, 2016)

Wildfires: Previous Occurrences

Table NW.26 shows the reported wildfire ignitions within the City of Niederwald according to TxWRAP and USGS Federal Fire Occurrence data from the years 1980 to 2015.

Table NW.26, Wildfire Ignitions, City of Niederwald

FPA ID	Date	Fire Size (Acres)
SFO-TX01430601-35766411	8/2/2001	50
SFO-TX02240706-30061	2/12/2006	75
SFO-TX02240706-26597	2/12/2006	110

Wildfires: Extent

Table NW.27 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 NW.27, TxWRAP Fire Intensity Acreage, City of Niederwald

Class	Acres	Percent
Non-Burnable	561	27.20%
1 (Very Low)	30	1.40%
1.5	38	1.80%
2 (Low)	6	0.30%
2.5	140	6.80%
3 (Moderate)	1,282	62.10%
3.5	6	0.30%
4 (High)	0	0.00%
4.5	0	0.00%
5 (Very High)	0	0.00%
Total	685	100.0 %

Wildfires: Probability

Based on 3 reported events in 35 years, the City of Niederwald can expect a wildfire event approximately once every 11 to 12 years on average in the future with up to a potential fire intensity of 3.5, or "Moderate" classification on the TxWRAP Characteristic Fire Intensity Scale.

Number of Reported Events	Number of Years in Dataset	Probability
3	35	0.09

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 NW.28 below lists the population, percent of total population, WUI acreage and percent of WUI acreage for the City of Niederwald, according to the Texas A&M Forest Service TxWRAP Community Summary Report. See Figure NW.15 for the location of WUI areas within the jurisdiction.

Table NW.28, WUI Acreage, City of Niederwald

Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	3	0.5 %	202	17.7 %
1hs/40ac to 1hs/20ac	11	1.7 %	121	10.6 %
1hs/20ac to 1hs/10ac	81	12.5 %	217	19.1 %
1hs/10ac to 1hs/5ac	231	35.5 %	330	29.0 %
1hs/5ac to 1hs/2ac	280	43.1 %	254	22.4 %
1hs/2ac to 3hs/1ac	44	6.8 %	13	1.2 %
GT 3hs/1ac	0	0.0 %	0	0.0 %
Total	650	100.0 %	1,136	100.0 %

Wildfires: Vulnerability Summary

Most of the fires that have been experienced recently within the Niederwald City limits have been grass fires that have not impacted life or structures. However, there is a risk resulting from the lack of trash service in the community. While contracts are being pursued, trash is typically burned. The burning within the City limits increases the risk of fires that could spread out of control and impact parts of the community that have large amounts of brush. The intermingling of residences with undeveloped tracts of land increases this risk. There is a limited number of hydrants with a limited volume of water available for fire supression. Hays/Caldwell ESD #1 transport water to each fire event within Niederwald and supplement their efforts with existing hydrants, and groudwater.

Risk Ranking Result

On January 12, 2017, planning representatives from the City of Niederwald 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 Niederwald are shown below (hazard values shown from highest risk to lowest):

Ranking Order	Hazard	Risk Ranking Value
1	Floods	81.6 (ranking tied for #1)
2	Wildfire	81.6 (ranking tied for #1)
3	Expansive Soils	81.6 (ranking tied for #1)
4	Drought	77.8
5	Extreme Heat	75.0
6	Tornadoes	58.1
7	Dam/Levee Failure	44.1
8	Sever Winter Storms	37.5
9	Hail Storms	33.8 (ranking tied for #9)
10	Wind Storms	33.8 (ranking tied for #9)
11	Lightning	33.8 (ranking tied for #9)
12	Earthquakes	30.0 (ranking tied for #12)
13	Land Subsidence	30.0 (ranking tied for #12)
14	Hurricanes/Tropical Storms	30.0 (ranking tied for #12)

Section 3: Mitigation Strategy

This section examines the community's ability to perform mitigation (review of existing capabilities, shown in Table NW.29) 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 NW.29, 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 Administrator	City Staff	Support for implementation of mitigation actions.
Engineer/Floodplain Administrator	Consultant	Expertise in structural mitigation projects and compliance with flood damage preventation 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
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
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)
City of Niederwald Ordinance 120406-B Zoning	Regulations	Regulates zoning in the City limits (Niederwald, TX, 2006)
City of Niederwald Ordinance 12605-A Subdivision	Regulations	Regulations for subdivisions in City Limits (Niederwald, TX, 2000)
City of Niederwald Ordinance 71706 Site Development	Regulations	Site development standards for residential and non-residential development (Niederwald, TX, 2006)
City of Niederwald Engineering Design Standards	Regulations	Adopted standards for design of structures for community. (Niederwald, TX, 2017)
City of Niederwald Budget	Funding	Can be reviewed for funding opportunities for community.

National Flood Insurance Program Participation

The City of Niederwald participates in the National Flood Insurance program. They do not have a Certified Floodplain Manager on staff, however, they do contract out their floodplain management program function to a Professional Engineer that is trained in the administration of the program. The City will continue to explore options for higher standards. The City of Niederwald has a total of 2 NFIP policies in force, as of January 2017 for a total of $313,300 in total 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 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 **Flood Insurance Information Campaign (previously action 8 in 2011 plan, modified)**	Floods	Promote the flood insurance program to lessen the number of structures uninsured from flood loss by providing citizens access to brochures about the NFIP at the local City Hall and links to resources on website.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing city staff and free NFIP materials from FEMA publication warehouse	3 months	Not started	N/A

Cost and Benefit Considerations
This project would indirectly benefit residents who need information about the hazard at little cost.

Number/Title	Hazard	Item Description	Implementation Agency
2 **Residential Development Permit Enhancement for Flood Mitigation (previously action 2 in 2011 plan, modified)**	Floods	Improve residential building permit to clarify floodplain information and reference required elevation certificates for development in Special Flood Hazard Area.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing City staff	3 months	In progress	E/F

Cost and Benefit Considerations
This project would be a low-cost method of ensuring that new development and substantial improvements are done with less risk for flood damage.

Number/Title	Hazard	Item Description	Implementation Agency
3 **Floodplain Management Courses to receive certification (previously action 3 in 2011 plan, modified)**	Floods	Send member of the staff or elected official to training in order to become a Certified Floodplain Manager.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff, cost of accommodations for FEMA E-273 Floodplain Course and CFM testing session	3 months	Not started	E/F

Cost and Benefit Considerations
If attending the course at the Emergency Management Institute, the cost of the course would be very low. A benefit of continuing education for the Floodplain Administrator would be that it would help both new and existing residents through guidance on how to mitigate flood damages to development.

Number/Title	Hazard	Item Description	Implementation Agency
4 Emergency Communications- Phone Tree Development (previously action 4 in 2011 plan)	All Hazards except Expansive Soils and Land Subsidence	Create phone tree with volunteer responsibilities for non-critical hazard call down messaging, such as drought alerts.	City of Niederwald City Administrator

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 activity provides 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
5 StormReady Designation for Niederwald (previously action 6 in 2011 plan)	Windstorm, Hailstorm, Severe Winter Storms, Lightning, Hurricanes/ Tropical Storms, Tornadoes, Floods	Application preparation and submission for StormReady designation from the National Weather Service that attests to the community's level of preparedness for severe winter.	Niederwald Emergency Planning

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff	12 months	Delayed	N/A

Cost and Benefit Considerations

This free application would benefit all members of the community in increasing the preparedness of the local government.

Number/Title	Hazard	Item Description	Implementation Agency
6 Increase Public Awareness of Hazards (previously action 9 in 2011 plan)	All Hazards	Creating a resource page on City website to promote information about the hazards that exist in the community and how to take mitigation actions at the individual level and in coordination with Special Utility District information on water conservation. Provide link to Haysinformed on local page.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff	6 months	Ongoing	N/A

Cost and Benefit Considerations

This free enhancement to the City's existing website would benefit all with internet access at little to no cost, except the staff resources required to do so.

Number/Title	Hazard	Item Description	Implementation Agency
7 Adopt Firewise hazard information from Hays County for mitigation activities (previously action 10 from 2011 plan, modified)	Wildfire	Formal adoption of Hays County Firewise maps and data for the purposes of planning activities to mitigate against wildfire risk.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff	6 months	Not started	F

Cost and Benefit Considerations

Building upon an existing and funded County level project, the community can take action to adopt Wildfire maps and data at no cost.

Number/Title	Hazard	Item Description	Implementation Agency
8 Adding Water Conservation to Ordinances/institution of Drought Monitor as part of operations (previously actions 11 and 12 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 Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff	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 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 Energy Prioritization Collaboration with Electric Cooperative (previously 13 in 2011 plan, modified)	Extreme Heat, Severe Winter Storms, Lightning, Windstorms, Tornadoes, Hurricanes/ Tropical Storms	Working with electricity providers 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 Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff, Electric Companies	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
10 De-icing Contract Research/ Plan Development (previously action 13 in 2011 plan)	Severe Winter Weather	Creation of a plan that provides established procedures and negotiated service providers and rates for ice removal for the 2 City streets.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff	12 months	Not Started	N/A

Cost and Benefit Considerations
By setting rates for ice removal for extreme cases of icy weather, the whole community could save money on potential price increases.

Number/Title	Hazard	Item Description	Implementation Agency
11 Coordination of new Limb and Large Item Pick-up day for Wildfire Mitigation (previously action 15 in 2011 plan, modified)	Wildfire, Severe Winter Weather, Lightning	Cross marketing of existing brush collection efforts from new trash vendor in order to promote mitigation.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff, trash provider	2 months	In Progress	N/A

Cost and Benefit Considerations
At only the cost of the staff for coordination, the community cross-marketing new resources for collecting/ accepting brush in order to promote cleaning brush and dead trees 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. This will benefit the whole community.

Number/Title	Hazard	Item Description	Implementation Agency
12 Engineering review of City Hall (modular building) to ensure soundness against natural hazards	Flood, Tornadoes, Windstorm, Hurricanes/ Tropical Storms, Hailstorms	Contract a consultation from an engineer to review the new City Hall building to ensure its resiliency (modular building that holds community documents and archives).	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff, cost of engineer study	12 months	Not started	E

Cost and Benefit Considerations
The cost of this review will benefit the City government as it will assist with the assurance of the continuity of operations for the community during disaster conditions.

Number/Title	Hazard	Item Description	Implementation Agency
13 Evacuation Plans/ Alternate road consideration (previously action 19 in 2011 plan, modified)	Hurricanes/Tropical Storms, Floods, Dam/Levee Failure, Wildfire	Documentation of an evacuation plan that includes multiple exits.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff, possible cost of buy out for an easement of land to develop an additional emergency exit for the community, pursuit of grant funding for effort.	18 months	Not started	F

Cost and Benefit Considerations
The cost of not establishing a way out of the community would greatly outweigh the cost of mitigating this risk of not being to get citizens out of danger.

Number/Title	Hazard	Item Description	Implementation Agency
14 Creation of Social Media Accounts for the City of Niederwald	All hazards	Opening Social Media accounts from multiple outlets to control emergency messaging and alerts for the community. No other communication methods are in place at the current time, besides County resources.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff, volunteer hours	3 months	In progress	N/A

Cost and Benefit Considerations
This free action would create a way to send messaging out to all members of the community that utilize social media.

Number/Title	Hazard	Item Description	Implementation Agency
15 Expansive Soil Information Sheet	Expansive Soils	Creating and providing an information sheet regarding expansive soils in the development permit packet given to developers and citizens building in the community. The sheet will provide risk information about the hazard and provide recommendations for soil compaction and engineered foundations, especially for non-site built structures.	City of Niederwald City Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff, $100 cost of printing	3 months	Not started	E/F

Cost and Benefit Considerations
This free effort would provide awareness and public information that will benefit those looking to perform new development and those who are improving or repairing existing property.

Number/Title	Hazard	Item Description	Implementation Agency
16 Dam Safety Evacuation Tabletop Exercise (previously action 18 in 2011 plan, modified)	Dam/ Levee Failure, Floods	Coordination with the US Army Corps of Engineers to participate in a tabletop exercise that provides the community leaders with insight on the USACE emergency procedures and evacuation plan.	USACE, City of Niederwald Mayor

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Cost covered by USACE, existing staff	9 months	Not started	N/A

Cost and Benefit Considerations
This request for a USACE tabletop will provide insight that will allow the community to inform all affected residents and visitors of the procedures for receiving warnings and seeking safety during emergency situations with the dam.

Capabilities Assessment

Evaluation/Prioritization of Actions

Each action added to the plan was developed using the Mitigation Action Summary Worksheet shown in Figure NW.16. Non-cost effective projects were not included in activity.

Figure NW.16, 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 NW.30, Mitigation Action Prioritization (with Hazards in order of highest priority to lowest)

Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community	Risk Ranking Score	Total Score
7. Adopt Firewise hazard information from Hays County for mitigation activities	1	1	1	1	0	1	1	1	1	1	82	91
6. Increase Public Awareness of Hazards	1	1	1	1	0	1	1	1	0	1	82	90
13. Evacuation Plans/Alternate road consideration	1	0	1	1	1	0	1	1	0	1	82	89
5. StormReady Designation for Niederwald	1	0	1	1	0	0	1	1	0	1	82	88
2. Residential Development Permit Enhancement for Flood Mitigation	0	1	1	1	1	0	1	1	0	0	82	88
4. Emergency Communications-Phone Tree Development	1	0	1	1	0	0	1	1	0	1	82	88
11. Coordination of new Limb and Large Item Pick-up day	1	1	1	1	1	1	-1	1	0	0	82	88
8. Adding Water Conservation to Ordinances/institution of Drought Monitor as part of operations	1	0	1	1	0	1	1	1	1	1	78	86
1. Flood Insurance Information Campaign	0	0	1	1	0	0	1	1	0	0	82	86
3. Attend Local Floodplain Management Courses to receive certification	1	1	1	0	0	0	0	1	0	0	82	86
12. Engineering review of City Hall (modular building) to ensure soundness against natural hazards	1	1	1	-1	0	0	0	1	0	0	82	85
14. Creation of Social Media Accounts for the City of Niederwald	1	0	1	-1	-1	0	1	1	1	0	82	85
15. Expansive Soil Information Sheet	0	1	1	-1	0	0	1	1	0	0	82	85
9. Energy Prioritization Collaboration with Electric Cooperative	1	0	1	0	-1	0	1	1	0	0	75	78
16. Dam Safety Evacuation Tabletop Exercise	1	1	1	1	1	1	0	1	0	1	44	52
10. De-icing Contract Research/ Plan Development	1	0	1	1	1	0	1	1	0	0	38	44

Mitigation Actions by Hazard

The mitigation actions in Table NW.31 are shown with the corresponding hazards.

Table NW.31, Mitigation Action Impact, City of Niederwald

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					
3									X					
4	X	X	X	X	X	X	X		X		X	X	X	X
5			X	X	X	X	X		X		X			
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7														X
8	X									X				
9		X	X	X		X	X				X			
10			X											
11			X	X										X
12					X	X	X		X		X			
13									X		X		X	X
14	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15								X						
16									X				X	

Integration Efforts

Table NW.32 captures ways that the Risk Assessment, Goals and Actions developed in the HMP can be integrated into other City of Niederwald documents, programs and regulations.

Table NW.32, Plan Integration Efforts, City of Niederwald

Name of Document	Type	Item Type	Opportunity for Integration
Niederwald Budget	Document	Action	Seek funding for Floodplain Administrator training within existing budget line item: 6330-Seminars and Continue Education. (Action 3)
HaysInformed.com	Program	Action	Link to existing Hays County HaysInformed.com emergency preparedness/awareness page when creating Public Awareness Page for hazards on Niederwald website. (Action 6)
Waste Management	Program	Action	Incorporate Large Item Pick up into negotiations for new trash service vendor that is currently in progress of being selected. (Action 11)
Niederwald Social Media	Program	Action	Pre-write Hazard Mitigation posts/tweets for year and provide to social media coordinator volunteer for posting on a regular basis once social media platforms are established formally. (Actions 6 & 14)
Hazard Mitigation Grant Program (HMGP)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
Pre-Disaster Mitigation (PDM)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
Flood Mitigation Assistance (FMA)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
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)

Changes in Development

The City of Niederwald is on the cusp of significant changes. The community expects and hopes for a 400% increase in residents in the coming planning period. The increase will be in several planned subdivisions. With the influx of residents, the community is preparing for many permitting applications and are anticipating being stewards for safe growth for their community.

Past Mitigation Action Progress Reports Summary - Completed and Canceled

2011 Action Number	Hazard	Item Description	Lead Department
1	Flood	Increase the number of Hays County communities that participate in the NFIP	City of Niederwald
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
Cost and Funding: Existing staff resources, no cost		Completed	Completed
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Item Description	Lead Department
5	All hazard	Development of and maintenance of countywide and individual community HAZMAP Plans	City of Niederwald
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
Existing staff resources		Original Plan adopted on 4/20/2004. Update in 2011	Completed.
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Item Description	Lead Department
16	Floods, thunderstorms, high winds, tornadoes, seismic	Upgrades to At-Risk Structures	City of Niederwald
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. Not fiscally feasible. More regulator measures adopted.
Cost Effectiveness			
Cost-effectiveness will vary with level of risk and project cost			

Changes in Priorities

As the community expects to grow, it is showing an increase in concern for public safety, as is indicated in the ranking of public safety actions in the prioritization of mitigation actions. Higher population counts call for greater levels of responsibility for the community. In addition, a concern for expansive soils also shows that the community hopes to mitigate the effects of this hazard for incoming residents and their structures.

Section 5: Approval and Adoption

Approval and Adoption Procedure

Table NW.33, Municipal Jurisdiction Adoption Date

Municipality	APA Date	Adoption Date
City of Niederwald		

Jurisdiction Adoption Documentation Placeholder

References

(2013). Groundwater depletion in the United States (1900–2008). Reston, VA: U.S. Geological Survey. Retrieved from USGS: https://pubs.er.usgs.gov/publication/sir20135079

Mashhood, F. (2012, February 14). Shopping center sinkhole provides chance to study runoff. Retrieved from Statesman: http://www.statesman.com/news/local/shopping-center-sinkhole-provides-chance-study-runoff/qDEdMu8LEgfIkucFBzObiK/

National Fire Protection Association. (2013, June). NFPA News & Research. Retrieved from Lightning Fires and Lightning Strikes: http://www.nfpa.org/news-and-research/fire-statistics-and-reports/fire-statistics/fire-causes/lightning-fires-and-lightning-strikes

National Highway Traffic Safety Administration. (2017, 03 11). Traffic Safety Facts. Retrieved from Texas 2011-2015: https://cdan.nhtsa.gov/SASStoredProcess/guest

National Oceanic and Atmospheric Administration. (2016). Historical Hurricane Tracks. Retrieved from National Oceanic and Atmospheric Administration Coastal Management: https://coast.noaa.gov/hurricanes/

National Oceanic and Atmospheric Administration Storm Event Database. (2016, 12 01). National Centers for Environmental Information. Retrieved from Data Access: https://www.ncdc.noaa.gov/data-access

National Severe Storms Laboratory. (2016, 12 01). Severe Storm Climatology. Retrieved from Total Threat: http://www.nssl.noaa.gov/projects/hazard/totalthreat.html

Niederwald, Tx. (2000). Ordinances: Niederwald Codes and Enforcement. Retrieved from Ordinance 12605-A Subdivision : http://niederwaldtx.com/sites/default/files/NIEDERWALD%20SUBDIVISION%20ORDINANCE.pdf

Niederwald, TX. (2006, 07 17). Ordinance: Niederwald Codes and Enforcement. Retrieved from Ordinance 71706 Site Development : http://niederwaldtx.com/sites/default/files/SITE-DEVELOPMENT-ORDINANCE.pdf

Niederwald, TX. (2006, 12). Ordinances: Niederwald Codes and Enforcement. Retrieved from Ordinance No. 120406-B: http://niederwaldtx.com/sites/default/files/NIEDERWALD-ZONING-ORDINANCE-120406-B.pdf

Niederwald, TX. (2017, 03 20). Ordinances: Niederwald Codes and Enforcement. Retrieved from Engineering Design Standards: http://niederwaldtx.com/sites/default/files/Niederwald%20-%20Engineering%20Design%20Standards%28Final%20Version11-30-04%29%20%282%29.pdf

Texas A&M Forest Service. (2016, 12 01). Wildfire Risk Assessment Portal. Retrieved from Public Viewer: https://www.texaswildfirerisk.com/

Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch. (2017). Texas Health Care Information Collection and Trauma Registry. Austin, TX: Dr. Stacy Jorgensen.

Texas Department of Transportation. (2017, 03 11). Crash Records Information System. Retrieved from C.R.I.S Query: https://cris.dot.state.tx.us/public/Query/#/public/welcome

Texas Natural Resources Information System. (2011). TNRIS Data Catalog Low Water Crossings. Retrieved from TNRIS: https://tnris.org/data-catalog

Texas Speleological Survey. (2007). Karst Regions of Texas. Retrieved from Texas Speleological Survey: https://www.texasspeleologicalsurvey.org/karst_caving/karst_regions.php

Tornado Facts. (2016, 03 16). Tornado Facts and Information . Retrieved from Tornado Scale: http://www.tornadofacts.net/tornado-scale.php

University of Nebraska-Lincoln. (2016, 12 01). The National Drought Mitigation Center. Retrieved from Drought Impact Reporter: http://droughtreporter.unl.edu/map/

USGS Earthquake Hazard Program. (2015). USGS Earthquake Hazard Program. Retrieved from USGS: https://earthquake.usgs.gov/data/

Vaisala NLDN. (2016, 12 01). Thunderstorm and Lightning Detection Systems. Retrieved from National Lightning Detection Network: http://www.vaisala.com/en/products/thunderstormandlightningdetectionsystems/Pages/NLDN.aspx

Wirfs-Brock, J. (2014, 08 18). Inside Energy. Retrieved from Data: Explore 15 Years of Power Outages: http://insideenergy.org/2014/08/18/data-explore-15-years-of-power-outages/