2017

Montgomery County Hazard Mitigation Plan

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Acronym List

RHMP	Regional Hazard Mitigation Plan
HMAP	Hazard Mitigation Plan
H-GAC	Houston-Galveston Area Council
FEMA	Federal Emergency Management Agency
TDEM	Texas Division of Emergency Management
TX	Texas
CRS	Community Rating System
NFIP	National Flood Insurance Program
HMGP	Hazard Mitigation Grant Program
CHARM	Community Health and Resource Management
mph	miles per hour
NOAA	National Oceanic and Atmospheric Administration
NSSL	National Severe Storm Laboratory
OEM	Office of Emergency Management
ArcGIS	Geographic Information System
RL	repetitive loss
KBDI	Keetch-Byram Drought Index
WUI	Wildland Urban Interface
FM	Farm to Market road
PHSI	Palmers Hydrological Severity Index
USDA	United States Department of Agriculture
LAL	Lightning Activity Levels
NCDC	National Climate Data Center
CDC	Centers for Disease Control and Prevention
NCEI	National Centers for Environmental Information
SPIA	Sperry-Piltz Iace Accumulation
NWS	National Weather Service
LEP	Linear Extensibility Percent
COLE	Coefficient of Linear Extent

Part 1: Introduction

Part 1: INTRODUCTION

Montgomery County's previous Hazard Mitigation Plan was adopted in 2006 and updated in 2011 as part of a seven-county Regional Hazard Mitigation Plan (RHMP). Due to new regulation and planning recommendations, Montgomery County prepared a new countywide multi-jurisdictional Hazard Mitigation Plan (HMAP). Montgomery County partnered with the Houston-Galveston Area Council (H-GAC) for both the 2006 and 2011 plans and continued this partnership during the development and adoption of the HMAP.

Image source: https://www.wikipedia.org/

History

On April 28, 2006, the Federal Emergency Management Agency (FEMA) and the Texas Division of Emergency Management (TDEM) approved the first RHMP. H-GAC prepared the regional plan in coordination with FEMA and TDEM to ensure it met all applicable state and federal requirements. H-GAC updated the RHMP in 2011 to re-assess vulnerabilities and increase the number and diversity of mitigation action items. The plan includes a more robust assessment of natural hazards, newly uncovered vulnerabilities, more advanced analysis techniques, and a more effective and informed mitigation strategy.

Purpose of Plan

The purpose of Montgomery County's HMAP is to reduce the loss of life and property within the county and lessen the negative impacts of natural disasters. Vulnerability to several natural hazards has been identified through research, analysis, and public input. These hazards threaten the safety of residents and have the potential to damage or destroy both public and private property, disrupt the local economy, and impact the overall quality of life of individuals who live, work, and play in the county. While natural hazards cannot be eliminated, the effective reduction of a hazard's impact can be accomplished through thoughtful planning and action.

The concept and practice of reducing risks to people and property from known hazards is generally referred to as hazard mitigation. One of the most effective tools a community can use to reduce hazard vulnerability is developing, adopting, and updating a hazard mitigation plan as needed. A hazard mitigation plan establishes the broad community vision and guiding principles for reducing hazard risk, including the development of specific mitigation actions designed to eliminate or reduce identified vulnerabilities.

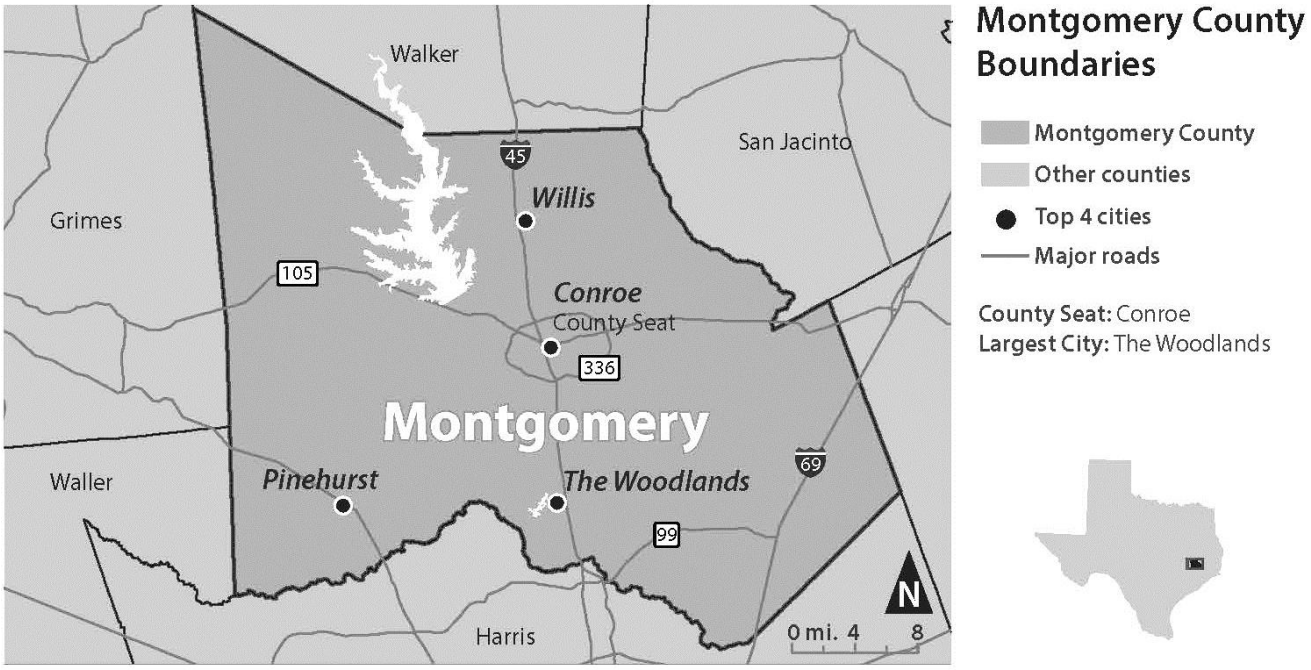
Scope of Plan

Montgomery County is in the east-central region of Texas, and scope of the HMAP includes the following participating jurisdictions:

- Unincorporated Montgomery County
- Conroe
- Cut and Shoot
- Magnolia

- Montgomery
- Oak Ridge North
- Panorama Village
- Patton Village
- Roman Forest
- Shenandoah
- Splendora
- Stagecoach
- Willis
- Woodbranch Village
- The Woodlands
- Woodloch

Planning Area Map



The plan, developed in accordance with state and federal rules and regulations governing local hazard mitigation plans, was adopted by the participating jurisdictions and shall be routinely monitored and revised to maintain compliance with all state and federal regulations.

The HMAP profiles the following hazards:

- Flooding
- Hurricanes and Tropical Storms
- Wildfire
- Severe Thunderstorms
- Drought
- Lightning
- Excessive Heat
- Hail
- Winter Weather
- Tornado
- Dam/Levee Failure
- Expansive Soils

Presidential Declared Disasters

Montgomery County has persevered through many natural disasters. The table below lists the presidential declared disasters that the County has experienced since 1973. Each disaster is costly and challenging. The goal of this HMAP is mitigation and reduce the impact of future disasters.

Year	Declaration Type	Type	Title
1973	Major Disaster Declaration	Flood	Severe Storms & Flooding
1979	Major Disaster Declaration	Severe Storm	Severe Storms, Tornadoes & Flooding
1979	Major Disaster Declaration	Flood	Severe Storms & Flooding
1983	Major Disaster Declaration	Hurricane	Hurricane Alicia
1989	Major Disaster Declaration	Severe Storm	Severe Storms, Tornadoes & Flooding
1993	Emergency Declaration	Drought	Extreme Fire Hazard
1994	Major Disaster Declaration	Flood	Severe Thunderstorms And Flooding
1996	Emergency Declaration	Fire	Extreme Fire Hazard
1998	Major Disaster Declaration	Severe Storm	Tropical Storm Charley
1998	Major Disaster Declaration	Flood	Tx-Flooding 10/18/98
1999	Emergency Declaration	Fire	Extreme Fire Hazards
2000	Fire Suppression Authorization	Fire	Tx - Peach Creek Fire - 09/04/00
2001	Major Disaster Declaration	Coastal Storm	Tx-Tropical Storm Allison-06-06-2001
2002	Major Disaster Declaration	Severe Storm	Severe Storms, Tornadoes And Flooding
2003	Emergency Declaration	Other	Loss Of The Space Shuttle Columbia
2005	Emergency Declaration	Hurricane	Hurricane Katrina Evacuation
2005	Emergency Declaration	Hurricane	Hurricane Rita
2005	Major Disaster Declaration	Hurricane	Hurricane Rita
2006	Major Disaster Declaration	Fire	Extreme Wildfire Threat
2008	Emergency Declaration	Fire	Wildfires
2008	Emergency Declaration	Hurricane	Hurricane Gustav
2008	Emergency Declaration	Hurricane	Hurricane Ike
2008	Major Disaster Declaration	Hurricane	Hurricane Ike
2011	Fire Management Assistance Declaration	Fire	Tamina Fire
2011	Fire Management Assistance Declaration	Fire	Riley Road Fire
2011	Major Disaster Declaration	Fire	Wildfires
2015	Major Disaster Declaration	Severe Storm	Severe Storms, Tornadoes, Straight-Line Winds And Flooding
2016	Major Disaster Declaration	Flood	Severe Storms And Flooding
2016	Major Disaster Declaration	Flood	Severe Storms And Flooding
2017	Major Disaster Declaration	Hurricane	Texas Hurricane Harvey

Source: Presidential Declared Disasters List (1953-2017), FEMA

2017

Part 2: Planning Process

Part 2: PLANNING PROCESS

This section includes a description of the process used by H-GAC, the County, and participating jurisdictions to develop the 2017 HMAP.

Overview

Hazard mitigation planning can be described as the means to break the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that pre-disaster investments will significantly reduce the demand for post-disaster assistance by alleviating the need for emergency response, repair, recovery, and reconstruction.

Hazard mitigation planning is the process of identifying natural hazards, understanding community capabilities and resources, identifying and assessing hazard vulnerability and risk, and determining how to minimize or manage those risks. In partnership with Montgomery County, H-GAC approached the hazard mitigation planning process by establishing a Planning Team. The next step of the planning process was the assessment of hazards and how they can impact specific assets. H-GAC conducted a hazard analysis that was provided to the Planning Team and presented at a public meeting on October 16, 2017.

After hazard identification and analysis, communities considered their vulnerability to the identified threats. Crucial input from the participating jurisdictions and members of the public helped inform a vulnerability and risk assessment for the entire county. H-GAC used information gathered from meetings with the Planning Team, online participation and input from the participating jurisdictions, and natural hazard modeling techniques to produce a comprehensive vulnerability assessment.

The planning process culminated in a Mitigation Strategy, i.e. identification of specific mitigation actions, which when viewed as a whole, represents a comprehensive strategy to reduce the impact of hazards. The Planning Team met on December 18, 2017, to begin the process of developing an overarching Mitigation Strategy, and a long-term approach to update and maintain the HMAP. Specific mitigation actions are identified in this plan and included in the Appendix E. Responsibility for each mitigation action is assigned to a specific individual, department or agency along with a schedule for its implementation. Plan maintenance procedures (Part 8 of this plan) establish procedures to monitor progress, including the regular evaluation and enhancement of the Plan. Multijurisdictional coordination and integration of the HMAP into local planning mechanisms was also addressed. The established maintenance procedures ensure that the plan remains a dynamic and functional document over time.

Plan Development Resources

The Montgomery County HMAP was developed using existing plans, studies, reports, and technical information. Materials and historic data were used to inform participants throughout the planning process, evaluate and analyze hazards, and develop the mitigation strategy.

Plan Development Resources: Existing Documents and Data	
FEMA Disaster Declarations	FEMA Flood Map Services
H-GAC Land Use & Demography Database	Houston-Galveston Area Regional Plan
New Waverly Floodplain Management Plan	NOAA Storm Event Database
State of Texas Hazard Mitigation Plan	Texas A&M Forest Service Wildfire Reports
US Census American Fact Finder	USDA Census of Agriculture Reports
USGS Homeland Infrastructure Foundation-Level Data	2011 Regional Hazard Mitigation Plan

Planning Team

Montgomery County and H-GAC established the Planning Team in Fall 2017 in preparation for the first public meeting and hazard mitigation planning workshop held on October 16, 2017. Members were asked to attend all public meetings in person, but were provided an online alternative if they were unable to do so. Online materials, surveys, forms, and documentation are provided in Appendix A. Representatives from the County Office of Emergency Management served as liaisons between H-GAC and stakeholders, staff, and members of the public who were unable to attend the meetings.

Representative Name & Position/Title	Agency/Office
Darren Hess, Emergency Management Coordinator	Montgomery County Office of Homeland Security and Emergency Management
Morgan Lumbley, Community Planner	Montgomery County Office of Homeland Security and Emergency Management
Chief Gomez, Chief of Police	City of Cut and Shoot
Paul Mendez, City Manager	City of Magnolia
Jack Yates, City Administrator	City of Montgomery
Shannon Sharp, Chief of Police	City of Patton Village
Liz Mullane, City Administrator	City of Roman Forest
Kassie Laughlin, Emergency Management Specialist	City of Conroe
Andrew Walters, Emergency Management Coordinator	City of Oak Ridge North
Lynn Scott, Mayor	City of Panorama Village
Leah Tarrant, Mayor	City of Patton Village
Joseph Peart, Public Works Director	City of Shenandoah
Alex Hadrych, Lieutenant	City of Splendora
Michael Wethington, Chief of Police	City of Stagecoach
James Nowak, Chief of Police	City of Willis
Charlotte Smith, City Secretary	Woodbranch Village
Jason Washington, Battalion Chief	The Woodlands Township
Diane Lincoln, Mayor	Town of Woodloch
Joey Kaspar, Senior Regional Planner	H-GAC
Amy Combs, Regional Planner	H-GAC

Meeting Dates & Details

October 16, 2017: Hazard Mitigation Kickoff Meeting

H-GAC and the Planning Team hosted a public meeting at the Lone Star Convention Center, 9055 Airport Road, Conroe TX, 77303 on October 16, 2017. The purpose of the meeting was for H-GAC staff to gather feedback and input on the draft Hazard Analysis and discuss local vulnerabilities. The Planning Team and members of the community were given a presentation and provided large maps displaying the analysis of various hazards. Participants worked with H-GAC staff to improve the accuracy of the analysis and pinpoint the vulnerabilities of each hazard within their communities. Meeting participants also discussed their current ability to mitigate these threats and how to draft a mitigation action to address them. Prior to the meeting, community members and stakeholders were invited through press releases, public service announcements, and other advertisements in eight newspapers and on KVST Radio 103.5 FM. See Appendix A for meeting agenda, attendees list, and press release.

December 18, 2017: Hazard Mitigation Strategy Meeting
H-GAC hosted a Planning Team meeting at its offices in Houston on December 18, 2017. The purpose of this meeting was to begin the development of a Mitigation Strategy and determine plan maintenance procedures. H-GAC staff gave a presentation on both topics and led a discussion about strategy development. Planning Team members outlined a Mitigation Strategy and refined their mitigation actions. See Appendix A for meeting agenda and sign-in sheet.

Stakeholders

Neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority regulate development, each contributed to the development of the HMAP. The chart below demonstrates the variety of stakeholders who participated and contributed:

Regional & Regulatory Stakeholders	Representative Position/Title
Houston-Galveston Area Council (H-GAC)	Community and Environmental Planning Department
Harris County Flood Control District	Floodplain Administer
Office of Homeland Security and Emergency Management	Montgomery County Emergency Management Coordinator
Regional Homeland Security Council	H-GAC Public Services Planner
San Jacinto River Authority	Director of Raw Water Enterprise
Neighboring Jurisdictions	
Liberty County	Emergency Management Coordinator
Waller County	Emergency Management Coordinator
Walker County	Emergency Management Coordinator
Local Stakeholders	
City of Cut and Shoot	Chief of Police
City of Magnolia	City Manager, Floodplain Administer
City of Montgomery	City Administrator, Floodplain Administer
City of Patton Village	Chief of Police, Floodplain Administer
City of Roman Forest	City Administrator, Floodplain Administer
City of Conroe	Emergency Management Specialist, Floodplain Administer
City of Oak Ridge North	Emergency Management Coordinator, Floodplain Administer
City of Panorama Village	Mayor, Floodplain Administer
City of Patton Village	Mayor, Floodplain Administer
City of Shenandoah	Public Works Director, Floodplain Administer
City of Splendora	Chief of Police, Floodplain Administer
City of Stagecoach	Chief of Police, Floodplain Administer
City of Willis	Chief of Police, Floodplain Administer
Woodbranch Village	City Secretary, Floodplain Administer
The Woodlands Township	Battalion Chief, Floodplain Administer
Town of Woodloch	Mayor

Participation & Public Input

Public input and participation is a crucial element of hazard mitigation planning. Feedback and input from the public during the October 16th Hazard Mitigation Kick-off meeting was used to identify vulnerabilities in each jurisdiction, identify valuable assets, and develop the risk assessment. Although the public was given the opportunity to attend public meetings in person, the first public meeting followed shortly after Hurricane Harvey. Many residents and local staff were busy with recovery efforts at the time, and attendance was difficult. To ensure the public's ability to participate in the planning process, H-GAC hosted all HMAP-related materials online and advertised both the meetings and the website link: (http://h-gac.com/community/community/hazard/montgomery-county-hazard-mitigation.aspx).

The Montgomery County Office of Emergency Management also distributed hardcopies of the surveys and forms to each participating jurisdiction that was unable to attend the public meeting on October 16th, 2017. These jurisdictions then had the option to either mail in the packet to H-GAC's office for processing, or submit the online surveys. The data from capability assessment survey was used to develop the risk assessment and identify vulnerabilities. The online mitigation action portal allowed jurisdictions to submit their proposed projects, and later used to develop the mitigation strategy. County and City Certified Floodplain Managers (CFMs) also submitted surveys which helped develop the flood hazard analysis and mitigation strategies for flooding.

The chart below demonstrates the method and type of participation by each jurisdiction.

Jurisdiction	Participated in Mitigation Strategy Development	Online/Mail-in Participation:		
		Capability Assessment	Mitigation Actions	NFIP Survey
Unincorporated Montgomery County	x	x	x	x
Conroe	x	x	x	x
Cut and Shoot	x	x	x	
Magnolia	x	x	x	x
Montgomery	x	x	x	x
Oak Ridge North	x	x	x	x
Panorama Village	x	x	x	x
Patton Village	x	x	x	x
Roman Forest	x	x	x	x
Shenandoah	x	x	x	x
Splendora	x	x	x	x
Stagecoach	x	x	x	x
Willis	x	x	x	x
Woodbranch Village	x	x	x	x
The Woodlands	x	x	x	x
Woodloch	x	x	x	

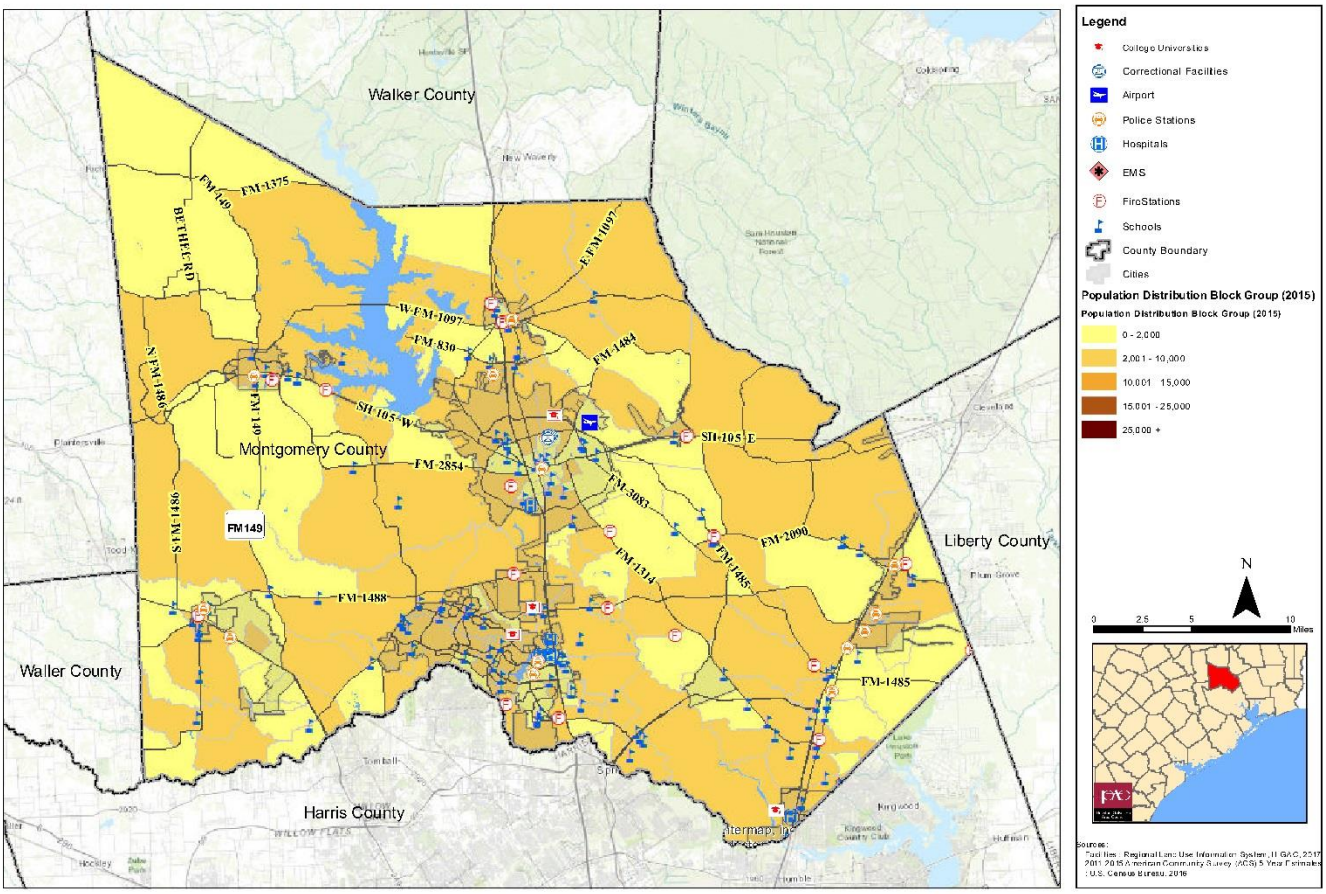
Part 3: County Profile

Part 3: COUNTY PROFILE

Montgomery County is north of the City of Houston, on the southern range of the Texas Piney Woods. The county is bound by Spring Creek to the south and is home to parts of Sam Houston National Forest and Lake Conroe, which feeds the San Jacinto River. The county is crossed by I-45 north-south and SH 105 east-west with a portion of I-69 in the east.

Montgomery County's population grew 323 percent from 127,000 in 1980 to 538,000 residents in 2015. Population is expected to more than double, to 1,183,000 by 2040.[i] The county seat, Conroe, was the United States' fastest growing city in 2016 with a population of 82,286 and a 7.8 percent annual population increase.[ii] The Woodlands, a master planned community, grew from a population of 8,443 in 1980 to an estimated 109,679 in 2010. It is now the largest community in the county. Other communities in Montgomery County with populations over 1,000 include Cut and Shoot, Magnolia, New Caney, Oak Ridge North, Panorama Village, Patton Village, Pinehurst, Porter, Roman Forest, Shenandoah, Splendora, Willis, and Woodbranch.

Population Distribution Map

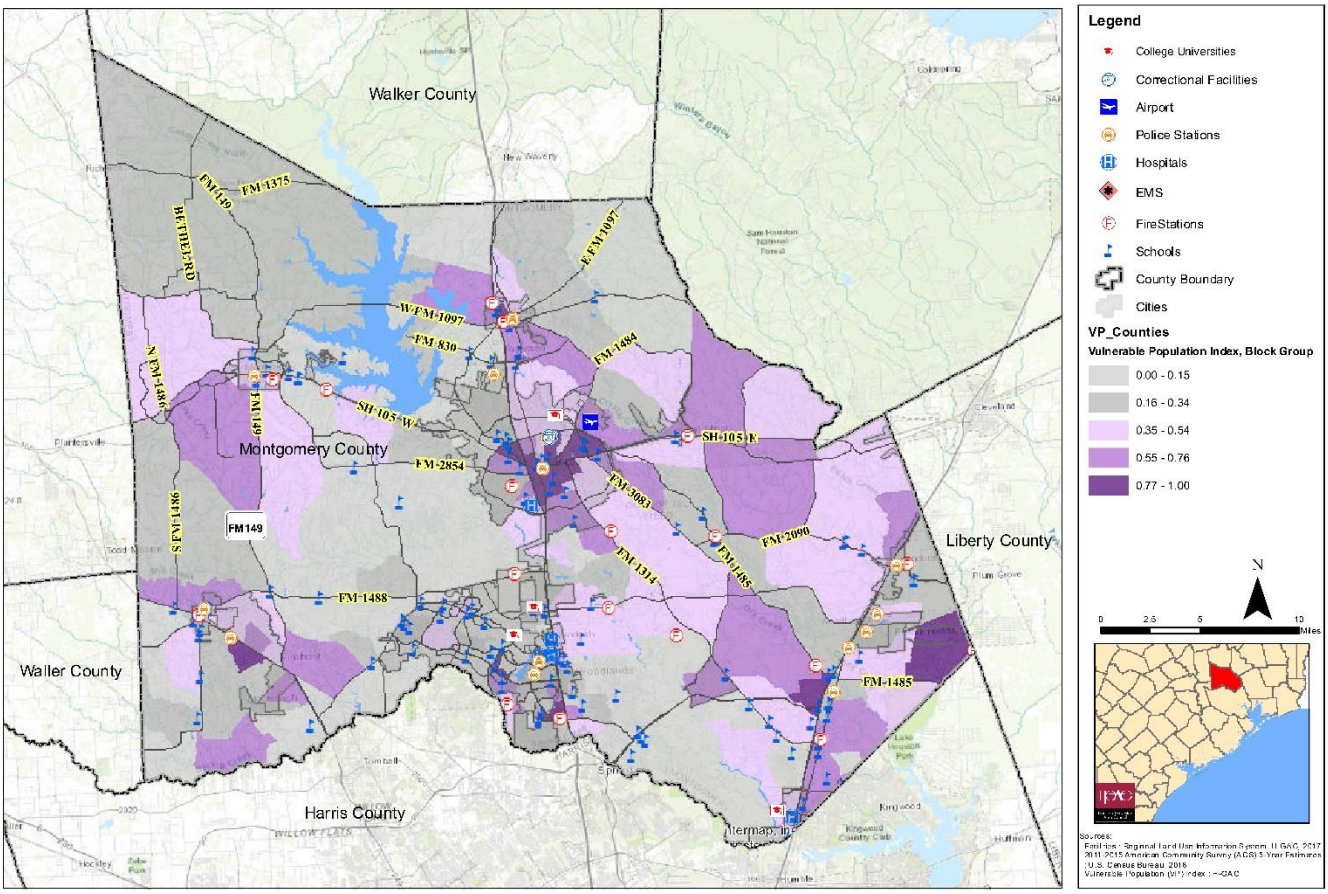


Although Montgomery County is largely residential (the majority of Montgomery County residents work in neighboring Harris County), Montgomery County's economy has grown in pace with its residential development.[iv] The Woodlands area has become an employment center and home to a Fortune 500 company headquarters. Business services are the largest employment cluster, with approximately 18,000 employees. Many of these jobs are related to the support activities for oil and gas operations.[v] Retail, healthcare, distribution, and manufacturing are important private sector employers. Retail trade comprised 12 percent of employment in 2014, and retail sales totaled $6.3 billion in 2012.[vi] Several major national retailers have distribution centers in

Montgomery County. Healthcare is a growing sector of the economy as many of the institutions based in the Texas Medical Center have opened or are planning to open hospitals in the county.

Households in Montgomery County have a median annual income of $68,800 and spend about 56% of their income on costs related to transportation and housing. The county has one of the highest median home values in the region at $176,900 and over 40% of its housing units have been built since 2000.

Vulnerable Population Map



The Vulnerable Population Index identifies areas throughout Montgomery County that may not have the means or the resources to act when a natural disaster occurs in Montgomery County. For the purposes of this plan, vulnerable populations include any households without a car, single female household with child/ children in the home, individuals living below the poverty line, individuals who are disabled, individuals who are Hispanic, individuals who are non-Hispanic, and non-white, and individuals 65 years and older. The areas in the county with the greatest proportion of these individuals is defined as the most vulnerable areas in Montgomery County. On the map, the areas in dark purple are the areas that have greatest proportion of the vulnerable population in Montgomery County. The map shows that New Waverly to the southeast is the city that has the largest proportion of the vulnerable population in Montgomery County. Defining and mapping vulnerable populations provides the opportunity to demonstrate where perhaps the most need is throughout Montgomery County.

[i] Houston-Galveston Area Council

[ii] U.S. Census Bureau

[iii] Texas Association of Counties

[iv] U.S. Census Bureau

[v] U.S. Cluster Mapping

[vi] U.S. Census

[vii] DATA USA, Workforce Solutions

[viii] USDA Census of Agriculture

[ix] Community Impact Newspaper

[x] National Weather Service

[xi] Workforce Solutions

[xii] Federal Reserve Bank of Saint Louis

2017

Part 4: Hazard Identification

Part 4: HAZARD IDENTIFICATION

The State of Texas's Hazard Mitigation Plan has identified 5 major natural hazards that affect the region. These include hurricane, flood, wildfire, drought, and tornado[i]. The local planning team identified 12 natural hazards which could affect the county and local jurisdictions.

Flooding

Flooding is one of the most frequently occurring, destructive, and costly natural hazards facing Texas.[ii] There are two main categories for floods: general and flash flooding. General flooding is typically a long-term event that can last from a couple of days to weeks. This type of flooding is characterized by an overflow of water from an existing waterway, including rivers, streams, and drainage ditches. Flash flooding is an event that typically lasts a few minutes to less than 6 hours. These floods are characterized by heavy rain or water from a dam failure that inundates waterways and infrastructure, such as bridges and roads. Either type of flooding is capable of destroying infrastructure, homes, and other structures, and pulling cars off roads. However, flash flooding typically is considered the most dangerous type of flooding, because of its "speed and the unpredictability"[iii]. Generally, the impact of flooding is intensified in urban areas because of less impervious surfaces and in suburban or rural areas because of building in vulnerable areas. While 100 and 500 year floodplains are identified throughout the county and local jurisdictions, flooding can occur outside of these areas.

Severe Thunderstorms

Thunderstorms are classified as severe when there is either 58 mile per hour (mph) winds and/ or hail that is one inch in diameter or greater. While there are over 100,000 thunderstorms annually throughout the United States, severe thunderstorms only account for 10 percent of thunderstorms in the United States.[iv] Hail, lightning, tornadoes, wind shear, and floods can be a part of thunderstorms. In the United States, flash flooding resulting from thunderstorms kills more people year than hurricanes, tornadoes, or lightning[v]. Along the Gulf Coast, severe thunderstorms are more likely to occur in the afternoon and in spring and summer months.[4]

On occasion, thunderstorms can produce a microburst. Microbursts are a localized column of sinking air (downdraft) within a thunderstorm and is usually less than or equal to 2.5 miles in diameter. Microbursts are dangerous and destructive because of the sudden winds reaching up to 100 mph and the potential for significant rain or hail in wet microburst.[vi]

Lightning

Lighting can be seen throughout thunderstorms, hurricanes, intense forest fires, and winter storms. Lightning occurs when positive and negative charges build within a cloud leading to a rapid discharge of electricity[vii]. While there are several types, lightning is typically classified as ground flashes or cloud flashes. One of the more common lightning strikes are cloud-to-ground lightning; these strikes are classified as ground flashes. Cloud-to-ground lighting starts as a channel of negative charge, called a stepped leader, zigzagging downward in roughly 50-yard segments in a forked pattern [viii]

Lightning often strikes tall structures, such as trees and skyscrapers, but can also strike open fields or other areas depending on where the electrical charges form. Lightning causes an average of 80 deaths and 300 injuries each year in the United States.[7] In 2017, 16 people were killed by lightning in the United States, two of these deaths occurred in Texas, but not in the county. [ix]

Hail

Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into balls of ice. To be considered hail, frozen precipitation needs to be at least .2 inches. Size of hail can range from pea-sized (1/4 inch in diameter) to softball-sized (4 ½ inches in diameter). Quarter sized hail (1 inch in diameter) and above is considered severe by the National Oceanic and Atmospheric Administration's (NOAA) National Severe Storm Laboratory. Hail storms can result in significant damage to vehicles, buildings, and crops. Severe hail and hail swaths can result in an accumulation of hail on roadways and roofs, which may result in car accidents or roofs collapsing.[x]. As of 2015, Texas had the highest level of hail loss claims throughout the country. According to the National Insurance Crimes Bureau, hail loss claims totaled 400,000 dollars in Texas from 2013 to 2015. However, damage from hail typically occurs in northern Texas rather than southern Texas.

Winter Weather

A winter storm is any event in which the main type of precipitation is snow, sleet, or freezing rain, according to (NOAA), 70 percent of injuries related to winter storms are in automobiles. Winter storms form with cold air, lift, and moisture.[xi] While there are several types of winter storms, ice storms and snow flurries or showers with light accumulation are the most likely in the region. The main concerns with winter weather are road conditions and power outages.

Hurricanes and Tropical Storms

Tropical cyclones with sustained winds of 74 mph and above are classified as hurricanes. Hurricanes can reach wind speeds of 156 mph or more, which would be considered a category five on the Saffir-Simpson scale with potential for catastrophic damage. Hurricanes generally have a well-defined center, called the eye. Hurricane season is generally June 1st through November 30th each year .[xii]However, hurricanes can and have formed outside of this season. Hurricanes are one of the top natural hazards affecting the region, with flooding considered one of the main impacts from hurricanes [xiii]

Tropical cyclones (rotating low-pressure weather systems that have organized thunderstorms, but no fronts) with sustain winds of at least 39 mph and no higher than 73 mph are classified as tropical storms. Tropical storms generally have ill-defined centers and slower moving winds than hurricanes.[12]

Hurricane Harvey is a recent example of the impact hurricanes and tropical storms have on the region, county, and local jurisdictions. Hurricane Harvey made landfall on August 25th 2017 as a category four hurricane near Rockport, Texas; Hurricane Harvey traveled further inland as a tropical storm over the next few days. The tropical storm triggered general and flash flooding throughout the region with recorded rainfall measuring as high as 60.58 inches in the region. Flooding was seen throughout the county and local jurisdictions.

Tornado

Tornadoes are a violently rotating column of air touching the ground, usually attached to the base of a thunderstorm.[xiv] However, tornadoes have formed during hurricanes and tropical storms. Tornadoes form when there is a change in a storm's speed and direction. Tornadoes can have wind speeds that range from 40 mph to 300 mph and move at 10 mph to 20 mph. However, tornadoes typically last a few minutes. The damage seen from a tornado is largely due to the strength of the winds, but strong hail and lighting often accompany tornadoes .[xv]

Wildfire

Wildfires are any non-structure fire, except prescribed fires that occur in wildland areas, including prairies or forest. as many as 90 percent of wildland fires in the United States are cause by humans and the other 10 percent are started by lava or lightning.[xvi] In understanding that most wildfires are started by people, the Texas Forest Service assigns a high priority to year-round wildfire prevention activities that reduce risks to residents and property. Texas Forest Service prevention campaigns use radio, TV, print, and web-based products along with local outreach programs to increase wildfire awareness and deliver fire safety messages. Texas Forest Service works with local and county officials to keep them informed of fire danger and the likelihood of large damaging wildfires. In 2017, five Texans died due to wildfires in north Texas; Texas faced more than 21 million dollars in damages from wildfires throughout the state .[xvii]

Drought

Drought varies greatly in length and extent. High temperatures, high winds, and low humidity can worsen drought conditions and can make areas more susceptible to wildfire. Human demands and actions, such as farming and animal grazing, can also hasten drought-related impacts. There are typically four types of drought: meteorological, agricultural, hydrological, and socio-economic. Meteorological droughts are typically defined by the level of dryness over a given period of time. Hydrological droughts are defined by the decline of soil/ground water or stream flow or lake/ river levels. Agricultural droughts refer to the impact of low rainfall and storm water or reduced ground water or reservoir levels needed for agriculture. Socio-economic drought considers the impact of drought conditions on supply and demand of some economic goods such as grains.[18, xviii] There are a wide range of effects that can occur from drought, including decreased land prices, loss of wetlands, increased energy demand, and increase of mental health disorders.[xix] Impacts seen in Texas from drought in the past, include wildfires, loss of agricultural crops including rice and wheat fields, and increase in energy cost and demand. [xx]

Expansive Soils

Expansive soils are soils and soft rock that tend to swell or shrink due to changes in moisture content. Expansive soils (bentonite, smectite, or other reactive clays) expand when the soil particles attract water and can shrink when the clay dries. Changes in soil volume present a hazard primarily to structures built on top of expansive soils. In Texas, most expansive soils are in a band 200 miles west of the coastline, stretching approximately from Beaumont to Brownsville. These areas receive the most moisture and are also vulnerable to droughts, which can cause the soils to contract. Problems associated with expansive soils are sinking or broken foundations or ruptured pipelines. In the region, the problems associated with expansive soils typically occur during drought periods.[xxi]

Heat Events

While the National Weather Service defines excessive heat as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks, a Heat Event is more loosely defined. A heat event could be a period where the county experiences high temperatures which could affect residents particularly children and the elderly. According to the National Weather Service, the county particularly in summer months experiences typical daily temperatures more than 90 degrees and humidity more than 75 percent. These high temperatures mixed with high percentage of humidity can affect the elderly and children even though these are not above average temperatures for the county.

Dam/ Levee Failure

Aging infrastructure and increased uncertainty of other natural hazards such as flooding are factors in the rising concern of dam and levee failure. Rising flood levels can create a levee breech or dam failure resulting in flashing flooding within as little as six hours or less. Aging infrastructure and other factors such as debris or melting snow may create a dam failure or levee breach over a greater period of time, weeks to months. The results of a dam failure or levee failure can result in residential and commercial buildings flooded outside of the identified 100 to 500 year floodplain and increase flood water levels during a flood event.[xxii]

There are 90 known dams and levees in Montgomery County. These dams are maintained by public, state, federal, local, or partnering entities. All dams have been classified as 'Low' in the hazard potential classification with the exception of the Lake Conroe Dam. Only the communities at risk of damage from a Lake Conroe Dam failure will be profiled. Those jurisdictions include Unincorporated Montgomery County, Conroe, Oak Ridge North, Shenandoah, The Woodlands, and Woodloch. The remaining jurisdictions participating in this plan are not at risk for dam and failure, and will not be profiled. Cut and Shoot, Magnolia, Panorama Village, Patton Village, Roman Forest, Splendora, Stagecoach, Willis, and Woodbranch Village will not be profiled for dam and levee failure.

References

[i] Texas Division of Emergency Management. (2013, October 15). *State of Texas Hazard Mitigation Plan 2013 Update*. Page 74. Retrieved from https://www.dps.texas.gov/dem/Mitigation/txHazMitPlan.pdf.

[ii] Texas Division of Emergency Management. (2013, October 15). *State of Texas Hazard Mitigation Plan 2013 Update*. Page 259. Retrieved from https://www.dps.texas.gov/dem/Mitigation/txHazMitPlan.pdf.

[iii] NOAA National Severe Storms Laboratory, Flood Basics. Retrieved from www.nssl.noaa.gov/education/svrwx101/floods/.

[iv] National Weather Service. Severe Weather Safety Guide.

[v] US Department of Commerce, NOAA, National Weather Service.(2015, July 23) What Constitutes a Severe Thunderstorm? Retrieved from: www.weather.gov/bmx/outreach_svr.

[vi] US Department of Commerce, NOAA, National Weather Service. (2016, Sept., 21)"What Is a Microburst?" Retrieved from www.weather.gov/bmx/outreach_microbursts.

[vii] *NOAA National Severe Storms Laboratory*, Lightning FAQ, Retrieved from: www.nssl.noaa.gov/education/svrwx101/lightning/faq/

[viii] *NOAA National Severe Storms Laboratory*, Thunderstorm Basics Retrieved from : www.nssl.noaa.gov/education/svrwx101/thunderstorms/.

[ix] NOAA's National Weather Service (2001,Jan.) Retrieved from www.lightningsafety.noaa.gov/.

[x] *NOAA National Severe Storms Laboratory*, Hail Basics. Retrieved from: www.nssl.noaa.gov/education/svrwx101/hail/.

[xi] US Department of Commerce, NOAA, National Weather Service.(2017, June 1) Severe Weather Definitions. Retrieved from: www.weather.gov/bgm/severedefinitions.

[xii] US Department of Commerce, National Oceanic and Atmospheric Administration. (2013, June, 28) What Is a Hurricane? Retrieved from: oceanservice.noaa.gov/facts/hurricane.html.

US Department of Commerce, NOAA, National Weather Service, and NWS Drought Safety Home.

[xiii] Texas Division of Emergency Management. (2013, October 15). *State of Texas Hazard Mitigation Plan 2013 Update*. Page 87. Retrieved from https://www.dps.texas.gov/dem/Mitigation/txHazMitPlan.pdf.

[xiv] NOAA National Severe Storms Laboratory. Tornado Basics. Retrieved from: www.nssl.noaa.gov/education/svrwx101/tornadoes/.

[xv] National Geographic. (2017,Sept. 2017). Tornadoes. *Tornado Facts and Information*. Retrieved from: www.nationalgeographic.com/environment/natural-disasters/tornadoes/.

[xvi] National Parks Service, U.S. Department of the Interior. Wildland Fire: Wildfire Causes | U.S. National Park Service. Retrieved from: www.nps.gov/fire/wildland-fire/learning-center/fire-in-depth/wildfire-causes.cfm.

[xvii] DTS Wildfire. TxWRAP - Home. Retrieved from: texaswildfirerisk.com/.

[18] US Department of Commerce, NOAA, National Weather Service. (2017, June, 1). Severe Weather Definitions. *Retrieved from:* www.weather.gov/bgm/severedefinitions.

[xviii] *National Weather Service*, NWS Drought Types Page Retrieved from: www.nws.noaa.gov/om/drought/types.shtml.
[xix] US Department of Commerce, NOAA, National Weather Service. (2001, January 1) Retrieved from: www.nws.noaa.gov/om/drought/impacts.shtml.
[xx] NPR, "Everything You Need to Know About the Texas Drought. Retrieved from: stateimpact.npr.org/texas/tag/drought.
[xxi] Geology. Expansive Soil and Expansive Clay. Retrieved from: geology.com/articles/expansive-soil.shtml.
[xxii] FEMA. (2017, November 15). Dam Failure Information. www.fema.gov/dam-failure-information

2017

Part 5: Risk Assessment

Part 5: RISK ASSESSMENT

A Vulnerability Assessment is the process of identifying threats by natural hazards to the population and infrastructure. By identifying the greatest vulnerabilities within the County, it becomes possible to develop a Mitigation Strategy that effectively allocates resources for addressing the most serious vulnerabilities. For this assessment, the Planning Team conducted three main processes to identify the vulnerabilities within Montgomery County:

- Cataloging critical and valuable assets within the County.
- Conducting a capability assessment.
- Assessing the County's vulnerability to each hazard and ranking these hazards according to degree of risk.

H-GAC maintains a database of critical facilities. During a public meeting on October 16, 2017, Montgomery County officials reviewed and updated this list, including adding additional valuable assets within the community. Following this process, the Planning Team determined 763 facilities are critical or valuable assets. Through a Hazus analysis, the Planning Team also identified residential and commercial units. Appendix B contains a comprehensive list of the facilities and the capability survey assessment. The full Hazus analysis is catalogued in Appendix C. A summary of the facilities is provided below.

Critical Facilities & Valuable Assets

Asset Description	Quantity
Emergency Operation Centers	14
Medical Facilities and Emergency Rooms	67
Fire Station	63
Police Station	24
Utility, Electrical, and Waste Water Facilities	190
Correctional Facilities	3
College University Campus and Buildings	5
Schools and Daycares	244
Nursing Home	59
Dams	88
Natural Gas Receipt Delivery	2
Brownfields & Superfund Sites	4
Residential Buildings	155,454
Commercial Units	9,600

Risk Assessment Survey

The Planning Team ranked the hazards by scoring the frequency, impact, and vulnerability of each. Impact and vulnerability ratings were weighted more heavily than frequency scores when determining overall risk. Additionally, communities described the loss or damage, and provided specific data that expand on the descriptions provided below.

Frequency Ratings	Impact Ratings	Vulnerability Ratings
Unlikely: Rare and isolated occurrences; Unlikely to occur within the next 5 years.	**Negligible:** Less than 10 percent of property and population impacted in the planning area.	**Low:** Hazard results in little to no damage, and negligible loss of property, services, and no loss of life. Planning area is not vulnerable to this hazard.
Likely: Frequent and regular occurrences; Likely to occur within the next 5 years.	**Limited:** 10 to 25 percent of property and population impacted in the planning area.	**Moderate:** Hazard results in some damage, and moderate loss of property, services, and potentially loss of life. Planning area is moderately vulnerable to this hazard.
Likely: Frequent and regular occurrences; Likely to occur within the next 5 years.	**Significant:** 25 to 75 percent of property and population impacted in the planning area.	**High:** Hazard results in extensive damage, and extensive loss of property, services, and potentially loss of life. Planning area is highly vulnerable to this hazard.
Very Likely: Consistent and predictable occurrences; Likely to occur more than once in the next 5 years.	**Extensive:** 75 to 100 percent of property and population impacted in the planning area.	**Extreme:** Hazard results in catastrophic damage, loss of property, services, and loss of life. Planning area is extremely vulnerable to this hazard.

Hazards Ranked by Risk

Each identified hazard poses a risk to Montgomery County. Ranking the hazards from greatest to lowest risk allows the communities to prioritize their resources and focus efforts where they are most needed.

Risk Rating	Ranking	Hazards
High	1	Flooding
	2	Hurricanes and Tropical Storms
	3	Wildfire
	4	Severe Thunderstorms
Moderate	5	Drought
	6	Lightning
	7	Excessive Heat
	8	Hail
Low	9	Winter Weather
	10	Tornado
	11	Dam and Levee Failure
	12	Expansive Soils

Capability Assessment

The participating jurisdictions completed a capability assessment survey to collect data on hazards that affect communities, the communities' ability to mitigate damages from these hazards, and current plans or programs in place to help mitigate natural hazards. The Planning Team used this information to assess the risk within each community and to determine a strategy to integrate the HMAP into their current planning mechanisms.

HMP: Hazard Mitigation Plan
DRP: Disaster Recovery Plan
CP: Comprehensive Land Use Plan
FMP: Floodplain Management Plan
SMP: Stormwater Management Plan
EOP: Emergency Operations Plan
COOP: Continuity of Operations Plan
REP: Radiological Emergency Plan
SARA: SARA Title III Emergency Response Plan
TP: Transportation Plan
REG-PL: Regional Planning
SO: Subdivision Ordinance
FDPO: Flood Damage Prevention Ordinance
MA: Mutual Aid Agreements
CRS: Community Rating System
CIP: Capital Improvements Plan (that regulates infrastructure in hazard areas)

Jurisdiction	DRP	CP	FMP	SMP	EOP	COOP	REP	SARA	TP	REG	SO	AB	MA	FDPO	CRS	CIP
Unincorporated Brazoria County					x					x		x				
Conroe	x	x	x	x	x	x	x		x	x	x				x	
Cut and Shoot			x		x									x		
Magnolia			x		x						x			x		
Montgomery			x		x						x					x
Oak Ridge North	x	x	x	x	x				x		x			x		x
Panorama Village			x		x						x			x		
Patton Village			x		x				x		x					
Roman Forest	x	x	x	x	x	x		x			x			x		
Shenandoah	x	x		x	x	x			x		x			x		
Splendora	x		x	x	x				x		x					x
Stagecoach			x		x									x		
Willis	x	x	x	x	x	x			x	x	x			x		x
Woodbranch Village	x		x	x	x						x			x		
The Woodlands					x				x		x					x
Woodlock					x				x		x					x

Expand and Improve

All participating jurisdiction examined their existing authorities, policies, programs and resources. Each participating jurisdiction then identified ways to improve upon and expand their existing authorities to support the mitigation strategy.

Jurisdiction	Capability Expansion Opportunities
Unincorporated Montgomery County	Identified their local budget as a factor that decreases their capability to implement mitigation actions and reduce future damages. Montgomery County will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Conroe	Expand and improve their public awareness activities and programs for all of the variety of natural hazards the community faces
Cut and Shoot	Identified an inadequate budget as a factor that decreases their capability to implement mitigation actions and reduce future damages. Cut and Shoot will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Magnolia	Will continue to build upon their community's comprehensive plan- improving infrastructure, transportation and connectivity that will help support the goals of the HMAP
Montgomery	Identified the local budget as a factor that decreases their capability to fund technical staff that can implement the mitigation strategy. Montgomery will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Oak Ridge North	Identified the local budget as a factor that decreases their capability to fund technical staff that can implement the mitigation strategy. Oak Ridge North will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards. .
Panorama Village	Will supplement their local budget by applying for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Patton Village	Identified the local budget as a factor that decreases their capability to fund technical staff that can implement the mitigation strategy. The jurisdiction will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Roman Forest	The jurisdiction will work to apply for state and federal funding for hazard mitigation activities. The community will also host workshops for the community and partners to expand the community's technical capabilities and awareness including drainage and development workshops
Shenandoah	Will supplement their local budget by applying for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Splendora	Local budget is a factor that decreases jurisdiction's capability to fund technical staff that can implement the mitigation strategy. Splendora will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Stage Coach	Work with the county and federal representatives to apply for federal and state funds in order to support hazard mitigation activities and projects
Willis	Expand outreach efforts to enroll more residents in their existing education strategy and to encourage residents to apply for boards and commissions to help the jurisdiction grow in an orderly way.
Woodbranch Village	Will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards. .
The Woodlands	Will supplement their local budget by applying for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Woodloch	Woodloch will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.

2017

Part 6.1: Flooding

6.1 Flooding

Floodplains are the primary tool used by FEMA to determine areas at risk of flooding. The periodic flooding of lands adjacent to rivers, streams, and shorelines is a natural and inevitable occurrence that can be expected based upon established recurrence intervals. The recurrence interval of a flood is the average time interval, in years, that can be anticipated between flood events of a certain magnitude. Using the recurrence interval with land and precipitation modeling, forecasters can estimate the probability and likely location of flooding. These are expressed as floodplains. The most commonly used floodplain measurements are the 100-year floodplain and the 500-year floodplain. The 100-year floodplain has a 1 in 100 chances of flooding each year. The 500-year floodplain is estimated to have a 1 in 500 chances of occurring each year.

Flooding causes widespread and varying degrees of damage. The magnitude or extent of flood damage is expressed by using the maximum depth of flood water during a specific flood event. Structures inundated by 4-feet or more of flood water are considered an absolute loss. Other forms of loss. such as roads, bridges, agriculture, services, or death or injury are also summarized by jurisdiction in this plan.

Historic Occurrences

The National Oceanic and Atmospheric Administration (NOAA) collects historic climate data for the entire nation. NOAA's storm event data can be accessed on the National Climatic Data Center (NCDC) storm events database. A condensed version of the Montgomery County flood events data from 1996 - present is provided in the table below.

Event Year	Fatalities	Property Damage (2015 Dollars)	Crops Damage (2015 Dollars)	Total Damage (2015 Dollars)
1996	0	$ 37,750.00	$ -	$ 37,750.00
1997	0	$ 7,400.00	$ -	$ 7,400.00
1997	0	$ 37,000.00	$ -	$ 37,000.00
1997	0	$ 14,800.00	$ -	$ 14,800.00
1997	0	$ 7,400.00	$ -	$ 7,400.00
1998	0	$ 29,000.00	$ -	$ 29,000.00
1998	0	$ -	$ -	$ -
1998	0	$ 5,800.00	$ -	$ 5,800.00
1998	0	$ 2,900.00	$ -	$ 2,900.00
1998	0	$ 21,750.00	$ -	$ 21,750.00
1998	0	$ 108,750.00	$ -	$ 108,750.00
1998	0	$ -	$ -	$ -
1998	0	$ 14,500.00	$ -	$ 14,500.00
1998	0	$ 29,000.00	$ -	$ 29,000.00
1998	0	$ 14,500.00	$ -	$ 14,500.00
1998	0	$ 14,500.00	$ -	$ 14,500.00
1998	0	$ 14,500.00	$ -	$ 14,500.00
1998	0	$ 7,250.00	$ -	$ 7,250.00
2000	0	$ 20,700.00	$ -	$ 20,700.00
2000	0	$ 69,000.00	$ -	$ 69,000.00
2000	0	$ 34,500.00	$ -	$ 34,500.00
2001	0	$ -	$ -	$ -
2001	0	$ -	$ -	$ -
2001	0	$ 33,500.00	$ -	$ 33,500.00

2001	0	$ 5,360.00	$ -	$ 5,360.00
2002	0	$ 33,000.00	$ -	$ 33,000.00
2003	0	$ 32,250.00	$ -	$ 32,250.00
2004	0	$ 3,750.00	$ -	$ 3,750.00
2004	0	$ 31,250.00	$ -	$ 31,250.00
2005	0	$ 6,050.00	$ -	$ 6,050.00
2006	0	$ 3,540.00	$ -	$ 3,540.00
2006	0	$ 36,580.00	$ -	$ 36,580.00
2006	0	$ 112,100.00	$ -	$ 112,100.00
2006	0	$ 59,000.00	$ -	$ 59,000.00
2006	0	$ 17,700.00	$ -	$ 17,700.00
2006	0	$ 8,260.00	$ -	$ 8,260.00
2007	0	$ -	$ -	$ -
2007	0	$ 5,700.00	$ -	$ 5,700.00
2008	0	$ 165,000.00	$ -	$ 165,000.00
2009	0	$ 825,000.00	$ -	$ 825,000.00
2009	0	$ 5,500.00	$ -	$ 5,500.00
2012	0	$ 3,090.00	$ -	$ 3,090.00
2012	0	$ -	$ -	$ -
2012	0	$ 3,090.00	$ -	$ 3,090.00
2012	0	$ 3,090.00	$ -	$ 3,090.00
2013	0	$ 2,000,000.00	$ 5,000.00	$ 2,005,000.00
2014	0	$ -	$ -	$ -
2015	0	$ -	$ -	$ -
2015	0	$ -	$ -	$ -
2016	0	$ 2,970,000.00	$ -	$ 2,970,000.00
2016	0	$ -	$ -	$ -
2016	0	$ 49,500.00	$ 29,700.00	$ 79,200.00
2017	3	$ 7,000,000,000.00	$ 10,000.00	$ 7,000,010,000.00

Source: https://www.ncdc.noaa.gov/stormevents/

Montgomery County Disaster Declarations

There have been six federally declared flood disasters Montgomery County since 1953. These events are considered the most significant flood events in Montgomery County's recent history.

Declaration Date	Title	Disaster Number
07/11/1973	SEVERE STORMS & FLOODING	398
09/25/1979	SEVERE STORMS & FLOODING	603
10/18/1994	SEVERE THUNDERSTORMS AND FLOODING	1041
10/21/1998	TX-FLOODING 10/18/98	1257
04/25/2016	SEVERE STORMS AND FLOODING	4269
06/11/2016	SEVERE STORMS AND FLOODING	4272

Source: https://www.FEMA.gov/

NFIP Participation

The National Flood Insurance Program (NFIP) is a voluntary program that aims to reduce the impacts of flooding by incentivizing communities to adopt and enforce floodplain management regulations. The NFIP provides affordable flood insurance for property owners, renters, and businesses in participating communities. This reduces the socio-economic impacts of flooding on communities through risk reduction via flood insurance and reduces the physical impacts of flooding through beneficial floodplain regulation. To participate in the NFIP, you must have a Certified Floodplain Manager (CFM) in charge of documenting and regulating the floodplain. In some instances, the Montgomery County CFM also serves as the CFM for the smaller jurisdictions. The cities of Cut of Shoot, Panorama Village, Patton Village, Shenandoah, Splendora, and Woodloch utilize the County CFM.

Jurisdiction	Certified Floodplain Manager

Montgomery County **CFM: Mark Mooney**

Permit review and inspections, enforcement of floodplain management regulations adopted on 7/14/14, consult with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

City of Conroe **CFM: Ann Tran**

Permit review and inspections, enforcement of Chapter 78 ordinance adopted on 7/24/14, consulting with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

City of Cut and Shoot **CFM: Mark Mooney**

Permit review and inspections, enforces floodplain ordnance that was adopted on 5/26/07, and consulting with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

City of Magnolia **CFM: Paul Mendes**

The City reviews all permit applications for flood plain areas. The City Council has updated the Flood Plain Ordonnance to require all slabs to be 18" above BFE of crest of roads. City of Magnolia Unified Development Code Chapter 5 5-3 & 5-4, 5-3-2.03 Special Flood Hazards Standards. City of Magnolia Ordinance 0-2017-032.

City of Montgomery **CFM: Jack Yates**

Permit review and inspections as well as consulting with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

City of Oak Ridge North **CFM: Deborah Capaccioli**

Permit review and inspections as well as consulting with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and emergency management. Enforcement of Ordinance No 41-2014 adopted on 7/28/14.

City of Panorama Village **CFM: Mark Mooney**

Works with the county to remain in compliance. Permit review and inspections, enforcement of floodplain management regulations adopted on 7/14/14, consult with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

City of Patton Village **CFM: Mark Mooney**

Works with the county to remain in compliance. Permit review and inspections, enforcement of floodplain management regulations adopted on 7/14/14, consult with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

City of Roman Forest **CFM: Liz Mullane**

The City Secretary and the City Administrator work together for issuing permits for rebuilding flooded homes by issuing permits and explaining all the requirements to the residents that are rebuilding. The city has contracted out the inspections to Bureau Veritas. Bureau Veritas works with the city to make sure everyone is in compliance with our Ordinances.

City of Shenandoah **CFM: Mark Mooney**

Works with the county to remain in compliance. Permit review and inspections, enforcement of floodplain management regulations adopted on 7/14/14, consult with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

City of Splendora **CFM: Mark Mooney**

Works with the county to remain in compliance. Permit review and inspections, enforcement of floodplain management regulations adopted on 7/14/14, consult with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

City of Stagecoach **CFM: Brenda Rutt**

Permit review and inspections, enforcement of floodplain management prevention ordinance No. 0-2014-258 and was adopted on 5/20/14.

City of Willis **CFM: John Mangiameli**

Flood Damage Prevention Ordinance # 14-0715 updated in July 2014 with the coordination of FEMA. Conduct permit and plan reviews, elevation certificates, inspections, and GIS work.

City of Woodbranch **CFM: Charlotte Smith**

Conduct permit review and inspections, and enforcement of Flood Damage Prevention ordinance #231 that was adopted on August 5, 2014.

Town of Woodloch **CFM: Mark Mooney**

Works with the county to remain in compliance. Permit review and inspections, enforcement of floodplain management regulations adopted on 7/14/14, consult with residents on drainage problems. Conducts outreach, GIS, floodplain determinations, site inspections, and engineering capabilities.

The Woodlands **CFM: Alan Benson**

The Woodlands, while not included in this list, does participate in the NFIP. The Woodlands was built as an unincorporated master-planned community within Montgomery County and the extra-territorial jurisdiction of the City of Houston. The Woodlands participation in the NFIP program is through Montgomery County due their unique situation as a Township. The Woodlands does not have a Community ID number assigned to them through the NFIP program, but participate through Montgomery County.

Repetive Loss Properties

Consistent and destructive flooding is one of Montgomery County's greatest challenges. Many NFIP insured properties have flooded multiple times. Repetitive loss properties (RL) are those that have received at least two insurance payments of $1,000 or more from the NFIP within the last 10 years. Montgomery County has a total of 1,356 RL properties, and 376 severe repetitive loss properties totaling $177,892,291.82 in insurance payouts in the past decade. A comprehensive list of all RL properties are located in Appendix D.

Jurisdiction	Total Paid Total
City of Conroe	$ 5,130,252.67
City of Cut and Shoot	$ 152,826.24
City of Magnolia	$ 120,136.42
Montgomery County	$ 166,069,208.53
City of Montgomery	$ 70,127.30
City of Oak Ridge North	$ 828,192.25
City of Panorama Village	$ 405,316.17
City of Patton Village	$ 617,458.81
City of Roman Forest	$ 484,541.22
City of Shenandoah	$ 224,473.04
City of Splendora	$ 462,127.83
Stagecoach	$ 278,016.15
Willis	$ 73,913.44
Woodbranch	$ 2,531,449.31
Woodloch	$ 444,252.44

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders, FEMA, NOAA, and the Department of Homeland Security (DHS) are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- FEMA's Hazus analysis software
- GIS analysis of critical facilities in the floodplain; and
- Stakeholder identified vulnerabilities.

Hazus was used to determine the economic loss and calculate the buildings stock that's at risk of flooding in Montgomery County. Shelter needs were also projected using this method. The complete HAZUS report is in Appendix C. H-GAC maintains a database of critical facilities in Montgomery County. Using GIS, this plan identifies any critical assets located within the 500-year floodplain. Stakeholders then provided valuable insight into additional vulnerabilities within their communities. These findings are provided in condensed charts for each jurisdiction.

Montgomery County (All participating jurisdictions)

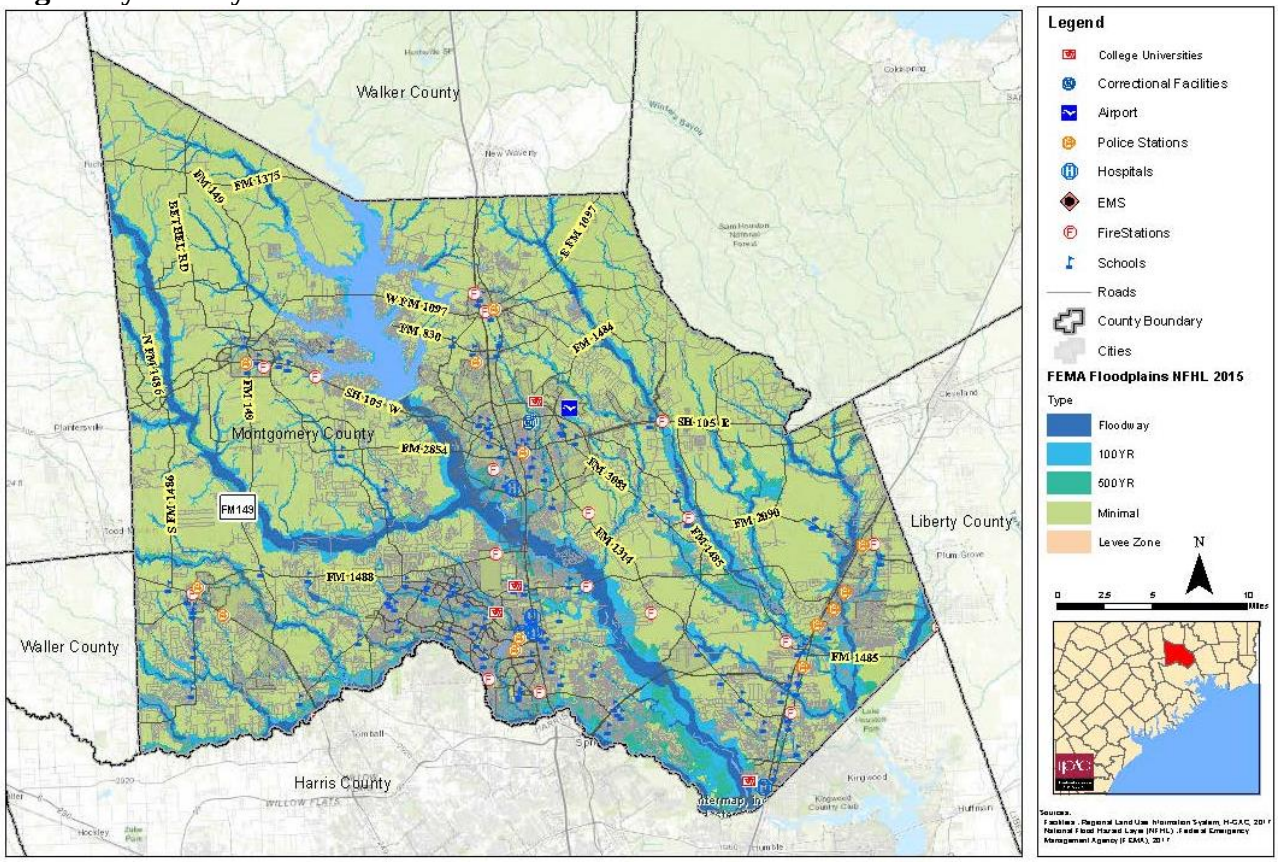
Identified Vulnerabilities:

- Individuals who reside or work within the 100 year or 500 year floodplain
- Communities without emergency shelters, local hospitals, or fire stations- relying on the county or larger jurisdiction for emergency services/ response
- Local or national business owners whose shops or commercial property flood
- Industrial sites located throughout the county

Identified Impacts:

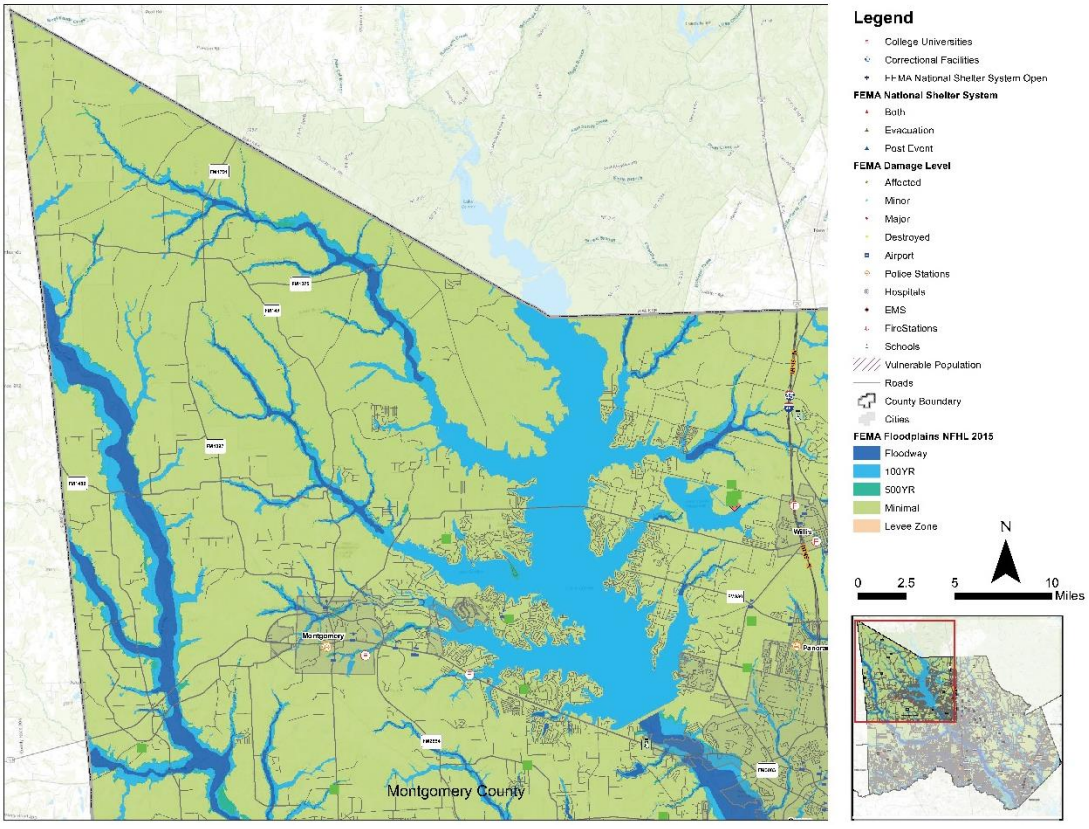
- Major roadways blocked by floodwaters may create an increase of serious injuries or loss of life due to responders not being able to reach those injured or in danger
- Lack of shelters and emergency responders throughout the county may lead to an increase in response time which may lead to a loss of life or serious injury
- Economic and financial loss for cities and individuals including property loss and loss of economic activity from loss of major employers including industrial and commercial activities

Montgomery County

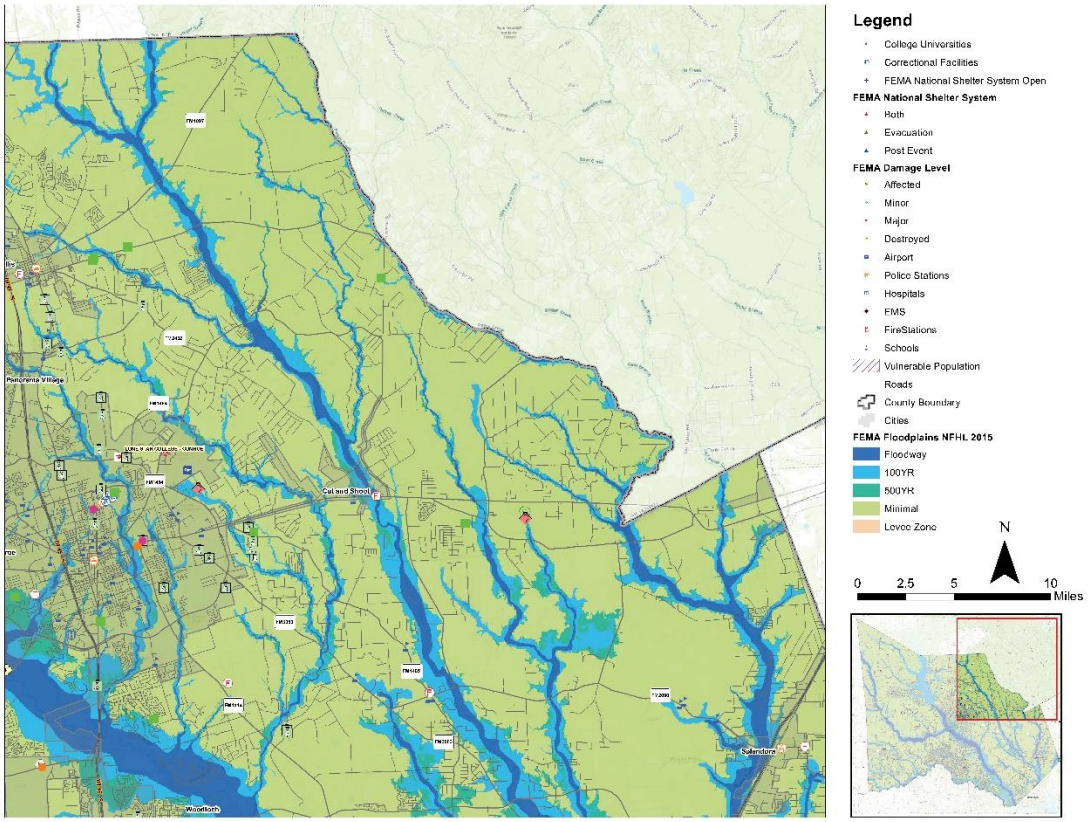


Higher resolution image located in Appendix B

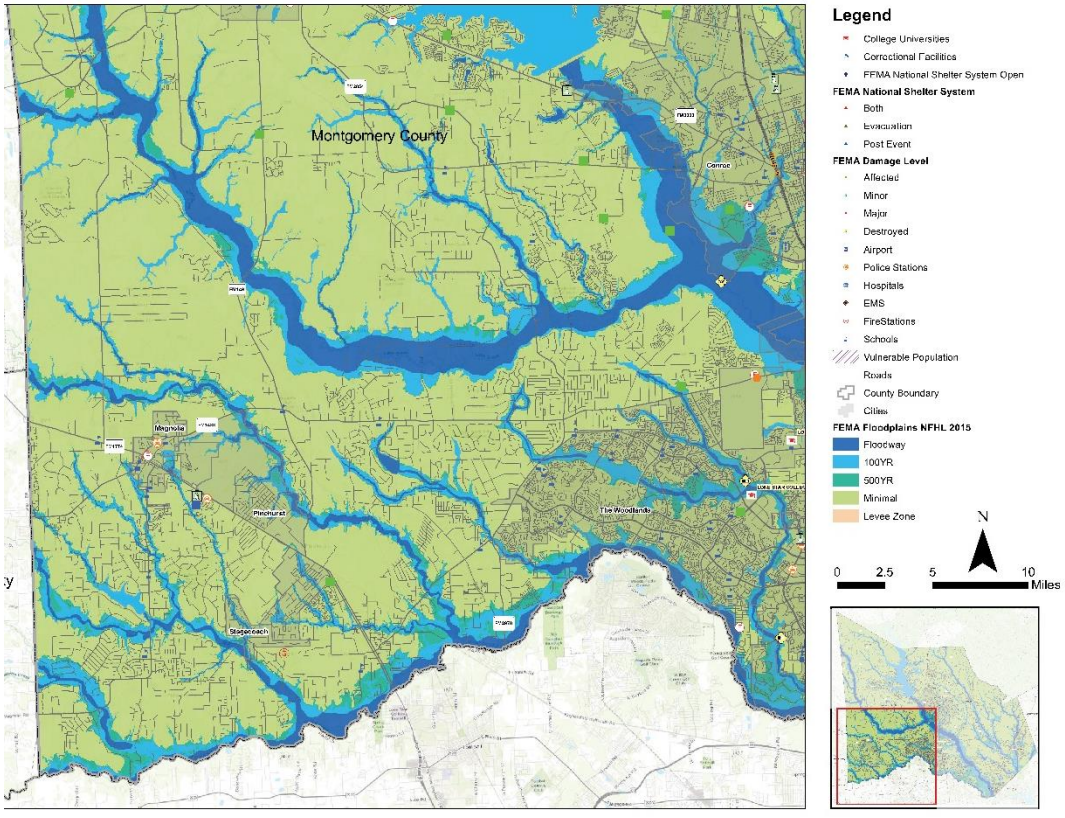
Montgomery County: Northwest County Map



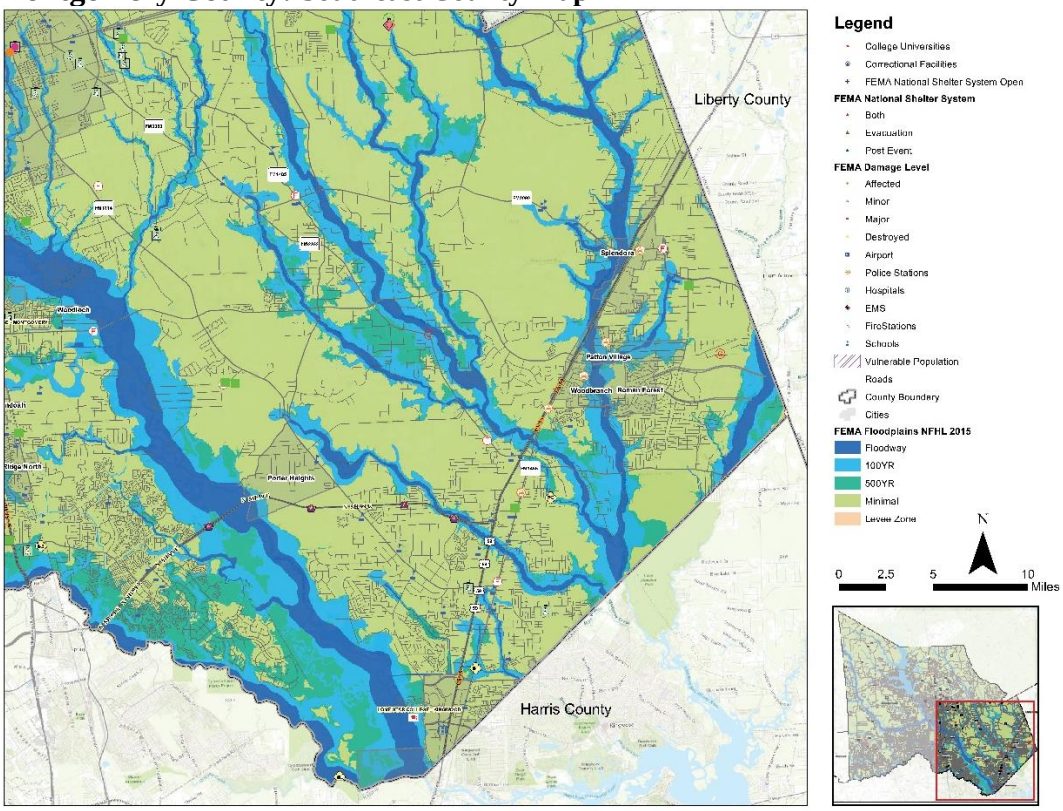
Montgomery County: Northeast County Map



Montgomery County: Southwest County Map



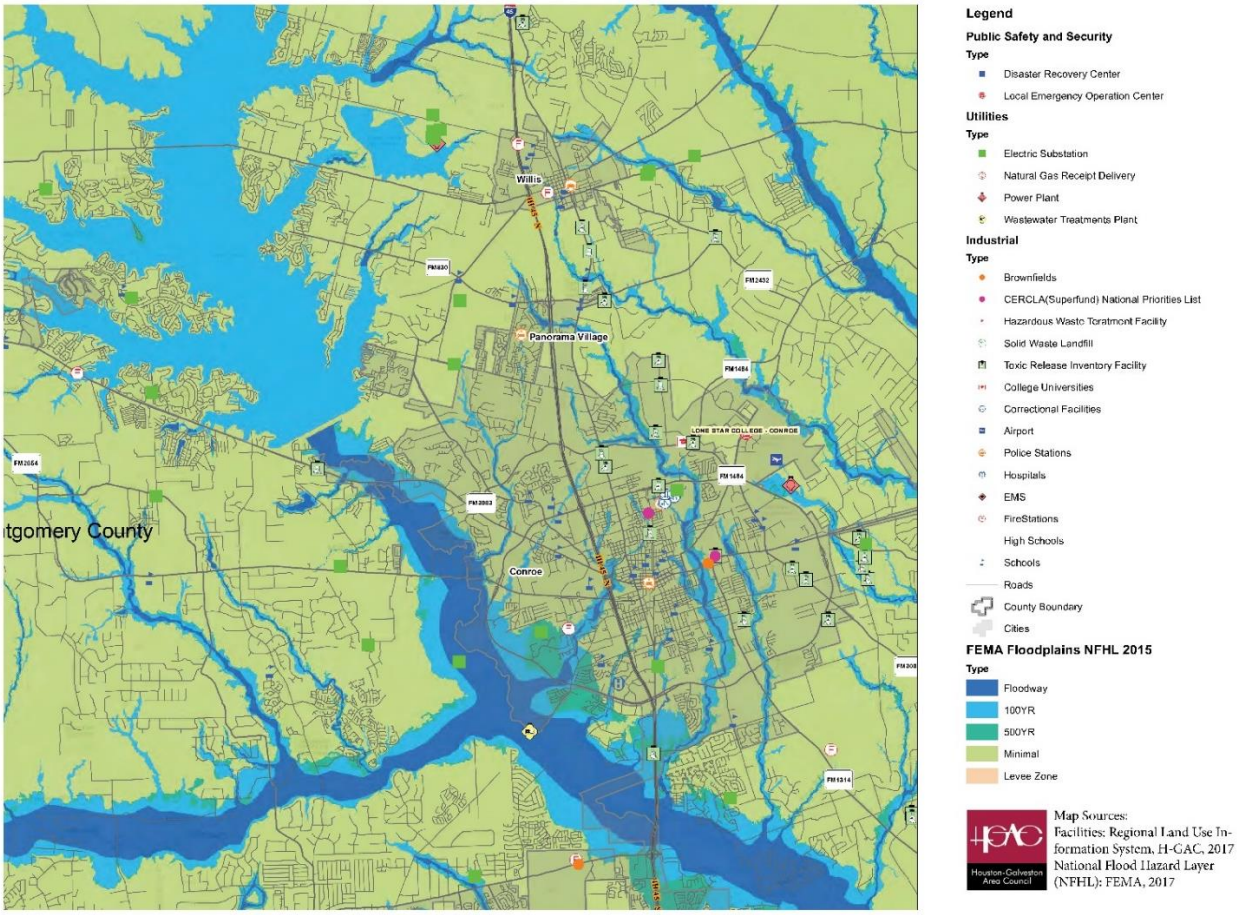
Montgomery County: Southeast County Map



Montgomery County			
Planning Area (Sq. mi):	935.3	**Occurrences since 1996:**	32
Area Affected:	22.5%	**Annual Event Average:**	1.5
Probability of Occurring in the next 5 years:	Very likely; 7.6 events estimated to occur within next 5 years.		
Greatest Occurrence:	30' of flood water over roadways and 3 deaths during Hurricane Harvey flooding.		
Extent:	Up to 35' of flood water over roadways, and up to 16' of flood water in homes		

Vulnerability	Impact
Hazus estimated that 847 homes and commercial structures would be destroyed during a 500-year event.	$1,025 million in direct property damage, and $3 million in business interruption loss.
19 roadways were flooded and impassible during Harvey.	Potential loss of life and damage to vehicles if residents or emergency responders try to drive on flooded roadways.
1 fire station located in the 500-year floodplain, and 3 schools are in the 500-year floodplain.	Costly to repair and educational services would be disrupted.
Communication equipment in county facilities is not elevated.	Communication and emergency response efforts would be ruined during a major flood event.
Hazus estimates that 17,938 persons seeking temporary shelter, and there will be 7,379 displaced households.	Displaced households and individuals cannot be safely housed during major flood events.

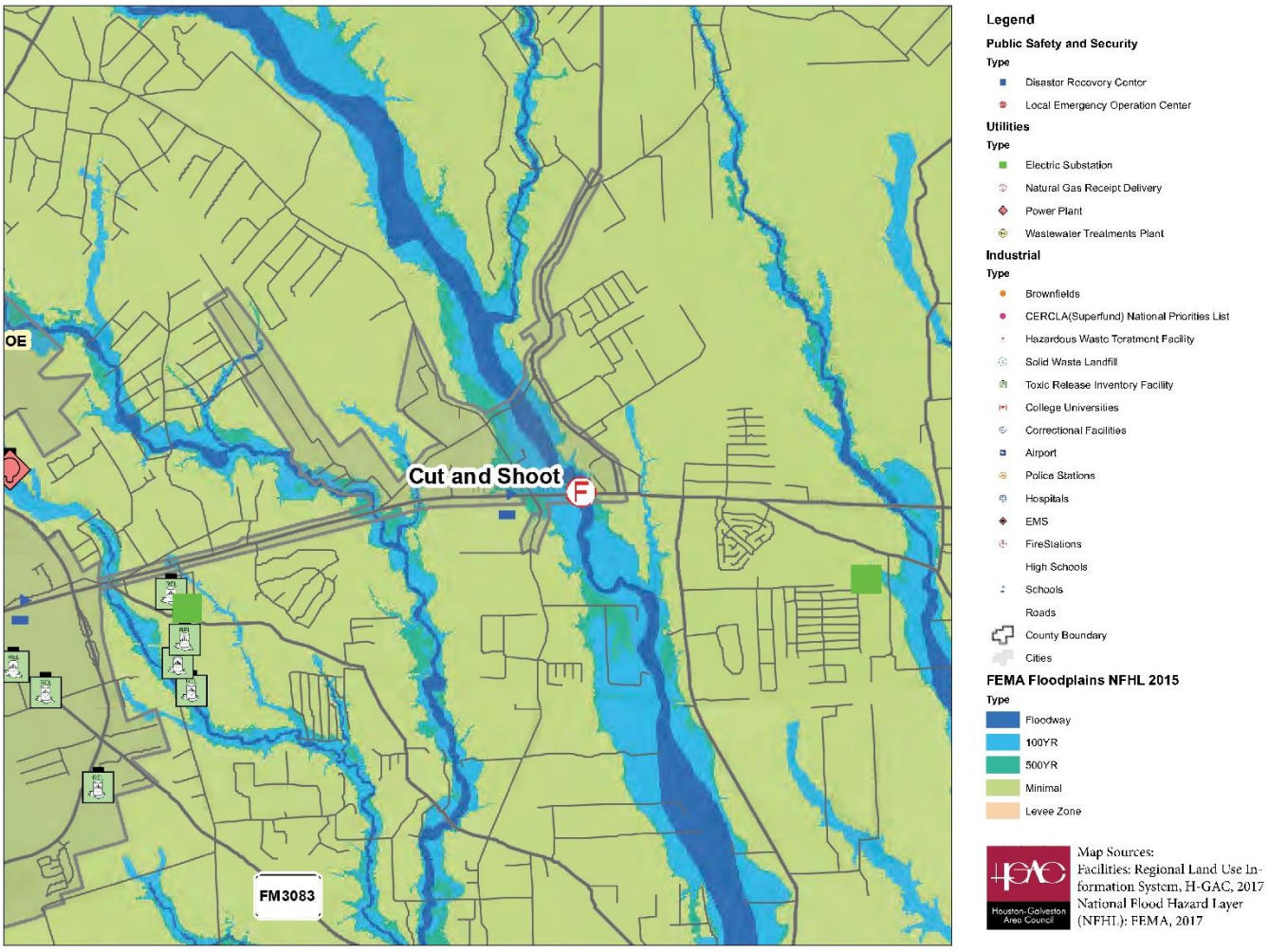
Conroe



Conroe			
Planning Area (Sq. mi):	72	**Occurrences since 1996:**	17
Area Affected:	21.5%	**Annual Event Average:**	0.8
Probability of Occurring in the next 5 years:	Very likely; 4 events estimated to occur within next 5 years.		
Greatest Occurrence:	14' of flood water in homes Over 800 homes were damaged by flooding in 2017		
Extent:	Up to 18' of flood water in homes		

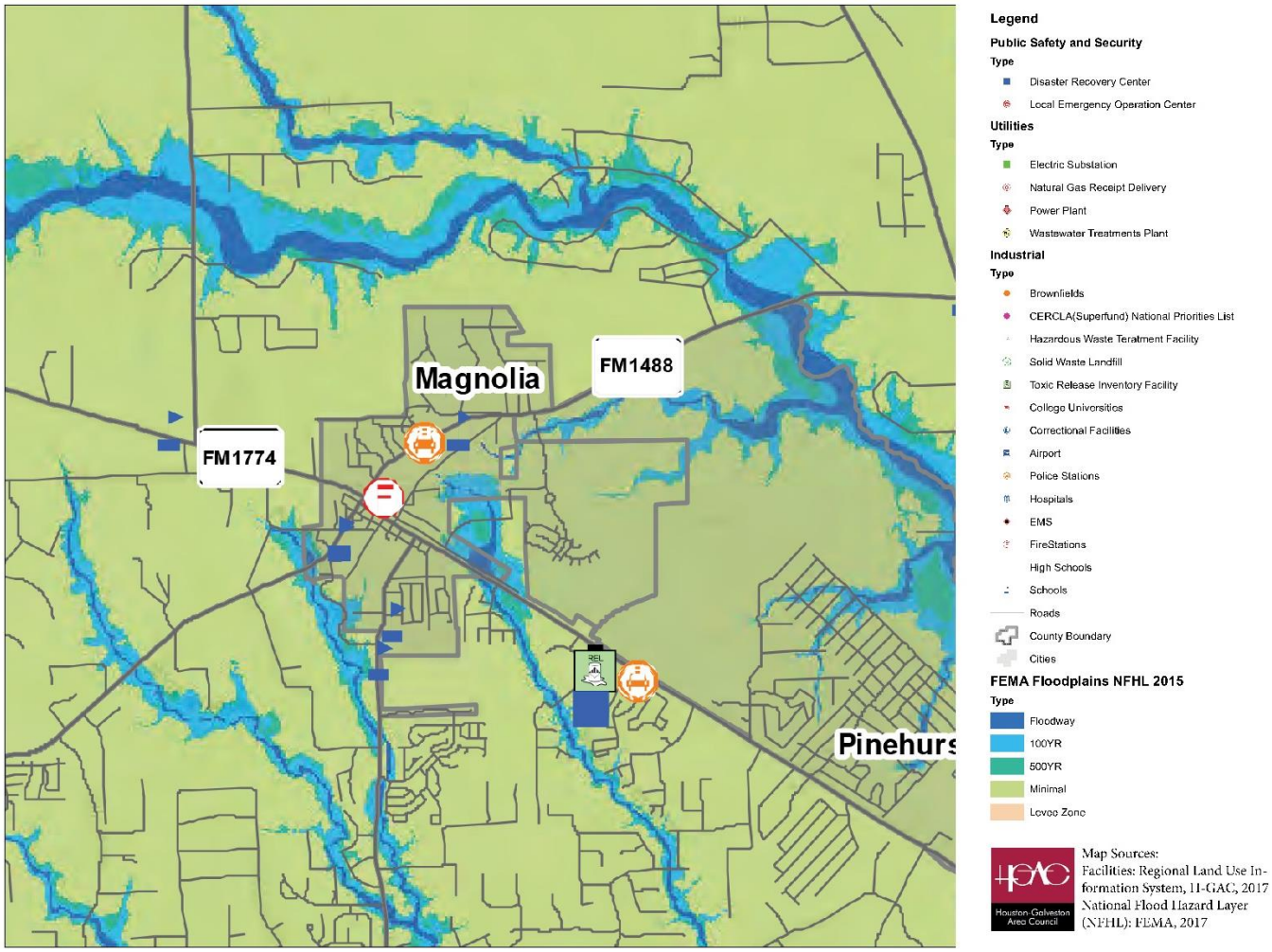
Vulnerability	Impact
2 electric substations located in the floodplain.	Disruption of services during major flood event could result in loss of life, and costly repairs.
2 designated shelters located in the floodplain.	Displaced households and individuals cannot be safely housed during major flood events.
2 schools located in the floodplain.	Costly to repair and educational services would be disrupted.
1 hospital located in the floodplain.	Disruption of services during major flood event could result in loss of life.
1 sewer facility was flooded during Hurricane Harvey.	Costly to repairs and loss of sanitary sewage services could result in illness and facility damage.

Cut and Shoot



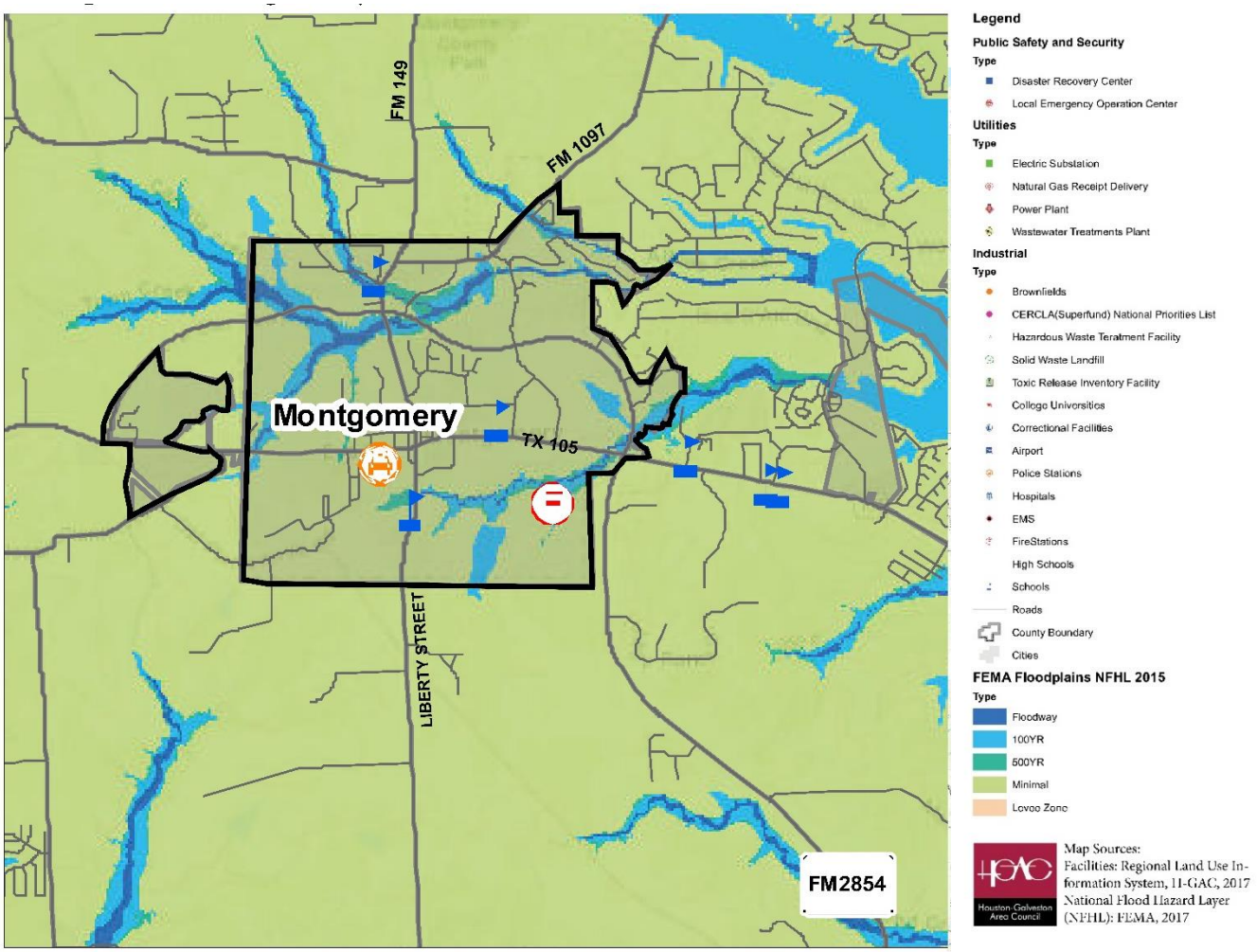
Cut and Shoot			
Planning Area (Sq. mi):	2.7	**Occurrences since 1996:**	15
Area Affected:	16.5%	**Annual Event Average:**	0.7
Probability of Occurring in the next 5 years:	Very likely; 3.5 events estimated to occur within next 5 years.		
Greatest Occurrence:	5.2' of flood water over roadways		
Extent:	Up to 8' of flood water over roadways, and up to 4' of flood water in homes		
Vulnerability		**Impact**	
371 residences are at risk of flood damage during a 500-year event.		Displaced residents cannot be safely housed during major flood events, and repairs would be costly.	

Magnolia



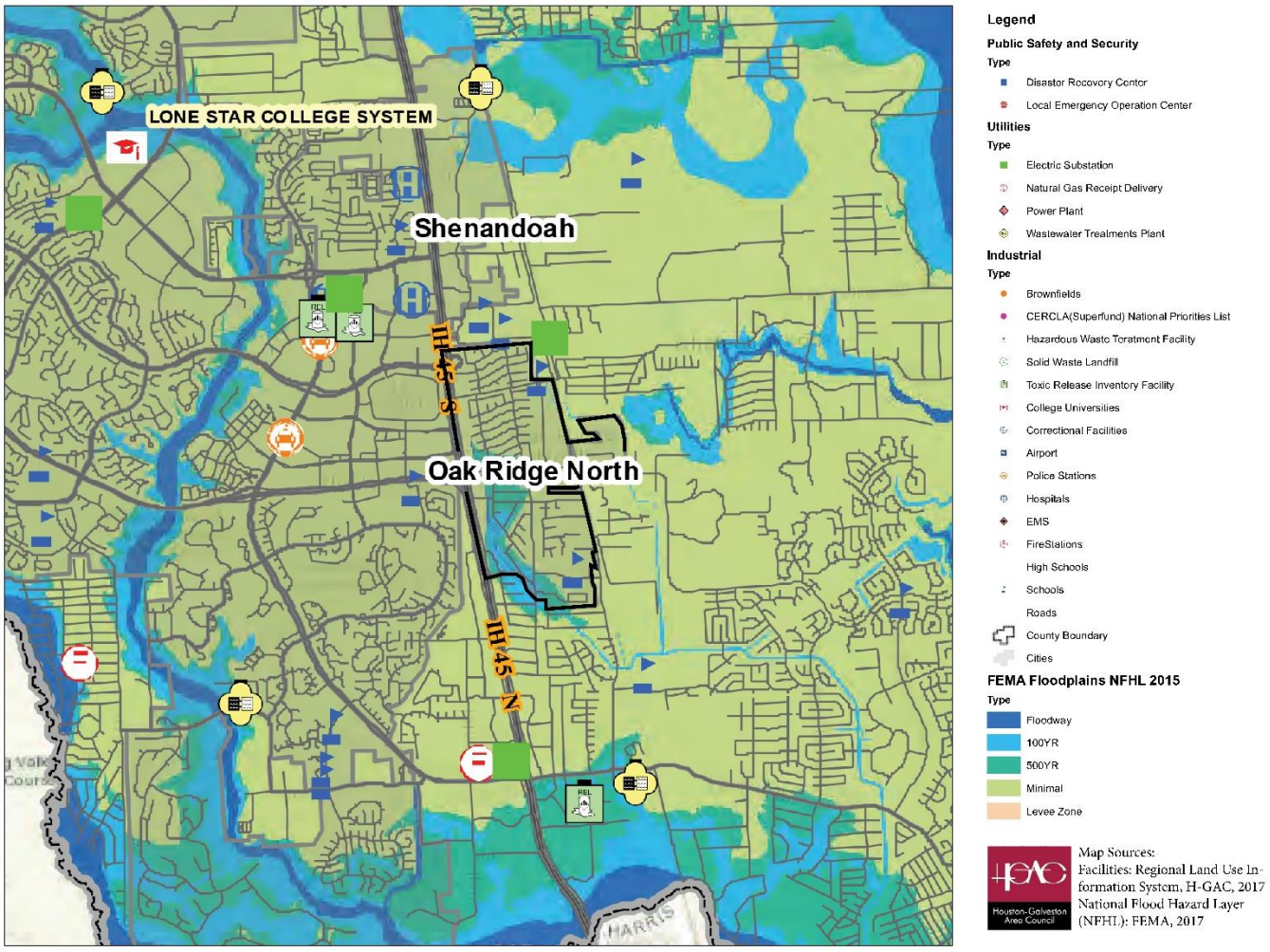
Magnolia			
Planning Area (Sq. mi):	2.8	**Occurrences since 1996:**	15
Area Affected:	4.9%	**Annual Event Average:**	0.7
Probability of Occurring in the next 5 years:	Very likely; 3.5 events estimated to occur within next 5 years.		
Greatest Occurrence:	2.52' high water mark recorded during Hurricane Harvey		
Extent:	Up to 5' of flood water in homes		
Vulnerability		**Impact**	
23 residences are at risk of flood damage during a 500-year event.		Displaced residents cannot be safely housed during major flood events, and repairs would be costly.	

Montgomery



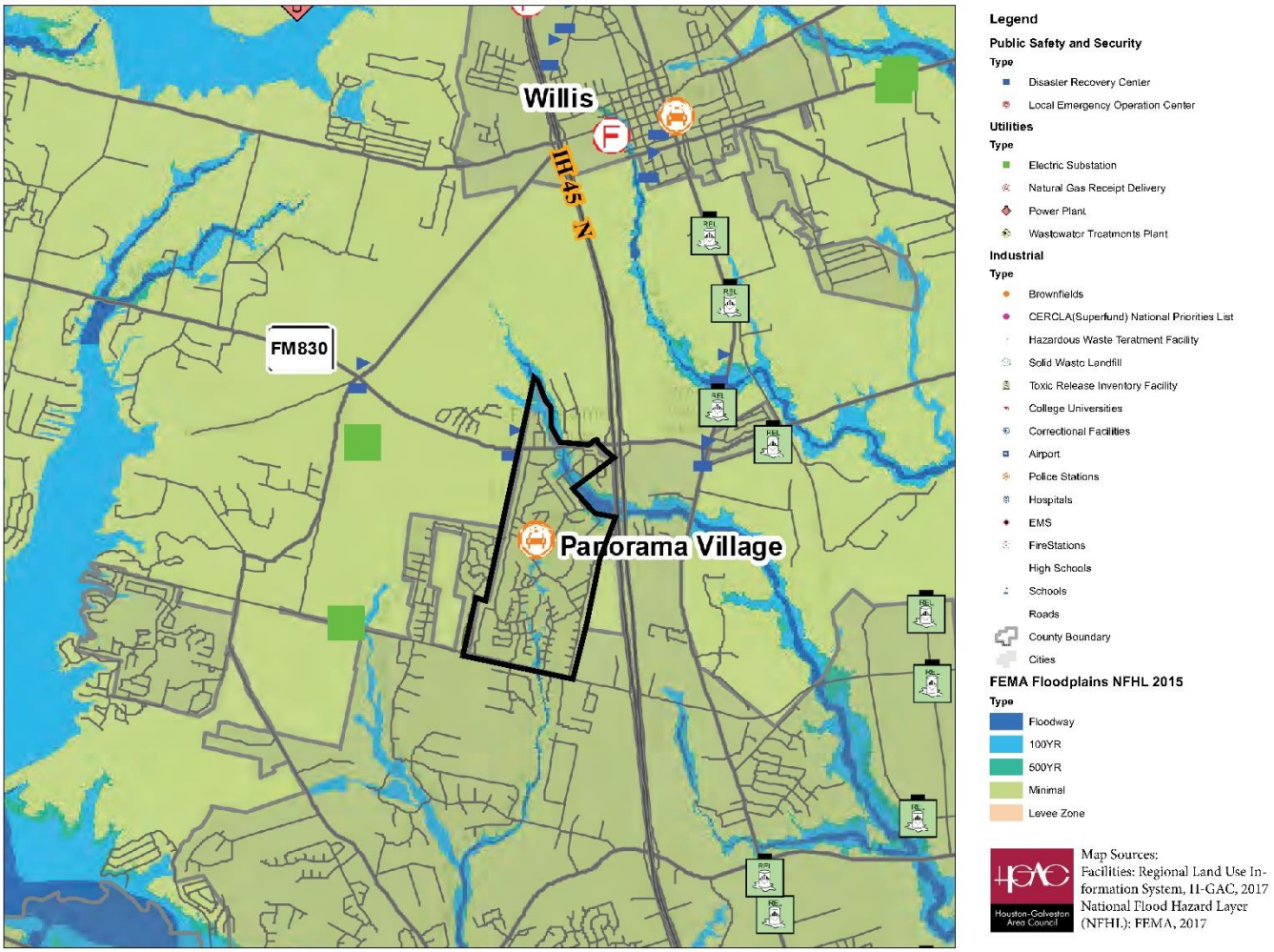
Montgomery			
Planning Area (Sq. mi):	4.6	**Occurrences since 1996:**	15
Area Affected:	11.2%	**Annual Event Average:**	0.7
Probability of Occurring in the next 5 years:	Very likely; 3.5 events estimated to occur within next 5 years.		
Greatest Occurrence:	All roads in/out of the city were flooded during Hurricane Harvey 8' of flood water in a city facility.		
Extent:	Up to 10' of flood water over roadways, and up to 12' of flood water in city facilities.		
Vulnerability		**Impact**	
23 residences are at risk of flood damage during a 500-year event.		Displaced residents cannot be safely housed during major flood events, and repairs would be costly.	

Oak Ridge North



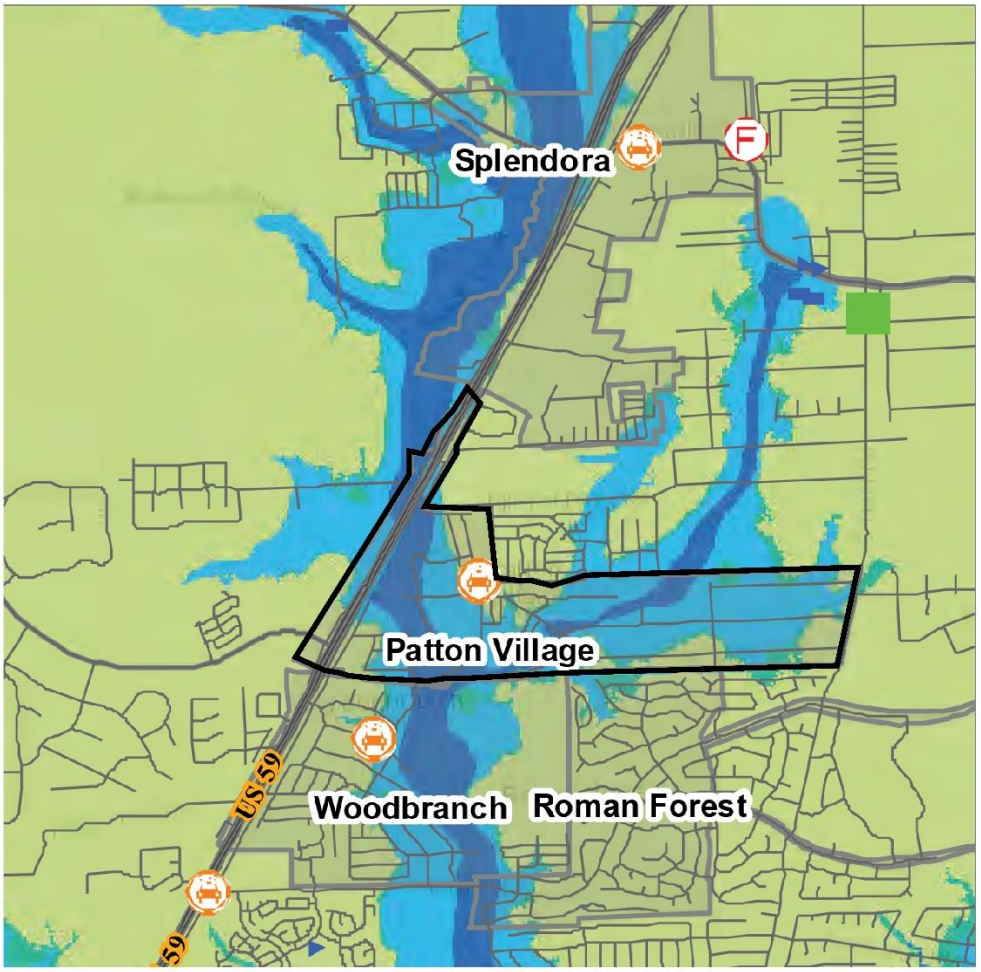
Oak Ridge North			
Planning Area (Sq. mi):	1.1	**Occurrences since 1996:**	14
Area Affected:	9.7%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	5.69' of flood water over roadways		
Extent:	Up to 10' of flood water over roadways, and 4' high water mark in homes.		
Vulnerability		**Impact**	
97 residences at risk of flooding during a 500-year event		Displaced residents cannot be safely housed during major flood events, and repairs would be costly.	

Panorama Village



Panorama Village			
Planning Area (Sq. mi):	1.1	**Occurrences since 1996:**	14
Area Affected:	21.0%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	1.25' of flood water over roadways		
Extent:	Up to 5' of flood water over roadways, and 2' of flood water in homes.		
Vulnerability		**Impact**	
185 residences are at risk of flooding during a 500-year event.		Displaced residents cannot be safely housed during major flood events, and repairs would be costly.	

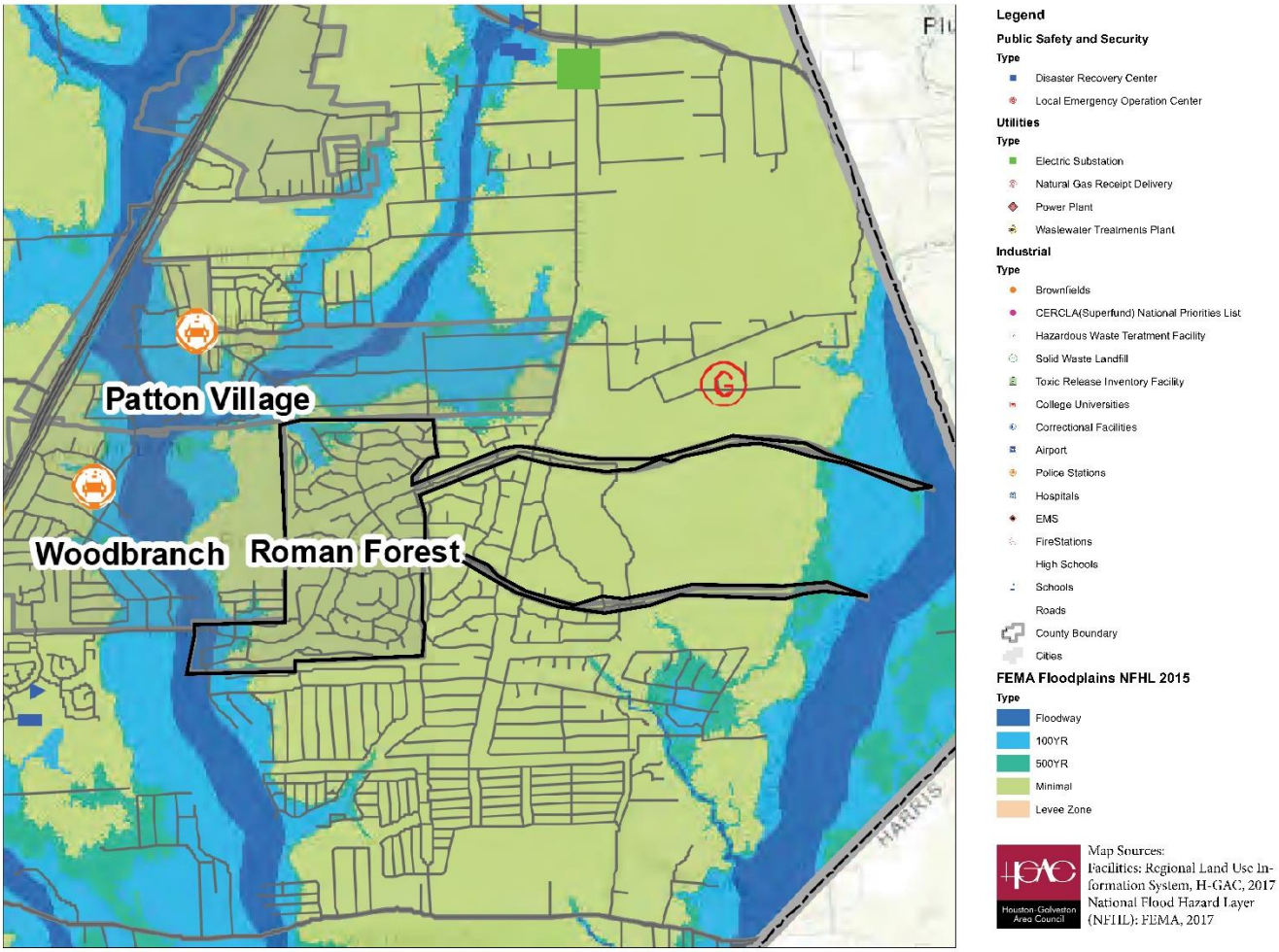
Patton Village



Patton Village			
Planning Area (Sq. mi):	2.1	**Occurrences since 1996:**	14
Area Affected:	92.0%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	4' of flood water in homes 8' of flood water in city facility		
Extent:	Up to 8' of flood water in homes, and 12' in city facilities.		

Vulnerability	Impact
312 residences at risk of flooding during 500-year event	Displaced residents cannot be safely housed during major flood events, and repairs would be costly.
1 sewer facility located in the 500-year floodplain	Costly to repairs and loss of sanitary sewage services could result in illness and facility damage.

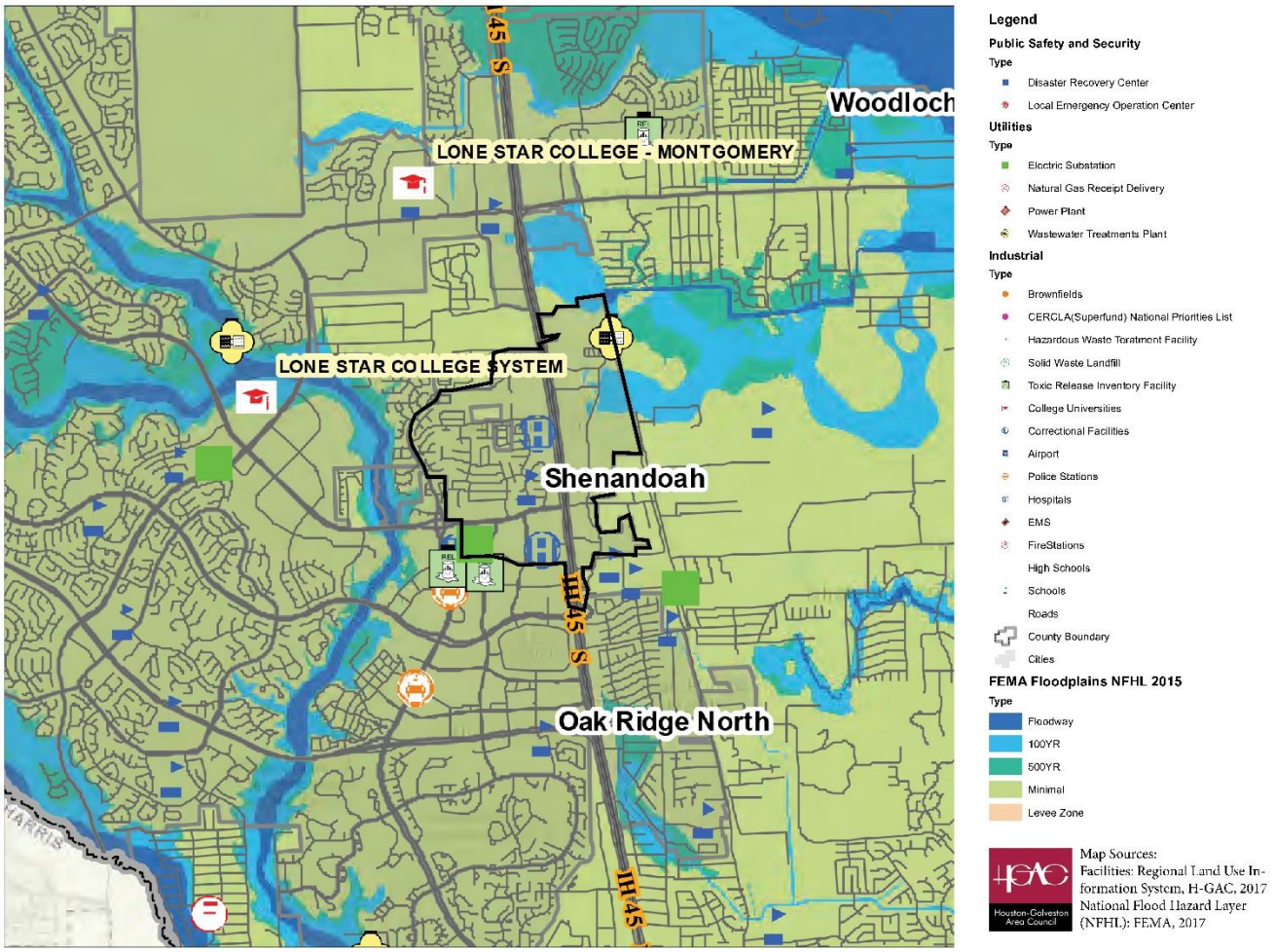
Roman Forest



Roman Forest			
Planning Area (Sq. mi):	1.5	**Occurrences since 1996:**	14
Area Affected:	7.4%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	4.8' high water mark during Hurricane Harvey		
Extent:	Up to 4' of flood water in homes, and 10' high water marks		

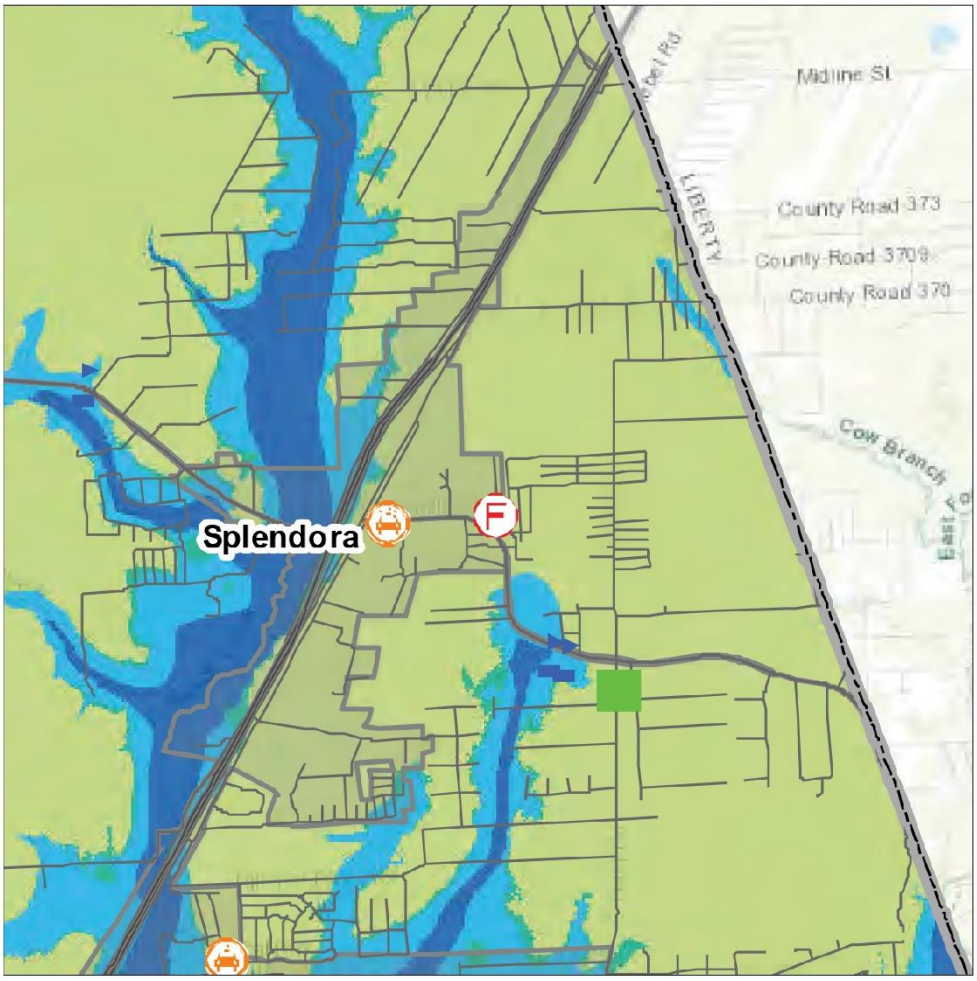
Vulnerability	**Impact**
36 residences at risk of flooding during 500-year event	Displaced residents cannot be safely housed during major flood events, and repairs will be costly.

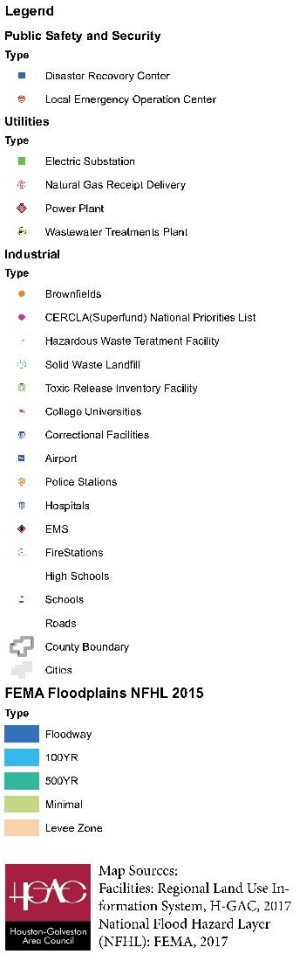
Shenandoah



Shenandoah			
Planning Area (Sq. mi):	1.3	**Occurrences since 1996:**	14
Area Affected:	3.4%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	4' of flood water in homes		
Extent:	Up to 8' of flood water in homes		
Vulnerability		**Impact**	
29 residences at risk of flooding during 500-year event		Displaced residents cannot be safely housed during major flood events, and repairs will be costly.	

Splendora

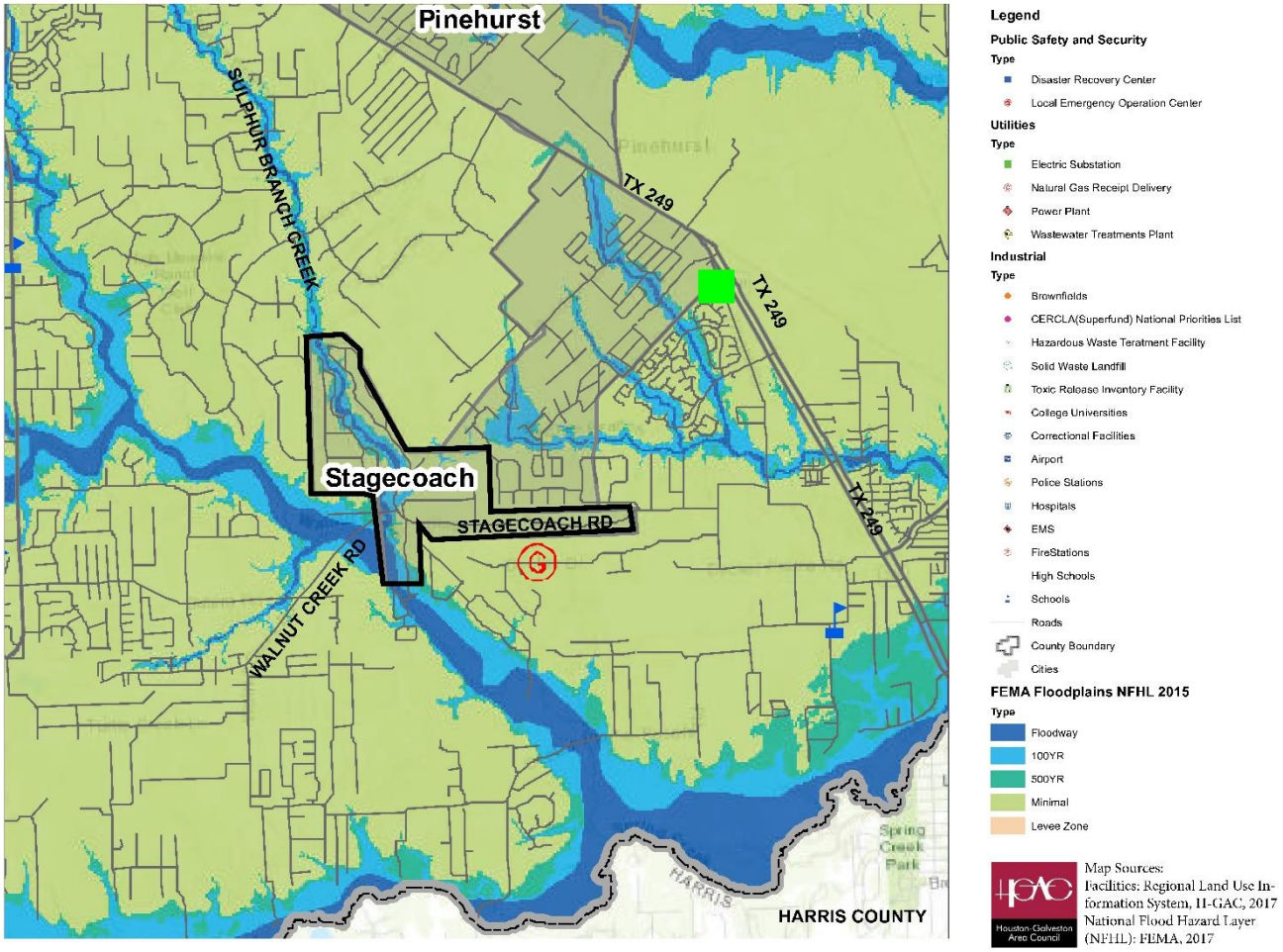




Splendora			
Planning Area (Sq. mi):	2.1	**Occurrences since 1996:**	14
Area Affected:	14.8%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	5' of flood water over roadways		
Extent:	Up to 8' of flood water over roadways		

Vulnerability	**Impact**
71 residences at risk of flooding during 500-year event	Displaced residents cannot be safely housed during major flood events, and repairs will be costly.

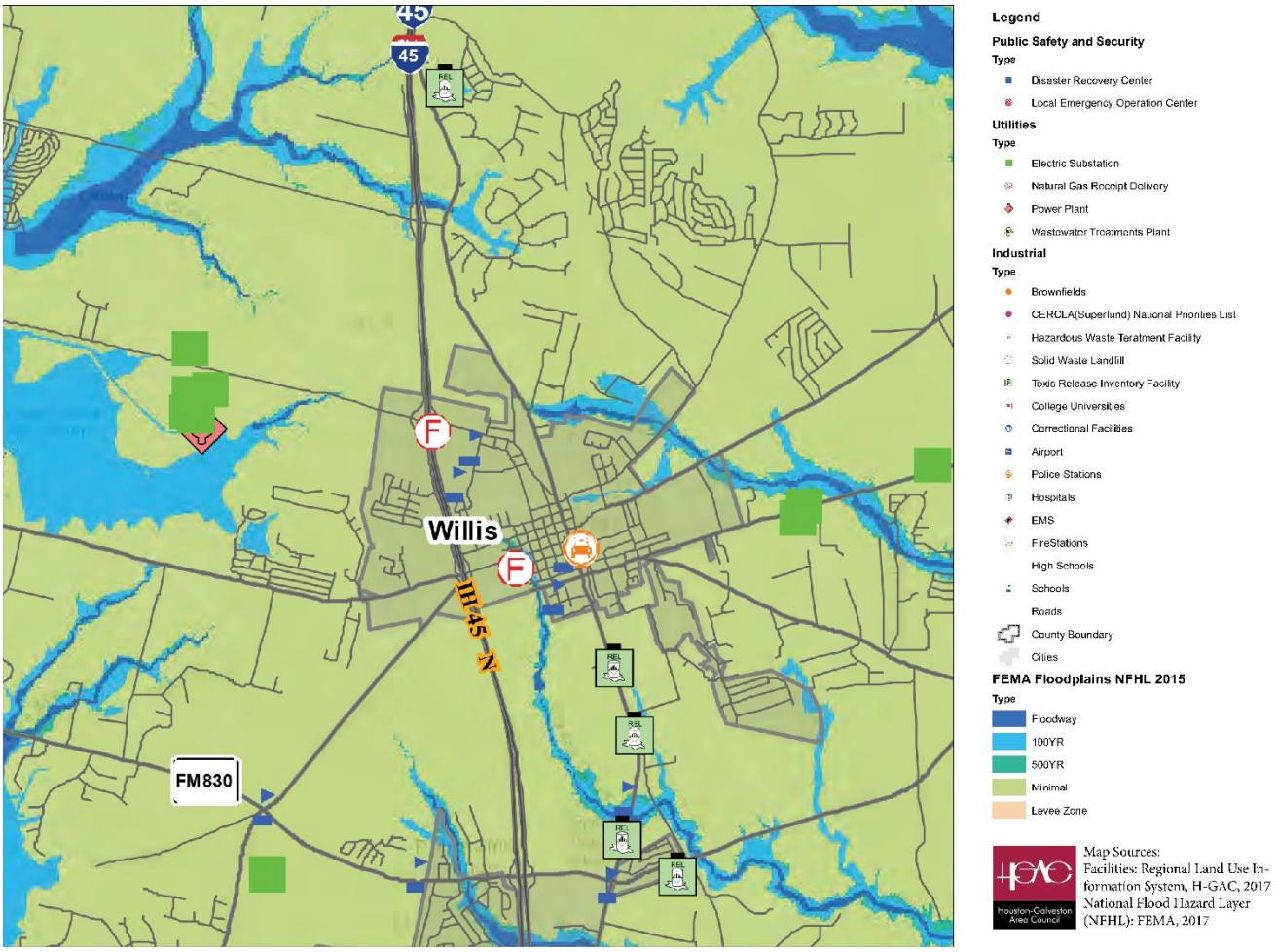
Stagecoach



Stagecoach			
Planning Area (Sq. mi):	1.2	**Occurrences since 1996:**	14
Area Affected:	15.7%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	2.88' of flood water in homes		
Extent:	Up to 6' of flood water in homes		

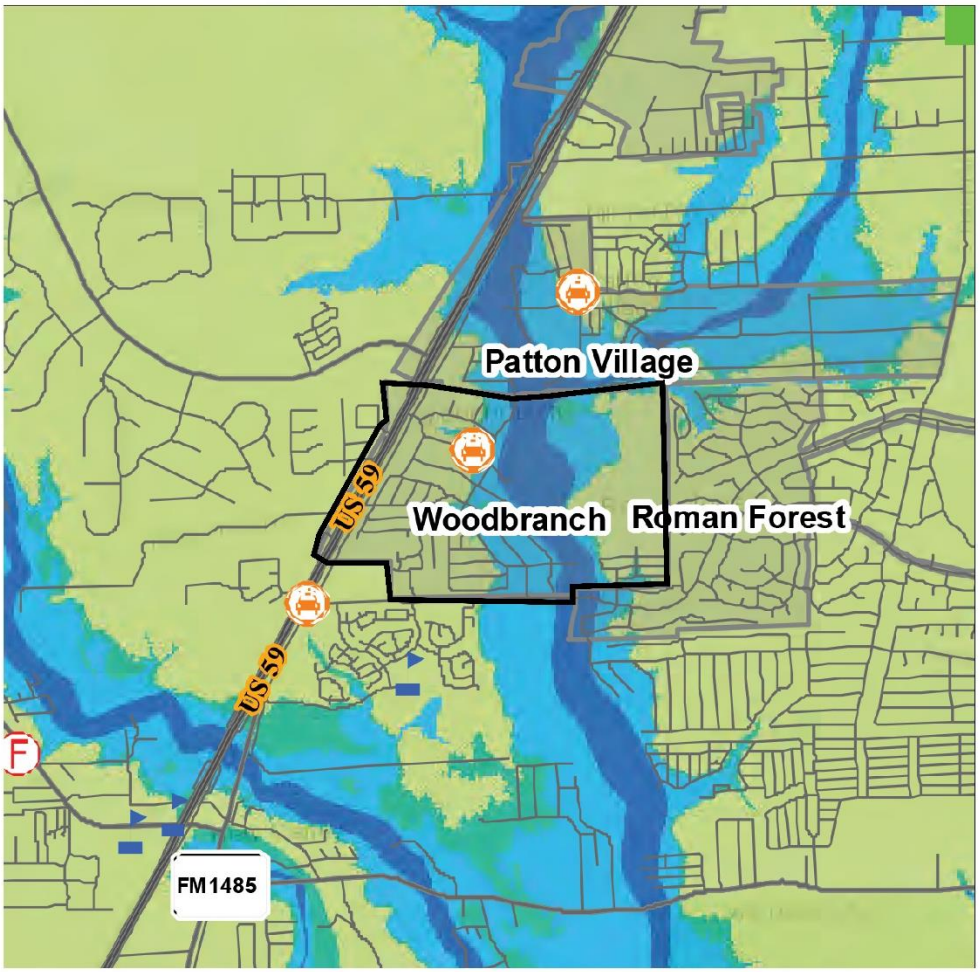
Vulnerability	Impact
12 residences at risk of flooding during 500-year event.	Displaced residents cannot be safely housed during major flood events, and repairs will be costly.
1 police station located in the 500-year floodplain.	Disruption of services and costly repairs could result in loss of life and property.

Willis



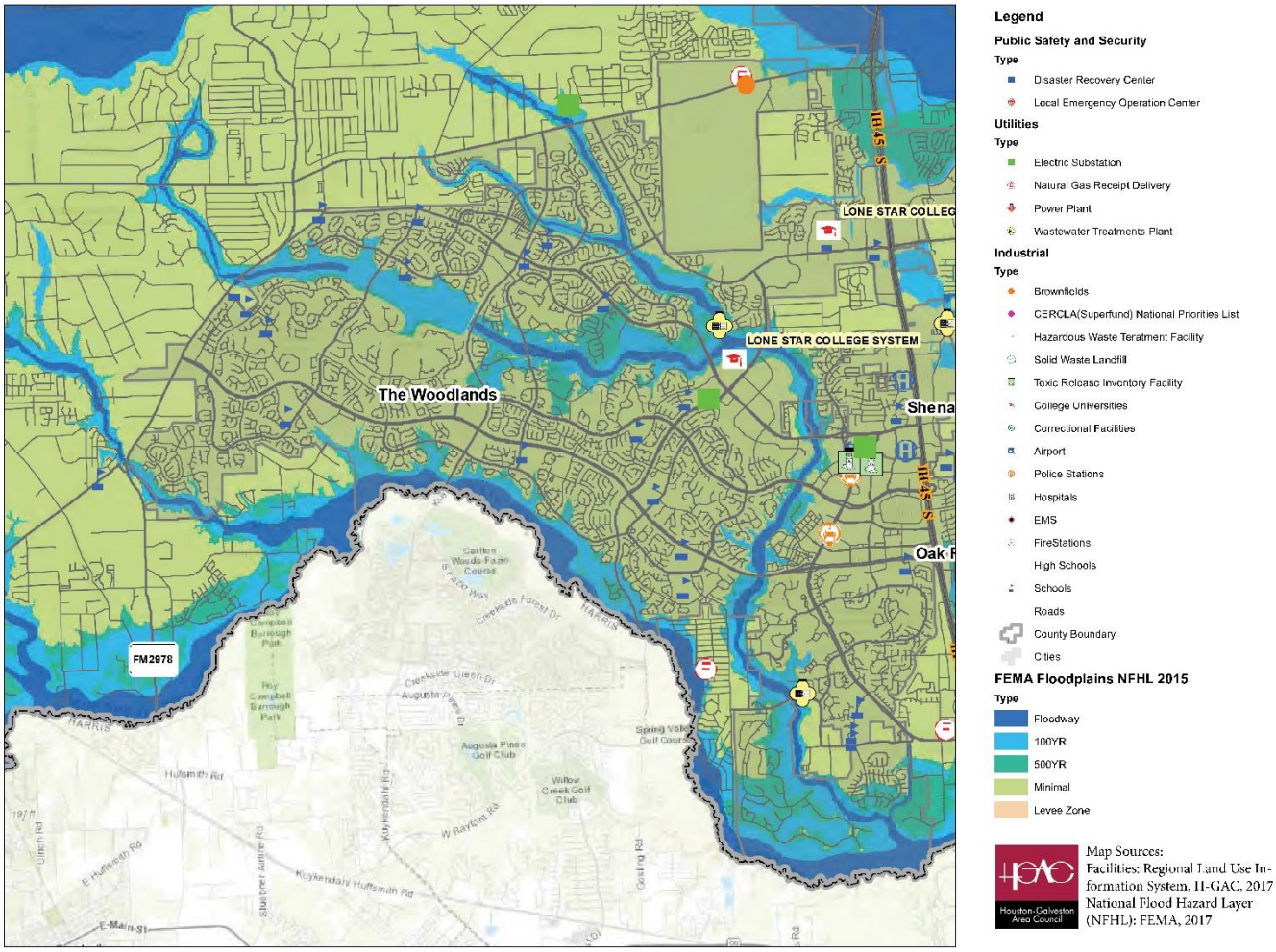
Willis			
Planning Area (Sq. mi):	3.3	**Occurrences since 1996:**	14
Area Affected:	4.7%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	4' of flood water in homes		
Extent:	Up to 8' of flood water in homes		
Vulnerability		**Impact**	
74 residences at risk of flooding during 500-year event.		Displaced residents cannot be safely housed during major flood events, and repairs will be costly.	

Woodbranch Village



Woodbranch Village			
Planning Area (Sq. mi):	1.9	**Occurrences since 1996:**	14
Area Affected:	31.5%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	4.88' of flood water in homes		
Extent:	Up to 7' of flood water in homes		
Vulnerability		**Impact**	
132 residences at risk of flooding during 500-year event.		Displaced residents cannot be safely housed during major flood events, and repairs will be costly	

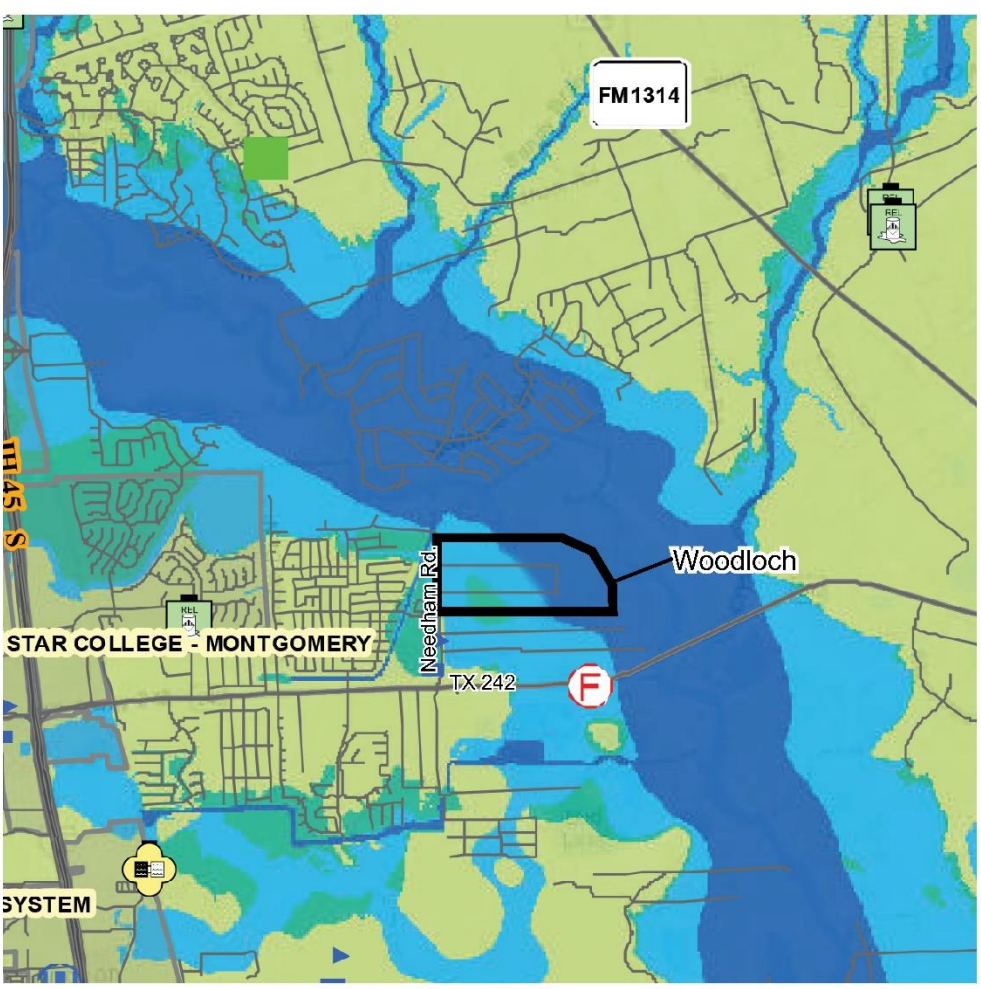
The Woodlands Township



The Woodlands Township			
Planning Area (Sq. mi):	43.9	**Occurrences since 1996:**	14
Area Affected:	22.0%	**Annual Event Average:**	0.67
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	5.69' of flood water over roadways More than 100 homes with 4' of water or more.		
Extent:	Up to 8' of floodwater in homes, and 8' over the roadways		

Vulnerability	Impact
3 schools located in the 500-year floodplain.	Costly to repair and educational services would be disrupted.
1 wastewater treatment plant located in the floodplain.	Interruption of services and costly repairs.
4060 residences at risk of flooding during 500-year event.	Displaced residents cannot be safely housed during major flood events, and repairs will be costly.

Woodloch



Legend

Public Safety and Security

Type

- Disaster Recovery Center
- Local Emergency Operation Center

Utilities

Type

- Electric Substation
- Natural Gas Receipt Delivery
- Power Plant
- Wastewater Treatments Plant

Industrial

Type

- Brownfields
- CERCLA(Superfund) National Priorities List
- Hazardous Waste Teratment Facility
- Solid Waste Landfill
- Toxic Release Inventory Facility
- College Universities
- Correctional Facilities
- Airport
- Police Stations
- Hospitals
- EMS
- FireStations
- High Schools
- Schools
- Roads
- County Boundary
- Cities

FEMA Floodplains NFHL 2015

Type

- Floodway
- 100YR
- 500YR
- Minimal
- Levee Zone

Map Sources: Facilities: Regional Land Use Information System, H-GAC, 2017 National Flood Hazard Layer (NFHL): FEMA, 2017

Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences since 1996:**	16
Area Affected:	100.0%	**Annual Event Average:**	0.8
Probability of Occurring in the next 5 years:	Very likely; 3.8 events estimated to occur within next 5 years.		
Greatest Occurrence:	8' of flood water in homes		
Extent:	Up to 12' of flood water in homes		
Vulnerabilities		**Impact**	
60 residences at risk of flooding during 500-year event		Displaced residents cannot be safely housed during major flood events, and repairs will be costly.	

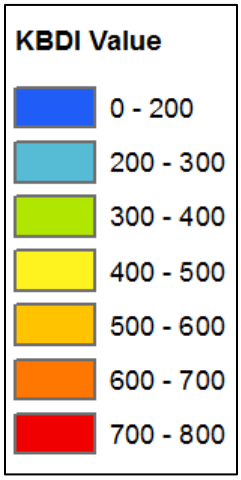
Part 6.2 Wildfires

6.2 Wildfire

A combination of the Keetch-Byram Drought Index (KBDI) and the Texas Wildfire Risk Assessment are used to assess the risk of wildfire. KBDI is an index that measures the daily water balance, precipitation, and moisture in the soil to determine the potential for wildfires. KBDI ranges from 0 to 800 units. Zero represents fully saturated soil or no indication of drought. A measurement of 800 is the maximum measurement for drought and indicates no moisture is present in the soil. In August 2011, the maximum KBDI value recorded in Montgomery County was 792. The minimum KBDI value, 41, was recorded in September of 2017. KBDI conditions can change rapidly based on short-term weather conditions, so the most extreme values should be considered when addressing wildfire risk.

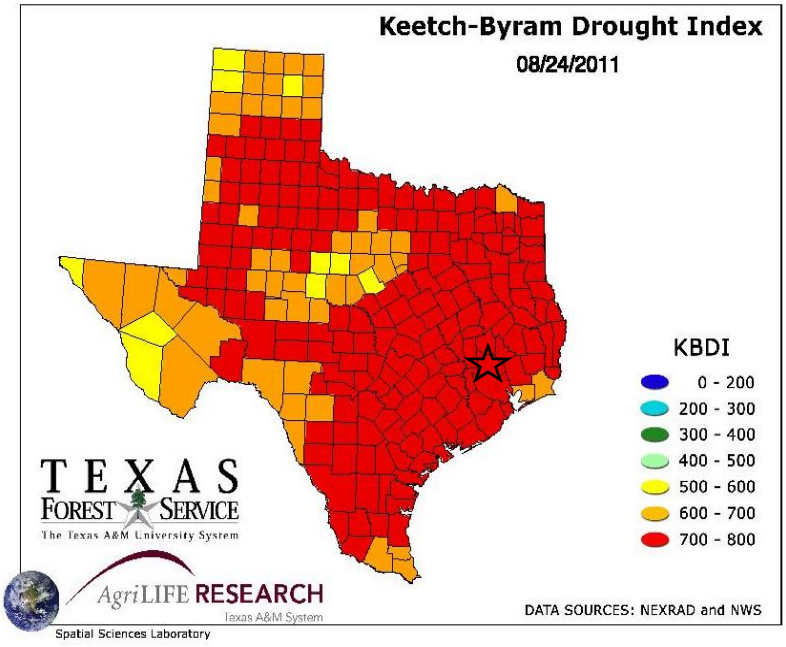
The Texas Wildfire Risk Assessment uses a variety of factors, such as fuels, vegetation, weather, and topography, to determine the fire potential of a specific land area. Particularly vulnerable are the Wildland Urban Interface (WUI) areas. These areas occur at the intersection of development and wildland. With continued population growth throughout the county, the WUI zones will become more abundant. Because most wildfires are caused by human activities, the intersection of WUI and drought are particularly dangerous.

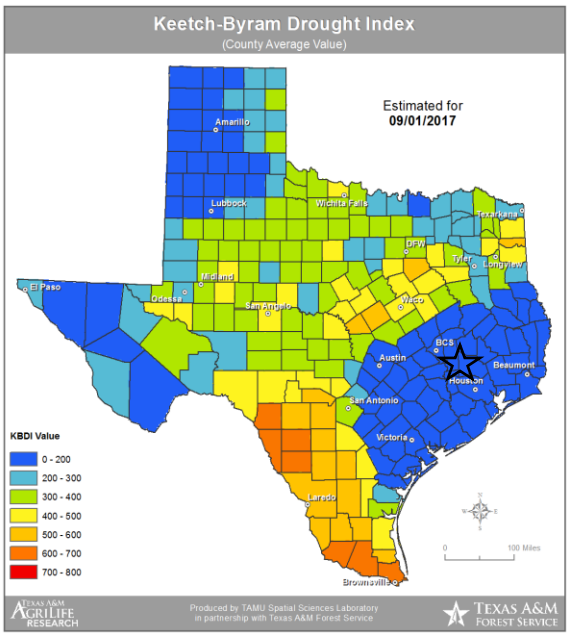
Wildland Fire Assessment System (WFAS) KBDI Value Scale:



Score	Description
0 - 200	Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of early spring following winter precipitation.
200 – 400	Fuels are beginning to dry and contribute to wildfire intensity. Heavier fuels will still not readily ignite and burn. This is often seen in late spring or early summer.
400 – 600	Lower litter and duff layers contribute to fire intensity and will burn actively. Wildfire intensity begins to increase significantly. Larger fuels could burn or smolder for several days. This is often seen in late summer and early fall.
600 – 800	Often associated with more severe drought with increased wildfire occurrence. Intense, deep-burning fires with extreme intensities can be expected. Live fuels can also be expected to burn actively at these levels.

Source: https://twc.tamu.edu/kbdi





Source: https://twc.tamu.edu/kbdi

Historic Occurrence

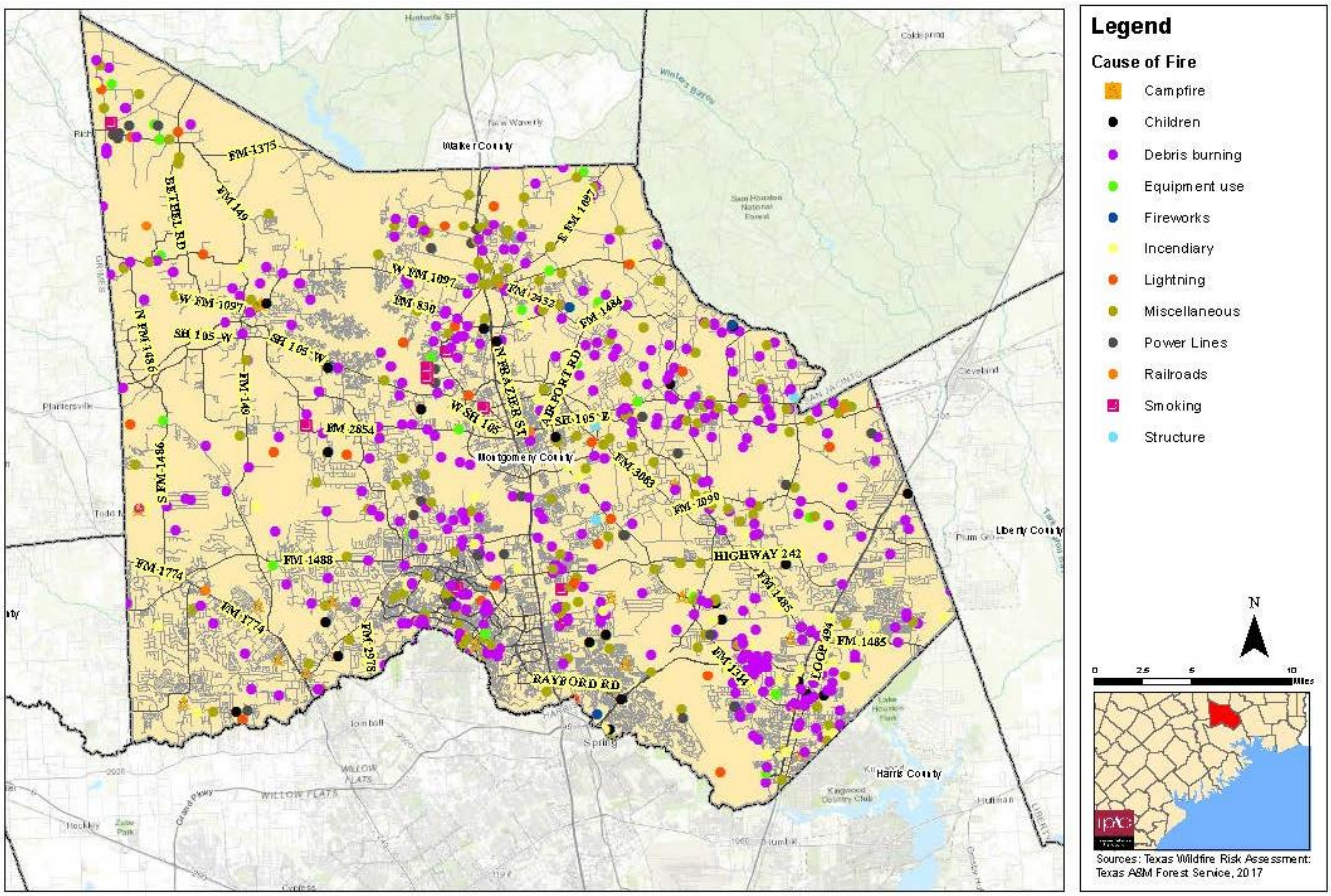
The Texas A&M Forest Service tracks wildfire events, acres destroyed, and the initial ignition cause of the fire. Below is the historic data associated with any burns that caused recorded damage.

Year	Cause	Damaged Acres	Year (cont..)	Cause (cont..)	Damaged Acres (cont..)	Year (cont..)	Cause (cont..)	Damaged Acres (cont..)
2005	Debris burning	6	2005	Debris burning	6	2006	Power Lines	10
2005	Debris burning	10	2005	Debris burning	18	2006	Miscellaneous	4
2005	Incendiary	17	2005	Debris burning	10	2006	Miscellaneous	5
2005	Miscellaneous	43	2005	Power Lines	4	2006	Debris burning	6
2005	Debris burning	5	2006	Debris burning	3	2006	Debris burning	4
2005	Children	4	2006	Debris burning	5	2006	Debris burning	3
2005	Incendiary	20	2006	Debris burning	3	2006	Campfire	7
2005	Debris burning	4	2006	Miscellaneous	3	2006	Debris burning	10
2005	Miscellaneous	4	2006	Miscellaneous	5	2006	Debris burning	7
2005	Debris burning	7	2006	Miscellaneous	15	2006	Debris burning	3
2005	Equipment use	30	2006	Miscellaneous	4	2006	Debris burning	3
2005	Miscellaneous	10	2006	Debris burning	7	2006	Debris burning	20
2005	Equipment use	29	2006	Debris burning	5	2007	Debris burning	15
2005	Miscellaneous	4	2006	Miscellaneous	4	2007	Debris burning	3
2005	Debris burning	4	2006	Debris burning	3	2007	Miscellaneous	25
2005	Debris burning	14	2006	Debris burning	3.3	2007	Debris burning	16
2005	Debris burning	5	2006	Incendiary	4	2007	Campfire	20
2005	Lightning	15	2006	Equipment use	11	2007	Debris burning	10
2005	Debris burning	3	2006	Incendiary	35	2007	Miscellaneous	17
2005	Debris burning	3	2006	Debris burning	4	2007	Debris burning	50
2005	Debris burning	250	2006	Incendiary	10	2007	Fireworks	45
2005	Incendiary	4	2006	Miscellaneous	7	2007	Debris burning	8
2005	Smoking	3	2006	Debris burning	12	2007	Railroads	3
2005	Miscellaneous	3	2006	Miscellaneous	9	2008	Debris burning	5
2005	Debris burning	10	2006	Debris burning	16	2008	Miscellaneous	6
2005	Debris burning	3	2006	Debris burning	22	2008	Miscellaneous	20
2005	Debris burning	3	2006	Debris burning	3	2008	Debris burning	5
2005	Debris burning	3	2006	Debris burning	25	2008	Debris burning	7
2005	Children	4	2006	Debris burning	10	2008	Debris burning	20
2005	Miscellaneous	6	2006	Incendiary	4	2008	Miscellaneous	5
2005	Miscellaneous	5	2006	Debris burning	4	2008	Miscellaneous	15
2005	Campfire	3	2006	Miscellaneous	6	2008	Debris burning	30
2005	Debris burning	6	2006	Debris burning	3	2008	Miscellaneous	80
2005	Campfire	10	2006	Debris burning	43	2008	Lightning	5
2005	Debris burning	7	2006	Miscellaneous	3	2008	Debris burning	12
2005	Debris burning	6	2005	Debris burning	6	2006	Power Lines	10
2005	Debris burning	10	2005	Debris burning	18	2006	Miscellaneous	4

Year	Cause	Damaged Acres	Year (cont..)	Cause (cont..)	Damaged Acres (cont..)	Year (cont..)	Cause (cont..)	Damaged Acres (cont..)
2008	Miscellaneous	5	2009	Incendiary	8	2009	Incendiary	14
2008	Fireworks	40	2009	Miscellaneous	15	2010	Debris burning	6
2008	Lightning	15	2009	Debris burning	15	2010	Debris burning	4
2008	Miscellaneous	10	2009	Children	4	2010	Debris burning	10
2008	Debris burning	8	2009	Incendiary	3	2010	Debris burning	5
2008	Debris burning	45	2009	Incendiary	175	2010	Debris burning	15
2008	Miscellaneous	6	2009	Incendiary	14	2010	Debris burning	5
2008	Debris burning	6	2009	Miscellaneous	3	2010	Incendiary	3
2008	Lightning	4	2009	Miscellaneous	8	2010	Debris burning	19
2008	Debris burning	3	2009	Debris burning	102	2010	Debris burning	6
2008	Miscellaneous	60	2009	Debris burning	4	2010	Debris burning	20
2008	Debris burning	5	2009	Debris burning	20	2010	Miscellaneous	20
2008	Debris burning	3	2009	Debris burning	15	2010	Miscellaneous	3
2008	Debris burning	4	2009	Miscellaneous	3	2010	Debris burning	7
2008	Debris burning	8	2009	Miscellaneous	5	2010	Debris burning	5
2008	Debris burning	20	2009	Miscellaneous	5	2010	Debris burning	4
2008	Debris burning	3	2009	Debris burning	12	2010	Railroads	3
2008	Debris burning	4	2009	Children	3	2010	Children	3
2008	Debris burning	5	2009	Incendiary	4	2010	Miscellaneous	3
2008	Miscellaneous	7	2009	Power Lines	5	2011	Miscellaneous	3
2008	Debris burning	10	2009	Debris burning	3	2011	Miscellaneous	16
2008	Debris burning	3	2010	Debris burning	5	2011	Incendiary	15
2009	Power Lines	3	2010	Debris burning	8	2011	Miscellaneous	183
2009	Debris burning	4	2010	Power Lines	6	2011	Miscellaneous	5
2009	Power Lines	4	2010	Debris burning	10	2011	Debris burning	5
2009	Debris burning	20	2010	Campfire	12	2011	Miscellaneous	3
2009	Power Lines	10	2010	Miscellaneous	6	2011	Campfire	25
2009	Miscellaneous	4	2010	Equipment use	14	2011	Equipment use	6
2009	Miscellaneous	51	2010	Debris burning	5	2011	Debris burning	43
2009	Miscellaneous	8	2010	Debris burning	3	2011	Campfire	3
2009	Miscellaneous	9	2010	Incendiary	3	2011	Debris burning	90
2009	Miscellaneous	6	2010	Equipment use	4	2011	Debris burning	25
2009	Miscellaneous	3	2010	Debris burning	3	2011	Debris burning	8
2009	Debris burning	185	2010	Children	5	2011	Miscellaneous	3
2009	Incendiary	3	2010	Equipment use	5	2011	Debris burning	9
2008	Miscellaneous	5	2009	Incendiary	8	2011	Debris burning	3
2008	Fireworks	40	2009	Miscellaneous	15	2010	Debris burning	6
2008	Lightning	15	2009	Debris burning	15	2010	Debris burning	4
2008	Miscellaneous	10	2009	Children	4	2010	Debris burning	10
2008	Debris burning	8	2009	Incendiary	3	2010	Debris burning	5
2008	Debris burning	45	2009	Incendiary	175	2010	Debris burning	15

Year	Cause	Damaged Acres	Year (cont..)	Cause (cont..)	Damaged Acres (cont..)	Year (cont..)	Cause (cont..)	Damaged Acres (cont..)
2010	Debris burning	5	2011	Debris burning	8	2013	Miscellaneous	3
2010	Incendiary	3	2011	Miscellaneous	3	2013	Debris burning	4
2010	Debris burning	6	2011	Debris burning	9	2013	Incendiary	4
2010	Debris burning	4	2011	Debris burning	3	2013	Children	4
2010	Debris burning	10	2011	Children	4	2013	Debris burning	3
2010	Debris burning	5	2011	Miscellaneous	4	2013	Incendiary	13
2010	Debris burning	15	2011	Railroads	30	2013	Miscellaneous	10
2010	Debris burning	5	2011	Debris burning	18	2013	Debris burning	7.5
2010	Incendiary	3	2011	Miscellaneous	17	2013	Debris burning	3
2010	Debris burning	19	2011	Smoking	6	2013	Debris burning	20
2010	Debris burning	6	2011	Railroads	6	2013	Debris burning	10
2010	Debris burning	20	2011	Power Lines	8	2013	Debris burning	15
2010	Miscellaneous	20	2011	Debris burning	8	2013	Debris burning	5
2010	Miscellaneous	3	2011	Children	3	2013	Miscellaneous	12
2010	Debris burning	7	2011	Miscellaneous	8	2013	Debris burning	3
2010	Debris burning	5	2011	Equipment use	10	2013	Debris burning	10
2010	Debris burning	4	2011	Lightning	10	2013	Debris burning	5
2010	Railroads	3	2011	Children	3	2013	Debris burning	5
2010	Children	3	2011	Lightning	47	2013	Equipment use	12
2010	Miscellaneous	3	2011	Lightning	14	2014	Equipment use	7.6
2011	Miscellaneous	3	2011	Debris burning	5	2014	Debris burning	23.6
2011	Miscellaneous	16	2011	Debris burning	7	2014	Miscellaneous	60
2011	Incendiary	15	2011	Children	34	2014	Children	9
2011	Miscellaneous	183	2011	Incendiary	6	2014	Power Lines	10.8
2011	Miscellaneous	5	2011	Power Lines	7	2014	Equipment use	8
2011	Debris burning	5	2011	Miscellaneous	10	2014	Debris burning	4
2011	Miscellaneous	3	2011	Debris burning	3	2015	Debris burning	8.8
2011	Campfire	25	2011	Incendiary	3	2015	Debris burning	100
2011	Equipment use	6	2011	Lightning	10	2015	Debris burning	4.5
2011	Debris burning	43	2011	Miscellaneous	77	2015	Debris burning	6.25
2011	Campfire	3	2011	Incendiary	171	2015	Debris burning	4.5
2011	Debris burning	90	2011	Debris burning	3	2015	Structure	4.66
2011	Debris burning	25	2012	Power Lines	50	2015	Debris burning	8.93
2011	Incendiary	11	2012	Miscellaneous	4	2015	Miscellaneous	3.4
2011	Incendiary	3	2012	Miscellaneous	3	2015	Miscellaneous	40
2011	Miscellaneous	9	2012	Debris burning	8	2015	Debris burning	3
2011	Equipment use	25	2012	Debris burning	5	2015	Smoking	3
2011	Incendiary	4	2012	Incendiary	3	2015	Campfire	7.43
2011	Miscellaneous	5	2012	Debris burning	5	2015	Debris burning	3
2011	Miscellaneous	4	2012	Children	6	2015	Debris burning	3
2011	Incendiary	3	2013	Miscellaneous	6			

Fire Ignition Point (2000 – 2015)



Montgomery County Wildfire Disaster Declarations

Year	Title	Disaster Number
1996	Extreme Fire Hazard	3117
1999	Extreme Fire Hazards	3142
2000	TX - Peach Creek Fire - 09/04/00	2331
2006	Extreme Wildfire Threat	1624
2008	Wildfires	3284
2011	Tamina Fire	2962
2011	Riley Road Fire	2964
2011	Wildfires	4029

https://www.FEMA.gov/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data represents the worst damage a jurisdiction could experience, based on recent recorded historical wildfire events. Information from stakeholders, Texas Forest Service, FEMA, and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of residential structures within 500 to 800 KBDI zones; and
- Stakeholder identified vulnerabilities.

The hazard analysis also includes maps showing the fire intensity scale for each community. The fire intensity scale measures fuel, weather, and topography conditions that determine the rate of heat released by a fire. The intensity scale helps depict possible areas that may be more susceptible to more intense wildfires. Green are less susceptible areas throughout the jurisdiction to forceful wildfires; red areas are those that are most susceptible.

Montgomery County (All Participating Jurisdictions)

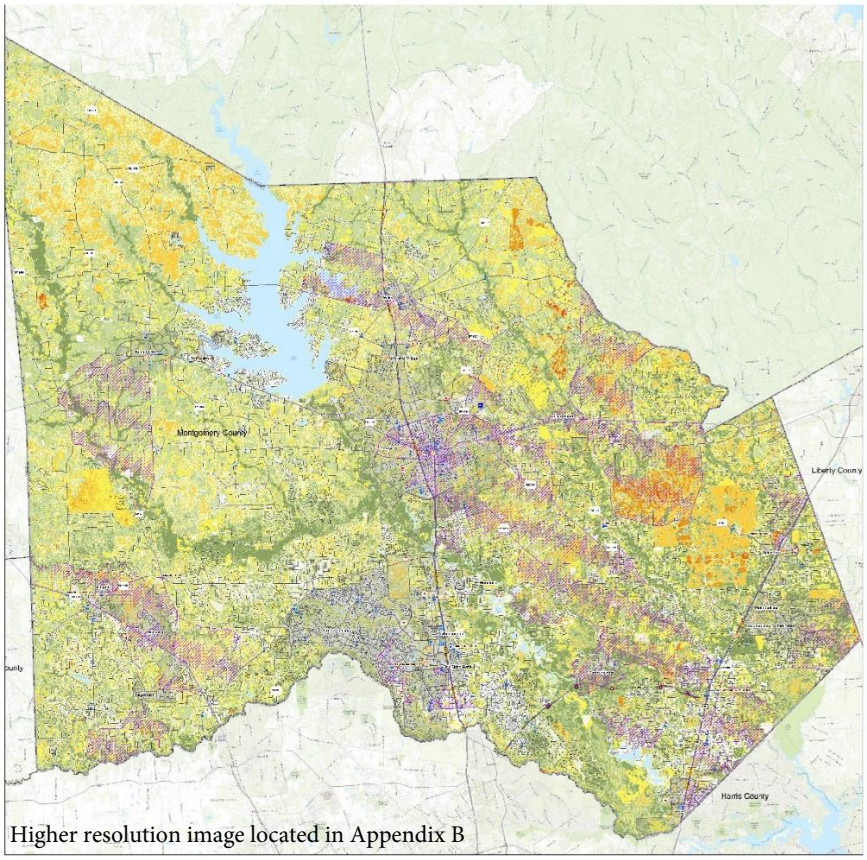
Identified Vulnerabilities:

- Residential structures throughout the county
- Vulnerable populations throughout the county (mapped and identified in Part 3)
- Agricultural areas and parklands throughout the county
- Industrial or commercial areas throughout the county

Identified Impacts:

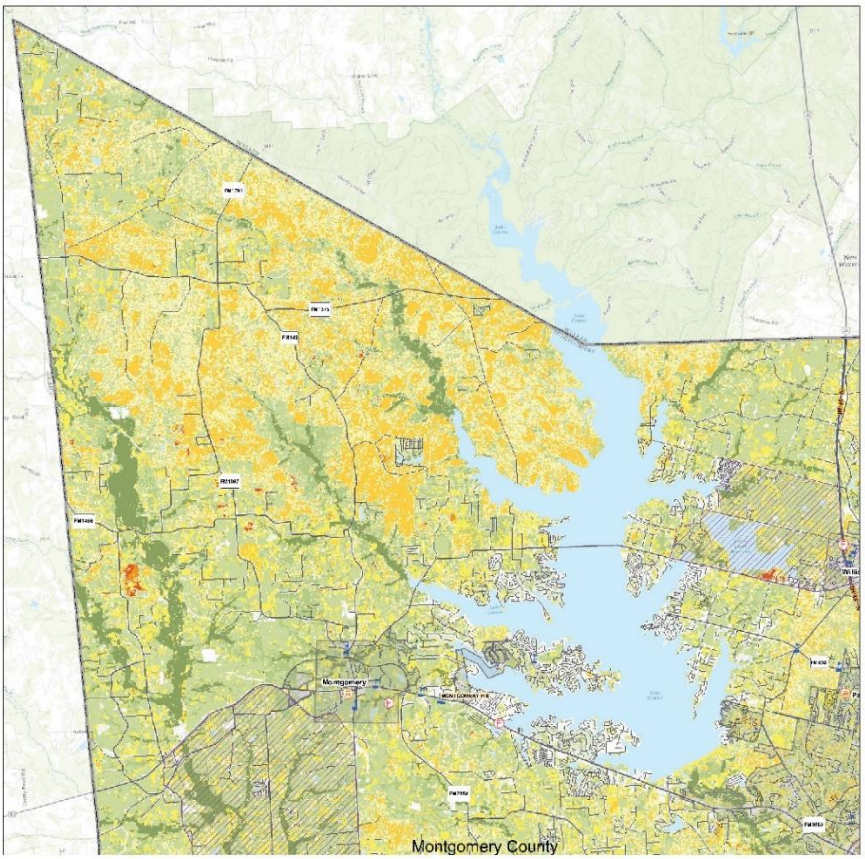
- Residential and commercial property loss throughout the county (identified by local jurisdictions below) may lead to a financial loss for residents and jurisdictions
- Significant injury or loss of life particularly for children or older individuals
- Loss of agriculture land throughout the county may lead to an economic loss for the county and a loss for local farmers and business/ residents that rely on agriculture throughout the county as well
- If an industrial or chemical site catches fire this may lead to a technical hazard leading to an increase in property loss, serious injuries or loss of life

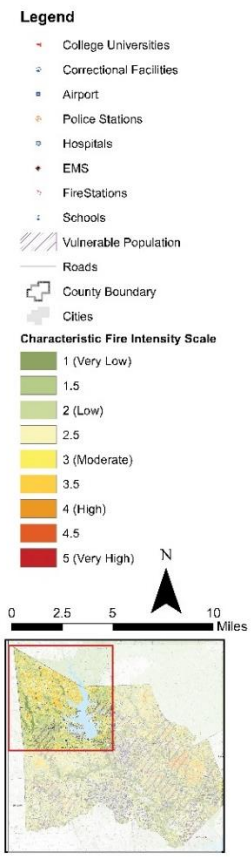
Montgomery County

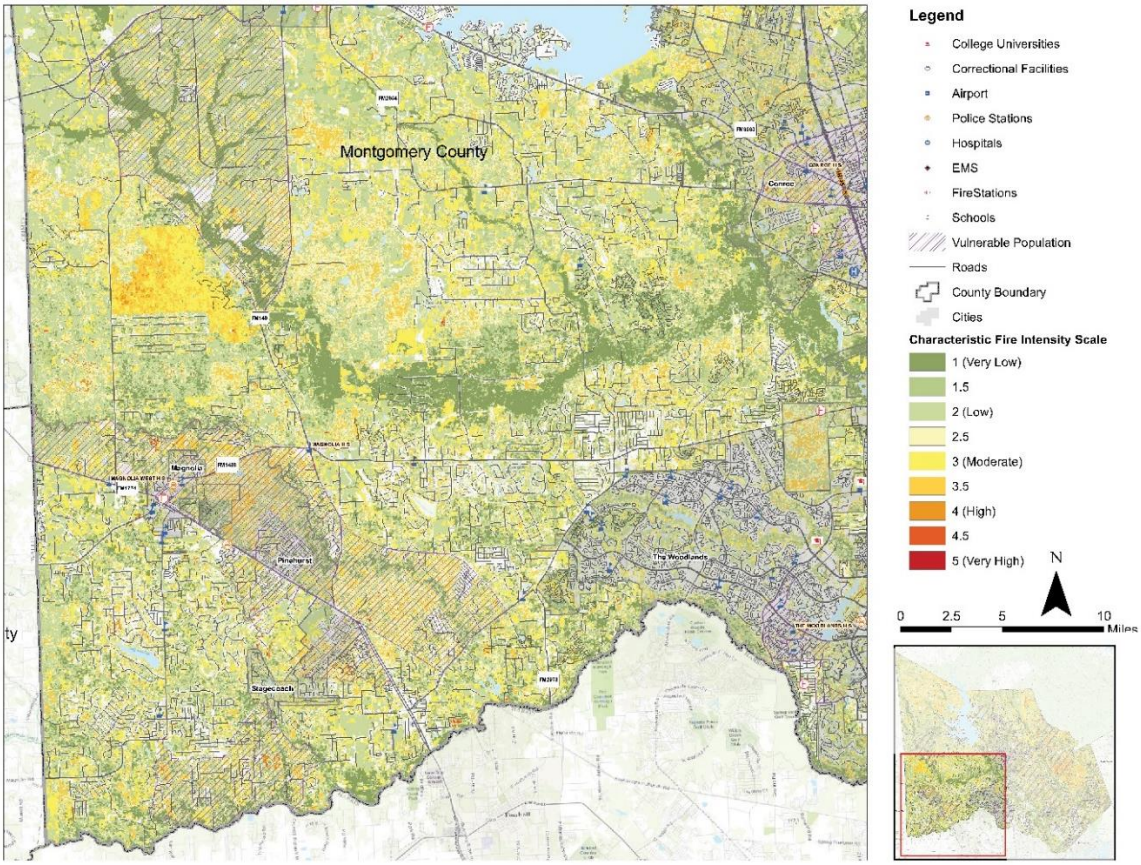


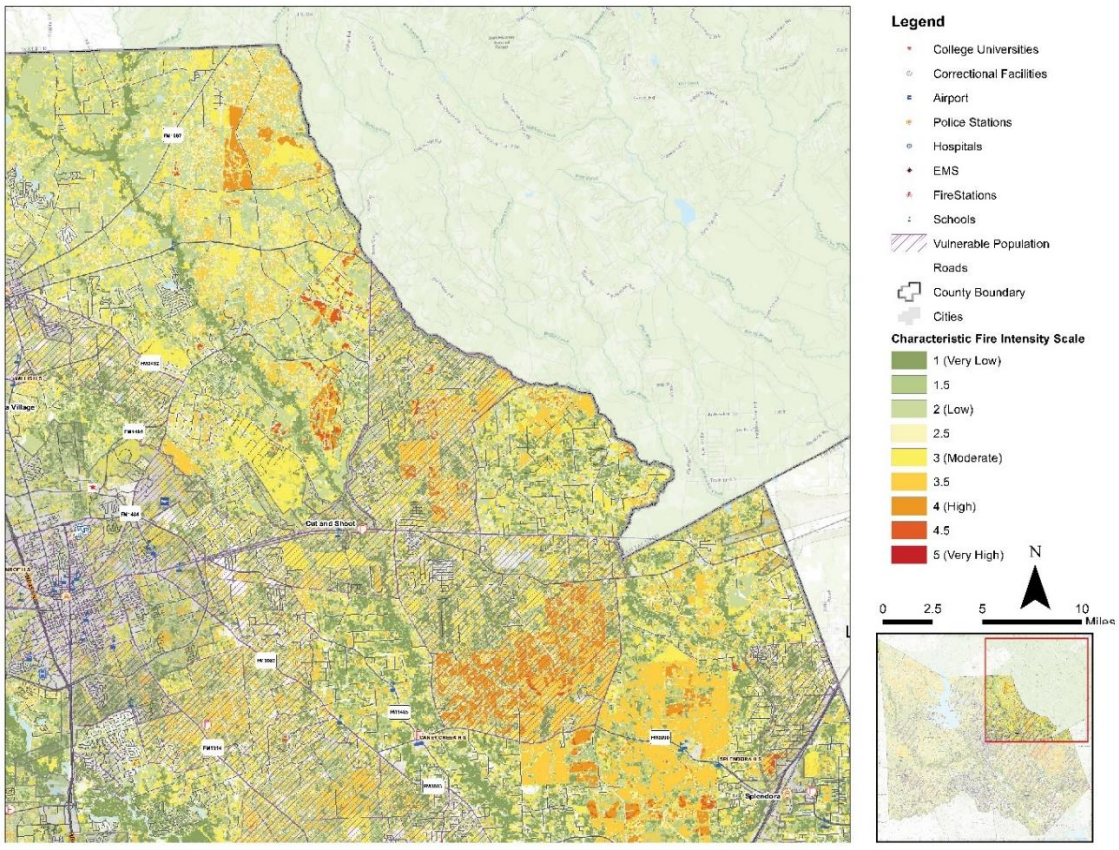
Higher resolution image located in Appendix B

Map Sources:
Facilities: Regional Land Use Information System, H-GAC, 2017
Texas Wildfire Risk Assessment: Texas A&M Forest Service, 2017






Montgomery County
Legend
College Universities
Correctional Facilities
Airport
Police Stations
Hospitals
EMS
FireStations
Schools
Vulnerable Population
Roads
County Boundary
Cities
Characteristic Fire Intensity Scale
1 (Very Low)
1.5
2 (Low)
2.5
3 (Moderate)
3.5
4 (High)
4.5
5 (Very High)
N
0 2.5 5 10
Miles


Legend
College Universities
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4.5
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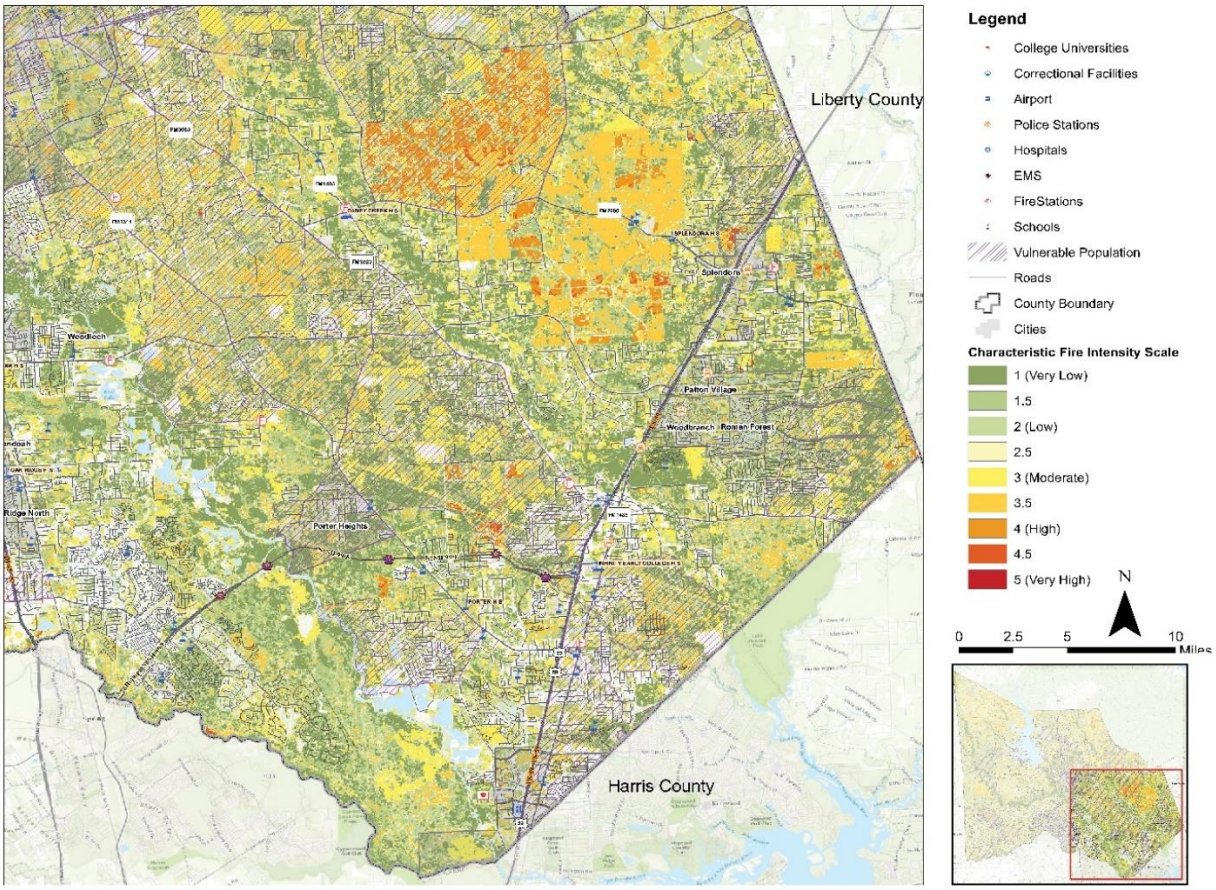
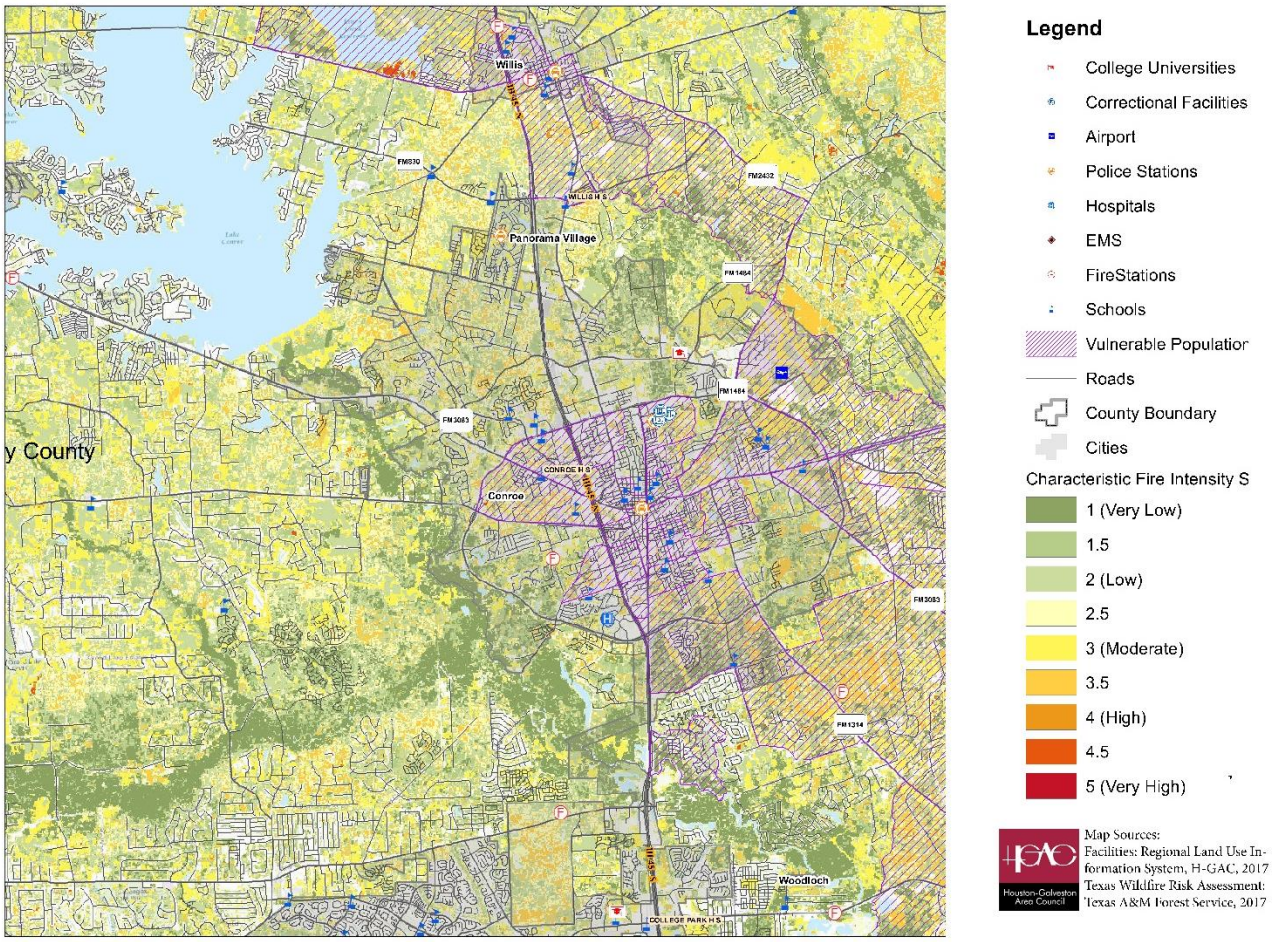
0 2.5 5 10
Miles



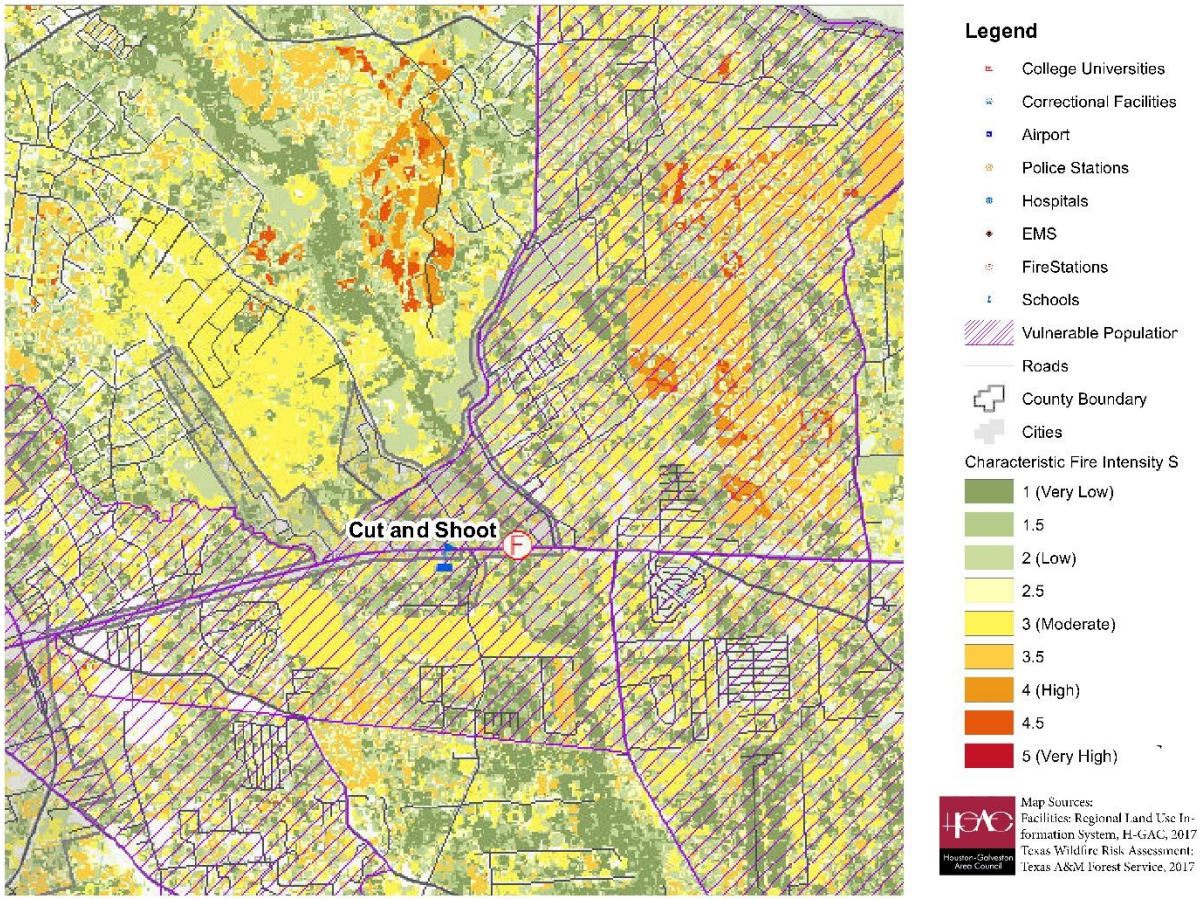
Unincorporated Montgomery County			
Planning Area (Sq. mi):	935.3	**Occurrences since 2005:**	167
Area Affected:	8%	**Annual Event Average:**	13.9
Probability of Occurring in the next 5 years:	Very likely; 69.58 events estimated to occur within next 5 years.		
Greatest Occurrence:	2,455 acres have burned since 2005, $7 million in property damage		
Extent:	Up to 4,000 acres burn in one year		
Vulnerability		**Impact**	
13,002 residential structures, and 155,362 acres of agricultural land at risk.		$3,822,706 in estimated financial losses, $12 million in agricultural losses, and potential loss of life.	

Conroe



Conroe			
Planning Area (Sq. mi):	72	**Occurrences since 2005:**	111
Area Affected:	4%	**Annual Event Average:**	9.25
Probability of Occurring in the next 5 years:	Very likely; 46.25 events estimated to occur within next 5 years.		
Greatest Occurrence:	250 acres burned during one event		
Extent:	Up to 400 acres burn during 1 event		
Vulnerability		**Impact**	
638 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

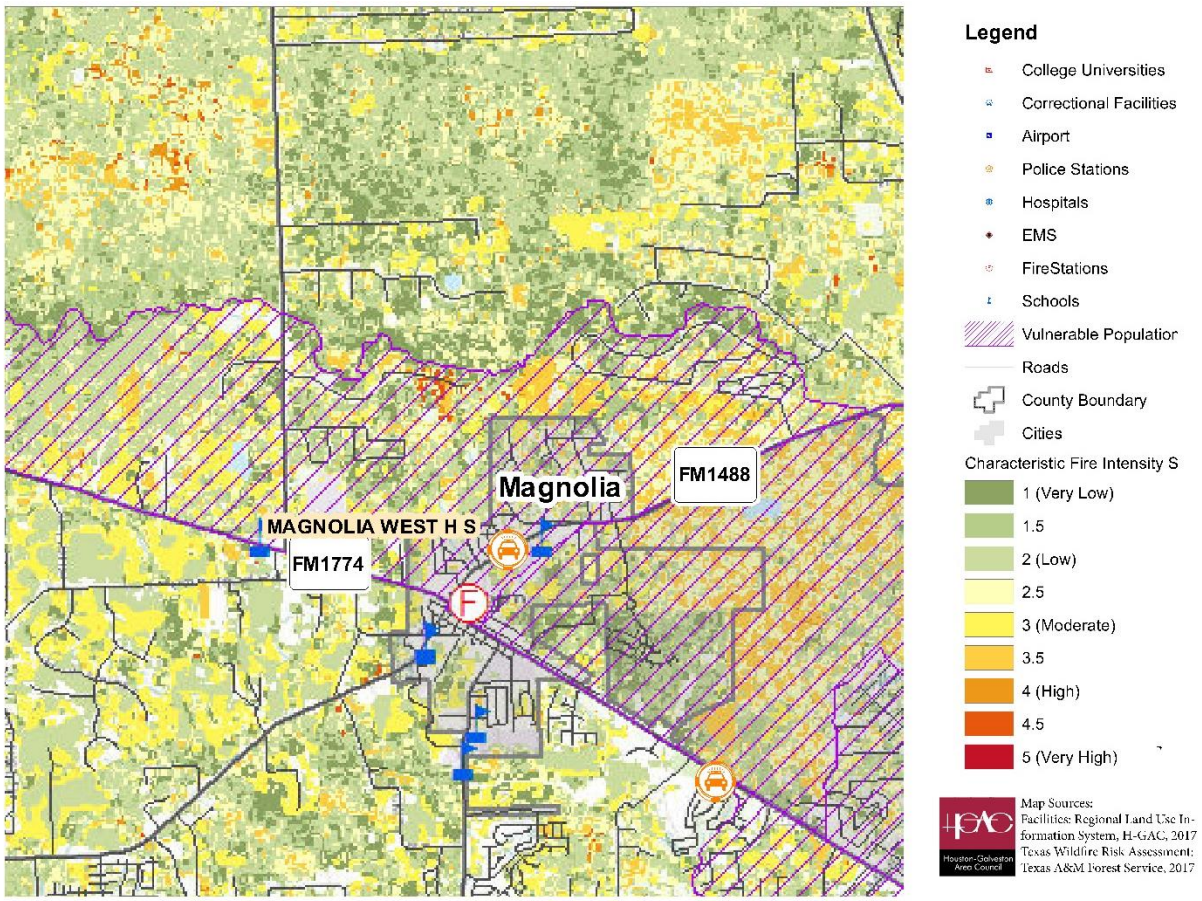
Cut and Shoot



Cut and Shoot			
Planning Area (Sq. mi):	2.7	**Occurrences since 2005:**	10
Area Affected:	3%	**Annual Event Average:**	0.83
Probability of Occurring in the next 5 years:	Very likely; 4.17 events estimated to occur within next 5 years.		
Greatest Occurrence:	15 acres burned during one event		
Extent:	Up to 60 acres burn during 1 event		

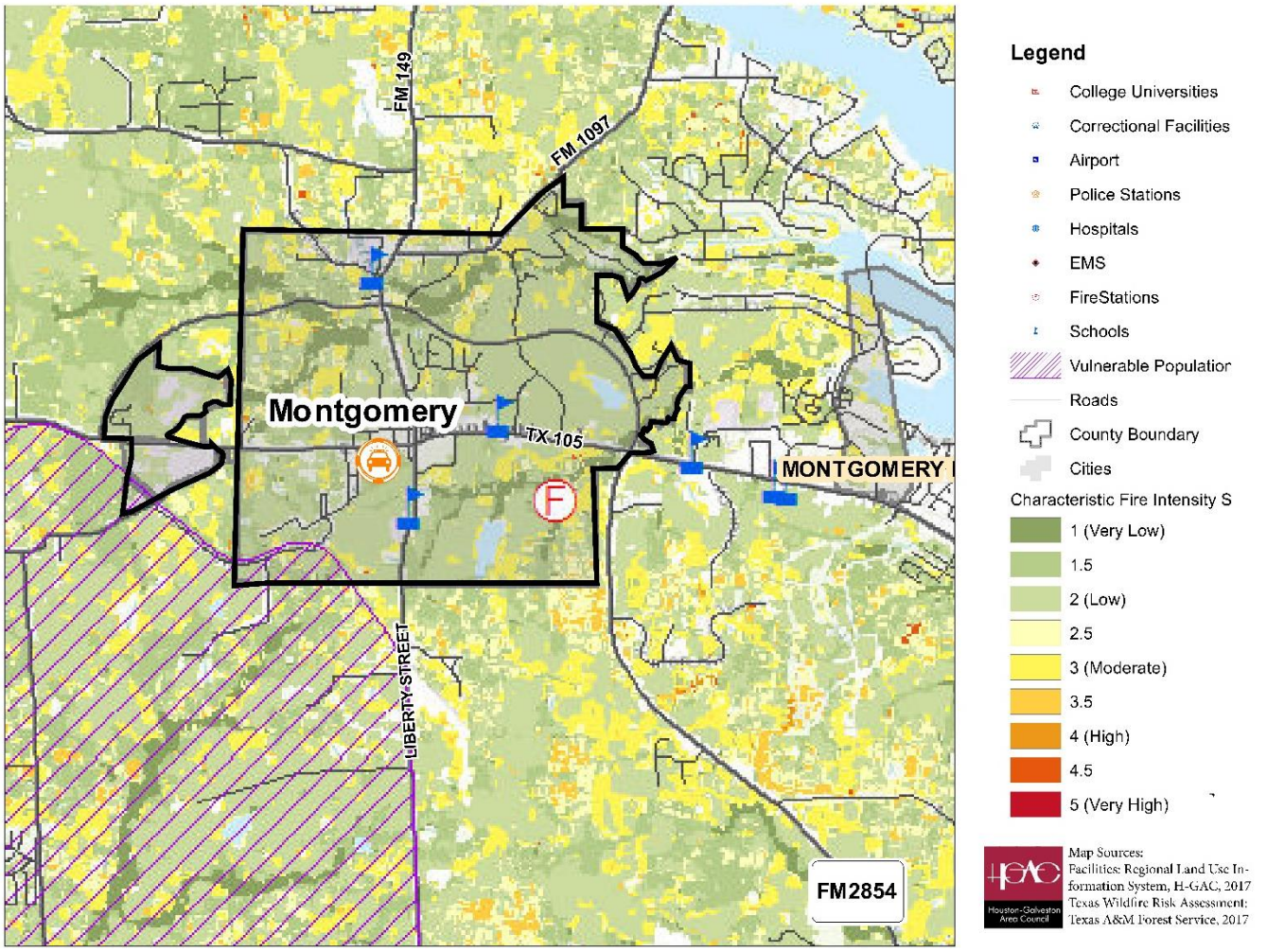
Vulnerability	Impact
10 residential structures at risk	Loss of homes is costly, and there is a potential loss of life.

Magnolia



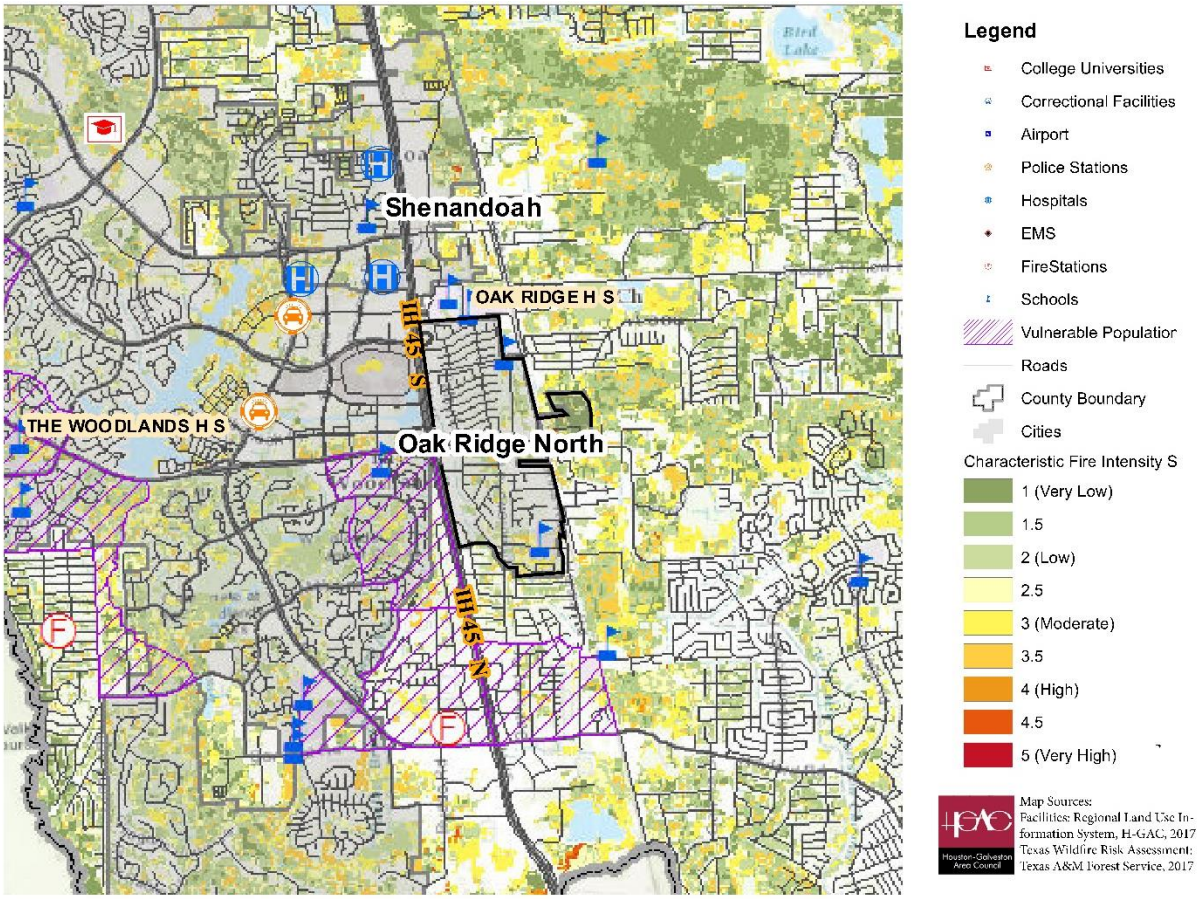
Magnolia			
Planning Area (Sq. mi):	2.8	**Occurrences since 2005:**	3
Area Affected:	4%	**Annual Event Average:**	0.25
Probability of Occurring in the next 5 years:	Very likely; 1.25 events estimated to occur within next 5 years.		
Greatest Occurrence:	3 acres burned during one event		
Extent:	Up to 15 acres burn during 1 event		
Vulnerability		**Impact**	
24 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

Montgomery



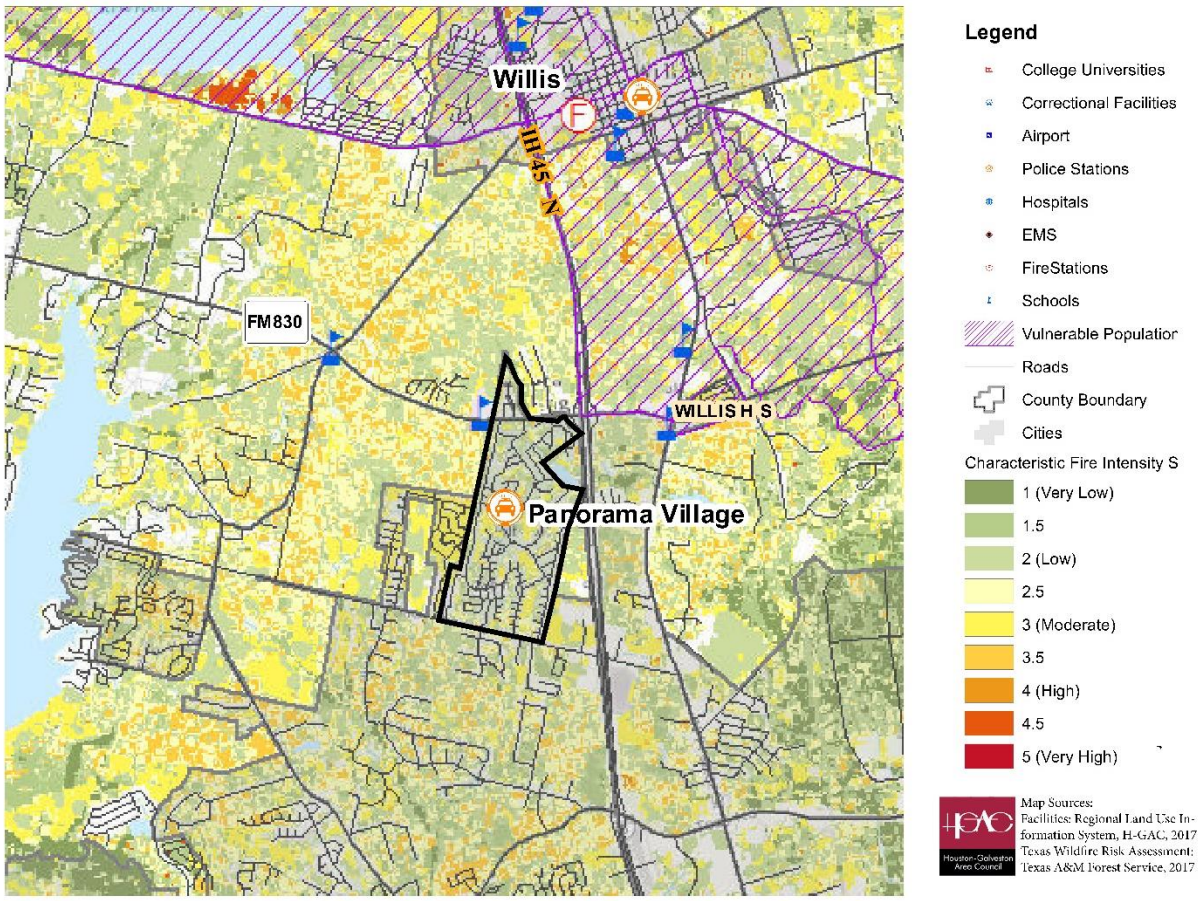
Montgomery			
Planning Area (Sq. mi):	4.6	**Occurrences since 2005:**	1
Area Affected:	3%	**Annual Event Average:**	0.08
Probability of Occurring in the next 5 years:	Likely; 42% chance event will occur within next 5 years.		
Greatest Occurrence:	5 acres burned during one event		
Extent:	Up to 20 acres burn during 1 event		
Vulnerability		**Impact**	
7 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

Oak Ridge North



Oak Ridge North			
Planning Area (Sq. mi):	1.1	**Occurrences since 2005:**	1
Area Affected:	1%	**Annual Event Average:**	0.08
Probability of Occurring in the next 5 years:	Likely; 42% chance event will occur within next 5 years.		
Greatest Occurrence:	4 acres burned during one event		
Extent:	Up to 20 acres burn during 1 event		
Vulnerability		**Impact**	
6 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

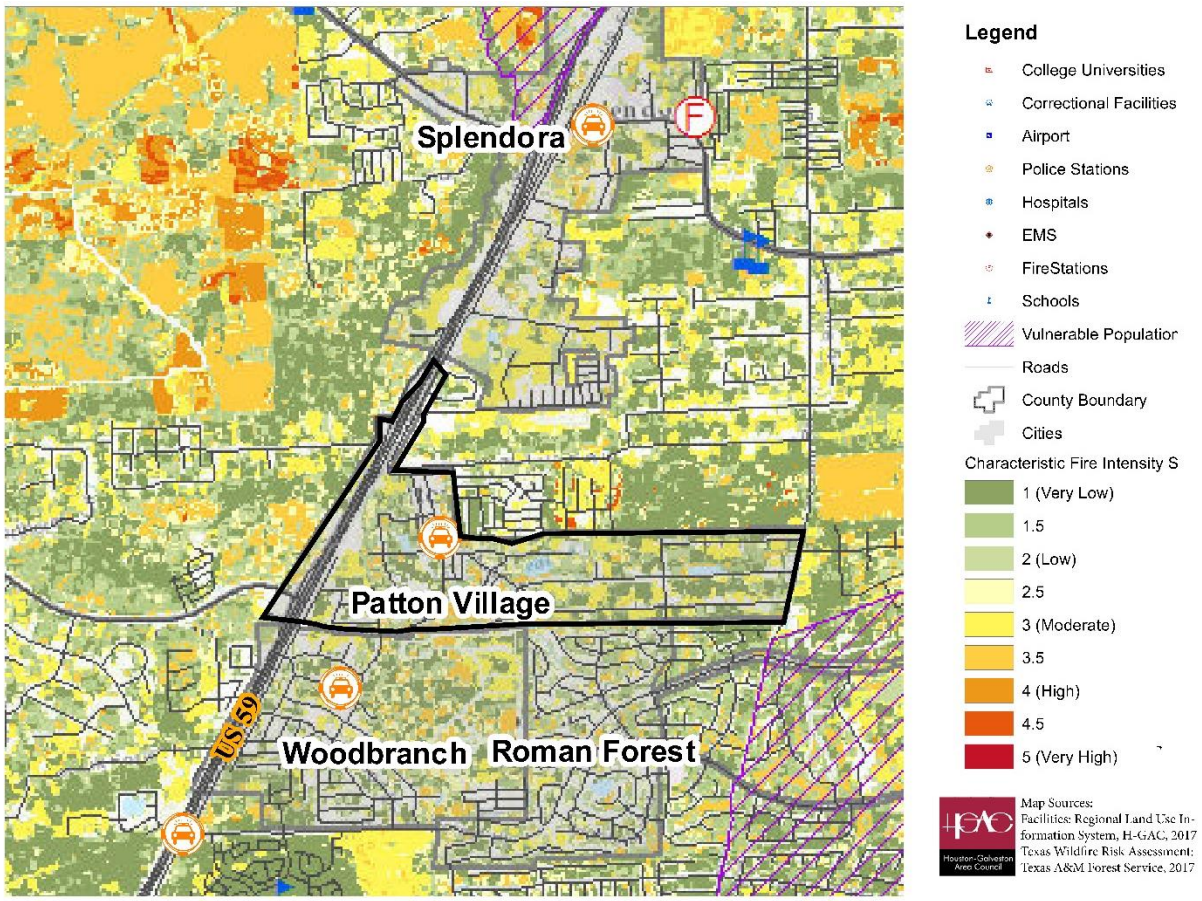
Panorama Village



Panorama Village			
Planning Area (Sq. mi):	1.1	**Occurrences since 2005:**	3
Area Affected:	13%	**Annual Event Average:**	0.25
Probability of Occurring in the next 5 years:	Very likely; 1.25 events estimated to occur within next 5 years.		
Greatest Occurrence:	3 acres burned during one event		
Extent:	Up to 15 acres burn during 1 event		

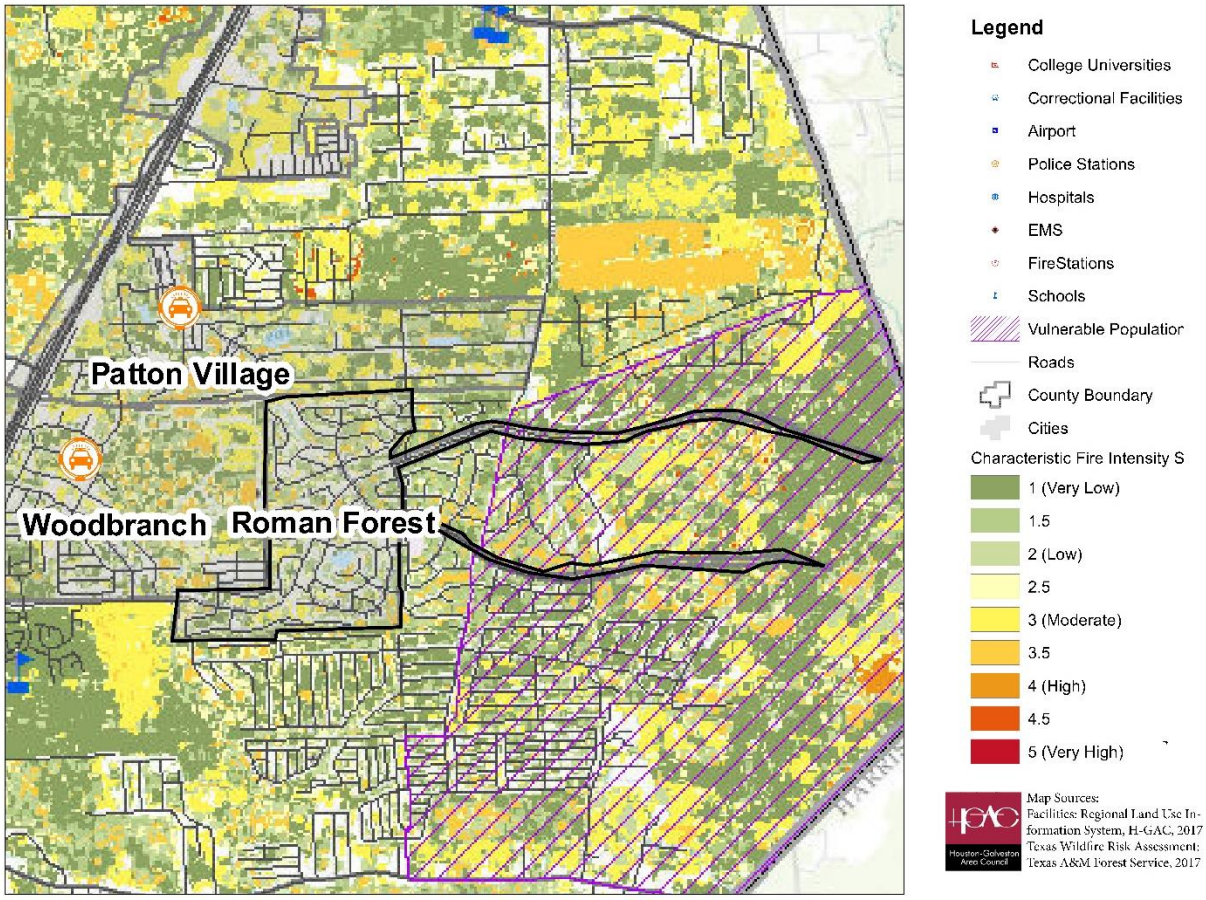
Vulnerability	**Impact**
127 residential structures at risk	Loss of homes is costly, and there is a potential loss of life.

Patton Village



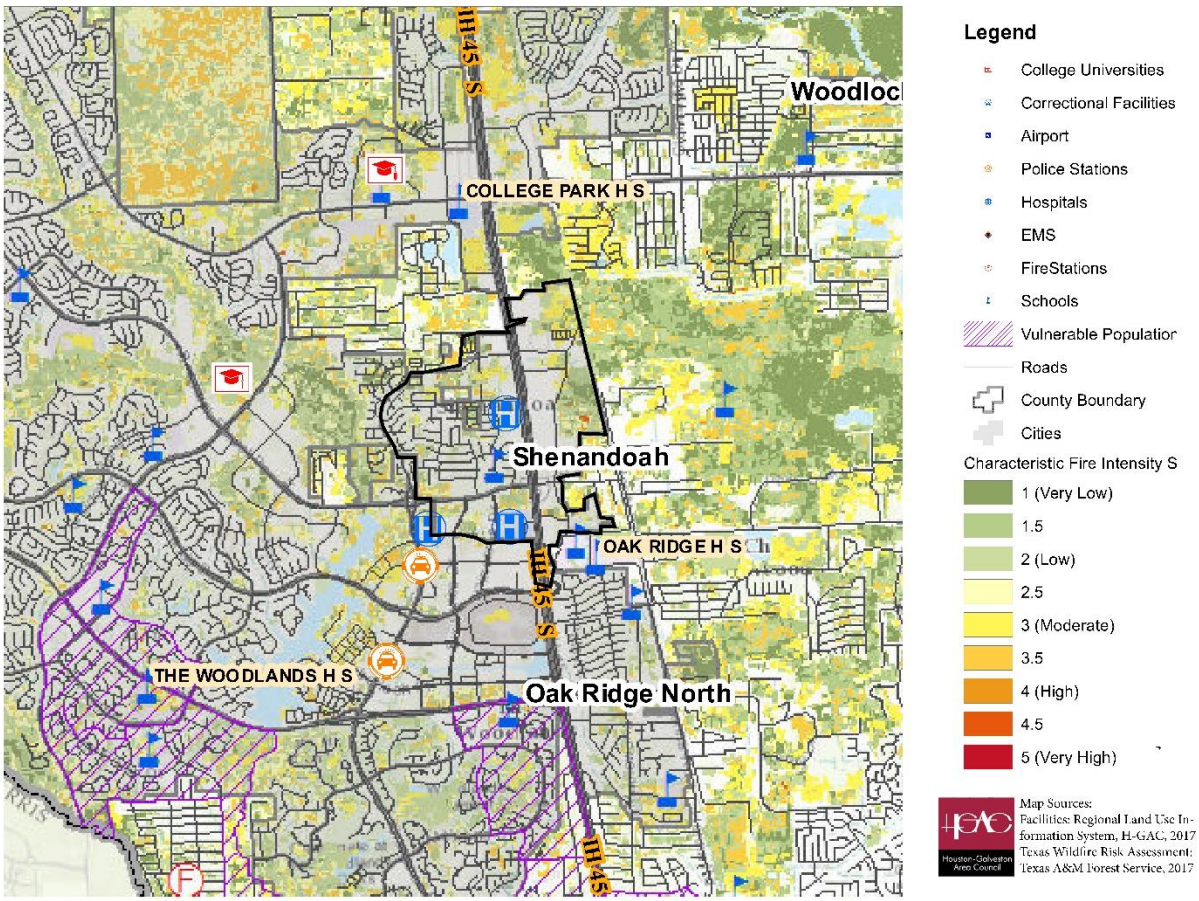
Patton Village			
Planning Area (Sq. mi):	2.1	**Occurrences since 2005:**	4
Area Affected:	4%	**Annual Event Average:**	0.33
Probability of Occurring in the next 5 years:	Very likely; 1.67 events estimated to occur within next 5 years.		
Greatest Occurrence:	1 acres burned during one event		
Extent:	Up to 10 acres burn during 1 event		
Vulnerability		**Impact**	
15 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

Roman Forest



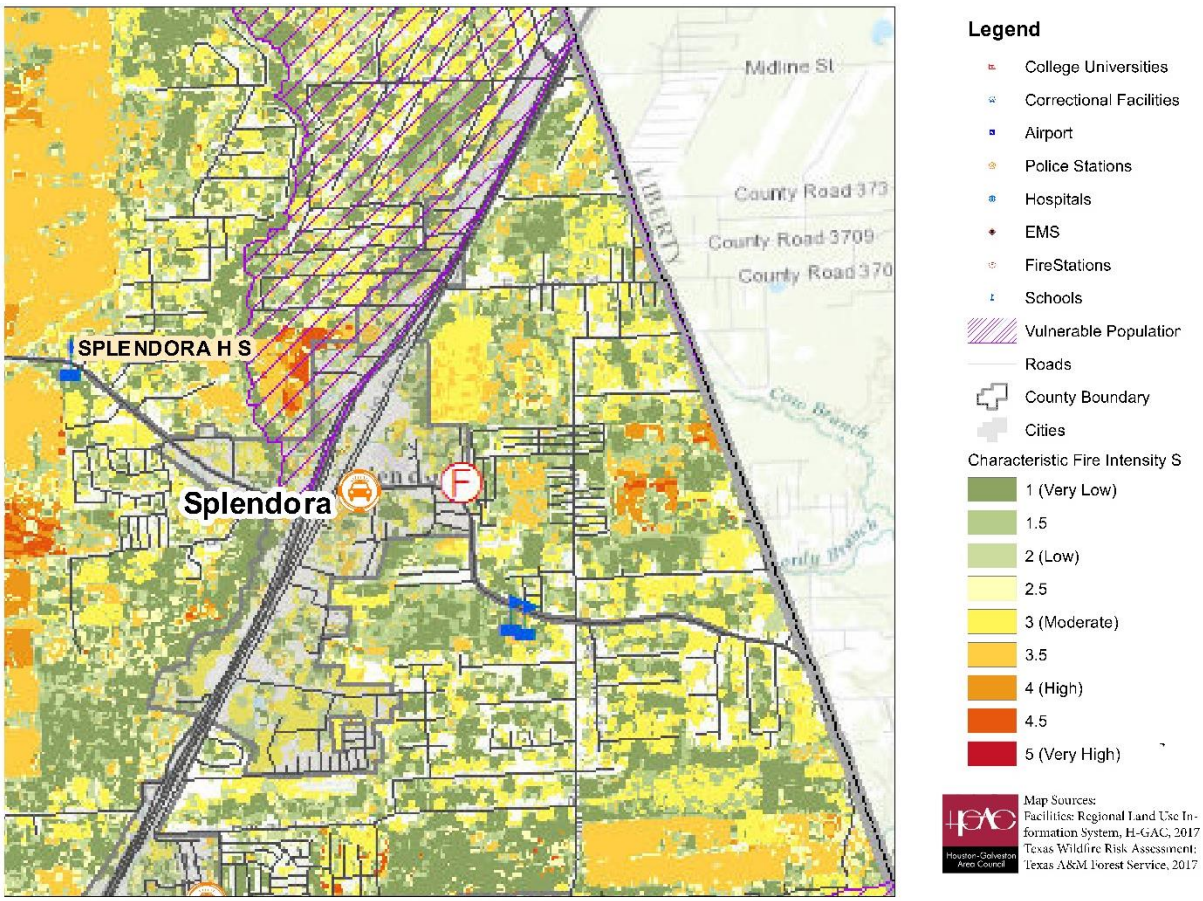
Roman Forest			
Planning Area (Sq. mi):	1.5	**Occurrences since 2005:**	1
Area Affected:	3%	**Annual Event Average:**	0.08
Probability of Occurring in the next 5 years:	Likely; 42% chance event will occur within next 5 years.		
Greatest Occurrence:	1 acres burned during one event		
Extent:	Up to 10 acres burn during 1 event		
Vulnerability		**Impact**	
16 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

Shenandoah



Shenandoah			
Planning Area (Sq. mi):	1.3	**Occurrences since 2005:**	0
Area Affected:	2%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; Shenandoah has not had any previous occurrences, but neighboring jurisdictions have experienced wildfires. This jurisdiction could potentially experience a wildfire.		
Extent:	Up to 10 acres burn during 1 event		
Vulnerability		**Impact**	
19 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

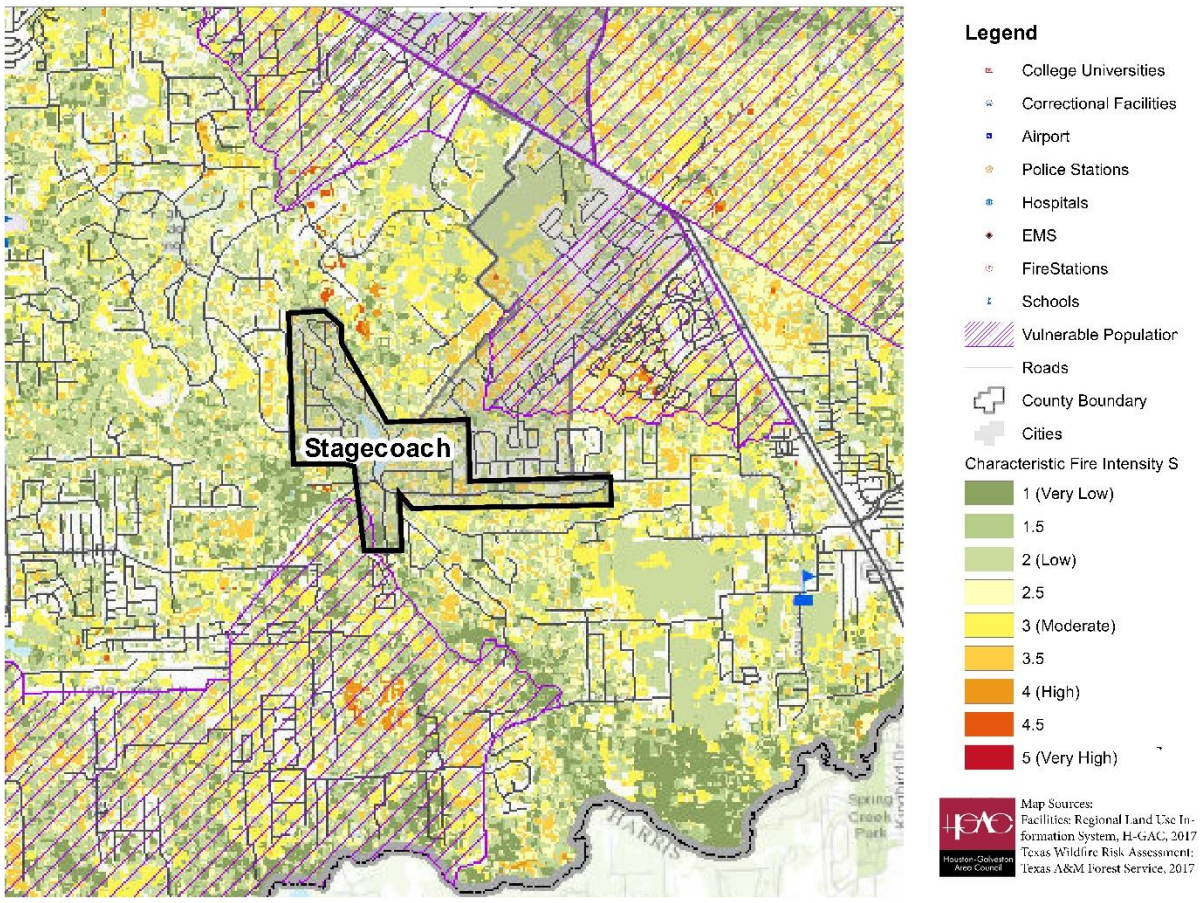
Splendora



Splendora			
Planning Area (Sq. mi):	2.1	**Occurrences since 2005:**	1
Area Affected:	6%	**Annual Event Average:**	0.08
Probability of Occurring in the next 5 years:	Likely; 42% chance event will occur within next 5 years.		
Greatest Occurrence:	1 acres burned during one event		
Extent:	Up to 10 acres burn during 1 event		

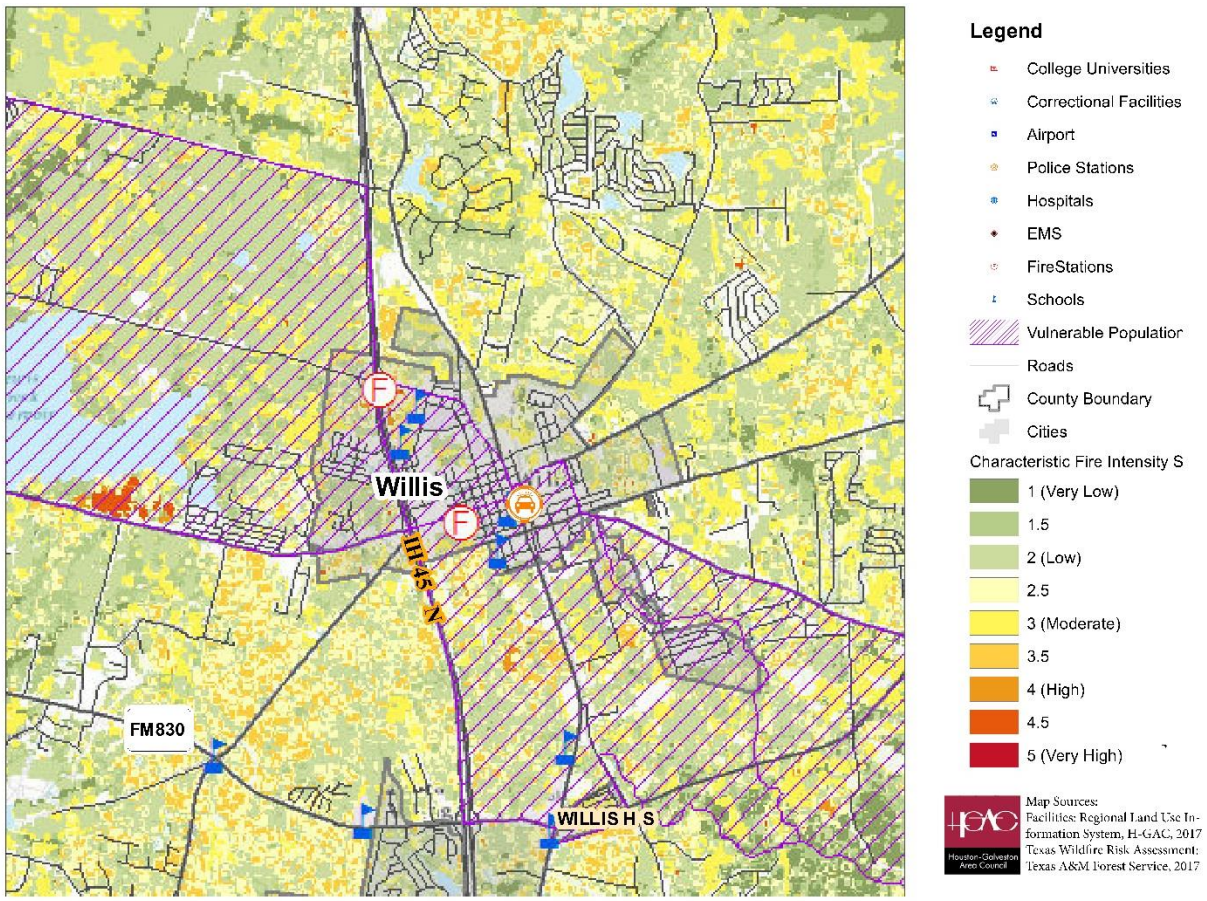
Vulnerability	Impact
33 residential structures at risk	Loss of homes is costly, and there is a potential loss of life.

Stagecoach



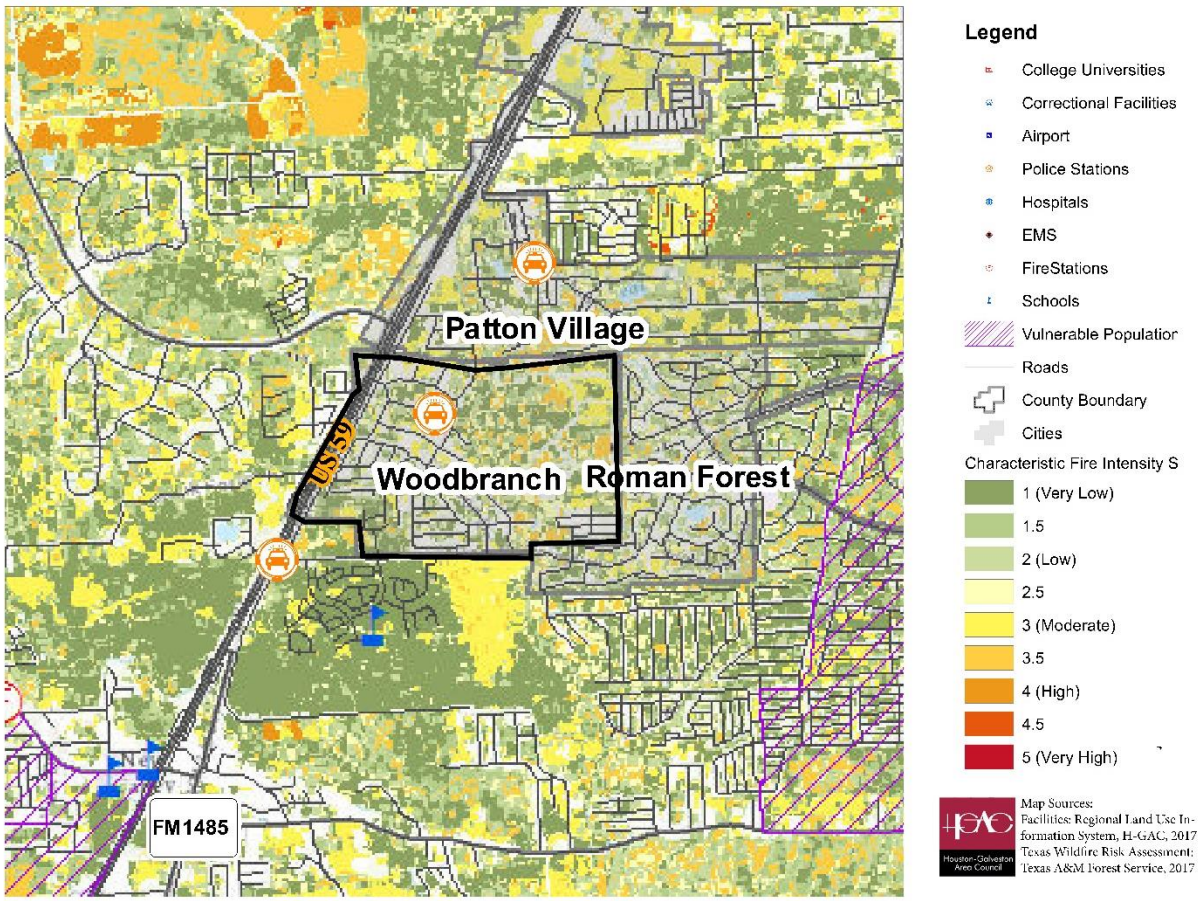
Stagecoach			
Planning Area (Sq. mi):	1.2	**Occurrences since 2005:**	1
Area Affected:	8%	**Annual Event Average:**	0.08
Probability of Occurring in the next 5 years:	Likely; 42% chance event will occur within next 5 years.		
Greatest Occurrence:	1 acres burned during one event		
Extent:	Up to 10 acres burn during 1 event		
Vulnerability		**Impact**	
12 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

Willis



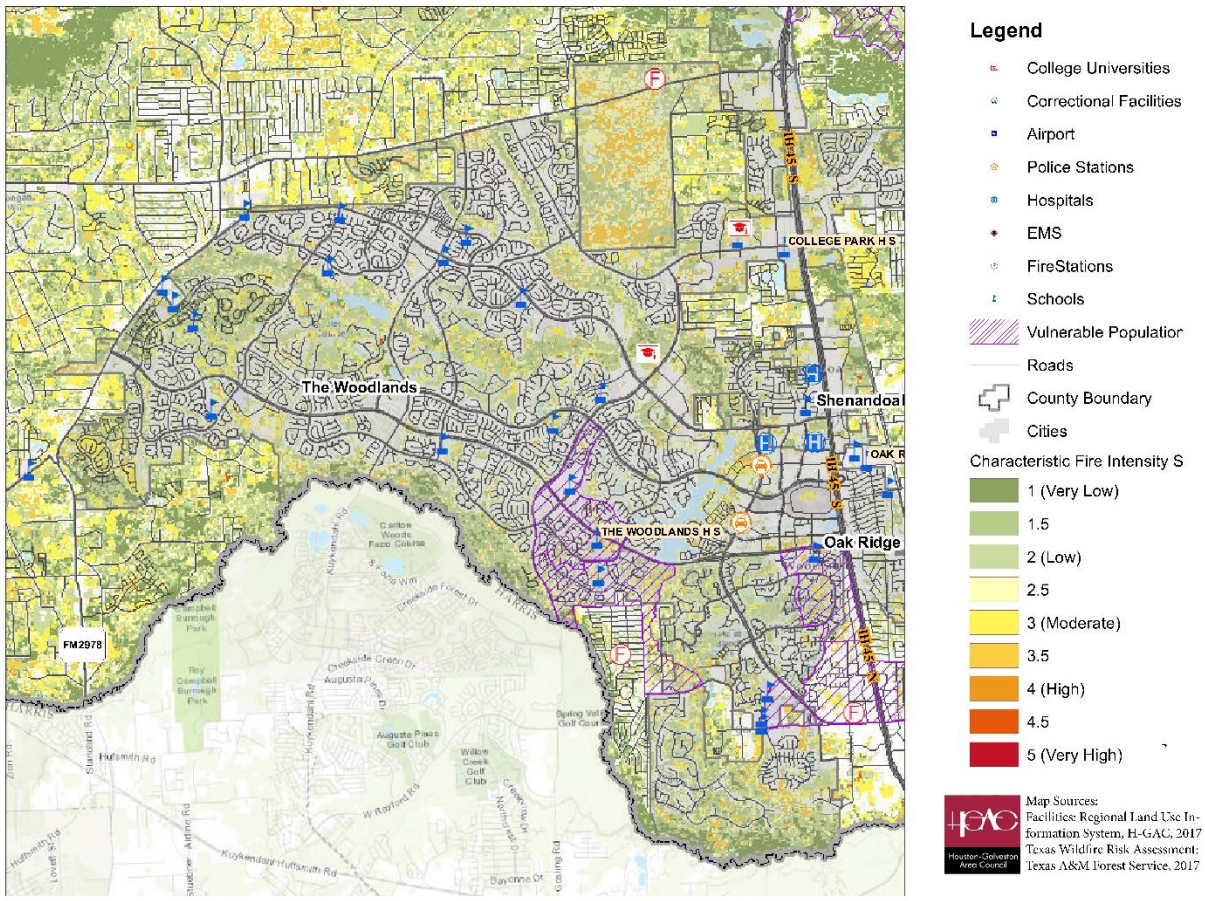
Willis			
Planning Area (Sq. mi):	3.3	**Occurrences since 2005:**	16
Area Affected:	6%	**Annual Event Average:**	1.33
Probability of Occurring in the next 5 years:	Very likely; 6.67 events estimated to occur within next 5 years.		
Greatest Occurrence:	1 home severely damaged during an event		
Extent:	Up to 10 acres burn during 1 event, and 5 homes are lost		
Vulnerability		**Impact**	
107 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

Woodbranch Village



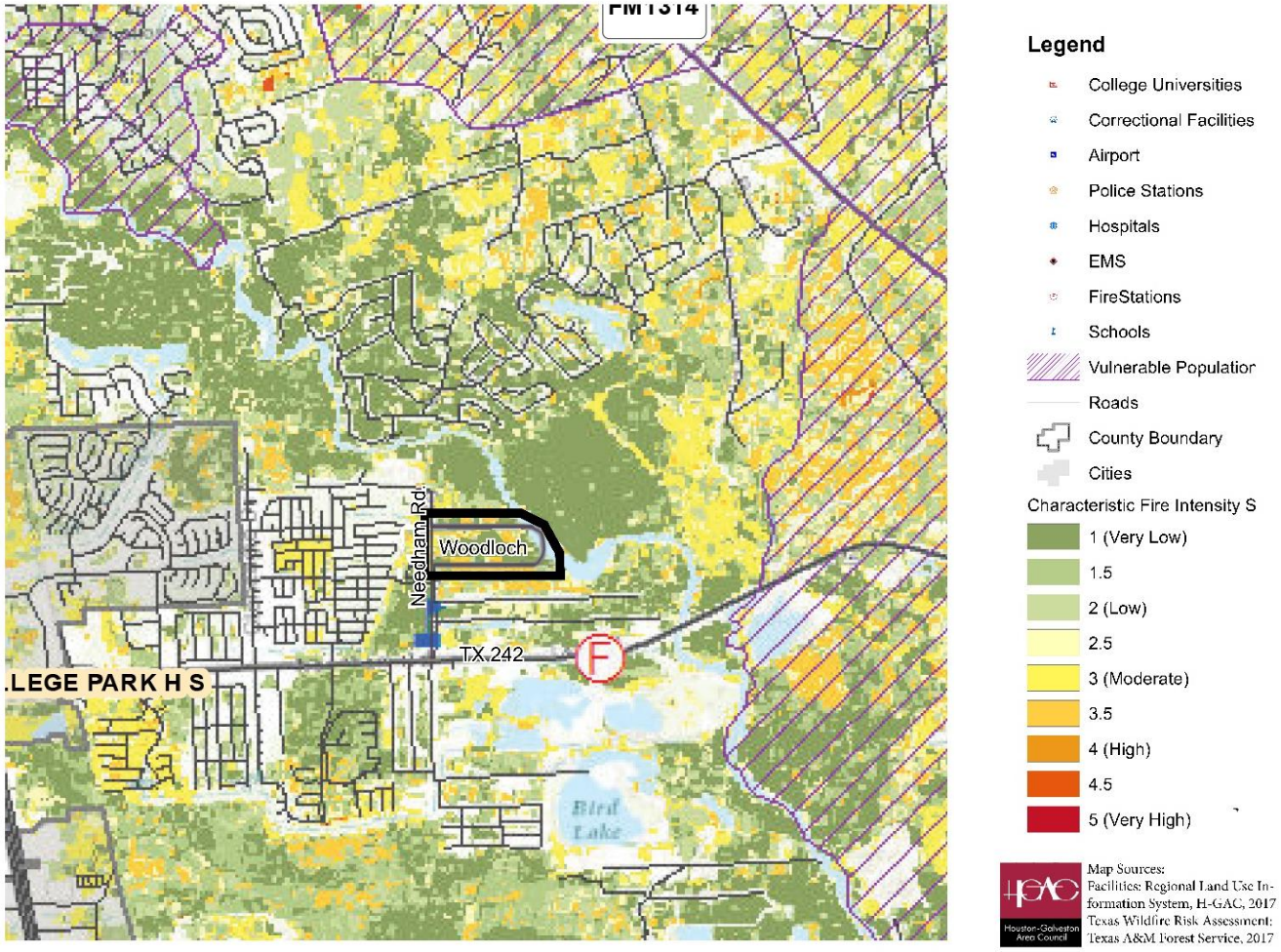
Woodbranch Village			
Planning Area (Sq. mi):	1.9	**Occurrences since 2005:**	2
Area Affected:	8%	**Annual Event Average:**	0.16
Probability of Occurring in the next 5 years:	Likely; 83% chance event will occur within next 5 years.		
Greatest Occurrence:	8 acres burned in one year		
Extent:	Up to 20 acres burn during 1 event		
Vulnerability		**Impact**	
38 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

The Woodlands Township



Woodlands Township			
Planning Area (Sq. mi):	43.9	**Occurrences since 2005:**	48
Area Affected:	5%	**Annual Event Average:**	4
Probability of Occurring in the next 5 years:	Very likely; 20 events estimated to occur within next 5 years.		
Greatest Occurrence:	3 deaths and 77 acres burned during one event		
Extent:	Up to 200 acres burn during 1 event		
Vulnerability		**Impact**	
1,051 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

Woodloch



Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences since 2005:**	0
Area Affected:	14%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; Woodloch has not had any previous occurrences, but neighboring jurisdictions have experienced wildfires. This jurisdiction could potentially experience a wildfire.		
Extent:	Up to 10 acres burn during 1 event		
Vulnerability		**Impact**	
10 residential structures at risk		Loss of homes is costly, and there is a potential loss of life.	

Part 6.3 Hurricane & Tropical Storms

6.3 Hurricanes and Tropical Storms

The Saffir-Simpson Scale ranks hurricanes that are formed in the Atlantic Ocean and Northern Pacific Ocean east of the international date line. The scale considers winds and the amount of damages that could be sustained by the storm. Category 1 is the lowest category of storm, while Category 5 is the strongest level storm. Tropical storms are tropical cyclones that have winds between 39 to 73 mph. While tropical cyclone winds do not reach the wind speeds for the Saffir- Simpson scale, according to the Beaufort Wind Scale, tropical storms are capable of producing winds that could break or uproot trees or create considerable structural damage.

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt. 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt. 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (Major)	111-129 mph 96-112 kt. 178-208 km/h	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (Major)	130-156 mph 113-136 kt. 209-251 km/h	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months
5 (Major)	157 mph min. 137 kt. min. 252 km/h	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Historic Occurrence

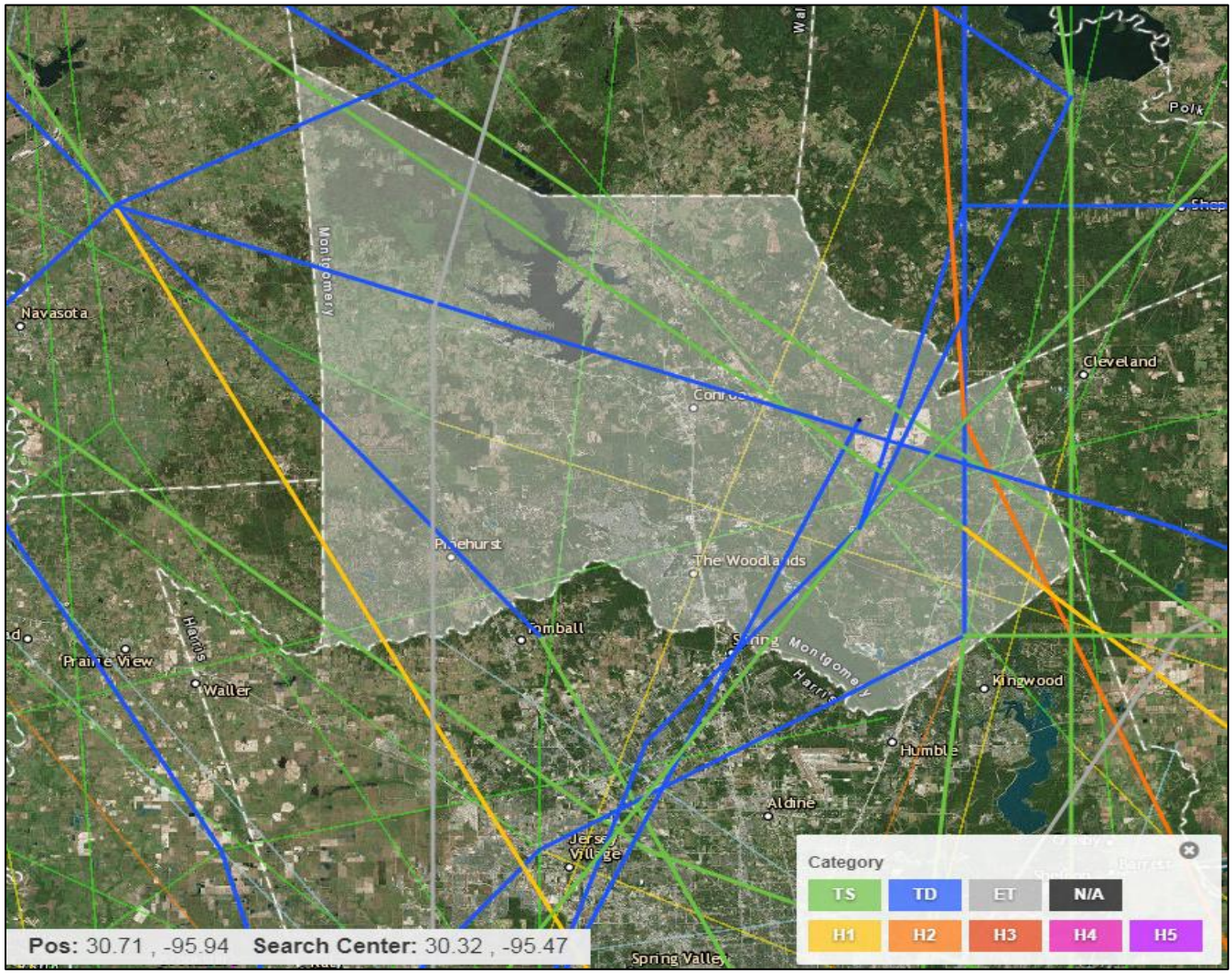
Based on recorded data, fifteen hurricanes and tropical storms have direct paths over Montgomery County. Those Hurricanes are denoted with an asterisk in the chart below. Several other hurricanes and tropical storms since 1950 are in included in the list below, and their monetary impact is also noted.

Year	Storm	**Property Damage** (2015 Dollars)
1941	Unnamed Hurricane	no data available
1942	Unnamed Hurricane	no data available
1949	Unnamed Tropical Storm	no data available
1958	Tropical Storm Gerda*	no data available
1959	Tropical Storm Debra*	no data available
1963	Tropical Storm Cindy*	no data available
1970	Tropical Storm Felice*	no data available
1971	Unnamed Tropical Storm*	no data available
1979	Tropical Storm Claudette*	no data available
1980	Unnamed Tropical Storm*	no data available
1981	Unnamed Tropical Storm*	no data available

1983	Hurricane Alicia	no data available	
1989	Hurricane Allison *	no data available	
1989	Tropical Strom Chantal	no data available	
1998	Unnamed Tropical Storm	$	25,000.00
2001	Tropical Storm Allison	$	20,110,000.00
2003	Tropical Storm Grace	$	25,000.00
2005	Hurricane Rita	$	2,500,000.00
2008	Tropical Storm Edouard	$	150,000.00
2008	Hurricane Ike	$	500,000,000.00
2015	Unnamed Tropical Storm	0	
2015	Tropical Storm Bill	0	
2017	Hurricane Harvey	$	7,000,000,000.00

NCDC; https://www.ncdc.noaa.gov/stormevents/

NOAA: Historical Hurricane Tracks in Montgomery County



Source: NOAA https://coast.noaa.gov/hurricanes/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders, FEMA, NOAA, and the Department of Homeland Security (DHS) are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- FEMA's Hazus analysis software
- Stakeholder identified vulnerabilities

Hazus was used to determine the economic loss and calculate the building stock at risk of hurricane damage in Montgomery County. Shelter needs were also projected using this method. The complete Hazus report is located in Appendix C. Stakeholders provided valuable insight into additional vulnerabilities within their communities. These findings are provided in condensed charts for each jurisdiction.

Montgomery County (All participating jurisdictions)

Identified Vulnerabilities:

While participating jurisdictions identified flooding as one of the main effects of hurricanes, flooding is addressed in the first section. In this section vulnerabilities from hurricane winds are addressed. High winds can tear down powerlines, trees, barns, fences, and multitude of other debris can be blown into roadways and homes during the event.

Additionally, residences and commercial buildings could be damaged or destroyed due to events; older residential neighborhoods and structures without a permanent foundation were identified as one of the main vulnerabilities throughout the county. While current building codes address the vulnerability of wind damage to structures, older buildings (particularly residential buildings) were built when less stringent building codes were in place; therefore, older residential building and residences without a permanent foundation are a focus in this section.

- According to Hazus 5,359 commercial residential buildings are at risk
- According to Hazus 146,511 residential buildings are at risk
- According to Hazus 94 households will be displaced from their homes
- Based on the Hazus reports residential buildings in comparison to commercial buildings are most at risk of the effects of hurricanes throughout the county

Montgomery County (All participating jurisdictions)
Identified Impacts: • Downed powerlines could impact communication and daily active leading to a finical loss for the county, cities and individuals, and could impede first responders from reaching those in need or residents evacuating • Strong winds could prevent first responders from traveling to assist individuals, because of unsafe driving conditions such as debris hitting emergency vehicles • Critical facilities could sustain wind damage, potentially delaying first responders reaching those in need and city services after the event • Economic and financial loss for cities and individuals including property loss: o According to Hazus there could be a potential of $ 42,702,039 in residential loss or 88 percent of total loss o According to Hazus there could be a potential of $ 3,681,350 in commercial property loss or about 8 percent of total loss

Montgomery County			
Planning Area (Sq. mi):	935.3	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 74 mph during Hurricane Rita 2 indirect fatalities during Hurricane Ike		
Loss Estimates:	2.58 billion in direct property loss 3.4 million in business interruption loss		
Shelter Requirements:	741 persons seeking short-term shelter 3,540 displaced households		
Extent:	Up to 129 mph wind gusts.		

Vulnerability	Impact
14,488 residential properties at risk of moderate or severe damage	Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.
More than 504,600 homes lost power during Hurricane Ike.	Potential loss of life and loss of communication.

Conroe			
Planning Area (Sq. mi):	72	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita 80% of households lost power during Hurricane Ike 12 days without power for some residences		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
1,485 homes at risk of damage during 500-year hurricane event.		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	
Above ground power lines and electrical stations that are damaged by high winds.		Extensive power outages, potential loss of life, and loss of communication.	

Cut and Shoot			
Planning Area (Sq. mi):	2.7	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 74 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
23 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Magnolia			
Planning Area (Sq. mi):	2.8	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind speeds of 57 mph during Hurricane Rita		
Extent:	Up to 80 mph wind gusts.		
Vulnerability		**Impact**	
23 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Montgomery			
Planning Area (Sq. mi):	4.6	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
10 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Oak Ridge North			
Planning Area (Sq. mi):	1.1	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 57 mph during Hurricane Rita		
Extent:	Up to 75 mph wind gusts.		
Vulnerability		**Impact**	
42 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Panorama Village			
Planning Area (Sq. mi):	1.1	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
80 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Patton Village			
Planning Area (Sq. mi):	2.1	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
135 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Roman Forest			
Planning Area (Sq. mi):	1.5	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
15 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Shenandoah			
Planning Area (Sq. mi):	1.3	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
13 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Splendora			
Planning Area (Sq. mi):	2.1	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
31 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Stagecoach			
Planning Area (Sq. mi):	1.2	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
9 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Willis			
Planning Area (Sq. mi):	3.3	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 71 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
32 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Woodbranch Village			
Planning Area (Sq. mi):	1.9	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 74 mph during Hurricane Rita		
Extent:	Up to 90 mph wind gusts.		
Vulnerability		**Impact**	
57 homes at risk of damage during 500-year hurricane event		Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.	

Woodlands Township			
Planning Area (Sq. mi):	43.9	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 74 mph during Hurricane Rita Some residents went 12 days without power		
Extent:	Up to 90 mph wind gusts.		

Vulnerability	Impact
1762 homes at risk of damage during 500-year hurricane event	Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.
Above ground power lines and electrical stations that are damaged by high winds.	Extensive power outages, potential loss of life, and loss of communication.

Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences since 1941:**	22
Area Affected:	100%	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	Wind gusts up to 74 mph during Hurricane Rita Some residents went 12 days without power		
Extent:	Up to 90 mph wind gusts.		

Vulnerability	Impact
26 homes at risk of damage during 500-year hurricane event	Displaced residents cannot be safely housed during major hurricane events, and repairs are very costly.

Part 6.4 Severe Thunderstorms

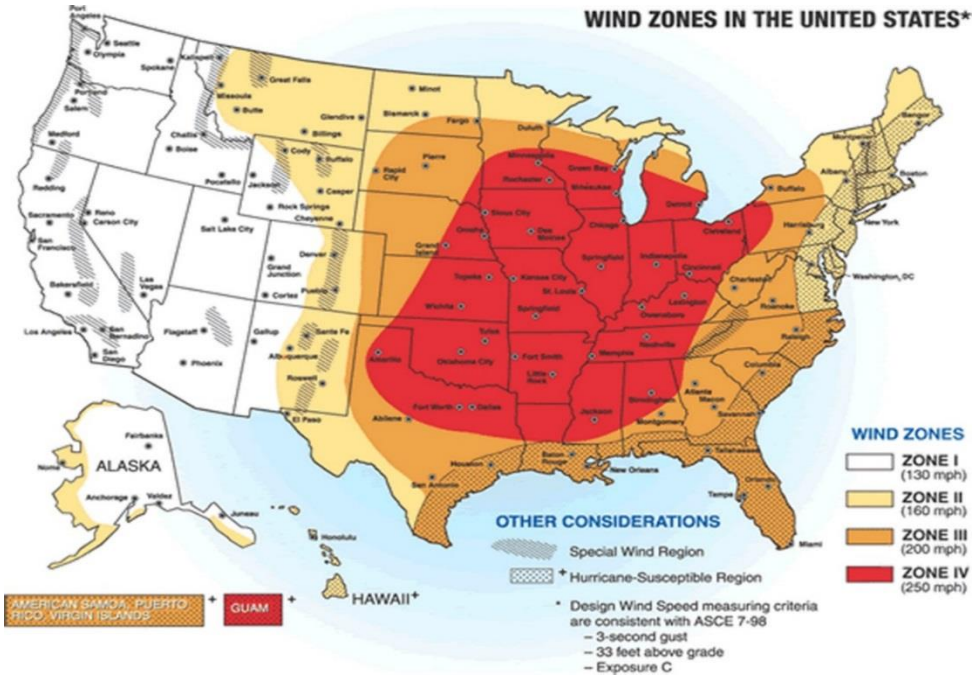
6.4 Severe Thunderstorm

A thunderstorm's magnitude is measured by the Beaufort Wind Scale. This scale considers visual and physical effects of wind to determine the force, displayed from 0 to 12. Severe gale to hurricane winds are typically considered more dangerous or damaging winds.

Force	Wind (Mph)	WMO Classification	Wind Effects
0	Less than 1	Calm	Calm, Smoke rises vertically
1	1 to 3	Light Air	Smoke drift indicates wind direction
2	4 to 8	Light Breese	Wind felt on face, leaves rustle, vanes begin to move
3	9 to 14	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	15-21	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	22-28	Fresh Breeze	Small trees in leaf begin to sway
6	29-36	Strong Breeze	Larger tree branches moving, whistling in wires
7	37-44	Near Gale	Whole trees moving, resistance felt walking against wind
8	45-53	Gale	Whole trees in motion, resistance felt walking against wind
9	54-62	Strong Gale	Slight structural damage occurs, shingles blow off roofs
10	63-72	Storm	Trees broken or uprooted, considerable structural damage occurs
11	73-83	Violent Storm	Widespread damage
12	84 +	Hurricane	Violence and destruction

Source: http://www.ncdc.noaa.gov

A second tool to help measure the potential magnitude of a thunderstorm is the Wind Zone map. This map from FEMA shows the variety of wind speeds and depicts the frequency and strength of potential storms throughout the United States. Montgomery County is in Wind Zone III meaning that the county could experience winds up to 200 mph.



Map source: http://www.fema.gov

Historic Occurrences

Date	Jurisdiction	Injuries	Property Damage (2015 Dollars)	Crops Damage (2015 Dollars)	Wind Speed (mph)
7/23/2000	Conroe	0	$89,700	$0	
8/22/2000	Magnolia	0	$20,700	$0	
9/1/2000	The Woodlands	0	$41,400	$0	
9/14/2000	Conroe	0	$20,700	$0	
11/5/2000	Montgomery	0	$158,700	$0	
11/23/2000	Woodlands	0	$20,700	$0	
1/29/2001	County Wide	0	$25,000	$0	
3/12/2001	Montgomery	0	$26,800	$0	
4/23/2001	Oak Ridge North	0	$33,500	$0	
10/11/2001	Conroe	0	$20,100	$0	
10/13/2001	Conroe	0	$17,420	$0	
4/7/2002	Willis	0	$39,600	$0	
6/16/2002	Montgomery	0	$26,400	$0	
6/29/2002	Magnolia	0	$13,200	$0	
12/30/2002	Magnolia	0	$72,600	$0	
6/12/2003	Willis	0	$6,450	$0	62
5/17/2004	Woodlands	0	$56,250	$0	69
7/25/2004	Montgomery	0	$25,000	$0	58
8/18/2004	Magnolia	0	$6,250	$0	58
8/28/2004	Shenandoah	0	$18,750	$0	63
11/23/2004	County Wide	0	$62,500	$0	69
3/19/2005	Conroe	0	$3,630	$0	60
7/14/2005	Conroe	0	$54,450	$0	61
7/22/2005	Lake Conroe	0	$15,730	$0	70
8/15/2005	Magnolia	0	$12,100	$0	58
4/21/2006	Magnolia	0	$16,520	$0	58
4/25/2007	Woodlands	0	$18,240	$0	60
3/3/2008	Cut and Shoot	0	$16,500	$0	62
5/27/2008	Conroe	0	$22,000	$0	61
8/3/2008	Conroe	1	$55,000	$0	63
3/25/2009	Cut and Shoot	0	$0	$0	60
3/25/2009	Shenandoah	0	$0	$0	58
8/26/2009	Montgomery	0	$3,300	$0	58
7/2/2011	Splendora	0	$5,250	$0	59
1/25/2012	Montgomery	0	$0	$36,050	64
2/18/2012	Willis	0	$5,000	$0	64
2/18/2012	Shenandoah	0	$7,000	$0	64
2/18/2012	Splendora	0	$5,000	$0	64
6/12/2012	Conroe	0	$50,000	$0	64
6/12/2012	Woodlands	0	$5,000	$0	64

6/12/2012	Lake Conroe	0	$5,000	$0	64
6/12/2012	Shenandoah	0	$5,000	$0	64
7/17/2012	Woodlands	0	$0	$0	60
8/10/2012	Montgomery	0	$7,000	$0	63
8/18/2012	Magnolia	0	$0	$0	61
11/3/2012	Conroe	0	$0	$0	61
12/25/2012	Splendora	0	$20,600	$0	64
6/6/2013	Willis	0	$6,630	$0	60
8/16/2013	Shenandoah	0	$3,060	$0	55
10/27/2013	Shenandoah	0	$2,040	$0	60
8/11/2014	Oak Ridge North	0	$10,000	$0	63
4/16/2015	Woodlands	0	$50,000	$0	55
4/27/2015	Willis	0	$30,000	$0	63
4/27/2015	Conroe	0	$0	$0	62
5/14/2015	Willis	0	$25,000	$0	64
5/14/2015	Conroe	0	$0	$0	59
5/24/2015	Woodlands	0	$45,000	$0	69
8/25/2015	Montgomery	0	$0	$0	58
4/27/2016	Conroe	0	$0	$0	59
4/27/2016	Willis	0	$0	$0	69
4/30/2016	Willis	0	$0	$0	58
5/26/2016	Conroe	0	$0	$0	66

Source: https://www.ncdc.noaa.gov/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders, FEMA, and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used three methods:

- GIS analysis to estimate structural damage costs in each jurisdiction; and
- Stakeholder identified vulnerabilities.

Montgomery County (All participating jurisdictions)

Identified Vulnerabilities:

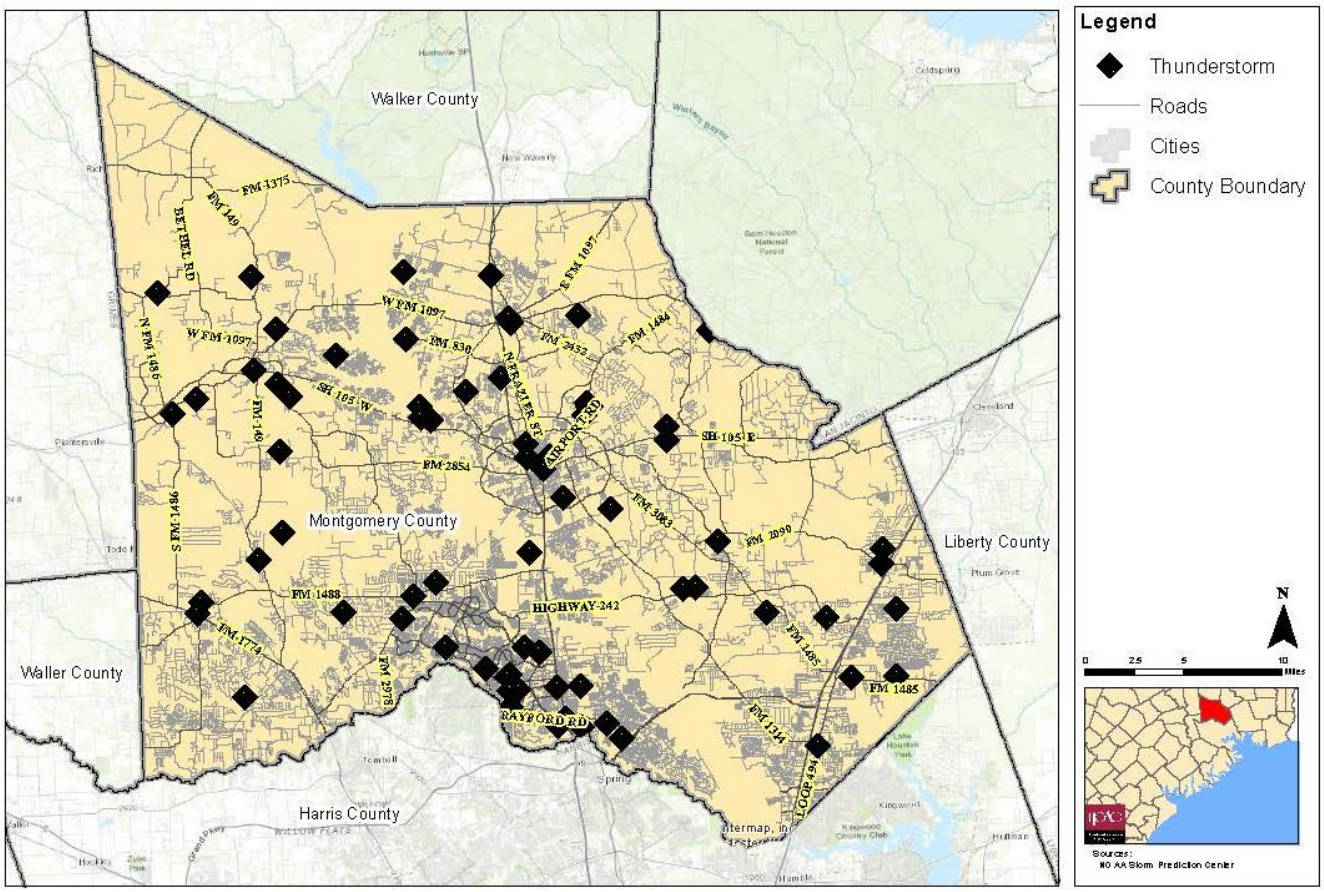
Similar to the hurricane section, this section identifies vulnerabilities from high winds. High winds can tear down powerlines, trees, barns, fences, and multitude of other debris can be blown into roadways and homes during the event.

Additionally, residences and commercial buildings could be damaged or destroyed due to wind events; older residential neighborhoods and structures without a permanent foundation were identified as one of the main vulnerabilities throughout the county. While current building codes address the vulnerability of wind damage to structures, older buildings (particularly residential buildings) were built when less stringent building codes were in place; therefore, older residential building and residences without a permanent foundation are a focus in this section.

Identified Impacts:

- Downed powerlines could impact communication and daily active leading to a finical loss for the county, cities and individuals, and could impede first responders from reaching those in need or residents evacuating
- Strong winds could prevent first responders from traveling to assist individuals, because of unsafe driving conditions such as debris hitting emergency vehicles
- Critical facilities could sustain wind damage, potentially delaying first responders reaching those in need and city services during and after the event
- Economic and financial loss for cities and individuals including property loss

Severe Thunderstorm Locations



Unincorporated Montgomery County			
Planning Area (Sq. mi):	935.3	**Occurrences since 2000:**	2
Area Affected:	Countywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	$62,500 in property damage from one event 69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		

Vulnerability	Impact
162,530 structures at risk	An estimated $12,689.52 in direct property damage to residences each year.

Conroe			
Planning Area (Sq. mi):	72	**Occurrences since 2000:**	14
Area Affected:	Citywide	**Annual Event Average:**	0.82
Probability of Occurring in the next 5 years:	Very likely; 4.12 events estimated to occur within next 5 years.		
Greatest Occurrence:	$89,700 in property damage from one event 66 mph wind speeds 1 injury		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
18,086 structures at risk		An estimated $ 92,379.73 in direct property damage to residences each year.	

Cut and Shoot			
Planning Area (Sq. mi):	2.7	**Occurrences since 2000:**	2
Area Affected:	Citywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	$16,500 in property damage from one event 62 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
371 structures at risk		An estimated $13,197.10 in direct property damage to residences each year.	

Magnolia			
Planning Area (Sq. mi):	2.8	**Occurrences since 2000:**	7
Area Affected:	Citywide	**Annual Event Average:**	0.41
Probability of Occurring in the next 5 years:	Very likely; 2 events estimated to occur within next 5 years.		
Greatest Occurrence:	$72,600 in property damage from one event 61 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
529 structures at risk		An estimated $46,189.87 in direct property damage to residences each year.	

Montgomery			
Planning Area (Sq. mi):	4.6	**Occurrences since 2000:**	8
Area Affected:	Citywide	**Annual Event Average:**	0.47
Probability of Occurring in the next 5 years:	Very likely; 2.35 events estimated to occur within next 5 years.		
Greatest Occurrence:	$158,700 in property damage from one event 64 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
237 structures at risk		An estimated $52,788.42 in direct property damage to residences each year.	

Oak Ridge North			
Planning Area (Sq. mi):	1.1	**Occurrences since 2000:**	2
Area Affected:	Citywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	$33,500 in property damage from one event 63 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
1,131 structures at risk		An estimated $13,197.10 in direct property damage to residences each year.	

Panorama Village			
Planning Area (Sq. mi):	1.1	**Occurrences since 2000:**	2
Area Affected:	Citywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
1,001 structures at risk		Costly repairs to residences and potential injuries.	

Patton Village			
Planning Area (Sq. mi):	2.1	**Occurrences since 2000:**	2
Area Affected:	Citywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
385 structures at risk		Costly repairs to residences and potential injuries.	

Roman Forest			
Planning Area (Sq. mi):	1.5	**Occurrences since 2000:**	2
Area Affected:	Citywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
547 structures at risk		Costly repairs to residences and potential injuries.	

Shenandoah			
Planning Area (Sq. mi):	1.3	**Occurrences since 2000:**	6
Area Affected:	Citywide	**Annual Event Average:**	0.35
Probability of Occurring in the next 5 years:	Very likely; 1.76 events estimated to occur within next 5 years.		
Greatest Occurrence:	$18,750 in property damage from one event 64 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
971 structures at risk		An estimated $39,591.31 in direct property damage to residences each year.	

Splendora			
Planning Area (Sq. mi):	2.1	**Occurrences since 2000:**	3
Area Affected:	Citywide	**Annual Event Average:**	0.18
Probability of Occurring in the next 5 years:	Likely; 88% chance event will occur within next 5 years.		
Greatest Occurrence:	$20,600 in property damage from one event 64 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
548 structures at risk		An estimated $19,795.66 in direct property damage to residences each year.	

Stagecoach			
Planning Area (Sq. mi):	1.2	**Occurrences since 2000:**	2
Area Affected:	Citywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
155 structures at risk		Costly repairs to residences and potential injuries.	

Willis			
Planning Area (Sq. mi):	3.3	**Occurrences since 2000:**	8
Area Affected:	Citywide	**Annual Event Average:**	0.47
Probability of Occurring in the next 5 years:	Very likely; 2.35 events estimated to occur within next 5 years.		
Greatest Occurrence:	$39,600 in property damage from one event 69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
1,782 structures at risk		An estimated $52,788.42 in direct property damage to residences each year.	

Woodbranch Village			
Planning Area (Sq. mi):	1.9	**Occurrences since 2000:**	2
Area Affected:	Citywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
477 structures at risk		Costly repairs to residences and potential injuries.	

Woodlands Township			
Planning Area (Sq. mi):	43.9	**Occurrences since 2000:**	8
Area Affected:	Citywide	**Annual Event Average:**	0.47
Probability of Occurring in the next 5 years:	Very likely; 2.35 events estimated to occur within next 5 years.		
Greatest Occurrence:	$56,250 in property damage from one event 69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
21,014 structures at risk		An estimated $52788.42 in direct property damage to residences each year.	

Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences since 2000:**	2
Area Affected:	Citywide	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	69 mph wind speeds		
Extent:	Up to 80 mph wind speeds		
Vulnerability		**Impact**	
68 structures at risk		Costly repairs to residences and potential injuries.	

Part 6.5 Drought

6.5 Drought

The Palmers Hydrological Drought Severity Index (PHDI) is the typical way extent of drought is observed throughout the United States. This regional index considers dry and wet spells over an extended period of time to calculate the range in the Index. The greater the number the more extreme the drought in a specific area.

Drought has particularly adverse effects on agriculture which is major industry in Montgomery County. The most extreme conditions occurred in 2011. The county's PHDI rating was < -4.0 (Extreme Drought) from March 2011 through January 2012. There were periods of severe drought preceding and following this period from August 2010 through October 2014. The agricultural loses are estimated at $5.2 billion, though specific numbers by county are not available for this event.

Palmers Drought Severity Index	
< -4.0	Extreme Drought
-3.99 to -3.0	Severe Drought
-2.99 to -2.0	Moderate Drought
-1.99 to -1.0	Mild Drought
-0.99 to -0.5	Incipient Drought
-0.49 to 0.49	Near Normal
0.5 to 0.99	Incipient Moist Spell
1.0 to 1.99	Moist Spell
2.0 to 2.99	Unusual Moist Spell
3.0 to 3.99	Very Moist Spell
> 4.0	Extreme Moist Spell

Source: https://www.ncdc.noaa.gov/

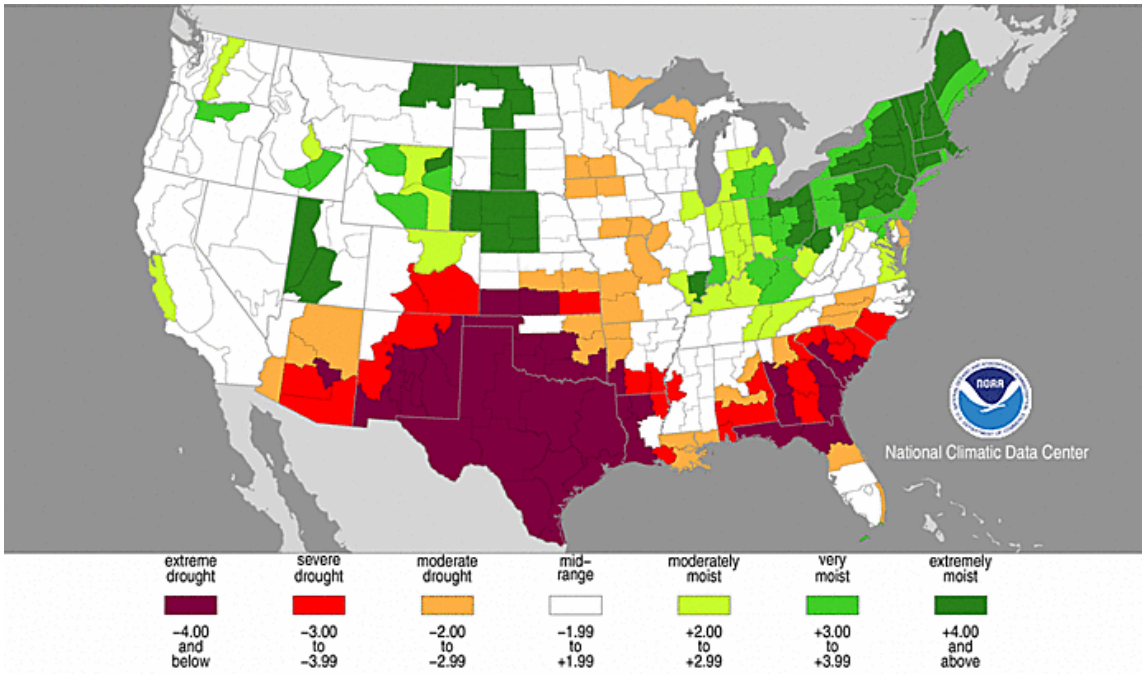
Historic Occurrence

In Montgomery County's recent history, there have been three major droughts, but only two causing agricultural losses. This information is listed below at the county level. There is no county-level data available for property and agricultural losses for the most recent and most extreme drought event.

Date	Description	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)
Sept. 1993	Presidential Declared Extreme Fire Hazard	Information not available	Information not available
1996	Drought Event	$0	$0
1998 - 2000	Declared Agricultural disaster by USDA	$1,000,000	$7,300,000
2000	Drought Event	$0	$0
2010 - 2014	Declared Agricultural disaster by USDA	Information not available	Information not available

Source: https://www.ncdc.noaa.gov/

Palmers Drought Severity Index: October 2011



Map source: https://www.ncdc.noaa.gov/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures exposed to hail damage; and
- Stakeholder identified vulnerabilities.

Droughts often last multiple years have economic impacts that last longer than the droughts themselves. Compounding the negative impacts of drought on the agricultural industry is the increased risk of wildfire. Montgomery County's agricultural industry has been determined the most vulnerable asset to drought. Montgomery County has 155,365 acres in agricultural production. According to the United States Department of Agriculture (USDA) Census of Agriculture, the market value of agricultural production in the county is $38,724,000 annually; with 48% of revenues from crops, and 52% of revenue from livestock production.

Montgomery County & All Participating Jurisdictions			
Planning Area (Sq. mi):	935.3	**Occurrences since 1990:**	5
Area Affected:	100% Entire Planning area	**Annual Event Average:**	0.18
Probability of Occurring in the next 5 years:	Likely; 92% chance event will occur within next 5 years.		
Greatest Occurrence:	$7.3 million in property and crop damage 1 year of extreme drought conditions; < -4.0 PHDI rating		
Extent:	Up to 2 years of extreme drought conditions; < -4.0 PHDI rating		

Vulnerability	Impact
155,362 acres of agricultural land	$23,835,688 of loss agricultural economic production in one year (catastrophic drought event)

Part 6.6 Lightning

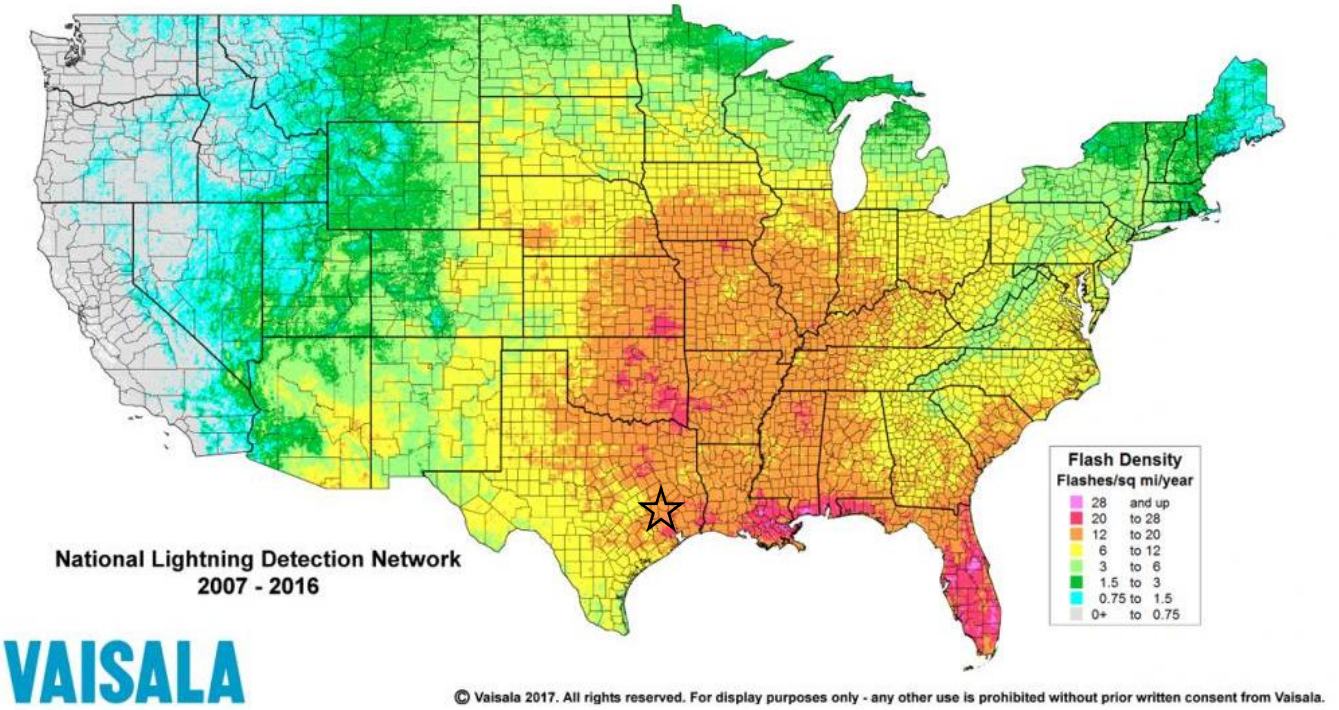
6.6 Lightning

There are two typical ways the magnitude of lightning is measured. The first is through the Lightning Activity Levels (LAL) grid. The National Oceanic and Atmospheric Administration (NOAA) considers how many cloud to ground strikes occur over a given period as well as rainfall to measure the amount of lighting activity occurring.

LAL	Cloud & Storm Development	Lighting Strikes/15 per minute
1	No thunderstorms	None
2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 clouds to ground strikes in a five-minute period.	1 to 8
3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 clouds to ground strikes in a 5-minute period.	9 to 15
4	Scattered thunderstorms. Moderate rain is commonly produced Lightning is frequent, 11 to 15 clouds to ground strikes in a 5-minute period	16 to 25
5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 clouds to ground strikes in a 5-minute period.	Greater than 25
6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.	Greater than 25

Source: https://www.ncdc.noaa.gov/

The second method is through the National Lightning Detection Network by Vaisala. This Network works by recording when lightning strikes the ground, taking into account the location, time, and polarity of the strike. According to this Network, Montgomery County is rated 12-20 flashes per square mile per year.



Historic Events

Date	Jurisdiction	Deaths	Injuries	Property Damage (2015 Dollars)	Crops Damage (2015 Dollars)
4/25/2007	Montgomery County	0	0	$ 5,000	0
6/24/2008	Shenandoah	0	0	$ 16,500	0
9/9/2010	Montgomery Co.	1	1	$ -	0
7/17/2012	The Woodlands	0	0	$ 8,240	0
7/17/2012	Montgomery Co.	0	0	$ 1,000	0
7/17/2012	Shenandoah	0	0	$ 4,000	0
7/17/2012	Shenandoah	0	0	$ 1,000	0
7/17/2012	The Woodlands	0	0	$ 1,000	0
4/21/2016	Montgomery Co.	0	0	$ 10,000	0
7/15/2017	Montgomery Co.	0	1	$ -	0

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders, Texas Forest Service, and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures and critical facilities exposed to lightning damage; and
- Stakeholder identified vulnerabilities

Extent

The magnitude of lightning was not recorded for each historical event; not all participating jurisdictions have a history of all lightning strikes that may have occurred in their jurisdiction; and lighting flashes per event for each jurisdiction was not found. Due to these data limitations and considering that lightning is not contained to a particular geographic area or jurisdiction, extent for the entire county was estimated; NOAA's Severe Weather Data Inventory does provide a history of flashes per event on the county level. According to the Data Inventory, the entire planning area saw approximately an average of 20 flashes per event from 2010 to 2017.

Montgomery County (All Jurisdictions)

Identified Vulnerabilities:

As described in the hazard identification section, lightning can strike anywhere, but is more likely to strike tall trees and structures, and in open fields. As noted in the historical occurrences above, lighting can cause serious injury to residents and property in these places. Lightning can also cause wildfires that could destroy or damage residential, commercial, public property or agricultural lands. Additionally, lightning could hit a structure directly and cause a structural fire. In considering this, vulnerabilities throughout the county include:

- Agricultural and parkland areas throughout the county including Sam Houston National Forest and the WG Jones State Forest
- Residential buildings throughout the county (identified below by jurisdiction)
- Communication towers (no data was found for the exact number of towers throughout the county)
- Critical facilities throughout the county

Identified Impacts:

- Residential, commercial, and public property loss throughout the county due to wildfires or structural fires started by lightning
- Farmland throughout the county at risk if a lightning strike causes a wildfire. Leading to financial and economic loss for individual farmers and the county
- Lightning striking a communication tower may lead to a loss of communication for a particular jurisdiction or for a large portion of the county. This could lead to an inability to reach people in need.
- In the instance that lightning does strike a critical facility without a generator or the generator does not work, critical facilities could lose power. This may slow down first responders and allow for greater loss of life, injury, or property damage particularly when lighting is accompanied by flooding or other hazardous events

Unincorporated Montgomery County

Planning Area (Sq. mi):	935.3	**Occurrences since 2000:**	5
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0.24
Probability of Occurring in the next 5 years:	Very likely; 1.19 events estimated to occur within next 5 years.		
Greatest Occurrence:	$10,000 in property damage from one event 1 death and 1 injury		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
162,530 structures at risk		$23,370 in annualized property loss	

Conroe			
Planning Area (Sq. mi):	72	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
18,086 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Cut and Shoot			
Planning Area (Sq. mi):	2.7	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event.		
Vulnerability		**Impact**	
371 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Magnolia			
Planning Area (Sq. mi):	2.8	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
529 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Montgomery			
Planning Area (Sq. mi):	4.6	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
237 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Oak Ridge North			
Planning Area (Sq. mi):	1.1	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
1,131 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Panorama Village			
Planning Area (Sq. mi):	1.1	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
1,001 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Patton Village			
Planning Area (Sq. mi):	2.1	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
385 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Roman Forest			
Planning Area (Sq. mi):	1.5	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
547 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Shenandoah			
Planning Area (Sq. mi):	1.3	**Occurrences since 2000:**	3
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0.14
Probability of Occurring in the next 5 years:	Likely; 71% chance event will occur within next 5 years.		
Greatest Occurrence:	$16,500 in property damage from one event		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
971 structures at risk		$14,582.88 in annualized property loss. Potential loss of power, communication, and life due to lightning strikes.	

Splendora			
Planning Area (Sq. mi):	2.1	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
548 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Stagecoach			
Planning Area (Sq. mi):	1.2	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
155 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Willis			
Planning Area (Sq. mi):	3.3	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
1,782 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Woodbranch Village			
Planning Area (Sq. mi):	1.9	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
477 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

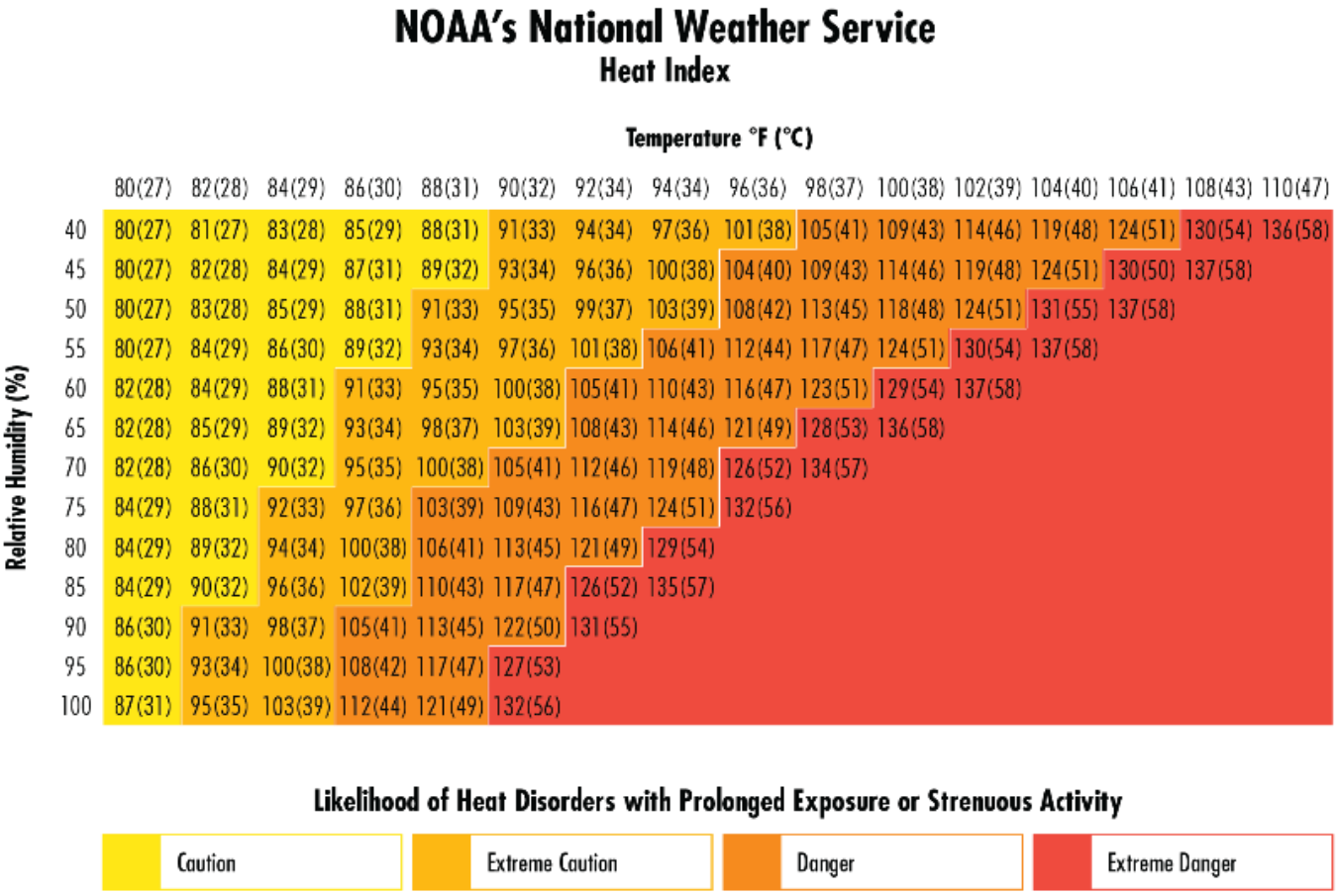
Woodlands Township			
Planning Area (Sq. mi):	43.9	**Occurrences since 2000:**	2
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0.10
Probability of Occurring in the next 5 years:	Likely; 48% chance event will occur within next 5 years.		
Greatest Occurrence:	$8,240 in property damage from one event		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
21,014 structures at risk		$9,721.92 in annualized property loss. Potential loss of power, communication, and life due to lightning strikes.	

Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences since 2000:**	0
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance that damge causing event will occur within the next 5 years.		
Greatest Occurrence:	The public reported lightning strikes occurring in their community.		
Extent:	According to NOAA's Severe Weather Data Inventory the county has seen an average of 20 flashes per event; the county could see 30 flashes per event		
Vulnerability		**Impact**	
68 structures at risk		Potential loss of power, communication, and life due to lightning strikes.	

Part 6.7 Heat Event

6.7 Heat Event

Heat Events are defined by NOAA as a period of heat resulting from the combination of elevated temperatures and relative humidity. A Heat Event occurs whenever heat index values meet or exceed locally/regionally established advisory thresholds. Fatalities or major impacts on human health occurring when ambient weather conditions meet heat advisory criteria are reported using the Heat Event. (NCDC)



Historic Occurrence

June to August are the months that Montgomery County could experience the most severe heat, with average temperatures between 90 and 100 degrees. According to NOAA's database 13 deaths were reported from 2000 to 2017 due to Heat Events. The 13 deaths occurred when cars stalled during the Hurricane Rita evacuation efforts, and evacuees were stranded on the highway during high heat without aid.

Date	Event	Deaths	Injuries	Property Damage	Crop Damage
7/6/2000	Heat Event	0	0	0	0
8/29/2000	Heat Event	0	0	0	0
9/1/2000	Heat Event	0	0	0	0
9/22/2005	Heat Event	13	0	0	0
6/24/2009	Heat Event	0	0	0	0
7/4/2009	Heat Event	0	0	0	0

Source: https://www.ncdc.noaa.gov/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders, USDA, CDC, and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of vulnerable populations
- USDA livestock production projections; and
- Stakeholder identified vulnerabilities

According to the Centers for Disease Control and Prevention (CDC), adults over 65 years of age, infants, children, individuals with chronic illnesses, low-income, outdoor workers, and athletes are the most vulnerable populations to heat related illnesses. The data available on these specified populations suggests that approximately 42.8% of the population in Montgomery County is vulnerable to heat related illnesses.

Montgomery County & All Participating Jurisdictions			
Planning Area (Sq. mi):	1,077	**Occurrences since 1990:**	5
Area Affected:	100% Entire Planning Area	**Annual Event Average:**	0.29
Probability of Occurring in the next 5 years:	Very likely; 1.47 events estimated to occur within next 5 years.		
Greatest Occurrence:	110 degrees Fahrenheit is the highest recorded temperature since 2000 146 days of temperatures greater than 90 degrees Fahrenheit in one year		
Extent:	Up to 115 degrees Fahrenheit Up t0 160 days of temperatures greater than 90 degrees Fahrenheit in one year		

Vulnerability	**Impact**
155,362 acres of agricultural land and livestock production.	$189,800 potential annual loss in livestock.
42.8% of the county population is estimated to be vulnerable to heat events, or 195,059 individuals.	Potential loss of life due to elevated temperatures and heat related illnesses.

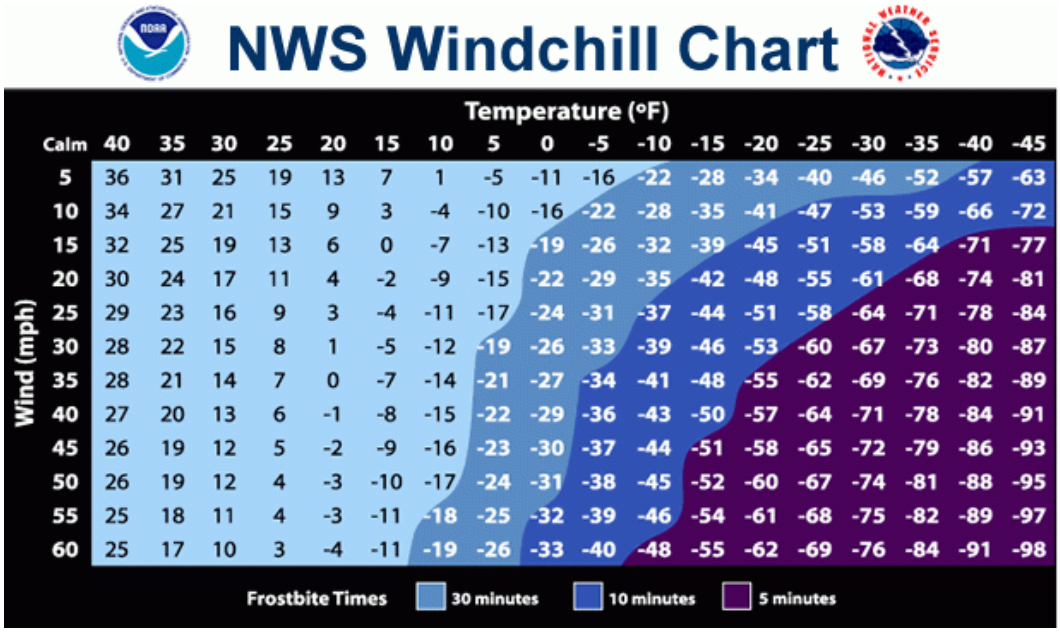
Part 6.8 Winter Weather

6.8 Winter Weather

The two main charts used to measure the magnitude of winter storms is the Sperry-Piltz Iace Accumulation (SPIA) Index Parameters and the National Weather Service's Windchill Chart. The SPIA chart measures the extent of ice in a region considering wind speed and the depth of ice on surfaces. The NWS Windchill Chart considers wind speed and temperatures to determine the amount of time frostbite may occur.

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) *Revised-October, 2011	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	> 15	
2	0.10 – 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 - 25	
	0.50 – 0.75	< 15	
3	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
	0.75 – 1.00	< 15	
4	0.25 – 0.50	> = 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 - 35	
	0.75 – 1.00	15 - 25	
	1.00 – 1.50	< 15	
5	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

Source: http://www.spia-index.com/



Source: http://www.nws.noaa.gov/om/cold/wind_chill.shtml

The national weather service and NOAA also have a variety of watches and warnings for freeze, frost, wind, and ice events; these have been organized in a chart below.

Watch/ Warning/ Advisory	Description
Winter Storm Watch	Issued when there is the potential for significant and hazardous winter weather within 48 hours. It is possible hazardous weather may occur. Significant and hazardous winter weather is defined as: 5 inches or more of snow/sleet within a 12-hour period or 7 inches or more of snow/sleet within a 24-hour period. And/ or enough ice accumulation to cause damage to trees or powerlines and/or a life threatening or damaging combination of snow and/or ice accumulation with wind.
Winter Storm Warning	Issued when a significant combination of hazardous winter weather is occurring or imminent. Significant and hazardous winter weather is defined as above.
Ice Storm Warning	¼ inch or more of ice accumulation.
Winter Weather Advisory	Issued for any amount of freezing rain, or when 2 to 4 inches of snow (alone or in combination with sleet and freezing rain) is expected to cause a significant inconvenience, but not serious enough to warrant a warning.
Freeze Watch	Issued when there is a potential for significant, widespread freezing temperatures within the next 24-36 hours.
Freeze Warning	Issued when significant, widespread freezing temperatures are expected.
Frost Advisory	Issued when the minimum temperature is forecast to be 33 to 36 degrees on clear and calm nights during the growing season.
Wind Chill Advisory	Issued when wind chills of -5F to -19F are expected east of the Blue Ridge Mountains and when wind chills of -10 to -24F are expected along and west of the Blue Ridge Mountains and in Frederick and Carroll Counties in Maryland.
Wind Chill Warning	Issued when wind chills of -20F or lower are expected east of the Blue Ridge Mountains, and when wind chills of -25F or lower are expected along and west of the Blue Ridge Mountains and in Frederick and Carroll Counties in Maryland.

Source: www.weather.gov/lwx/WarningsDefined#Winter Storm Watch

Historic Occurrences

Montgomery County experienced an average of 21 days a year at or below freezing since 2000. The extreme minimum temperature from 2000 to 2017 was 15 degrees in 2010. The County experienced several freeze warnings, frost advisories and winter weather advisories.

Date	Jurisdiction	Event	Total Property Damage (2015 Dollars)
1/16/2007	Montgomery County	Ice Storm	$ 4,000.00
2/3/2011	Montgomery County	Ice Storm	$ -
1/23/2014	Montgomery County	Winter Storm	$ -
1/28/2014	Montgomery County	Winter Weather	$ -
3/3/2014	Montgomery County	Winter Storm	$ -

Source: https://www.ncdc.noaa.gov/stormevents/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders, Centers for Disease Control and Prevention (CDC), and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of vulnerable populations
- Stakeholder identified vulnerabilities

According to the CDC, adults over 65 years of age and children are the most vulnerable populations to winter weather related illnesses. The data available on these populations suggests that approximately 38% of the population in Montgomery County is vulnerable to winter weather.

Montgomery County & All Participating Jurisdictions			
Planning Area (Sq. mi):	1,077	**Occurrences since 1990:**	5
Area Affected:	100% Entire Planning Area	**Annual Event Average:**	0.29
Probability of Occurring in the next 5 years:	Very likely; 1.47 events estimated to occur within next 5 years.		
Greatest Occurrence:	$4,000 of damage caused during an ice storm. 15-degree Fahrenheit is lowest recorded temperature		
Extent:	Down to 10-degree Fahrenheit and up to 40 days of below freezing temperatures in one year.		

Vulnerability	**Impact**
155,362 acres of agricultural land	$189,800 potential annual loss of crop and livestock
173,183 individuals (38% of the county population) is vulnerable to winter weather events.	Potential loss of life due to freezing temperatures.
Frozen limbs fall onto above ground powerline and knock-out the power.	House fires caused by residents trying to heat their homes, and loss of life and property.

Part 6.9 Hail

6.9 Hail

NOAA's National Centers for Environmental Information (NCEI) intensity scale for hail is the typical way to measure the extent for hail storms. This scale considers the size of an individual piece of hail. A hail storm is considered severe if hail reaches one inch in diameter or roughly the size of a quarter.

Size	Hail Diameter (Inches)	Description
H0	1/4	Pea Size
H1	1/2	Small Marble Size
H2	¾	Penny or Large Marble Size
H3	7/8	Nickel Size
H4	1	Quarter Size
H5	1 ¼	Half Dollar Size
H6	1 ½	Walnut or Ping Pong Ball Size
H7	1 ¾	Golfball Size
H8	2	Hen Egg Size
H9	2 ½	Tennis Ball Size
H10	2 ¾	Baseball Size
H11	3	Teacup Size
H12	4	Grapefruit Size
H13	4 ½	Softball Size

Source: https://www.ncei.noaa.gov/

Since 1990, Montgomery County experienced 140 hail events. Seventy-seven were considered severe (quarter sized and above). Golf ball sized hail or size H13 is the largest size hail the County experienced.

Historic Occurrences

Event Date	Jurisdiction	Magnitude (Inches)	Total Damage (2015 Dollars)
4/26/1991	Montgomery County	1.75	$0
5/4/1991	Montgomery County	0.75	$0
5/16/1991	Montgomery County	0.75	$0
6/1/1992	Montgomery County	1.75	$0
10/12/1993	The Woodlands	1.75	$50,000
4/15/1994	Montgomery County	0.75	$0
4/15/1994	Montgomery County	0.75	$0
10/22/1994	New Caney	1.75	$0
10/22/1994	Cut-N-Shoot	1	$0
10/22/1994	Splendora	0.75	$0
3/29/1995	Montgomery County	0.75	$0
5/31/1995	Montgomery County	1	$1,000
5/31/1995	Montgomery County	1	$1,000
5/31/1995	Yellow Pine	0.75	$0
3/23/1996	Montgomery County		$0
3/23/1996	Montgomery County		$0
4/12/1996	Woodlands	0.75	$10,000
4/21/1996	Montgomery County	2.75	$0
4/21/1996	Montgomery County	2.75	$0
4/21/1996	Montgomery County	2.75	$0
4/21/1996	Montgomery County	2.75	$0
4/21/1996	Montgomery County	2.75	$0
6/2/1996	Cut and Shoot	0.75	$5,000

8/9/1996	Conroe	0.75	$5,000
9/17/1996	Montgomery County	0.88	$0
9/17/1996	Montgomery County	0.88	$0
4/25/1997	Montgomery County	2	$10,000
4/25/1997	Montgomery County	0.75	$5,000
5/28/1997	Conroe	0.75	$5,000
8/23/1997	Cut and Shoot	0.75	$5,000
1/11/1998	Willis	1.5	$7,000
1/21/1998	Montgomery County	0.75	$1,000
1/21/1998	Conroe	0.75	$3,000
4/27/1998	Montgomery County	1.75	$10,000
4/27/1998	Willis	1.75	$10,000
4/27/1998	Willis	0.75	$3,000
7/14/1998	Conroe	1.75	$10,000
4/3/1999	Willis	0.75	$10,000
5/27/1999	Conroe	1.75	$40,000
5/27/1999	Shenandoah	1.75	$40,000
5/27/1999	Shenandoah	1.75	$40,000
3/10/2000	Conroe	1	$100,000
4/2/2000	Magnolia	1.75	$100,000
5/2/2000	Conroe	2.75	$10,000,000
5/4/2000	The Woodlands	1.75	$50,000
5/4/2000	Conroe	0.75	$10,000
5/12/2000	Conroe	0.75	$10,000
3/8/2001	Oak Ridge North	0.75	$5,000
3/8/2001	Montgomery County	0.75	$5,000
3/14/2001	Montgomery County	1.75	$10,000
3/14/2001	Splendora	0.75	$5,000
6/28/2001	Conroe	1	$10,000
8/17/2001	The Woodlands	0.88	$5,000
6/21/2002	Conroe	0.75	$4,000
2/21/2003	Montgomery County	1.75	$9,000
3/13/2003	Magnolia	0.75	$6,000
3/13/2003	Conroe	0.75	$6,000
3/25/2003	The Woodlands	0.75	$4,000
5/16/2003	Conroe	1	$5,000
1/17/2004	Conroe	1.5	$7,000
1/17/2004	Cut and Shoot	1	$5,000
1/17/2004	Willis	1	$5,000
1/17/2004	Willis	0.75	$3,000
4/10/2004	Magnolia	4.75	$75,000
4/10/2004	Montgomery County	2.75	$30,000
4/10/2004	Montgomery County	1	$5,000
4/10/2004	The Woodlands	0.75	$15,000
6/27/2004	Montgomery County	0.75	$5,000
8/18/2004	Magnolia	0.75	$15,000
8/21/2004	Montgomery County	1.75	$60,000
11/23/2004	Willis	1.5	$8,500
11/27/2004	The Woodlands	1.75	$30,000
2/13/2005	Conroe	2.75	$30,000
2/13/2005	Conroe	2.75	$30,000
2/13/2005	Willis	2	$25,000
2/13/2005	Cut and Shoot	2	$25,000

2/13/2005	Willis	1	$5,000
3/19/2005	Conroe Arpt	0.75	$3,000
3/19/2005	Willis	0.75	$4,000
3/21/2005	The Woodlands	0.75	$7,000
6/14/2005	Montgomery County	1.75	$10,000
6/14/2005	Magnolia	1.75	$12,000
6/14/2005	Cut and Shoot	0.75	$5,000
8/14/2005	Montgomery	0.75	$10,000
5/14/2006	Montgomery	1	$15,000
5/14/2006	Lake Conroe Dam	0.88	$4,000
6/13/2006	Cut and Shoot	0.88	$5,000
8/22/2006	The Woodlands	0.75	$3,000
5/3/2007	Montgomery County	1.25	$0
5/3/2007	Montgomery County	1.25	$3,000
5/3/2007	Shenandoah	0.75	$0
5/3/2007	Montgomery County	0.75	$0
5/3/2007	Montgomery County	0.75	$0
5/3/2007	Conroe	0.75	$0
5/10/2007	The Woodlands	1.75	$0
5/10/2007	Montgomery County	1.75	$0
5/10/2007	The Woodlands	0.75	$0
5/10/2007	The Woodlands	0.75	$0
1/31/2008	Montgomery County	1	$2,000
1/31/2008	Montgomery County	0.75	$0
2/5/2008	Shenandoah	1.75	$3,000
2/5/2008	Shenandoah	1	$1,000
2/15/2008	Shenandoah	0.75	$0
3/25/2009	Montgomery County	0.75	$0
3/27/2009	Montgomery County	2.75	$15,000
3/27/2009	Conroe	1.75	$20,000
3/27/2009	Cut and Shoot	1.75	$15,000
3/27/2009	Montgomery County	1	$1,000
3/27/2009	Willis	1	$1,000
3/27/2009	Montgomery County	1	$1,000
3/27/2009	Montgomery County	1	$1,000
3/27/2009	Montgomery County	1	$2,000
3/27/2009	Lake Conroe Dam	0.88	$0
3/27/2009	Montgomery County	0.75	$0
4/16/2009	Montgomery County	0.75	$0
8/21/2009	Montgomery County	1.75	$5,000
8/21/2009	Conroe Arpt	0.88	$0
9/3/2009	Montgomery	0.88	$0
4/7/2010	Willis	1	$1,000
4/7/2010	Shenandoah	0.88	$0
5/25/2011	Montgomery County	3	$10,000
4/2/2012	Montgomery County	1	$2,000
8/10/2012	Montgomery	0.75	$0
11/26/2012	Willis	1	$0
3/31/2013	Willis	1.25	$0
4/27/2013	Montgomery County	1.75	$2,000
4/27/2013	Montgomery County	1	$0
4/27/2013	Oklahoma	1	$0
4/27/2013	Montgomery County	0.75	$0

6/12/2014	Montgomery County	1.5	$0
6/12/2014	Montgomery County	1	$0
6/24/2014	Montgomery County	0.75	$0
4/19/2015	Magnolia	1	$0
4/19/2015	Shenandoah	1	$0
4/19/2015	Pinehurst	0.75	$0
5/2/2016	Willis	1.75	$0
5/14/2016	Montgomery County	0.75	$0
3/24/2017	Montgomery County	1	$0
4/2/2017	Montgomery	1	$0
5/20/2017	Willis	1.75	$0

Source: https://www.ncdc.noaa.gov/stormevents/

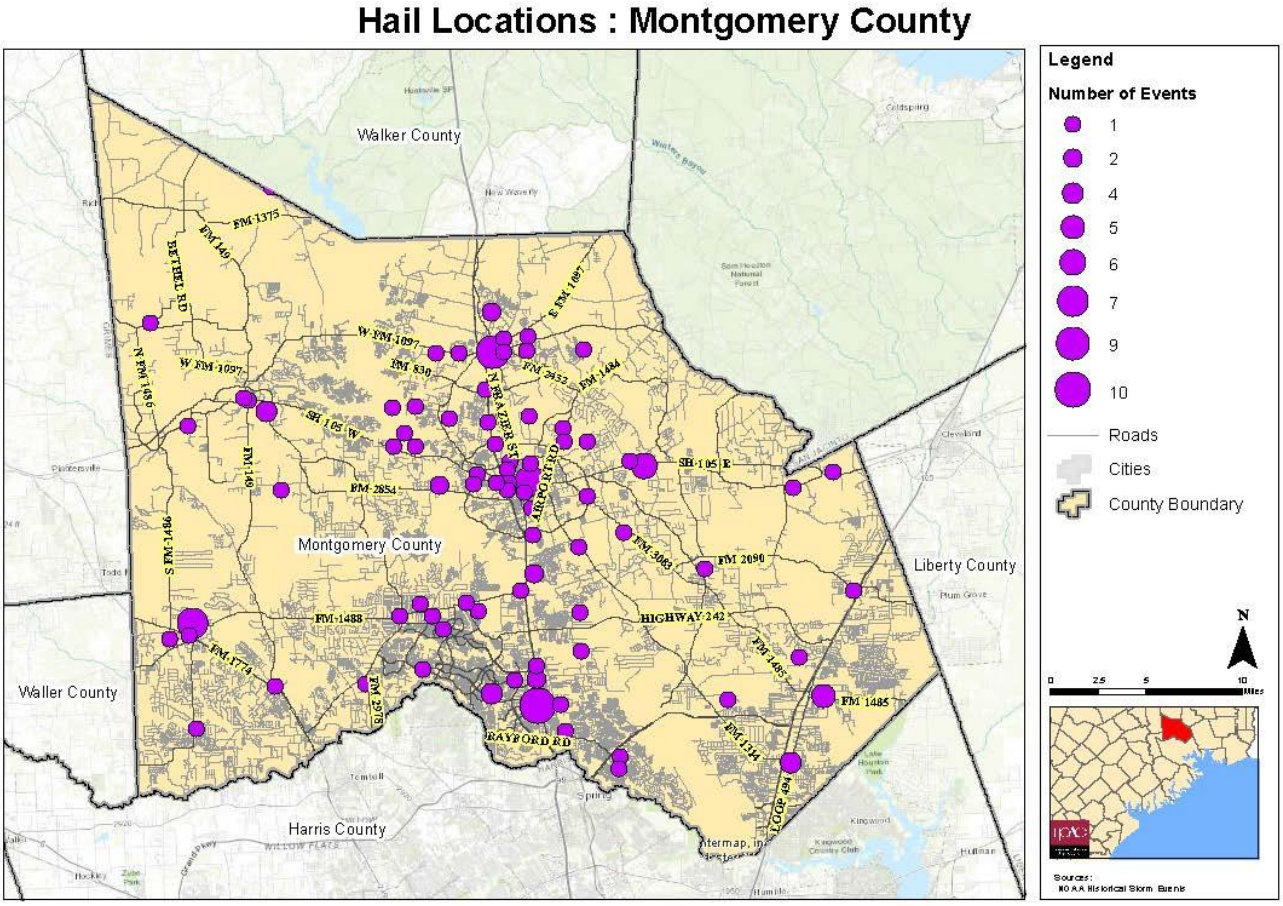
Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures exposed to hail damage; and
- Stakeholder identified vulnerabilities.



Location and quantity of hail events that have occurred throughout the County from 2002 to present.

Montgomery County (All participating jurisdictions)

Identified Vulnerabilities:

- Critical facilities including emergency response vehicles (fire trucks, ambulances etc.) throughout the county including:
  - Uncovered parking lots may lead to damaged vehicles
  - Facility's generators located outside may be damaged.
  - Damage to critical facilities, including roof damage or window damage, may occur as well.
- Identified vulnerable populations throughout the county, identified in the county profile, may be more vulnerable financially if they sustain damage to a personal vehicle or property

Identified Impacts:

- Strong winds or hail could prevent first responders from traveling to assist individuals, because of unsafe driving conditions such as debris hitting emergency vehicles
- Critical facilities could sustain hail damage- windows of response vehicles broken, potentially delaying first responders reaching those in need and city services during and after the event
- Financial loss for individuals whose vehicles or homes are damaged by hail-including cost to repair hail damage and potential financial loss from potential loss of a job because of the lack of transportation to and from their job
- Financial loss for jurisdictions that need to replace damaged buildings or infrastructure, including damaged roofs or equipment

Unincorporated Montgomery County			
Planning Area (Sq. mi):	935.3	**Occurrences since 1990:**	56
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	2.07
Probability of Occurring in the next 5 years:	Very likely; 10.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	2.75" hail stones $60,000 property damage in one event		
Extent:	Up to 4" hail stones		
Vulnerability		**Impact**	
162530 structures are at risk of hail damage.		Estimated annualized property loss: $199,856.8	

Conroe			
Planning Area (Sq. mi):	72	**Occurrences since 1990:**	22
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.81
Probability of Occurring in the next 5 years:	Very likely; 4.1 events estimated to occur within next 5 years.		
Greatest Occurrence:	2.75" hail stones $10,000,000 property damage in one event		
Extent:	Up to 4" hail stones		
Vulnerability		**Impact**	
18086 structures are at risk of hail damage.		Estimated annualized property loss: $1,112,840.04	

Cut and Shoot			
Planning Area (Sq. mi):	2.7	**Occurrences since 1990:**	8
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.3
Probability of Occurring in the next 5 years:	Very likely; 1.5 events estimated to occur within next 5 years.		
Greatest Occurrence:	1.75" hail stones $25,000 property damage in one event		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
371 structures are at risk of hail damage.		Estimated annualized property loss: $29,978.52	

Magnolia			
Planning Area (Sq. mi):	2.8	**Occurrences since 1990:**	6
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.22
Probability of Occurring in the next 5 years:	Very likely; 1.1 events estimated to occur within next 5 years.		
Greatest Occurrence:	4.75" hail stones $100,000 property damage in one event		
Extent:	Up t o5" hail stones		
Vulnerability		**Impact**	
529 structures are at risk of hail damage.		Estimated annualized property loss: $21,984.25	

Montgomery			
Planning Area (Sq. mi):	4.6	**Occurrences since 1990:**	5
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.18
Probability of Occurring in the next 5 years:	Likely; 90% chance an event will occur within next 5 years.		
Greatest Occurrence:	1" hail stones $15,000 property damage in one event		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
237 structures are at risk of hail damage.		Estimated annualized property loss: $17,987.11	

Oak Ridge North			
Planning Area (Sq. mi):	1.1	**Occurrences since 1990:**	1
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.03
Probability of Occurring in the next 5 years:	Likely; 20% chance an event will occur within next 5 years.		
Greatest Occurrence:	0.75" hail stones $5,000 property damage in one event		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
1131 structures are at risk of hail damage.		Estimated annualized property loss: $3,997.14	

Panorama Village			
Planning Area (Sq. mi):	1.1	**Occurrences since 1990:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced hail and this jurisdiction is at risk of experiencing a hail storm.		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
1001 structures are at risk of hail damage.		Estimated annualized property loss: $3,537.7	

Patton Village			
Planning Area (Sq. mi):	2.1	**Occurrences since 1990:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced hail and this jurisdiction is at risk of experiencing a hail storm.		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
385 structures are at risk of hail damage.		Estimated annualized property loss: $1,359.05	

Roman Forest			
Planning Area (Sq. mi):	1.5	**Occurrences since 1990:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced hail and this jurisdiction is at risk of experiencing a hail storm.		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
547 structures are at risk of hail damage.		Estimated annualized property loss: $1,930.91	

Shenandoah			
Planning Area (Sq. mi):	1.3	**Occurrences since 1990:**	8
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.29
Probability of Occurring in the next 5 years:	Very likely; 1.5 events estimated to occur within next 5 years.		
Greatest Occurrence:	1.75" hail stones $40,000 property damage in one event		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
971 structures are at risk of hail damage.		Estimated annualized property loss: $3,427.63	

Splendora			
Planning Area (Sq. mi):	2.1	**Occurrences since 1990:**	2
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.07
Probability of Occurring in the next 5 years:	Likely; 40% chance an event will occur within next 5 years.		
Greatest Occurrence:	0.75" hail stones		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
548 structures are at risk of hail damage.		Estimated annualized property loss: $7,994.27	

Stagecoach			
Planning Area (Sq. mi):	1.2	**Occurrences since 1990:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced hail and this jurisdiction is at risk of experiencing a hail storm.		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
155 structures are at risk of hail damage.		Estimated annualized property loss: $547.15	

Willis			
Planning Area (Sq. mi):	3.3	**Occurrences since 1990:**	16
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.59
Probability of Occurring in the next 5 years:	Very likely; 3 events estimated to occur within next 5 years.		
Greatest Occurrence:	2" hail stones $25,000 property damage in one event		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
1782 structures are at risk of hail damage.		Estimated annualized property loss: $59,957.04	

Woodbranch Village			
Planning Area (Sq. mi):	1.9	**Occurrences since 1990:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced hail and this jurisdiction is at risk of experiencing a hail storm.		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
477 structures are at risk of hail damage.		Estimated annualized property loss: $1,683.81	

Woodlands Township			
Planning Area (Sq. mi):	43.9	**Occurrences since 1990:**	12
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.44
Probability of Occurring in the next 5 years:	Very likely; 2.2 events estimated to occur within next 5 years.		
Greatest Occurrence:	1.75" hail stones $50,000 property damage in one event		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
21014 structures are at risk of hail damage.		Estimated annualized property loss: $43,968.50	

Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences since 1990:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced hail and this jurisdiction is at risk of experiencing a hail storm.		
Extent:	Up to 3" hail stones		
Vulnerability		**Impact**	
68 structures are at risk of hail damage.		Estimated annualized property loss: $240.04	

Part 6.10 Tornado

6.10 Tornado

Before 2007, tornadoes were ranked through the Fujita Scale. The Enhanced Fujita Scale replaced the Fujita Scale in 2007 and is a set of wind estimates (not measurements) based on damage. The higher the number the more intense the tornado. Both the Fujita Scale and the Enhanced Fujita Scale are below.

Fujita Scale			Enhanced Fujita Scale		
Scale	**Fastest 1/4 mile (mph)**	**3 second gust (mph)**	**EF Number**	**3 Second Gust (mph)**	**Typical Damage**
F0	40-72	45-78	0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
F1	73-112	79-117	1	86-109	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
F2	113-157	118-161	2	110-137	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-207	162-209	3	138-167	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
F4	208-260	210-261	4	168-199	Devastating damage. Whole frame houses Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
F5	261-318	262-317	5	200-234	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 109 yards; high-rise buildings have significant structural deformation; incredible phenomena will occur.

Source: http://www.spc.noaa.gov/

Historic Occurrence

Date	Jurisdiction	Magnitude	Total Damage (2015 Dollars)
November 5, 2000	Conroe	F1	$34,500.00
November 23, 2000	Conroe	F0	$138,000.00
December 16, 2001	Willis	F0	$40,200.00
December 23, 2002	Montgomery	F0	$9,240.00
March 18, 2003	Conroe	F0	$2,580.00
May 11, 2004	Conroe	F1	$448,750.00
November 23, 2004	Cut and Shoot	F0	$40,000.00
November 23, 2004	Montgomery	F0	$5,000.00

April 29, 2006	Conroe	F0	$23,600.00
June 17, 2006	Montgomery	F0	$47,200.00
December 12, 2015	Willis	EF2	$0.00
January 16, 2017	Oak Ridge North	EF0	$99,000.00

Source: https://www.ncdc.noaa.gov/stormevents/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. Information from stakeholders and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures exposed to tornado damage; and
- Stakeholder identified vulnerabilities.

Montgomery County (All participating jurisdictions)

Identified Vulnerabilities:

Similar to the hurricane and thunderstorm sections, this section identifies vulnerabilities from high winds. High winds can tear down powerlines, trees, barns, fences, and multitude of other debris can be blown into roadways and homes during the event.

Additionally, residences and commercial buildings could be damaged or destroyed due to wind events; older residential neighborhoods and structures without a permanent foundation were identified as one of the main vulnerabilities throughout the county. While current building codes address the vulnerability of wind damage to structures, older buildings (particularly residential buildings) were built when less stringent building codes were in place; therefore, older residential building and residences without a permanent foundation are a focus in this section.

Identified Impacts:

- Downed powerlines could impact communication and daily active leading to a finical loss for the county, cities and individuals, and could impede first responders from reaching those in need or residents evacuating
- Strong winds could prevent first responders from traveling to assist individuals, because of unsafe driving conditions such as debris hitting emergency vehicles
- Critical facilities could sustain wind damage, potentially delaying first responders reaching those in need and city services during and after the event
- Economic and financial loss for cities and individuals including property loss

Unincorporated Montgomery County			
Planning Area (Sq. mi):	935.3	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
162,530 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Conroe			
Planning Area (Sq. mi):	72	**Occurrences since 2000:**	5
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.29
Probability of Occurring in the next 5 years:	Very likely; 1.47 events estimated to occur within next 5 years.		
Greatest Occurrence:	$448,750 in property damage from one event F1 Magnitude		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
18,086 structures are at risk of tornadoes.		$17,342.95 in annual losses	

Cut and Shoot			
Planning Area (Sq. mi):	2.7	**Occurrences since 2000:**	1
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.06
Probability of Occurring in the next 5 years:	Likely; 29% chance event will occur within next 5 years.		
Greatest Occurrence:	$40,000 in property damage from one event F0 Magnitude		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
371 structures are at risk of tornadoes.		$2,352.59 in annual losses	

Magnolia			
Planning Area (Sq. mi):	2.8	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
529 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Montgomery			
Planning Area (Sq. mi):	4.6	**Occurrences since 2000:**	3
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.18
Probability of Occurring in the next 5 years:	Likely; 88% chance event will occur within next 5 years.		
Greatest Occurrence:	$47,200 in property damage from one event F0 Magnitude		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
237 structures are at risk of tornadoes.		$2,776 in annual losses	

Oak Ridge North			
Planning Area (Sq. mi):	1.1	**Occurrences since 2000:**	1
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.06
Probability of Occurring in the next 5 years:	Likely; 29% chance event will occur within next 5 years.		
Greatest Occurrence:	$99,000 in property damage from one event EF0 Magnitude		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
1,131 structures are at risk of tornadoes.		$5,500 in annual losses	

Panorama Village			
Planning Area (Sq. mi):	1.1	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
1,001 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Patton Village			
Planning Area (Sq. mi):	2.1	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
385 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Roman Forest			
Planning Area (Sq. mi):	1.5	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
547 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Shenandoah			
Planning Area (Sq. mi):	1.3	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
971 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Splendora			
Planning Area (Sq. mi):	2.1	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
548 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Stagecoach			
Planning Area (Sq. mi):	1.2	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
155 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Willis			
Planning Area (Sq. mi):	3.3	**Occurrences since 2000:**	2
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0.12
Probability of Occurring in the next 5 years:	Likely; 59% chance event will occur within next 5 years.		
Greatest Occurrence:	$40,200 in property damage from one event EF2 Magnitude		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
1,782 structures are at risk of tornadoes.		$2,364 in annual losses	

Woodbranch Village			
Planning Area (Sq. mi):	1.9	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
477 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Woodlands Township			
Planning Area (Sq. mi):	43.9	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
21,014 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences since 2000:**	0
Area Affected:	100%; Entire Planning Area	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; No documented occurrences, but neighboring jurisdictions have experienced tornados. This jurisdiction is at risk of experiencing a tornado.		
Extent:	Up to EF4 Magnitude Tornado		
Vulnerability		**Impact**	
68 structures are at risk of tornadoes.		Expensive repairs of damaged structures, and interruption of regular community services.	

Part 6.11 Dam & Levee Failure

6.11 Dam and Levee Failure

According to FEMA's Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams, extent is measured through judging the potential for human, economic, lifeline, and environmental loss.

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected.	Yes (But not necessary for this classification)

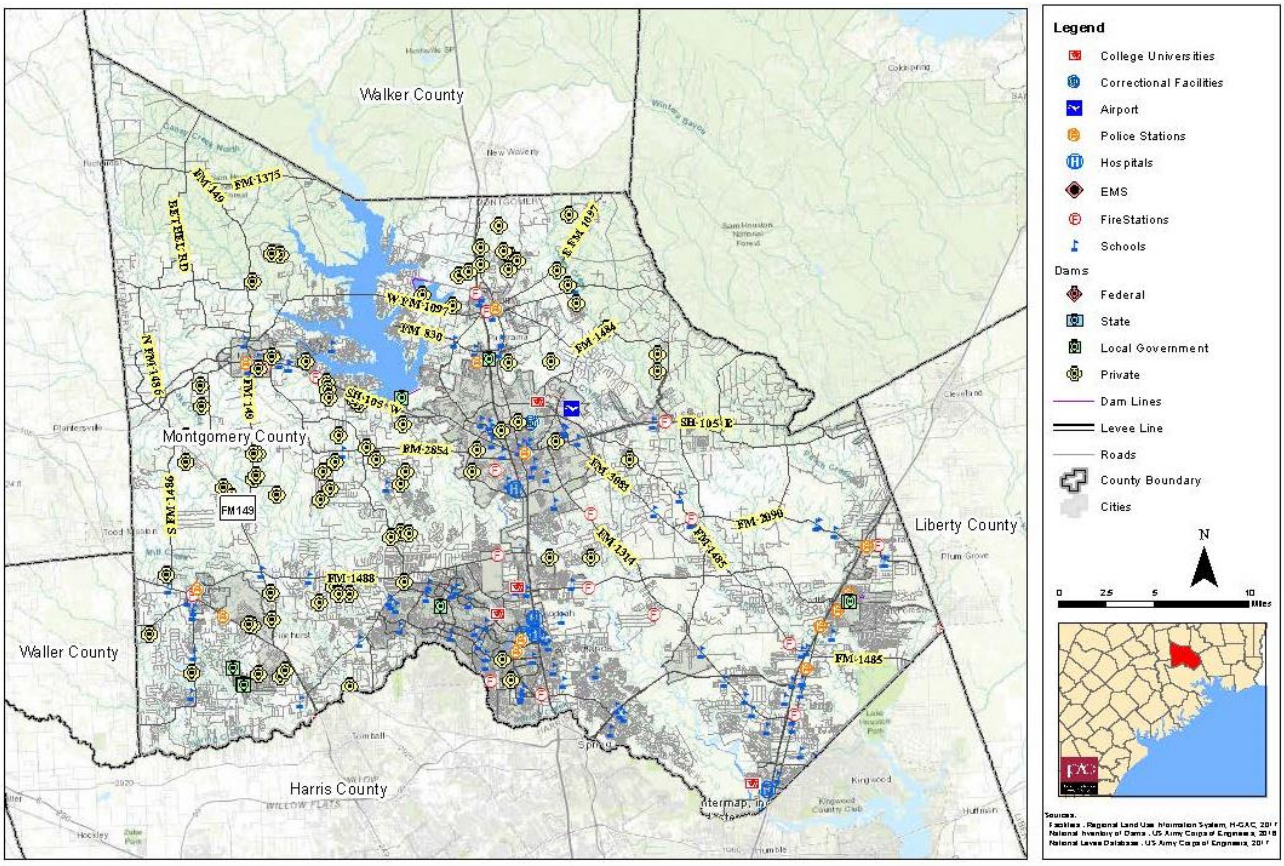
Source: https://www.fema.gov/

Historic Occurrence

Montgomery County does not have any dam or levee failures to report.

Dam & Levee Classification

There are 90 known dams and levees in Montgomery County. These dams are maintained by public, state, federal, local, or partnering entities. All dams have been classified as 'Low' in the hazard potential classification with the exception of the Lake Conroe Dam. Only the communities at risk of damage from a Lake Conroe Dam failure will be profiled. Those jurisdictions include Unincorporated Montgomery County, Conroe, Oak Ridge North, Shenandoah, The Woodlands, and Woodloch. The remaining jurisdictions participating in this plan are not at risk for dam and failure and will not be profiled. Cut and Shoot, Magnolia, Montgomery, Panorama Village, Patton Village, Roman Forest, Splendora, Stagecoach, Willis, and Woodbranch Village will not be profiled for dam and levee failure. The Lake Conroe dam located in the northwest portion of the county is the only dam in Montgomery County that has a high potential for human, economic, lifeline, and environmental loss classification. The risk of failure has been determined low.



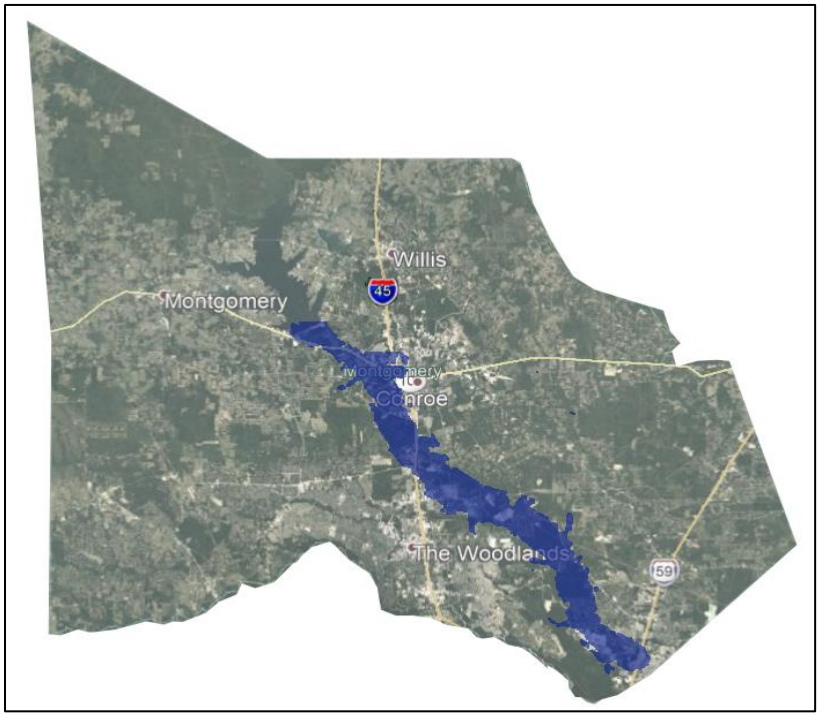
Jurisdiction	Name	Hazard Potential Classification
Conroe	Lake Conroe Dam	High
Conroe	Country Club Lake Dam	Low
Conroe	Artesian Lake Dam	Low
Conroe	Walmart Store No 400 Expansion Pond Dam	Low
Conroe	The Lake Dam	Low
Conroe	Heb Detention Pond Dam	Low
The Woodlands	Lake Harrison Dam	Low
The Woodlands	Bear Branch Lake Dam	Low
The Woodlands	Lake Woodlands Dam	Low
Woodloch	Forrest Hills Lake Dam	Low
Montgomery County	Chambers Lake Dam	Low
Montgomery County	Lewis Creek Dam	Low
Montgomery County	Hulon Lake Dam	Low
Montgomery County	Lake Ann Dam	Low
Montgomery County	Hall Lake Dam	Low
Montgomery County	Lake Egypt Dam	Low
Montgomery County	Neidigk Lake Dam	Low
Montgomery County	Kachel Lake Dam	Low
Montgomery County	Blue Lake	Low
Montgomery County	Lake Windcrest Dam	Low
Montgomery County	Pebble Lake Dam	Low
Montgomery County	Rock Lake Dam	Low
Montgomery County	Lake Azure Dam	Low
Montgomery County	Upper Serenity Dam	Low
Montgomery County	Lower Serenity Dam	Low
Montgomery County	Lake Hollow Dam	Low
Montgomery County	Lake Hazy Dam	Low
Montgomery County	Woodland Lake Dam	Low
Montgomery County	Goodson Branch Dam	Low
Montgomery County	Indigo Lake Dam	Low
Montgomery County	Decker Lake Dam	Low
Montgomery County	Lake Apache Dam	Low
Montgomery County	Lake Hardin Dam	Low
Montgomery County	Wagon Wheel Detention Pond Dam	Low
Montgomery County	Old Mill Creek Dam	Low
Montgomery County	Rannefeld Dam	Low
Montgomery County	Peach Creek Dam	Low
Montgomery County	Lakeland Lake Dam	Low
Montgomery County	Shadow Lake Dam	Low
Montgomery County	Lake Wildwood Dam	Low
Montgomery County	Conroe Dam	High
Montgomery County	Lake Forest Falls Dam	Low
Montgomery County	Panorama Lake Dam	Low
Montgomery County	Price Lake Dam	Low
Montgomery County	Fort Clark Lake Dam	Low
Montgomery County	Lake Abilene Dam	Low
Montgomery County	Moose Jaw Lake Dam	Low

Montgomery County	Selden Lake Dam	Low
Montgomery County	Dunwoody Lake Dam	Low
Montgomery County	Fish Lake Dam	Low
Montgomery County	Lake Dodge Dam	Low
Montgomery County	Hillside Lake Dam	Low
Montgomery County	Lake Louise Dam	Low
Montgomery County	Dobbin Lake Dam	Low
Montgomery County	Hickory Lake Dam	Low
Montgomery County	Rushing Springs Lake Dam	Low
Montgomery County	Lake Conroe Forest Dam	Low
Montgomery County	Lake Forest Dam	Low
Montgomery County	Lake Bonanza Dam	Low
Montgomery County	Deer Lake Dam	Low
Montgomery County	Near Kim Lake Dam	Low
Montgomery County	Kim Lake Dam	Low
Montgomery County	Mitchell Lake Dam	Low
Montgomery County	Old Lake 177 Dam	Low
Montgomery County	Lago Del Bosque Lower Lake Dam	Low
Montgomery County	Lago Del Bosque Upper Lake Dam	Low
Montgomery County	Lake Lorraine Dam	Low
Montgomery County	Pine Lake Dam	Low
Montgomery County	Tri-Lakes Estates Dam 1	Low
Montgomery County	Old Trailway Lake Dam	Low
Montgomery County	Fish Creek Dam No 1	Low
Montgomery County	Ridge Lake Dam	Low
Montgomery County	Trophy Dam	Low
Montgomery County	Majestic Lake Dam	Low
Montgomery County	Crown Dam	Low
Montgomery County	Skye Ranch Dam A	Low
Montgomery County	Perfection Lake Dam	Low
Montgomery County	Stone Ranch Dam	Low
Montgomery County	Brad Dodd Lake Dam	Low
Montgomery County	Stewart Lake Dam	Low
Montgomery County	Cape Conroe Dam No 1	Low
Montgomery County	Flamingo Lake No 1 Dam	Low
Montgomery County	Lake Mount Pleasant Dam	Low
Montgomery County	Hidden Forest Lake Dam	Low
Montgomery County	Rampy Lake Dam	Low
Montgomery County	Bart Lake Dam	Low
Montgomery County	Spring Lake Dam	Low
Montgomery County	Royal Forest Lake Dam	Low
Montgomery County	Farrells Lake Dam	Low
Montgomery County	Shadow Lake Dam Gsc	Low
Montgomery County	Mcrae Dam	Low

Hazard Analysis & Vulnerability Identification

Due to Homeland Security restrictions, the San Jacinto River Authority (SJRA) cannot release locational or inundation maps of the Lake Conroe Dam. SJRA provided data for the hazard analysis to the greatest extent possible, and the information is included in the hazard analysis charts below. According to SJRA, only communities located on the West Fork San Jacinto river downstream of the Lake Conroe Dam are vulnerable to intense flooding caused by a dam failure. Peak flow rates of 67,000 cubic feet per second are estimated in the event the dam reaches capacity and cannot hold back the inflow. The map to demonstrates the drainage inflow zones of the West Fork San Jacinto River downstream of the Lake Conroe Dam.

The Lake Conroe dam located in the northwest portion of the county is the only dam in Montgomery County that has a high potential for human, economic, lifeline, and environmental loss classification. The risk of failure has been determined low. The Lake Conroe Dam suffered damage from Hurricane Ike in 2008. The hurricane winds generated waves that caused damage on the southern face of the dam. No loss of life or property were reported during this event. The Lake Conroe Dam was repaired in 2008 by the San Jacinto River Authority. During Hurricane Harvey in 2017, Lake Conroe Dam reached a level of 206 feet (5 feet above its normal level of 201 feet). There were no concerns or indications of dam failure, though 106 billion gallons of water were released over several days to prevent the risk of failure.



The hazard analysis also uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data is the most extreme and worst damage a jurisdiction could experience. Information from stakeholders, SJRA FEMA**,** and H-GAC's critical facilities database were used for this analysis.

Montgomery County (All Jurisdictions)
Identified Vulnerabilities: As described in the hazard identification section, there are no records of failed dams or levees in the county and no available inundation maps. For the purposes of this plan, all immediately downstream critical facilities, residences, and human life will be treated as vulnerable to dam and levee failures. Each dam and levee has a low hazard classification except the Conroe dam, and some flooding can be expected in the event of a complete or partial failure. Because of the low hazard classification, this analysis only considered structures and property within 1 mile of dams and levees. Based on this assumption, the following vulnerabilities have been identified: • Residences immediately downstream of dam and levees are considered vulnerable. • Agricultural land is vulnerable • Downstream critical facilities are vulnerable to a dam and levee failure
Potential Impacts: • Residential, commercial, and public property loss throughout the county due to flooding in localized areas or throughout the county, leading to a financial and economic loss for the participating jurisdictions • Mass evacuations during a levee breech or failure may strain shelters throughout the county or may create a potential for an increase in car accidents leading to serious injury or financial loss for residents throughout the county • Destroyed powerlines or electrical substations may lead to a loss of communication for a particular jurisdiction or for a large portion of the county. This could lead to an inability to reach people in need. • In the instance that flooding occurs at critical facility without a generator or the generator does not work, critical facilities could lose power and may not be usable due to flooding or power outage. This may slow down first responders and allow for a greater loss of life, injury, or property damage particularly when dam or levee failure is accompanied by other hazardous events.

Unincorporated Montgomery County			
Planning Area (Sq. mi):	935.3	**Occurrences:**	0
Area Affected:	7%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A,		
Extent:	Complete failure of dam during major rain event; Peak flow rates of 67,000 cubic feet per second		
Vulnerability		**Impact**	
Total number of structures exposed to hazard: 11,377		Expensive repairs and rebuilding associated with flooding of property and structures. Potential loss of life.	

Conroe			
Planning Area (Sq. mi):	72	**Occurrences:**	0
Area Affected:	25%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A		
Extent:	Complete failure of dam during major rain event; Peak flow rates of 67,000 cubic feet per second		
Vulnerability		**Impact**	
Total number of structures exposed to hazard: 4,521		Expensive repairs and rebuilding associated with flooding of property and structures. Potential loss of life.	

Oak Ridge North			
Planning Area (Sq. mi):	1.1	**Occurrences:**	0
Area Affected:	15%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A		
Extent:	Complete failure of dam during major rain event; Peak flow rates of 67,000 cubic feet per second		
Vulnerability		**Impact**	
Total number of structures exposed to hazard: 113		Expensive repairs and rebuilding associated with flooding of property and structures. Potential loss of life.	

Shenandoah			
Planning Area (Sq. mi):	1.3	**Occurrences:**	0
Area Affected:	5%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A		
Extent:	Complete failure of dam during major rain event; Peak flow rates of 67,000 cubic feet per second		
Vulnerability		**Impact**	
Total number of structures exposed to hazard: 97		Expensive repairs and rebuilding associated with flooding of property and structures. Potential loss of life.	

Woodlands Township			
Planning Area (Sq. mi):	43.9	**Occurrences:**	0
Area Affected:	5%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A		
Extent:	Complete failure of dam during major rain event; Peak flow rates of 67,000 cubic feet per second		
Vulnerability		**Impact**	
Total number of structures exposed to hazard:		Expensive repairs and rebuilding associated with flooding of property and structures. Potential loss of life.	

Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences:**	0
Area Affected:	100%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A		
Extent:	Complete failure of dam during major rain event; Peak flow rates of 67,000 cubic feet per second		
Vulnerability		**Impact**	
Total number of structures exposed to hazard: 68		Expensive repairs and rebuilding associated with flooding of property and structures. Potential loss of life.	

Part 6.12 Expansive Soils

6.12 Expansive Soils

The chart below shows the Linear Extensibility Percent (LEP) and Coefficient of Linear Extent (COLE) to show the Shrink-Swell Class of expansive soils. COLE is a test frequently used to characterize expansive soils. COLE is a measure expressed as a fraction of the change in a soil sample dimension from the moist to dry state. The LEP is a measure expressed as a percentage of the change in a soil sample dimension from the moist to dry state. The Shrink-Swell Class is found in comparing these two measurements. A Moderate to Very High rating marks soils that have the potential to contract and expand, leading to broken foundations and water pipes, for example.

Shrink-Swell Class	Linear Extensibility Percent (LEP)	Coefficient of Linear Extent (COLE)
Low	3	0.03
Moderate	3 to 6	.03-.06
High	6 to 9	.06-.09
Very High	Greater than or equal to 9	Greater than or equal to 0.09

Source: https://www.nrcs.usda.gov

The cities of Cut and Shoot, Magnolia, Oak Ridge North, Panorama Village, Patton Village, Roman Forest, Shenandoah, Splendora, The Woodlands, and Woodbranch are not comprised of soil with high swelling potentials and have no previous occurrences to report. These jurisdictions will not be included in the Expansive Soil hazard analysis.

Montgomery County Expansive Soils Data

Jurisdiction	Low Swelling Potential	Moderate Swelling Potential	High Swelling Potential
Unincorporated Montgomery County	69.3%	7.0%	7.4%
Conroe	60.4%	2.0%	2.8%
Cut and Shoot	82.2%	0.6%	0.0%
Magnolia	63.3%	2.4%	0.0%
Montgomery	20.4%	25.5%	39.5%
Oak Ridge North	20.5%	0.0%	0.0%
Panorama Village	59.7%	0.0%	0.0%
Patton Village	65.7%	5.8%	0.0%
Roman Forest	77.7%	0.1%	0.0%
Shenandoah	34.6%	0.0%	0.0%
Splendora	55.9%	0.5%	0.0%
Stagecoach	77.8%	8.9%	1.1%
The Woodlands	42.9%	0.0%	0.2%
Willis	46.1%	9.1%	1.4%
Woodbranch	69.9%	7.5%	0.0%
Woodloch	32.1%	0.0%	4.5%

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The extent data represents the worst damage a jurisdiction can experience Information from stakeholders, USDA's Natural Resource Conservation Services**,** and H-GAC's critical facilities database were used for this analysis.

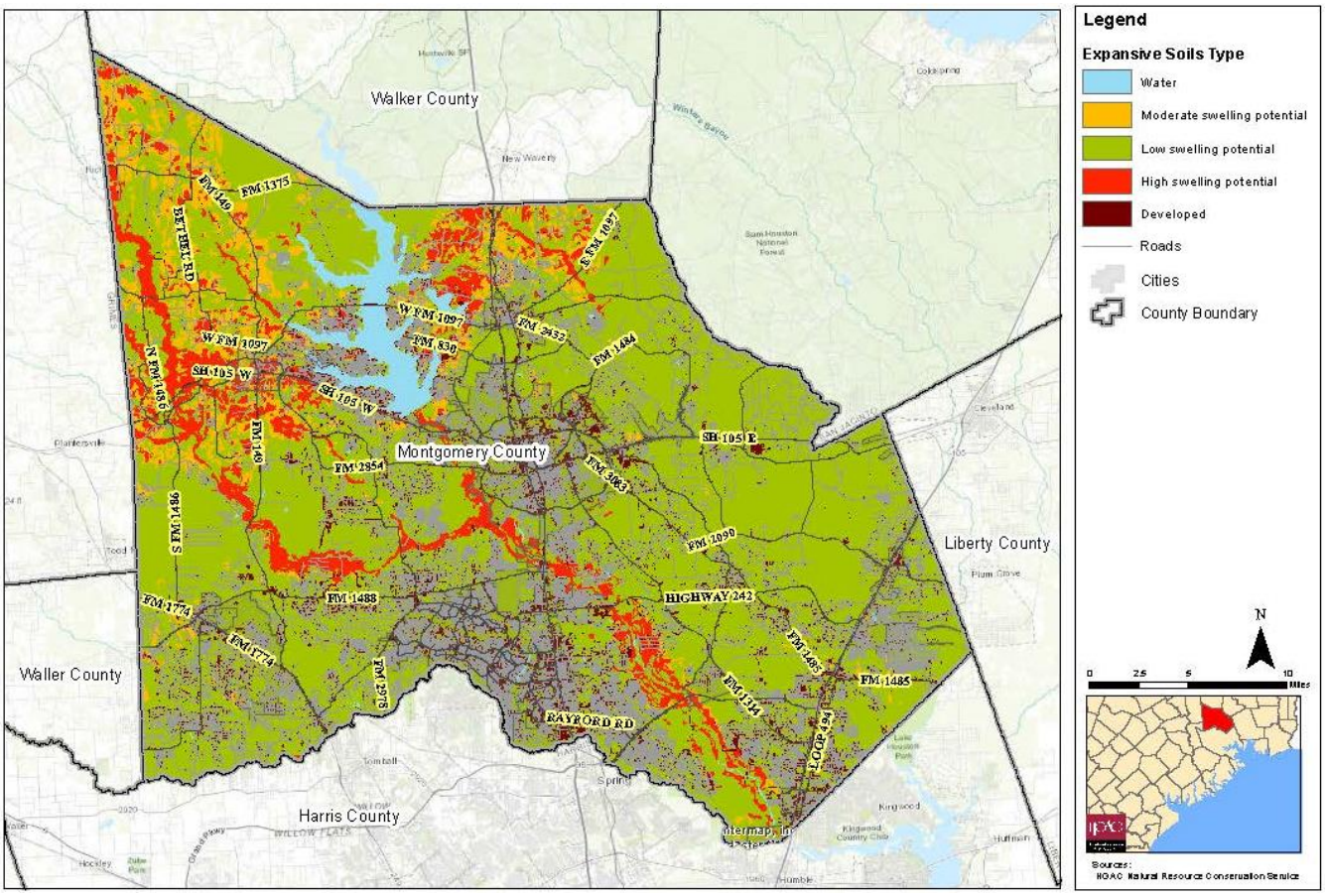
To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures within the high to very high shrink swell classes; and
- Stakeholder identified vulnerabilities.

High to Very High shrink swell classes marks soils that have the potential to contract and expand. This can lead to broken foundations and water pipes and will be used to measure the area effected in the hazard impact analysis. Using GIS, critical facilities located on soils with high shrink and swell classifications were identified as vulnerable. A data deficiency for "Occurrences" was addressed by assigning 1 occurrence for any jurisdiction that had Very High shrink swell classes.

Montgomery County (All Jurisdictions)
Identified Vulnerabilities: Broken foundations and water pipes in commercial and residential buildings and public property. While newer buildings can be impacted; older buildings including critical facilities and homes are more likely to be impacted; this is due to older buildings being exposed to numerous weather events and seasons, having building standards that do not take expansive soils into account, and the lack of engineering solutions to mitigate expansive soils in the past. Therefore, the vulnerabilities focus on older buildings in each of the jurisdictions.
Identified Impacts: Jurisdictions can be impacted by expensive financial costs to repair foundations and water lines for public facilities. School districts, home owners, and business owners could also be impacted by broken pipes, cracked foundations, and other structural repairs caused by expanding and contracting soils. Pipes in critical facilities may also lead to a loss of service, or damaged roads/bridges can increase response time to get to someone in need.

Expansive Soil Map: Montgomery County



A higher resolution map of the expansive soils is located in Appendix B.

Unincorporated Montgomery County			
Planning Area (Sq. mi):	935.3	**Occurrences since 2000:**	1
Area Affected:	7.4%	**Annual Event Average:**	0.6
Probability of Occurring in the next 5 years:	Likely; 29% chance event will occur within next 5 years.		
Greatest Occurrence:	Reports of minor foundations damage.		
Extent:	Foundations of structures shifting requiring major repairs.		
Vulnerability		**Impact**	
4 railroad bridges and 9 roadway bridges are constructed on soils with high swelling potential		Costly repairs and potential interruption of services.	

Conroe			
Planning Area (Sq. mi):	72	**Occurrences since 2000:**	1
Area Affected:	2.8%	**Annual Event Average:**	0.6
Probability of Occurring in the next 5 years:	Likely; 29% chance event will occur within next 5 years.		
Greatest Occurrence:	Reports of minor foundations damage.		
Extent:	Foundations of structures shifting requiring major repairs.		
Vulnerability		**Impact**	
507 structures at risk of damage due to expansive soils		Costly repairs of privately owned structures.	

Montgomery			
Planning Area (Sq. mi):	4.6	**Occurrences since 2000:**	1
Area Affected:	39.5%	**Annual Event Average:**	0.6
Probability of Occurring in the next 5 years:	Likely; 29% chance event will occur within next 5 years.		
Greatest Occurrence:	Foundations of structures shifting requiring repairs, and water and sewer line damage.		
Extent:	Foundations requiring major repairs, and water and sewer line breaks due to expanding soils.		
Vulnerability		**Impact**	
1 police station, 1 EMS station, 2 schools, and 3 shelters are constructed on soils with high swelling potential		Costly repairs and potential interruption of services resulting in the loss of life.	

Willis			
Planning Area (Sq. mi):	3.3	**Occurrences since 2000:**	1
Area Affected:	0.2%	**Annual Event Average:**	0.6
Probability of Occurring in the next 5 years:	Likely; 29% chance event will occur within next 5 years.		
Greatest Occurrence:	Reports of minor foundations damage.		
Extent:	Foundations of structures shifting requiring major repairs.		
Vulnerability		**Impact**	
1 electric substation is constructed on soils with high swelling potential		Costly repairs and potential interruption of services.	

Woodloch			
Planning Area (Sq. mi):	0.1	**Occurrences since 2000:**	1
Area Affected:	4.5%	**Annual Event Average:**	0.6
Probability of Occurring in the next 5 years:	Likely; 29% chance event will occur within next 5 years.		
Greatest Occurrence:	Reports of minor foundations damage.		
Extent:	Foundations of structures shifting requiring major repairs.		
Vulnerability		**Impact**	
1 dam constructed on soils with high swelling potential		Costly repairs and maintenance of dam	

2017

Part 7: Mitigation Strategy

Part 7: MITIGATION STRATEGY

The planning process, hazard analysis, and vulnerability assessment serve as a foundation for a meaningful hazard mitigation strategy. The mitigation strategy provides an outline for how the county and the local jurisdictions aim to address and reduce the risks associated with the natural hazards identified in the HMAP and reduce the potential impact on residents and structures identified through the Vulnerability Analysis. The mitigation strategy is divided into three sections the mission statement, goals and objectives, and the mitigation action plan. The mission statement provides the overall purpose of the mitigation strategy and the HMAP. The goals and objectives provide milestones for how the county aims to meet this purpose. The mitigation action plan details specific mitigation actions, or projects, programs, and polices the county aims to meet these goals and objectives.

Mission Statement

The HMAP aims to implement new policies, programs, and projects to reduce the risks and impacts associated with natural hazards, including public education and partnerships between local officials and residents.

Goal
Reduce the loss of life and damage to property from natural hazard events

Objective
Reduce the number of structures in the 100-year floodplain

Objective
Retrofit county and local jurisdiction infrastructure to minimize damage from wind

Objective
Construct new critical facilities across the county in order to protect residents from and fully respond to all natural hazards

Goal
Improve communications between the public, county departments, and other local jurisdictions

Objective
Implement new and revisit existing public education campaigns related to natural hazards

Objective
Implement new early warning detective system and expand current communication outlets in order to provide earliest warning possible to all areas of the county

Goal
Through a cooperative effort with all county partners, improve existing plans, ordinances, and codes to reduce the impacts from natural hazards.

Objective
Hold workshops throughout the county to update plans, ordinances, and codes

Objective
Provide incentives to partners and residents throughout the county to encourage further participation in hazard mitigation activities and educational events.

Mitigation Action Plan

The mitigation action plan explains the specific programs, policies, and projects that the county and the local jurisdictions aim to implement for the county to reach its HMAP objectives and goals. The mitigation action plan provides the details of each mitigation action including which local department will be in charge of implementing the actions, how the county or local jurisdiction plan to pay for these actions, and the estimated time for implementing these actions.

Each jurisdiction and the county prioritized mitigation actions based on their greatest vulnerabilities and needs. Actions were rated 1, 2, or 3 with 1 being the highest priority. Within each of the priority categories, a sub-category for feasibility was created. Each action was evaluated for feasibility using FEMA's mitigation action evaluation worksheet (Appendix A). After evaluating the mitigation actions based on priorities and feasibility, the actions were assigned a number. The following charts below demonstrate the organization, scoring, and the hazards addressed by each participating jurisdiction.

All Participating Jurisdictions

Jurisdiction:	All Participating Jurisdictions	**Action Number:**	A-0
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Heat Events Hail Winter Weather Lightning		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for all hazards to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office or Mayor for each participating jurisdiction.		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Montgomery County

Jurisdiction:	Montgomery County	**Action Number:**	A-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Tornado Winter Weather		
Project Title:	Road Closures		
Project Description:	Purchase and installation of road closure devices (barricades, gates) that can be enabled and disabled by emergency personnel during times of disaster. Devices installed along roads that are continuously affected by storms, where closing the road is paramount to life safety.		
Responsible Entity:	Montgomery Co. Judges Office, OEM, Individual County Precincts		
Losses avoided:	Life Safety		
Cost Estimate:	$ 200,000.00	**Timeframe:**	60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	FEMA, HMPG, CDBD-DR, PDM, Local Funds	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Montgomery County	**Action Number:**	A-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Property Acquisition		
Project Description:	Purchase of properties within Montgomery County that are substantially damaged, are repetitively damaged, and/or severely repetitively damaged from flooding events. The purchase of properties is paramount to life safety, and community restoration.		
Responsible Entity:	Montgomery Co Judges Office, OEM, Individual county precincts		
Losses avoided:	Life Safety		
Cost Estimate:	$70,000,000.00	**Timeframe:**	60 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	FEMA, HMPG, CDBD-DR, PDM, Local Funds	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Montgomery County	**Action Number:**	A-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Drought Expansive Soils Heat Events		
Project Title:	Detention/Retention Reservoirs		
Project Description:	Construction of multiple detention/retention reservoirs within/around Montgomery County. Reservoirs would be a combination of water supply conservation (continuously hold water) and as a capture source during heavy rain events.		
Responsible Entity:	Montgomery Co Judges Office, OEM, Individual county precincts		
Losses avoided:	Life Safety and Property Conservation		
Cost Estimate:	$1,600,000,000	**Timeframe:**	60 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	FEMA, USACE, USDA, HMPG, CDBD-DR	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Montgomery County	**Action Number:**	A-4
Hazard(s) Addressed:	Floods		
Project Title:	Public Information and Awareness		
Project Description:	Identify sites where stream and rain gauges are needed. Add or upgrade sites as needed and coordinate installation requests with USGS and River Authority. Additional sites will help provide early detection of potential flood areas to assist in evacuation and protection of property and inform the public of imminent hazard.		
Responsible Entity:	County EMC, USGS, local community officials		
Losses avoided:	Life Safety		
Cost Estimate:	$ 110,000.00	**Timeframe:**	12 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	Cost share with Montgomery County and local communities FEMA-All Hazards Operational Planning, USDA- Environmental Quality Incentives Program, EPA-NPS Grant Program, USDA NRCS-Emergency Watershed Protection, TWDB-Clean Water State Revolving Fund, TWDB (Development Fund II)-Texas Water Development Fund, USDA NRCS-Watershed Protection and Flood Prevention Program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Montgomery County	**Action Number:**	A-5
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Dam/ Levee Failure Heat Events Hail Winter Weather		
Project Title:	Emergency Power System		
Project Description:	Purchase and deployment of secondary emergency power systems		
Responsible Entity:	Montgomery County OEM, Commissioners Court		
Losses avoided:	Life Safety		
Cost Estimate:	$ 2,000,000.00	**Timeframe:**	12 - 60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	Available FEMA Grant Programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Montgomery County	**Action Number:**	A-6
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Dam/ Levee Failure Expansive Soils Heat Events Hail Winter Weather		
Project Title:	Emergency Shelter		
Project Description:	Construction of Emergency Shelters throughout Montgomery County		
Responsible Entity:	Montgomery County OEM, Commissioners Court		
Losses avoided:	Life Safety		
Cost Estimate:	$ 12,000,000.00	**Timeframe:**	12 - 60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	Available FEMA Grant Programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Montgomery County	**Action Number:**	A-7
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Drought Expansive Soils Heat Events		
Project Title:	Detention/Retention Reservoirs		
Project Description:	Construction of multiple detention/retention reservoirs within/around Montgomery County. Reservoirs would be a combination of water supply conservation (continuously hold water) and as capture source during heavy rain events.		
Responsible Entity:	Montgomery Co. Judges Office, OEM, Individual County Precincts		
Losses avoided:	Life Safety and Property Conservation		
Cost Estimate:	$ 1,600,000,000.00	**Timeframe:**	60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	FEMA, USACE, USDA HMPG, CDBD-DR	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Montgomery County	**Action Number:**	A-8
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms		
Project Title:	Property Protection		
Project Description:	Reduce hazardous fuels in ditches in county right of way to lessen the threats and impacts from wildfires, droughts and floods.		
Responsible Entity:	County Commissioners		
Losses avoided:	Life Safety		
Cost Estimate:	$ 150,000.00	**Timeframe:**	6 - 12 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	County Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Montgomery County		**Action Number:**	A-9
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Dam/ Levee Failure Expansive Soils Heat Events Hail Winter Weather			
Project Title:	Emergency Services			
Project Description:	Establish a secondary Emergency Operations Center			
Responsible Entity:	Montgomery County OEM			
Losses avoided:	Life and Property			
Cost Estimate:	$ 4,000,000.00	**Timeframe:**	24 - 60 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	6	
Potential Funding Sources:	FEMA Emergency Operations Center Grant Program, DOJ State Homeland Security Program, FEMA Emergency Management Performance Grant, FEMA All Hazards Operational Planning	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	Montgomery County		**Action Number:**	A-10
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Dam/ Levee Failure Expansive Soils Heat Events Hail Winter Weather			
Project Title:	Emergency Services			
Project Description:	Purchase and deployment of Emergency Response Equipment.			
Responsible Entity:	Montgomery County OEM, Commissioners Court			
Losses avoided:	Life Safety			
Cost Estimate:	$ 1,500,000.00	**Timeframe:**	12 - 60 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	5	
Potential Funding Sources:	Available FEMA Grant Programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	Montgomery County	**Action Number:**	A-11
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Dam/ Levee Failure Expansive Soils Heat Events Hail Winter Weather		
Project Title:	Emergency Public Warning System		
Project Description:	Purchase and deployment of secondary public emergency notification system.		
Responsible Entity:	Montgomery County OEM, Commissioners Court		
Losses avoided:	Life Safety		
Cost Estimate:	$ 2,000,000.00	**Timeframe:**	12 - 60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	Available FEMA Grant Programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Montgomery County	**Action Number:**	A-12
Hazard(s) Addressed:	Wildfire Drought		
Project Title:	Public Information and Awareness, Property Protection		
Project Description:	Relaunch the Ready, set, Go Educational Program		
Responsible Entity:	Texas Forest Service, County Fire Marshall's Office, Montgomery County Emergency Management		
Losses avoided:	Life Safety		
Cost Estimate:	$ 30,000.00	**Timeframe:**	6 - 12 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	PDM,HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Montgomery County		**Action Number:**	A-13
Hazard(s) Addressed:	Expansive Soils			
Project Title:	Structural and Foundation Protection			
Project Description:	Install moisture sensing irrigation systems at all existing and future county, local, and critical facilities. Irrigation systems automatically water building to reduce the impacts of shrinking and swelling soils during drought.			
Responsible Entity:	Facilities and building departments of participating jurisdictions			
Losses avoided:	Structural foundations and anticipated cost of repairs			
Cost Estimate:	$ 175,000.00	**Timeframe:**	36 - 48 months	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	7	
Potential Funding Sources:	Local budgets and HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	Montgomery County		**Action Number:**	A-14
Hazard(s) Addressed:	Tornado			
Project Title:	Tornado mitigation through rebate program			
Project Description:	The county will develop a rebate program for building owners who install straps, structural bracings, window shutters, or interlocking roof shingles in new construction or when renovating residences or businesses.			
Responsible Entity:	Agrilife Extension Office, Permits Department, County Engineer			
Losses avoided:	Residents, homes, business, and local facilities.			
Cost Estimate:	$ 5,000.00	**Timeframe:**	3 months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8	
Potential Funding Sources:	HMGP, USDA Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	Montgomery County		**Action Number:**	A-15
Hazard(s) Addressed:	Floods			
Project Title:	Prevention			
Project Description:	Enforce state regulations that prohibit dumping in streams, ditches, area waterways with concentration on those areas that have the potential to block the normal drainage of rainfall.			
Responsible Entity:	Environmental Health Services and Local Community Officials			
Losses avoided:	Roads damage, flooded vehicles, life safety			
Cost Estimate:	$ 110,000.00	**Timeframe:**	60 months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	3	
Potential Funding Sources:	Cost share with Montgomery County and local communities, EPA-NPS Grant Program, USDA NRCS-Emergency Watershed Protection Agency, TWDB-Clean Water State Revolving Fund, TWDB (Development Fund II)-Texas Water Development Fund, USDA NRCS-Watershed Protection and Flood Prevention Program, PDM, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	Montgomery County	**Action Number:**	A-16
Hazard(s) Addressed:	Drought Heat Events		
Project Title:	Prevention		
Project Description:	Implement actions to support regulations that assist in reducing excess ozone pollution and urban heat. May include actions such as providing incentives for developers to increase tree planting and a county-wide public education and awareness program m to promote smog awareness, volunteer mass transit, car-pooling, and health tips for living in a high ozone smog area.		
Responsible Entity:	County Health District, County EMS, local community officials		
Losses avoided:	Reduce the effects of drought and heat events		
Cost Estimate:	$ 50,000.00	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	-4
Potential Funding Sources:	Public private partnership, staff time and resources	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Montgomery County	**Action Number:**	A-17
Hazard(s) Addressed:	Lightning		
Project Title:	Lightning and Fire Protection		
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	homes and residents who could be affected by lightening throughout the		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	-4
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Montgomery County	**Action Number:**	A-18
Hazard(s) Addressed:	Dams and Levee Failure		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for dam and Levee failure to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office or Mayor for each participating jurisdiction.		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Montgomery County	**Action Number:**	A-19
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for expansive soils to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office or Mayor for each participating jurisdiction.		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Conroe

Jurisdiction:	City of Conroe	**Action Number:**	B-1
Hazard(s) Addressed:	Floods Dam/ Levee Failure		
Project Title:	Wastewater Treatment Plant Elevation		
Project Description:	Elevate and fortify essential platforms, equipment, and office at the City Wastewater Treatment plant to ensure continuity or operations during and after catastrophic flooding		
Responsible Entity:	City of Conroe Council, Mayor, Public Works Department, and Engineering Department		
Losses avoided:	Mitigateloss of critical infrastructure		
Cost Estimate:	$2,500,000.00	**Timeframe:**	10-24 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	FEMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Adopting land-use ordinance		
Project Description:	The city shall adopt a land-use ordinance which prohibits building residential or commercial structures in the 100-year flood plain.		
Responsible Entity:	City manager, City Council, Office of Code Enforcement		
Losses avoided:	Future buildings and infrastructure that may have been built within the 100 year flood plain.		
Cost Estimate:	$5,000	**Timeframe:**	4 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	Current city budget and salary, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	City Ordinance		
Project Description:	The city shall adopt a land use ordinance which requires any structure within the 100-year floodplain to be elevated 2 feet above base flood elevation		
Responsible Entity:	City council and mayor		
Losses avoided:	Homes, businesses, and residents within the 100 year flood plain		
Cost Estimate:	$5,000	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HGMP, current city budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	City Ordinance		
Project Description:	The city shall adopt a land use ordinance which requires any structure within the 100-year floodplain to be elevated 2 feet above base flood elevation.		
Responsible Entity:	City council and mayor		
Losses avoided:	Homes, businesses, and residents within the 100 year floodplain		
Cost Estimate:	$5,000	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HGMP, current city budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-5
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Property Protection		
Project Description:	. Project will clear obstacles, mow and reshape ditches, and upgrade culverts to restore adequate drainage to mitigate flooding. Removal of debris, silt and vegetation obstacles in drainage ways		
Responsible Entity:	City Engineer		
Losses avoided:	Homes, business, and public facilities		
Cost Estimate:	$250,000	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-6
Hazard(s) Addressed:	Floods		
Project Title:	Prevention, Property Protection		
Project Description:	Improve drainage system by clearing debris, widening drainage ditches, and increasing stormwater management infrastructure.		
Responsible Entity:	City Administration		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$1,000,000	**Timeframe:**	36-48 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	USACE-Small Flood Control Projects, HMGP, USDA NRCS, Emergency Watershed Protection Agency, TWDB Clean Water State Revolving Fund, TWDB (Development Fund II) - Texas Water Development Fund, USDA NRCS Watershed Protection and	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio

	Flood Prevention Program, EPA NPS Grant Program, PDM, HMGP		
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe		**Action Number:**	B-7
Hazard(s) Addressed:	Floods Dam/ Levee Failure			
Project Title:	Elevation of Police Training Grounds/Gun Range			
Project Description:	Elevate and fortify essential buildings and equipment at the City of Conroe Police Training Grounds to ensure Continuity of operations and mitigate damages			
Responsible Entity:	City council, mayor, police department			
Losses avoided:	Mitigate the loss of life and property			
Cost Estimate:	$2,500,000.00	**Timeframe:**	10-24 Months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8	
Potential Funding Sources:	FEMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Conroe		**Action Number:**	B-8
Hazard(s) Addressed:	Floods Dam/ Levee Failure			
Project Title:	Elevate Flood Protection Dikes			
Project Description:	Elevating and fortifying current flood protection dikes to levels appropriate for recent flooding situations			
Responsible Entity:	City Public Works and Engineering Depts.			
Losses avoided:	Mitigate the loss of life and property			
Cost Estimate:	$2,500,000.00	**Timeframe:**	10-24 Months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8	
Potential Funding Sources:	FEMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Conroe		**Action Number:**	B-9
Hazard(s) Addressed:	Wildfire Drought			
Project Title:	Public Information and Awareness, Property Protection			
Project Description:	Implement Ready, Set, Go Educational Program			
Responsible Entity:	Texas Forest Service, Fire Marshall's Office			
Losses avoided:	Mitigate the loss of life and property			
Cost Estimate:	$8000	**Timeframe:**		
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8	
Potential Funding Sources:	PDM, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Conroe		**Action Number:**	B-10
Hazard(s) Addressed:	Drought			
Project Title:	Adopting ordinance for drought tolerant plants			
Project Description:	The county will partner with cities to develop an ordinance to require incorporating drought tolerant landscape design into all new county and city owned properties.			
Responsible Entity:	Emergency Managers			
Losses avoided:	Mitigate the loss of life and property			
Cost Estimate:	$1,000	**Timeframe:**	3 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8	
Potential Funding Sources:	Local budgets and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Conroe		**Action Number:**	B-11
Hazard(s) Addressed:	Drought			
Project Title:	Adopting ordinance for drought tolerant plants			
Project Description:	The county will partner with cities to develop an ordinance to require incorporating drought tolerant landscape design into all new county and city owned properties			
Responsible Entity:	Emergency Managers			
Losses avoided:	Reduce the effects of drought			
Cost Estimate:	$1,000	**Timeframe:**	3 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8	
Potential Funding Sources:	Local budgets and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Conroe		**Action Number:**	B-12
Hazard(s) Addressed:	Severe Thunderstorms Hail Winter Weather			
Project Title:	Educate public of home improvement opportunities			
Project Description:	Educate elderly, low-income residents of grant funding opportunities to insulate the foundation of pier and beam homes, and update homes to withstand hurricane force winds and hail			
Responsible Entity:	County emergency managers, partnering jurisdictions mayors and city councils, code enforcement and building departments			
Losses avoided:	Life, health, and safety of vulnerable populations, and property damage			
Cost Estimate:	$2,500	**Timeframe:**	6 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8	
Potential Funding Sources:	HMGP, USDA, Home Repair Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Conroe	**Action Number:**	B-13
Hazard(s) Addressed:	Wildfire Drought		
Project Title:	Public Information and Awareness		
Project Description:	Conduct wildfire outreach and education campaign by distributing information at public buildings, town hall meetings, and other speaking engagements		
Responsible Entity:	City of Conroe		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$0	**Timeframe:**	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	PDM, HMGP, TFS	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Conroe	**Action Number:**	B-14
Hazard(s) Addressed:	Hail		
Project Title:	Hail Damage Protection		
Project Description:	The county and partnering jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail damage		
Responsible Entity:	Emergency Coordinator and Local Building Departments		
Losses avoided:	Buildings, residents, and city/county employees in county and city buildings when a hail storm hits.		
Cost Estimate:	$20,000	**Timeframe:**	24-36 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	HMGP, Housing Preservation Grants, Weatherization Assistance Program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Conroe	**Action Number:**	B-15
Hazard(s) Addressed:	Severe Thunderstorms		
Project Title:	Lightning and Fire Protection		
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	homes and residents who could be affected by lightening throughout the		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No
Jurisdiction:	City of Conroe	**Action Number:**	B-16

Hazard(s) Addressed:	Floods		
Project Title:	High Water Gates and Storm Inlets		
Project Description:	Install high water gates and upsize storm inlets and laterals to improve drainage conveyance at locations of concern.		
Responsible Entity:	City Council, City Engineering Department		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$200,000.00	**Timeframe:**	6-18 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	FEMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-17
Hazard(s) Addressed:	Floods		
Project Title:	Prevention		
Project Description:	Enforce state regulations that prohibit dumping in streams, ditches and area waterways with concentration on those areas that have the potential to block the normal drainage of rainfall.		
Responsible Entity:	County Emergency Management, Environmental Health Services and local community officials.		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$100,000	**Timeframe:**	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	Cost share with Montgomery County and local communities, EPA-NPS Grant Program, USDA NRCS-Emergency Watershed Protection Agency, TWDB-Clean Water State Revolving Fund, TWDB (Development Fund III) - Texas Water Development Fund. USDA NRCS-Watershed Protection and Flood Prevention Program	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-18
Hazard(s) Addressed:	Hurricane/ Tropical Storms		
Project Title:	Hurricane resistant powerline poles		
Project Description:	All new power line poles installed within the jurisdiction will be wind resistant		
Responsible Entity:	Engineering Department		
Losses avoided:	Homes, businesses, and public facilities		
Cost Estimate:	$120,000.00	**Timeframe:**	36 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-19
Hazard(s) Addressed:	Floods		
Project Title:	Prevention, Property Protection		
Project Description:	Using a regional detention feasibility study conducted by staff, develop new mitigation strategies and public outreach initiatives to reduce the impacts of flood on the City of Conroe		
Responsible Entity:	Planning, Engineering and Fire		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$5,000	**Timeframe:**	Within 2-3 years of funding
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	National Weather Service, FEMA Fire Fighters Grant, FEMA All Hazards Operational Planning, HMGP, PDMGP, Public-Private Partnerships, FEMA Homeland Security Grants	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-20
Hazard(s) Addressed:	Wildfire		
Project Title:	Rebate program for wildfire protection		
Project Description:	The city will develop a rebate program for residents who use non-combustible material when renovating properties or building new homes		
Responsible Entity:	Mayor		
Losses avoided:	Residents and existing and new properties		
Cost Estimate:	$100,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Conroe	**Action Number:**	B-21
Hazard(s) Addressed:	Floods Dam/ Levee Failure		
Project Title:	Property Protection, Public Information and Awareness		
Project Description:	Implement Lake Conroe Dam failure plan, including education and awareness for affected neighborhoods.		
Responsible Entity:	City administration, San Jacinto River Authority		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$100,000	**Timeframe:**	24-36 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	FEMA National Dam Safety Program, FEMA First Responder Counter-Terrorism Training Assistance, HMGP, PDM, Flood Mitigation Assistance Program	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Conroe	**Action Number:**	B-22
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Drainage Master Plan & Detention Ordinance		
Project Description:	Assess drainage citywide and evaluate the possible need for regional detention. Eliminating site specific detention ponds. Update the City's detention ordinance.		
Responsible Entity:	City Council, mayor, engineering department		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$600,000.00	**Timeframe:**	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:		**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-23
Hazard(s) Addressed:	Floods		
Project Title:	Emergency Services, Property Protection		
Project Description:	Public safety and risk assessment study/plan		
Responsible Entity:	Planning and Fire		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$750,00	**Timeframe:**	24-36 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	FEMA, Homeland Security Grants, HMGP, PDM	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Conroe	**Action Number:**	B-24
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms Tornado Heat Events Winter Weather		
Project Title:	Battery backups for Traffic Signals		
Project Description:	Install battery backup units for highway signals per TXDOT Standards. Allow for safe travel and minimize traffic delays and disruptions during and after outages for extreme events.		
Responsible Entity:	City Engineering Department and Public Works dept.		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$600,000	**Timeframe:**	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	7
Potential Funding Sources:		**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-25
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Dam/ Levee Failure Lightning Heat Events Hail Winter Weather		
Project Title:	Emergency Services		
Project Description:	Establish a secondary Emergency Operations Center		
Responsible Entity:	City Administration		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$4,000,000	**Timeframe:**	24-60 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	FEMA Emergency Operation Center Grant Program, DOJ State Homeland Security Program, FEMA Emergency Management Performance Grant, FEMA All Hazards Operational Planning	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-26
Hazard(s) Addressed:	Hurricane/ Tropical Storms		
Project Title:	Old Conroe Road Project		
Project Description:	Extend Old Conroe Road to a 4-lane divided roadway to provide an alternate North-South Connection and reduce traffic congestion on I-45. Provides an alternate Hurricane evacuation route.		
Responsible Entity:	City of Conroe		
Losses avoided:	Mitigate the loss of life during a Hurricane event		
Cost Estimate:	$90,000,000	**Timeframe:**	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	HMGP, current city and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Conroe	**Action Number:**	B-27
Hazard(s) Addressed:	Heat Events		
Project Title:	Installing misting stations		
Project Description:	The county and partnering cities will install misting stations throughout city and county owned parks and property		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	Human life and health; Residents especially the elderly and children; Also protects visitors for festival and local events.		
Cost Estimate:	$3,000	**Timeframe:**	6-12 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMGP, current city and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Conroe	**Action Number:**	B-28
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Dam/ Levee Failure Winter Weather		
Project Title:	Emergency Services		
Project Description:	Purchase back-up radio system. The radio will be used before, during, and after major natural hazard events to coordinate road closures, emergency responders, shetlers, and evacuations.		
Responsible Entity:	Fire/Police Dept.		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$500,000	**Timeframe:**	24 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	National Weather Service, HMGP, PDM, FEMA Emergency Management Performance Grant, USDA Rural Utilities Service-Weather Radio Grant Program, FEMA Hurricane Local Grant Program, USDA Environmental Quality Incentives Program	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Conroe	**Action Number:**	B-29
Hazard(s) Addressed:	Dams and Levee Failure		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for dam and Levee failure to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Conroe	**Action Number:**	B-30
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for expansive soils to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office or Mayor for each participating jurisdiction.		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Cut and Shoot

Jurisdiction:	City of Cut and Shoot	**Action Number:**	C-1
Hazard(s) Addressed:	Wildfire		
Project Title:	Rebate program for wildfire protection		
Project Description:	The city will develop a rebate program for residents who use non-combustible material when renovating properties or building new homes		
Responsible Entity:	Mayor		
Losses avoided:	The city will develop a rebate program for residents who use non-combustible material when renovating properties or building new homes		
Cost Estimate:	$200,000	**Timeframe:**	12-24 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Cut and Shoot	**Action Number:**	C-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Property Protection		
Project Description:	Removal of debris, silt and vegetation obstacles in drainage ways. Project will clear obstacles, mow and reshape ditches, and upgrade culverts to restore adequate drainage to mitigate flooding		
Responsible Entity:	Mayor		
Losses avoided:	Homes, businesses and public facilities		
Cost Estimate:	$250,000	**Timeframe:**	6 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Cut and Shoot	**Action Number:**	C-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Drought		
Project Title:	Property Protection		
Project Description:	Reduce hazardous fuels in ditches in county right of way to lessen the threats and impacts from wildfire, droughts and floods		
Responsible Entity:	Mayor		
Losses avoided:	Life Safety		
Cost Estimate:	$150,000	**Timeframe:**	6-12 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	County Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Cut and Shoot		**Action Number:**	C-4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Drought			
Project Title:	Property Protection			
Project Description:	Removal of debris, silt and vegetation obstacles in drainage ways. Project will clear obstacles, mow and reshape ditches, and upgrade culverts to restore adequate drainage to mitigate flooding.			
Responsible Entity:	Mayor			
Losses avoided:	Life Safety			
Cost Estimate:	$150,000	**Timeframe:**	6-12 Months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	3	
Potential Funding Sources:	County Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Cut and Shoot		**Action Number:**	C-5
Hazard(s) Addressed:	Tornado			
Project Title:	Tornado mitigation through rebate program			
Project Description:	The city will develop a rebate program for building owners who install straps, structural bracings, window shutters, or interlocking roof shingles in new construction or when renovating residences or businesses			
Responsible Entity:	City Mayor, Office of Code Enforcement			
Losses avoided:	Residents, homes, business, and local facilities			
Cost Estimate:	$10,000.00	**Timeframe:**	3 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	2	
Potential Funding Sources:	HMGP, current city budget and salary	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Cut and Shoot		**Action Number:**	C-6
Hazard(s) Addressed:	Severe Thunderstorms Hail Winter Weather			
Project Title:	Educate public of home improvement opportunities			
Project Description:	Educate elderly, low-income residents of grant funding opportunities to insulate the foundation of pier and beam homes, and update homes to withstand hurricane force winds and hail.			
Responsible Entity:	Mayor, City Council, Code Enforcement and Building Departments			
Losses avoided:	Life, health, safety of vulnerable populations and property damage			
Cost Estimate:	$2,500	**Timeframe:**	6-12 months	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	5	
Potential Funding Sources:	HMGP, USDA, Home Repair Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Cut and Shoot	**Action Number:**	C-7
Hazard(s) Addressed:	Hurricane/ Tropical Storms Winter Weather		
Project Title:	Hurricane resistant powerline poles		
Project Description:	All new powerline poles installed within the jurisdiction will be wind resistant, or burried underground.		
Responsible Entity:	Engineering Department		
Losses avoided:	Homes, businesses, and public facilities		
Cost Estimate:	$200,000	**Timeframe:**	36 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Cut and Shoot	**Action Number:**	C-8
Hazard(s) Addressed:	Wildfire		
Project Title:	Becoming an active participant in Firewise USA program		
Project Description:	The city will become an active participant in the Firewise USA program and encourage local neighborhoods to join the program as well.		
Responsible Entity:	Mayor, City Council, Fire Marshal		
Losses avoided:	Property and residents throughout the city		
Cost Estimate:	$4,000	**Timeframe:**	12 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMP	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Cut and Shoot	**Action Number:**	C-9
Hazard(s) Addressed:	Lightning		
Project Title:	Lightning and Fire Protection		
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county		
Responsible Entity:	Mayor, City Secretary		
Losses avoided:	Homes and residents who could be affected by lightning throughout the city		
Cost Estimate:	$150,000	**Timeframe:**	12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	HMGP, FP&s Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Cut and Shoot		**Action Number:**	C-10
Hazard(s) Addressed:	Drought			
Project Title:	Adopting ordinance for drought tolerant plants			
Project Description:	The county will partner with cities to develop an ordinance to require incorporating drought tolerant landscape design into all new county and city owned properties			
Responsible Entity:	Mayor and local planning departments			
Losses avoided:	Reduce the effects of drought			
Cost Estimate:	$1,000	**Timeframe:**	3 months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2	
Potential Funding Sources:	Local budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Cut and Shoot		**Action Number:**	C-11
Hazard(s) Addressed:	Winter Weather			
Project Title:	Infrastructure Improvements			
Project Description:	All participating jurisdictions will burying power-lines to prevent power outages from falling limbs during Winter Weather.			
Responsible Entity:	County OEM and Mayor's office for each participating jurisdiction			
Losses avoided:	Preventing the loss of life of vulnerable residents that lose power during Winter Weather.			
Cost Estimate:	$1,500,000	**Timeframe:**	36-48 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	3	
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Cut and Shoot		**Action Number:**	C12
Hazard(s) Addressed:	Hail			
Project Title:	Hail damage protection			
Project Description:	City will retrofit city owned structures with roofs and window panes that can withstand hail damage.			
Responsible Entity:	Mayor, local building departments			
Losses avoided:	Buildings, residents, and city employees in county and city buildings when a hail storm hits			
Cost Estimate:	$350,000	**Timeframe:**	24-36 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	1	
Potential Funding Sources:	HMGP, housing preservation grants, weatherization assistance program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Cut and Shoot	**Action Number:**	C-13
Hazard(s) Addressed:	Heat Events		
Project Title:	Installing misting stations		
Project Description:	The city will install misting stations throughout city owned parks and property		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	Human life and health; Residents especially the elderly and children; Also protects visitors for festival and local events.		
Cost Estimate:	$3,000	**Timeframe:**	6-12 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMGP, current city and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Magnolia

Jurisdiction:	City of Magnolia		**Action Number:**	D-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms			
Project Title:	Water Waste System			
Project Description:	City has identified several of its lift stations, and trunk lines that are in need of repairs/renovations to protect them during natural disasters. The work needed includes engineering, elevations, electrical, and replacing lines.			
Responsible Entity:	Mayor, City Council, capital improvement boards, engineering department			
Losses avoided:	Lives, homes, businesses, critical assets, public facilities, and infrastructure destructions.			
Cost Estimate:	$3,000,000.00	**Timeframe:**	24-36 Months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7	
Potential Funding Sources:	HMGP, CDBG-DR, TWDB	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Magnolia		**Action Number:**	D-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms			
Project Title:	Water Drainage Improvement			
Project Description:	City has identified several road intersections, where significant changes to the current drainage system are needed. This includes upsizing of culverts and associated engineering work.			
Responsible Entity:	Mayor, City Council, capital improvement boards, engineering department			
Losses avoided:	Lives, homes, businesses, critical assets, public facilities, and infrastructure destructions			
Cost Estimate:	$70,000.00	**Timeframe:**	24-36 Months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7	
Potential Funding Sources:	HMGP, CDBG-DR, TWDB	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Magnolia		**Action Number:**	D-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Heat Events Hail Winter Weather			
Project Title:	Emergency Shelter			
Project Description:	Construction of an Emergency Shelter.			
Responsible Entity:	Mayor, city council			
Losses avoided:	life safety			
Cost Estimate:	$2,000,000	**Timeframe:**	12-60 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7	

Potential Funding Sources:	FEMA grant programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Magnolia	**Action Number:**	D-4
Hazard(s) Addressed:	Floods		
Project Title:	Public Information and Awareness		
Project Description:	Attend CRS workshop hosted by H-GAC		
Responsible Entity:	Emergency Manager		
Losses avoided:	Increase capability to reduce the effects of flooding and mitigate loss.		
Cost Estimate:	$0	**Timeframe:**	6-24 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	-3
Potential Funding Sources:	n/a	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Magnolia	**Action Number:**	D-6
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado Hail Winter Weather		
Project Title:	Educate public of home improvement opportunities		
Project Description:	Educate elderly, low-income residents of grant funding opportunities to insulate the foundation of pier and beam homes, and update homes to withstand hurricane force winds and hail		
Responsible Entity:	Mayor, City Council		
Losses avoided:	Life, health, safety of vulnerable populations and property damage		
Cost Estimate:	$2,500	**Timeframe:**	6-12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, USDA Home Repair Grant	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Magnolia	**Action Number:**	D-5
Hazard(s) Addressed:	Wildfire Drought		
Project Title:	Public Information and Awareness		
Project Description:	Conduct wildfire outreach and education campaign by distributing information at public buildings, town hall meetings, and other speaking engagements		
Responsible Entity:	Mayor, City Council, Emergency manager		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$3,000	**Timeframe:**	6-12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	HMGP, PDM,TFS	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Magnolia	**Action Number:**	D-6
Hazard(s) Addressed:	Wildfire		
Project Title:	Becoming an active participant in Firewise USA program		
Project Description:	The City will become an active participant in the Firewise USA program and encourage local neighborhoods to join the program as well		
Responsible Entity:	Mayor, city council, Fire marshal		
Losses avoided:	Property and residents throughout the city		
Cost Estimate:	$4,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	HMP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Magnolia	**Action Number:**	D-7
Hazard(s) Addressed:	Hurricane/ Tropical Storms Winter Weather Tornado		
Project Title:	Hurricane resistant powerline poles		
Project Description:	All new powerline poles installed within the jurisdiction will be wind resistant or buried underground.		
Responsible Entity:	Engineering department		
Losses avoided:	Homes, businesses and public facilities		
Cost Estimate:	$500,000	**Timeframe:**	36 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Magnolia	**Action Number:**	D-8
Hazard(s) Addressed:	Hail		
Project Title:	Hail damage protection		
Project Description:	City will retrofit city owned structures with roofs and window panes that can withstand hail damage.		
Responsible Entity:	Mayor, local building departments		
Losses avoided:	Buildings, residents, and city employees in county and city buildings when a hail storm hits		
Cost Estimate:	$350,000	**Timeframe:**	24-36 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	1
Potential Funding Sources:	HMGP, housing preservation grants, weatherization assistance program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Magnolia	**Action Number:**	D-9
Hazard(s) Addressed:	Lightning		

Project Title:	Lightning		
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	homes and residents who could be affected by lightening throughout the		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	-4
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Magnolia	**Action Number:**	D-10
Hazard(s) Addressed:	Heat Events		
Project Title:	Installing misting stations		
Project Description:	The city will install misting stations throughout city owned parks and property		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	Human life and health; Residents especially the elderly and children; Also protects visitors for festival and local events.		
Cost Estimate:	$3,000	**Timeframe:**	6-12 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMGP, current city and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Magnolia	**Action Number:**	D-11
Hazard(s) Addressed:	Drought		
Project Title:	Adopting ordinance for water sensing irrigation systems		
Project Description:	The city will develop an ordinance to require incorporating water sensing irrigation systems in all public areas.		
Responsible Entity:	City Manager		
Losses avoided:	Monetary loss/ Water Conservation		
Cost Estimate:	$1,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	City Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Montgomery

Jurisdiction:	City of Montgomery	**Action Number:**	E-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Structural		
Project Description:	Incorporate routine repairs and structural renovation efforts of our roads and bridges into capital improvement plans. Make repairs/ renovations to allow for better flood control.		
Responsible Entity:	Mayors Office		
Losses avoided:	Life safety, Property Conservation		
Cost Estimate:	$1,500,000	**Timeframe:**	60 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMPG, Local Funds, PDM, CDBG-DR	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Montgomery	**Action Number:**	E-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Dam/ Levee Failure Expansive Soils Heat Events Hail Winter Weather		
Project Title:	Natural Disaster Planning and Exercise		
Project Description:	Table top exercise with emergency services and the city of Montgomery. Exercise scenario will be a natural hazard, i.e. tornado		
Responsible Entity:	Mayors Office, responsible jurisdictions		
Losses avoided:	Life Safety, Property Conservation		
Cost Estimate:	$10,000.00	**Timeframe:**	12 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	Local funds and available grant opportunities. i.e. CDBG, PDM, HMPG, TDEM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Montgomery	**Action Number:**	E-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Dam/ Levee Failure Expansive Soils Heat Events Hail Winter Weather		

Project Title:	Coop, Shelter Support		
Project Description:	Improvements, replacements, and additions to redundant power supply systems at critical city infrastructure sites.		
Responsible Entity:	Mayors office		
Losses avoided:	Life safety, Property Conservation		
Cost Estimate:	$400,000	**Timeframe:**	34 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	Local funds and available grant opportunities. i.e. CDBG, PDM, HMPG, TDEM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Montgomery	**Action Number:**	E-4
Hazard(s) Addressed:	Floods Wildfire		
Project Title:	Property Protection		
Project Description:	Vegetation management program. Remove excessive vegetation to remove fuels for wildfires, and create fire breaks for residences and businesses. Removal of natural barriers will have added benefits by improving drainage for flood waters.		
Responsible Entity:	Mayors Office		
Losses avoided:	Life safety, Property Conservation		
Cost Estimate:	95,000.00	**Timeframe:**	12 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	Local funds and available grant opportunities. i.e. CDBG, PDM, HMPG	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Montgomery	**Action Number:**	E-5
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Flood Relief Project		
Project Description:	Improvements to two water channels within the city. Anders Branch and Town Creek. Physical improvements to both waterways.		
Responsible Entity:	Mayors Office		
Losses avoided:	Life safety, Property Conservation		
Cost Estimate:	$400,000.00	**Timeframe:**	12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	Local funds and available grant opportunities. i.e. CDBG, PDM, HMPG, TDEM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Montgomery	**Action Number:**	E-6
Hazard(s) Addressed:	Heat Events		
Project Title:	Cooling Stations		
Project Description:	The city will provide areas within the city hall for individuals to cool in cases of Heat Events.		

Responsible Entity:	Public works / parks department		
Losses avoided:	Life, health safety of vulnerable populations		
Cost Estimate:	$2,000	**Timeframe:**	36-48 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	City Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Montgomery	**Action Number:**	E-7
Hazard(s) Addressed:	Hurricane/ Tropical Storms Winter Weather Tornado		
Project Title:	Hurricane resistant powerline poles		
Project Description:	All new powerline poles installed within the jurisdiction will be wind resistant or buried underground.		
Responsible Entity:	Engineering department		
Losses avoided:	Homes, businesses and public facilities		
Cost Estimate:	$500,000	**Timeframe:**	36 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Montgomery	**Action Number:**	E-8
Hazard(s) Addressed:	Hail		
Project Title:	Hail damage protection		
Project Description:	City will retrofit city owned structures with roofs and window panes that can withstand hail damage.		
Responsible Entity:	Mayor, local building departments		
Losses avoided:	Buildings, residents, and city employees in county and city buildings when a hail storm hits		
Cost Estimate:	$350,000	**Timeframe:**	24-36 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	1
Potential Funding Sources:	HMGP, housing preservation grants, weatherization assistance program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Montgomery	**Action Number:**	E-9
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Structural and Foundation Protection		
Project Description:	Install moisture sensing irrigation systems at all existing and future county, local, and critical facilities. Irrigation systems automatically water building to reduce the impacts of shrinking and swelling soils during drought		
Responsible Entity:	Facilities and building departments of participating jurisdictions		
Losses avoided:	Structural foundations and anticipated cost of repairs		
Cost Estimate:	$175,000.00	**Timeframe:**	36-48 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	0

Potential Funding Sources:	Local budgets and HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Montgomery	**Action Number:**	E-10
Hazard(s) Addressed:	Lightning		
Project Title:	Lightning and Fire Protection		
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	homes and residents who could be affected by lightening throughout the		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	-4
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Montgomery	**Action Number:**	E-11
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for expansive soils to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office or Mayor for each participating jurisdiction.		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Montgomery	**Action Number:**	E-12
Hazard(s) Addressed:	Drought		
Project Title:	Adopting ordinance for water sensing irrigation systems		
Project Description:	The city will develop an ordinance to require incorporating water sensing irrigation systems in all public areas.		
Responsible Entity:	City Manager		
Losses avoided:	Monetary loss/ Water Conservation		
Cost Estimate:	$1,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	City Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Oak Ridge North

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Property Protection, Prevention		
Project Description:	Improve drainage system by clearing debris, widening drainage ditches, and increasing stormwater management infrastructure. Project will clear obstacles, mow and reshape ditches, and upgrade culverts to restore adequate drainage to mitigate flooding		
Responsible Entity:	City of Oak Ridge North		
Losses avoided:	Lives, homes, infrastructure damage		
Cost Estimate:	$180,000	**Timeframe:**	60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	local budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Detention Basin Spring Pines Drive		
Project Description:	Proposed 4.3 acre storage on city-owned parcel		
Responsible Entity:	City of Oak Ridge North,, Public Works		
Losses avoided:	It would be connected to Sam Bell Gully, which will provide additional storage of flood waters for the surrounding area, as well as assisting in reducing overall downstream impact and provides storage within the watershed		
Cost Estimate:	2,362,000	**Timeframe:**	24 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	CDBG-DR grant	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Dam and Levee Failure		
Project Title:	Adopting land-use ordinance		
Project Description:	The city shall adopt a land-use ordinance which prohibits building residential or commercial structures in the 100-year floodplain		
Responsible Entity:	Mayor, City Council		
Losses avoided:	Homes, businesses, and residents within the 100 year flood plain		
Cost Estimate:	$6,000	**Timeframe:**	12 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, current city budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-4
Hazard(s) Addressed:	Hail		
Project Title:	Hail damage protection		
Project Description:	The county and partnering jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail damage		
Responsible Entity:	Mayor, City Council, local building departments		
Losses avoided:	Life, Health Safety of Vulnerable Populations and Property Damage		
Cost Estimate:	$50,000	**Timeframe:**	12 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	HMGP, USDA home repair grant	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-5
Hazard(s) Addressed:	Floods		
Project Title:	Drainage Master Plan		
Project Description:	A drainage master plan for the southern part of the City of Oak Ridge North. It includes 19 projects that would reduce and mitigate flood hazards for the city.		
Responsible Entity:	City of Oak Ridge North, Public Works		
Losses avoided:	Homes, businesses, and public facilities		
Cost Estimate:	$44,000,000	**Timeframe:**	60 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	HMGP, any available grant funding	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-6
Hazard(s) Addressed:	Severe Thunderstorms Hail Winter Weather		
Project Title:	Educate public of home improvement opportunities		
Project Description:	Educate elderly, low-income residents of grant funding opportunities to insulate the foundation of pier and beam homes, and update homes to withstand hurricane force winds and hail.		
Responsible Entity:	Mayor, City Council, Code Enforcement and Building Departments		
Losses avoided:	Life, health, safety of vulnerable populations and property damage		
Cost Estimate:	$3,000	**Timeframe:**	6-12 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	HMGP, USDA Home Repair Grant	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-7
Hazard(s) Addressed:	Drought		
Project Title:	Adopting ordinance for water sensing irrigation systems		
Project Description:	The city will develop an ordinance to require incorporating water sensing irrigation systems in all public areas.		
Responsible Entity:	City Manager		
Losses avoided:	Monetary loss/ Water Conservation		
Cost Estimate:	$1,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	City Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-8
Hazard(s) Addressed:	Heat Events		
Project Title:	Installing Misting Stations		
Project Description:	The county and partnering cities will install misting stations throughout city and county owned parks and property		
Responsible Entity:	Public Works / Parks Department		
Losses avoided:	Human life and health, residents especially the elderly and children. Projects visitors for festivals and local events.		
Cost Estimate:	$2,000	**Timeframe:**	36-48 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	HMGP, current city budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-9
Hazard(s) Addressed:	Heat Events		
Project Title:	Cooling Stations		
Project Description:	The city will provide areas within the city hall for individuals to cool in cases of Heat Events.		
Responsible Entity:	Public works / parks department		
Losses avoided:	Life, health safety of vulnerable populations		
Cost Estimate:	$2,000	**Timeframe:**	36-48 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	City Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Oak Ridge North		**Action Number:**	F-10
Hazard(s) Addressed:	Severe Thunderstorms Lightning			
Project Title:	Lightning and Fire Protection			
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.			
Responsible Entity:	Mayor, City Council, Code and Building Departments			
Losses avoided:	Life, health safety of vulnerable populations and property damage			
Cost Estimate:	$150,000	**Timeframe:**	12 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5	
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Oak Ridge North		**Action Number:**	F-11
Hazard(s) Addressed:	Dam/ Levee Failure			
Project Title:	Structural			
Project Description:	Incorporate routine repairs and structural renovation efforts of dams and levee into capital improvement plans			
Responsible Entity:	Mayor, City Council, capital improvement boards, engineering department			
Losses avoided:	Lives, homes, businesses, critical assets, public facilities, and infrastructure destructions in the event a levee failure			
Cost Estimate:	$100,000	**Timeframe:**	36-48 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4	
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Oak Ridge North		**Action Number:**	F-12
Hazard(s) Addressed:	Drought			
Project Title:	Adopting ordinance for drought tolerant plants			
Project Description:	The county will partner with cities to develop an ordinance to require incorporating drought tolerant landscape design into all new county and city owned properties			
Responsible Entity:	City managers and local planning departments			
Losses avoided:	Reduce the effects of drought			
Cost Estimate:	$1,000	**Timeframe:**	12 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4	
Potential Funding Sources:	Local budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-13
Hazard(s) Addressed:	Winter Weather		
Project Title:	Infrastructure Improvements		
Project Description:	All participating jurisdictions will burying power-lines to prevent power outages from falling limbs during Winter Weather.		
Responsible Entity:	County OEM and Mayor's office for each participating jurisdiction		
Losses avoided:	Preventing the loss of life of vulnerable residents that lose power during Winter Weather.		
Cost Estimate:	$1,500,000	**Timeframe:**	36-48 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-14
Hazard(s) Addressed:	Dams and Levee		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for dam and Levee failure to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-15
Hazard(s) Addressed:	Tornado		
Project Title:	Tornado mitigation through rebate program		
Project Description:	The city will develop a rebate program for building owners who install straps, structural bracings, window shutters, or interlocking roof shingles in new construction or when renovating residences or businesses		
Responsible Entity:	City Mayor, Office of Code Enforcement		
Losses avoided:	Residents, homes, business, and local facilities		
Cost Estimate:	$10,000.00	**Timeframe:**	3 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2
Potential Funding Sources:	HMGP, current city budget and salary	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Oak Ridge North	**Action Number:**	F-16
Hazard(s) Addressed:	Wildfire		
Project Title:	Technical support for residents, effort to reduce the risk of wildfire		
Project Description:	The city will provide incentives and technical support for property owners to reduce underbrush throughout the city. Support their efforts to effectively trim back trees, upgrade fencing, and replace landscape materials.		
Responsible Entity:	Mayors Office		
Losses avoided:	Life safety, Property Conservation		
Cost Estimate:	$20,000.00	**Timeframe:**	12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMPG, PDM, Local Funds, USDA, USFS, TFS	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Panorama Village

Jurisdiction:	City of Panorama Village	**Action Number:**	G-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Heat Events Hail Winter Weather		
Project Title:	City Shelter		
Project Description:	The city will work to identify location(s) within the city, and harden site(s), allowing it to serve as a shelter(s) during disaster situations. This action includes construction activities and generator acquisitions. Site identified may include more than one location.		
Responsible Entity:	Mayors Office		
Losses avoided:	Life Safety, Property Conservation		
Cost Estimate:	$250,000.00	**Timeframe:**	60 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMPG, Local funds, PDM, CDBG-DR	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Panorama Village	**Action Number:**	G-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Heat Events Winter Weather		
Project Title:	Prevention		
Project Description:	Vegetation management program, with an emphasis on trees. Improved drainage, decreased damage caused by falling limbs, and wildire risk reduction can be accomplished through vegetation management program.		
Responsible Entity:	Mayors Office, Public Works		
Losses avoided:	Life Safety, Property Conservation		
Cost Estimate:	$250,000.00	**Timeframe:**	24 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMPG, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Panorama Village	**Action Number:**	G-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Flood Mitigation		
Project Description:	Widen drainage ditches within the city limits		

Responsible Entity:	Mayors Office, Public works		
Losses avoided:	Life safety, Property Conservation		
Cost Estimate:	$300,000.00	**Timeframe:**	12 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, PDM, Local Funds	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Panorama Village	**Action Number:**	G-4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Retention Pond		
Project Description:	Property acquisition and construction of a retention pond along Stewarts creek.		
Responsible Entity:	Mayors Office, Public Works		
Losses avoided:	Life safety, Property Conservation		
Cost Estimate:	$250,000.00	**Timeframe:**	24 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	HMPG, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Panorama Village	**Action Number:**	G-5
Hazard(s) Addressed:	Wildfire		
Project Title:	Technical support for residents, effort to reduce the risk of wildfire		
Project Description:	The city will provide incentives and technical support for property owners to reduce underbrush throughout the city. Support their efforts to effectively trim back trees, upgrade fencing, and replace landscape materials.		
Responsible Entity:	Mayors Office		
Losses avoided:	Life safety, Property Conservation		
Cost Estimate:	$20,000.00	**Timeframe:**	12 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMPG, PDM, Local Funds, USDA, USFS, TFS	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Panorama Village	**Action Number:**	G-6
Hazard(s) Addressed:	Drought Heat Events		
Project Title:	Citizen Cooling and Structural foundation protection		
Project Description:	Install moisture stations at parks and other city properties, to provide relief to citizens during periods of Heat Events and drought. Further expanding this program to include moisture sensing irrigation systems at all existing and future local buildings and critical infrastructure sites.		
Responsible Entity:	Mayor and council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$175,000.00	**Timeframe:**	60 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8

Potential Funding Sources:	TDEMS, FEMA, CDBG, TWDB	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Panorama Village	**Action Number:**	G-7
Hazard(s) Addressed:	Wildfire		
Project Title:	Firewise USA		
Project Description:	The city will become an active participant in the Firewise USA program. Through a combined effort with CERT members, initiate an active campaign to bring 90% of all residents into the program within 12 months.		
Responsible Entity:	Mayors Office		
Losses avoided:	Life Safety, Property Conservation		
Cost Estimate:	$5,000.00	**Timeframe:**	12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMPG, Local Funds, USFS, TFS	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Panorama Village	**Action Number:**	G-8
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Structural and Foundation Protection		
Project Description:	Install moisture sensing irrigation systems at all existing and future county, local, and critical facilities. Irrigation systems automatically water building to reduce the impacts of shrinking and swelling soils during drought		
Responsible Entity:	Mayors Office, Public Works		
Losses avoided:	Structural foundations and anticipated cost of repairs		
Cost Estimate:	$175,000.00	**Timeframe:**	36-48 months
Priority:	3 = Mid-Level Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	Local budgets and HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Panorama Village	**Action Number:**	G-9
Hazard(s) Addressed:	Lightning		
Project Title:	Lightning and Fire Protection		
Project Description:	The city will develop a program that offers reduced price lightning rods and technical assistance for homeowners.		
Responsible Entity:	Fire Chief		
Losses avoided:	homes and residents who could be affected by lightening throughout the		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	-4
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Patton Village

Jurisdiction:	City of Patton Village	**Action Number:**	H-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Adopting land use ordinance		
Project Description:	The city shall adopt a land-use ordinance which prohibits building residential or commercial structures in the 100-year floodplain.		
Responsible Entity:	City Council, Mayor, Office of Code Enforcement		
Losses avoided:	Future buildings and infrastructure that may have been built within the 100 year flood plain		
Cost Estimate:	$5,000	**Timeframe:**	4 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, current city budget and salary	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Patton Village	**Action Number:**	H-2
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Structural and foundation protection		
Project Description:	Install moisture sensing irrigation systems at all existing and future county, local, and critical facilities. Irrigation systems automatically water building to reduce the impacts of shrinking and swelling soils during drought.		
Responsible Entity:	City Hall		
Losses avoided:	Structural foundations and anticipated cost of repairs		
Cost Estimate:	$175,000.00	**Timeframe:**	36-48 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	Local budgets and HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Lightning Tornado Drought Heat Events Hail Winter Weather		
Project Title:	Emergency Services Equipment Housing		
Project Description:	Construction of a building to house emergency services equipment		
Responsible Entity:	Mayor, City Council		
Losses avoided:	Mitigate loss of equipment during hazard event.		
Cost Estimate:	$1,000,000.00	**Timeframe:**	12-60 months

Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	Available FEMA grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-5
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Expansive Soils Heat Events Hail Winter Weather		
Project Title:	Construct an EOC		
Project Description:	Construct an Emergency Operations Center for the City of Patton Village		
Responsible Entity:	Mayor, City council		
Losses avoided:	Life and Property		
Cost Estimate:	$2,500,000.00	**Timeframe:**	24-60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	FEMA Emergency Operation Center Grant Program, DOJ State Homeland Security Program, FEMA Emergency Management Performance Grant, FEMA All Hazards Operational Planning	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-6
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Heat Events Hail Winter Weather		
Project Title:	Emergency Public Warning System		
Project Description:	Purchase and deployment of secondary public emergency notification system		
Responsible Entity:	City Council / Mayor		
Losses avoided:	life safety		
Cost Estimate:	$2,000,000.00	**Timeframe:**	12-60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	Available FEMA grant programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-7
Hazard(s) Addressed:	Wildfire		
Project Title:	Becoming an active participant in Firewise USA program		
Project Description:	The City will become an active participant in the Firewise USA program and encourage local neighborhoods to join the program as well.		
Responsible Entity:	Mayor, city council, Fire Marshal		
Losses avoided:	Property and residents throughout the city		
Cost Estimate:	$4,000	**Timeframe:**	12 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-8
Hazard(s) Addressed:	Tornado		
Project Title:	Tornado mitigation through rebate program		
Project Description:	The city will develop a rebate program for building owners who install straps, structural bracings, window shutters, or interlocking roof shingles in new construction or when renovating residences or businesses.		
Responsible Entity:	City Manager, Office of Code Enforcement		
Losses avoided:	Residents, homes, business, and local facilities		
Cost Estimate:	$5,000	**Timeframe:**	3 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, current city budget and salary	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio

Does this action reduce effects of hazards on existing buildings?	Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?	Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?	No

Jurisdiction:	City of Patton Village	**Action Number:**	H-9
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Heat Events Hail Winter Weather		
Project Title:	Secondary Communications System		
Description:	Purchase and deployment of secondary communications system for use during a disaster		
Responsible Entity:	City Council / Mayor		
Losses avoided:	life safety		
Cost Estimate:	$50,000.00	**Timeframe:**	12-60 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	Available FEMA grant programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-10
Hazard(s) Addressed:	Floods		
Project Title:	Public Information and Awareness		
Project Description:	Attend CRS workshop hosted by H-GAC		
Responsible Entity:	Emergency Manager		
Losses avoided:	Increase capability to reduce the effects of flooding and mitigate loss.		
Cost Estimate:	0	**Timeframe:**	6-24 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	0
Potential Funding Sources:	n/a	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Patton Village	**Action Number:**	H-11
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado Hail Winter Weather		
Project Title:	Educate public of home improvement opportunities		
Project Description:	Educate elderly, low-income residents of grant funding opportunities to insulate the foundation of pier and beam homes, and update homes to withstand hurricane force winds and hail.		
Responsible Entity:	Mayor, City Council, Police Department		
Losses avoided:	Life, health, safety of vulnerable populations and property damage		
Cost Estimate:	$2,500	**Timeframe:**	6-12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8

Potential Funding Sources:	HMGP, USDA Home Repair Grant	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-12
Hazard(s) Addressed:	Wildfire		
Project Title:	Technical support for residents in order to reduce the risk of wildfire		
Project Description:	The county and partnering cities will provide incentives and technical support for property owners to reduce underbrush throughout the county to properly cut back trees, upgrade fences, and replace landscape materials with nonflammable materials		
Responsible Entity:	Mayor, City Council		
Losses avoided:	Homes within the wild-urban interface and residents living within these areas.		
Cost Estimate:	$5,000	**Timeframe:**	3 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, local budget and current salary / staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-13
Hazard(s) Addressed:	Hail		
Project Title:	Hail damage protection		
Project Description:	The county and partnering jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail damage.		
Responsible Entity:	Mayor, City Council		
Losses avoided:	Buildings, residents, and city employees in county and city buildings when a hail storm hits.		
Cost Estimate:	$100,000	**Timeframe:**	24-36 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	HMGP, housing preservation grants, weatherization assistance program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Patton Village	**Action Number:**	H-14
Hazard(s) Addressed:	Drought		
Project Title:	Adopting ordinance for drought tolerant plants		
Project Description:	The county will partner with cities to develop an ordinance to require incorporating drought tolerant landscape design into all new county and city owned properties.		
Responsible Entity:	Mayor, City Council		
Losses avoided:	Reduce the effects of drought		
Cost Estimate:	$2,500	**Timeframe:**	3 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	Local budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes

Does this action reduce effects of hazards for new buildings, infrastructure, or future development?	Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?	No

Jurisdiction:	City of Patton Village		**Action Number:**	H-15
Hazard(s) Addressed:	Heat Events			
Project Title:	Installing misting stations			
Project Description:	The county and partnering cities will install misting stations throughout city and county owned parks and property			
Responsible Entity:	Mayor, City Council			
Losses avoided:	Human life and health, residents especially the elderly and children. Protects visitors for festivals and local events.			
Cost Estimate:	$3,000	**Timeframe:**	6-12 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5	
Potential Funding Sources:	HMGP, current city budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Patton Village		**Action Number:**	H-16
Hazard(s) Addressed:	Hurricane/ Tropical Storms Tornado Winter Weather			
Project Title:	Hurricane resistant powerline poles			
Project Description:	All new powerline poles installed within the jurisdiction will be wind resistant or buried underground.			
Responsible Entity:	City Council, Mayor			
Losses avoided:	Homes, businesses, and public facilities			
Cost Estimate:	$120,000	**Timeframe:**	36 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4	
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Roman Forest

Jurisdiction:	City of Roman Forest	**Action Number:**	I-1
Hazard(s) Addressed:	Hurricane/ Tropical Storms		
Project Title:	Hurricane resistant powerline poles		
Project Description:	All new powerline poles installed within the jurisdiction will be wind resistant		
Responsible Entity:	City Council, Mayor		
Losses avoided:	Homes, businesses and public facilities		
Cost Estimate:	$120,000	**Timeframe:**	36 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Roman Forest	**Action Number:**	I-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Property Protection		
Project Description:	Removal of debris, silt and vegetation obstacles in drainageways. Project will clear obstacles, mow and reshape ditches, and upgrade culverts to restore adequate drainage to mitigate flooding		
Responsible Entity:	Mayor, City Council		
Losses avoided:	Homes, businesses and public facilities		
Cost Estimate:	$2,000,000	**Timeframe:**	6 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Roman Forest	**Action Number:**	I-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Peach Creek Bridge at Roman Forest Blvd		
Project Description:	Rebuild bridge to extend over the reoccurring flooding of Peach Creek to include 4 lanes and higher elevation		
Responsible Entity:	City of Roman Forest, State of Texas, County		
Losses avoided:	Loss of service, loss of property, loss of life		
Cost Estimate:	$2,000,000	**Timeframe:**	36 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	FEMA All Hazards Operational Planning, HMGP, PDMGP, Public-Private Partnerships, FEMA Homeland Security Grants, CDBG, HUD, TXDOT, San Jacinto River Authority, County Funds, State of Texas	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Roman Forest	**Action Number:**	I-4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Public Safety Building		
Project Description:	Relocate the fire department to it doesn't flood. Move to an area that is bit cut off from the rest of the county due to flooding of Peach Creek, Caney Creek, and East Fork of the San Jacinto River and to provide adequate facilities to house all public safety, including Fire Rescue, Police, and EMS		
Responsible Entity:	City of Roman Forest, ESD 7, MCHD		
Losses avoided:	Loss of service, loss of property, loss of life		
Cost Estimate:	$4,000,000	**Timeframe:**	36 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	FEMA Firefighters Grant, FEMA All Hazards Operational Planning, HMGP, PDMGP, Public-Private Partnerships, FEMA Homeland Security Grants, CDBG, HUD	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Roman Forest	**Action Number:**	I-5
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Heat Events Hail Winter Weather		
Project Title:	Emergency Shelter		
Project Description:	Construction of Emergency Shelter in the area of Roman Forest		
Responsible Entity:	Mayor, City council		
Losses avoided:	life safety		
Cost Estimate:	$2,000,000	**Timeframe:**	12-60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	Available FEMA grant programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Roman Forest	**Action Number:**	I-6
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Heat Events Hail Winter Weather		
Project Title:	Emergency Public Warning System		

Project Description:	Purchase and deployment of secondary public emergency notification system		
Responsible Entity:	City Council, Mayor		
Losses avoided:	life safety		
Cost Estimate:	$2,000,000.00	**Timeframe:**	12-60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	Available FEMA grant programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Roman Forest	**Action Number:**	I-7
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Tornado		
Project Title:	Public Information and Awareness		
Project Description:	Implement the National Weather Service Skyward program into local volunteer organizations to increase the number of volunteer providing the NWS with early notification of severe weather that may result in property damage and/or flooding		
Responsible Entity:	City of Roman Forest, County OEM		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$10,000.00	**Timeframe:**	24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	National Weather Service, FEMA Fire Fighters Grant, FEMA All Hazards Operational Planning, HMGP, PDMGP, Public-Private Partnerships, FEMA Homeland Security Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Roman Forest	**Action Number:**	I-8
Hazard(s) Addressed:	Severe Thunderstorms Hail Winter Weather		
Project Title:	Educate public of home improvement opportunities		
Project Description:	Educate elderly, low-income residents of grant funding opportunities to insulate the foundation of pier and beam homes, and update homes to withstand hurricane force winds and hail.		
Responsible Entity:	Mayor, City Council, Code Enforcement and Building Departments		
Losses avoided:	Life, health, safety of vulnerable populations and property damage		
Cost Estimate:	$2,500	**Timeframe:**	6-12 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	HMGP, USDA Home Repair Grant	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Roman Forest	**Action Number:**	I-9
Hazard(s) Addressed:	Hail		
Project Title:	Hail Damage Protection		
Project Description:	The county and partnering jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail damage		
Responsible Entity:	City Council / Mayor		
Losses avoided:	Buildings, residents, and city employees in city buildings when a hail storm hits		
Cost Estimate:	$20,000.00	**Timeframe:**	24-36 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	HMGP, Housing Preservation Grants, Weatherization Assistance Program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Roman Forest	**Action Number:**	I-10
Hazard(s) Addressed:	Drought Heat Events		
Project Title:	Prevention		
Project Description:	Implement actions to support regulations that assist in reducing excess ozone pollution and urban heat. May include actions such as providing incentives for developers to increase tree planting and a county-wide public education and awareness program to promote smog awareness, volunteer mass transit, carpooling, and health tips for living in a high ozone smog area.		
Responsible Entity:	County Health District, County EMS, City of Roman Forest		
Losses avoided:	Reduce the effects of drought and heat events		
Cost Estimate:	$50,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	0
Potential Funding Sources:	Public private partnership, staff time and resources	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Roman Forest	**Action Number:**	I-11
Hazard(s) Addressed:	Drought		
Project Title:	Adopting ordinance for water sensing irrigation systems		
Project Description:	The city will develop an ordinance to require incorporating water sensing irrigation systems in all public areas.		
Responsible Entity:	City Manager		
Losses avoided:	Monetary loss/ Water Conservation		
Cost Estimate:	$1,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	City Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Shenandoah

Jurisdiction:	City of Shenandoah	**Action Number:**	J-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms Dam/ Levee Failure		
Project Title:	Detention Pond		
Project Description:	The city will work to create a detention pond eastside relief of city		
Responsible Entity:	Public Works / Capital Projects		
Losses avoided:	Homes and businesses and loss of sales tax revenue		
Cost Estimate:	$20,000,000	**Timeframe:**	60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	Property Tax / MDD Tax	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms Dam/ Levee Failure		
Project Title:	Detention Pond Overflow Outlet		
Project Description:	The city will work to create an Oak Haven detention pond overflow outlet		
Responsible Entity:	Public Works / Capital Projects		
Losses avoided:	Homes and businesses and reduction of street flooding		
Cost Estimate:	$350,000	**Timeframe:**	18 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Property Tax / MDD Tax	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah		**Action Number:**	J-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Dam/ Levee Failure Heat Events Hail Winter Weather			
Project Title:	Emergency Services			
Project Description:	Establish a secondary of Mobile Emergency Operations Center			
Responsible Entity:	Public Works / Police Department			
Losses avoided:	Life and Property			
Cost Estimate:	$750,000	**Timeframe:**	24-60 months	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	6	
Potential Funding Sources:	FEMA grant money	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Shenandoah		**Action Number:**	J-4
Hazard(s) Addressed:	Tornado Drought Hail			
Project Title:	Public Information and Awareness			
Project Description:	During the planning and building the plan review, encourage and educate owners and businesses on the benefits of drought tolerant landscaping as well as safe building material to withstand high winds and hail			
Responsible Entity:	Public Works / Building Department			
Losses avoided:	Life, health and safety of vulnerable population and property damage			
Cost Estimate:	$2,500	**Timeframe:**	12-24 months	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	5	
Potential Funding Sources:	Current budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Shenandoah		**Action Number:**	J-5
Hazard(s) Addressed:	Wildfire			
Project Title:	Reduce Underbrush			
Project Description:	The city will continue to work to reduce underbrush on identified city owned property through researched techniques			
Responsible Entity:	Public Works			
Losses avoided:	Current and future buildings and residents within the city			
Cost Estimate:	$10,000	**Timeframe:**	12-24 months	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	5	
Potential Funding Sources:	Local budgets and current salary	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-6
Hazard(s) Addressed:	Drought		
Project Title:	Review ordinances and drought contingency plan		
Project Description:	Review of current ordinances and incorporate a drought contingency plan into them		
Responsible Entity:	Building Department		
Losses avoided:	Reduce the effects of drought		
Cost Estimate:	$1,000	**Timeframe:**	12-24 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	local budget and staff time	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-7
Hazard(s) Addressed:	Drought		
Project Title:	Drought Contingency Plan		
Project Description:	Monitor the current city drought contingency plan		
Responsible Entity:	Public Works		
Losses avoided:	Reduce the effects of drought		
Cost Estimate:	$1,000	**Timeframe:**	60 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2
Potential Funding Sources:	Current budget and staff time	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-8
Hazard(s) Addressed:	Wildfire		
Project Title:	Initiative		
Project Description:	The city will work to join the Firewise USA program		
Responsible Entity:	Administration		
Losses avoided:	Property and Residents throughout the city		
Cost Estimate:	$4,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2
Potential Funding Sources:	Property Tax	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-9
Hazard(s) Addressed:	Heat Events		
Project Title:	Install misting stations		
Project Description:	City will review and install misting stations throughout city and city owned parks		
Responsible Entity:	Public Works		
Losses avoided:	Human life and health		
Cost Estimate:	$5,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	1
Potential Funding Sources:	Current budget and staff time	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-10
Hazard(s) Addressed:	Severe Thunderstorms Tornado Hail		
Project Title:	Retrofitting Structures for Hail and Wind Protection		
Project Description:	Retrofit city and county owned structures with roofs and window panes that can withstand hail and high wind damage.		
Responsible Entity:	Public Works		
Losses avoided:	Buildings damage decreased considerably, and injury prevention of city/county employees during major hail and wind events.		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	0
Potential Funding Sources:		**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-11
Hazard(s) Addressed:	Lightning		
Project Title:	Lightning and Fire Protection		
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	homes and residents who could be affected by lightening throughout the		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Priority:	3 = Highest Priority Rating	**Feasibility Score**	-4
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-12
Hazard(s) Addressed:	Dam/ Levee Failure		
Project Title:	Structural		
Project Description:	Incorporate routine repairs and structural renovation efforts of dams and levee into capital improvement plans		
Responsible Entity:	Mayor, City Council, capital improvement boards, engineering department		
Losses avoided:	Lives, homes, businesses, critical assets, public facilities, and infrastructure destructions in the event a levee failure		
Cost Estimate:	$100,000	**Timeframe:**	36-48 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-13
Hazard(s) Addressed:	Winter Weather		
Project Title:	Infrastructure Improvements		
Project Description:	All participating jurisdictions will burying power-lines to prevent power outages from falling limbs during Winter Weathers.		
Responsible Entity:	County OEM and Mayor's office for each participating jurisdiction		
Losses avoided:	Preventing the loss of life of vulnerable residents that lose power during Winter Weathers.		
Cost Estimate:	$1,500,000	**Timeframe:**	36-48 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Shenandoah	**Action Number:**	J-15
Hazard(s) Addressed:	Dams and Levee Failure		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for dam and Levee failure to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office or Mayor for each participating jurisdiction.		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Splendora

Jurisdiction:	City of Splendora	**Action Number:**	K-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Prevention		
Project Description:	Improve drainage system by clearing debris, widening drainage ditches, and increasing stormwater management infrastructure.		
Responsible Entity:	Mayor and council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$750,000	**Timeframe:**	60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	USACE, FEMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Splendora	**Action Number:**	K-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Structural Project		
Project Description:	Construct detention ponds in flood prone areas		
Responsible Entity:	Mayor and council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$750,000.00	**Timeframe:**	60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	TWDB, USACE, USDA NRCS, FEMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Splendora	**Action Number:**	K-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Lighning Tornado Heat Events Hail Winter Weather		
Project Title:	Back Up Power for City Hall / Police Station		
Project Description:	Acquire, and install back up power systems at both our City Hall and Police Department. This will allow the city and police department to continue operations in those facilities during times of disaster.		
Responsible Entity:	Mayor and council		
Losses avoided:	Life safety and property conservation		

Cost Estimate:	$1,000,000	**Timeframe:**	60 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	TDEMS, FEMA, CDBG	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Splendora	**Action Number:**	K-4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Prevention, Ordinance		
Project Description:	Revise local flood damage prevention ordinance to incorporate cumulative substantial damage / improvement requirements		
Responsible Entity:	Mayor and council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$5,000.00	**Timeframe:**	12 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	NFIP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Splendora	**Action Number:**	K-5
Hazard(s) Addressed:	Drought Heat Events		
Project Title:	Citizen Cooling and Structural foundation protection		
Project Description:	Install misting stations at parks and other city properties, to provide relief to citizens during periods of Heat Events and drought. Further expanding this program to include moisture sensing irrigation systems at all existing and future local buildings and critical infrastructure sites.		
Responsible Entity:	Mayor and council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$175,000.00	**Timeframe:**	60 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	TDEMS, FEMA, CDBG, TWDB	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Splendora	**Action Number:**	K-6
Hazard(s) Addressed:	Heat Events Hail Winter Weather		
Project Title:	Public Education and grant opportunity home improvement opportunities		
Project Description:	Educate public on importance of proper home insulation, energy savings tips. Provide grant opportunities for the elderly, and low income citizens, for the insulation of their homes, and retrofit of windows and roofs that can withstand hail damage.		
Responsible Entity:	Mayor and Council		
Losses avoided:	Life safety and property conservation		

Cost Estimate:	$500,000.00	**Timeframe:**	60 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	TDEMS, FEMA, CDBG, TWDB	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Splendora	**Action Number:**	K-7
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Dam/ Levee Failure Heat Events Hail Winter Weather		
Project Title:	All Hazards Shelter		
Project Description:	Construction of a shelter facility within the city limits, to give residents a shelter during disasters		
Responsible Entity:	Mayor and Council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$2,000,000	**Timeframe:**	60 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	TDEMS, FEMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Splendora	**Action Number:**	K-8
Hazard(s) Addressed:	Wildfire		
Project Title:	Becoming an active participant in Firewise USA program		
Project Description:	The City will become an active participant in the Firewise USA program and encourage local neighborhoods to join the program as well		
Responsible Entity:	Mary and Council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$5,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	USFS, TFS	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Splendora	**Action Number:**	K-9
Hazard(s) Addressed:	Tornado		
Project Title:	Tornado Mitigation Program		
Project Description:	Develop a rebate program for building owners who install straps, structural bracing, window shutters, or interlocking roof shingles in new construction or when renovations are completed.		

Responsible Entity:	Mayor and council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$20,000	**Timeframe:**	60 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, Current Budgets	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Splendora	**Action Number:**	K-10
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Prevention, Ordinance		
Project Description:	Revise local flood damage prevention ordinance to incorporate cumulative substantial damage/improvement requirements		
Responsible Entity:	Mayor and council		
Losses avoided:	Life safety and property conservation		
Cost Estimate:	$5,000	**Timeframe:**	12 months
Priority:		**Feasibility Score**	8
Potential Funding Sources:	NFIP	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Splendora	**Action Number:**	K-11
Hazard(s) Addressed:	Drought		
Project Title:	Adopting ordinance for water sensing irrigation systems		
Project Description:	The city will develop an ordinance to require incorporating water sensing irrigation systems in all public areas.		
Responsible Entity:	City Manager		
Losses avoided:	Monetary loss/ Water Conservation		
Cost Estimate:	$1,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	City Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Stagecoach

Jurisdiction:	City of Stagecoach	**Action Number:**	L-1
Hazard(s) Addressed:	Wildfire		
Project Title:	Reducing underbrush for wildfire prevention		
Project Description:	The city and county will work to reduce underbrush on identified wild-urban interface areas through techniques such as using skid steers or goats		
Responsible Entity:	Mayor, Fire Marshal, Emergency Manager		
Losses avoided:	Current and future buildings and residents in wild urban interface areas		
Cost Estimate:	$500,000	**Timeframe:**	12-24 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, local budget and current salary, fire prevention and safety grants	**Benefit-Cost Ratio:**	Less than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Stagecoach	**Action Number:**	L-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Property Protection		
Project Description:	Removal of debris, silt and vegetation obstacles in drainageways. Project will clear obstacles, mow and reshape and widen ditches, and upgrade culverts to		
Responsible Entity:	City Engineer		
Losses avoided:	Homes, businesses and public facilities		
Cost Estimate:	$250,000	**Timeframe:**	6 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Stagecoach	**Action Number:**	L-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Lightning Heat Events Hail Winter Weather		
Project Title:	Emergency Shelter		
Project Description:	Construction of Emergency Shelters		
Responsible Entity:	Mayor, City council		
Losses avoided:	life safety		
Cost Estimate:	$2,000,000	**Timeframe:**	12-60 months

Priority:	1 = Highest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	Available FEMA grant programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Stagecoach	**Action Number:**	L-4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Adopting land-use ordinance		
Project Description:	The city shall adopt a land-use ordinance which prohibits building residential or commercial structures in the 100-year floodplain.		
Responsible Entity:	Mayor, City Council, Office of Code Enforcement		
Losses avoided:	Homes, businesses, and residents within the 100 year flood plain		
Cost Estimate:	$5,000	**Timeframe:**	6 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	HMGP, current city budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Stagecoach	**Action Number:**	L-5
Hazard(s) Addressed:	Tornado		
Project Title:	Tornado mitigation through rebate program		
Project Description:	The city will develop a rebate program for building owners who install straps, structural bracings, window shutters, or interlocking roof shingles in new construction or when renovating residences or businesses		
Responsible Entity:	City Manager, Office of Code Enforcement		
Losses avoided:	Residents, homes, business, and local facilities		
Cost Estimate:	$10,000	**Timeframe:**	3 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	-2
Potential Funding Sources:	HMGP, current city budget and salary	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Stagecoach	**Action Number:**	L-6
Hazard(s) Addressed:	Flood		
Project Title:	Public Information and Awareness		
Project Description:	Attend CRS workshop hosted by H-GAC		
Responsible Entity:	Emergency Manager		
Losses avoided:	Increase capability to reduce the effects of flooding and mitigate loss.		
Cost Estimate:	$0	**Timeframe:**	6-24 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	-3
Potential Funding Sources:	N/A	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Stagecoach	**Action Number:**	L-7
Hazard(s) Addressed:	Wildfire		
Project Title:	Becoming an active participant in Firewise USA program		
Project Description:	The City will become an active participant in the Firewise USA program and encourage local neighborhoods to join the program as well.		
Responsible Entity:	Mayor, City council, Fire Marshal		
Losses avoided:	Property and residents throughout the city		
Cost Estimate:	$4,000	**Timeframe:**	12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	HMP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Stagecoach		**Action Number:**	L-8
Hazard(s) Addressed:	Wildfire			
Project Title:	Technical support for residents in order to reduce the risk of wildfire			
Project Description:	Provide incentives and technical support for property owners to reduce underbrush throughout the county to properly cut back trees, upgrade fences, and replace landscape materials with nonflammable materials			
Responsible Entity:	Mayor, Fire Marshal, Emergency Manager			
Losses avoided:	Homes within the wild-urban interface and residents living within these areas			
Cost Estimate:	$5,000	**Timeframe:**	3 months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4	
Potential Funding Sources:	HMGP, local budget and current salary / staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Stagecoach		**Action Number:**	L-9
Hazard(s) Addressed:	Severe Thunderstorms			
Project Title:	Lightning and Fire Protection			
Project Description:	The city will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.			
Responsible Entity:	Mayor, City Secretary			
Losses avoided:	Homes and residents who could be affected by lightning throughout the city			
Cost Estimate:	$150,000	**Timeframe:**	12 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4	
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Stagecoach		**Action Number:**	L-10
Hazard(s) Addressed:	Wildfire			
Project Title:	Rebate program for wildfire protection			
Project Description:	The city will develop a rebate program for residents who use non-combustible material when renovating properties or building new homes			
Responsible Entity:	Mayor			
Losses avoided:	Residents and existing new properties			
Cost Estimate:	$200,000	**Timeframe:**	12-24 months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4	
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Stagecoach		**Action Number:**	L-11
Hazard(s) Addressed:	Heat Events			
Project Title:	Installing misting stations			
Project Description:	The county and partnering cities will install misting stations throughout city and county owned parks and property.			
Responsible Entity:	Mayor, Emergency Coordinator			
Losses avoided:	Human life and health, residents especially the elderly and children. Protects visitors for festivals and local events.			
Cost Estimate:	$3,000	**Timeframe:**	6-12 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	3	
Potential Funding Sources:	HMGP, current city budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Stagecoach		**Action Number:**	L-12
Hazard(s) Addressed:	Drought			
Project Title:	Adopting ordinance for drought tolerant plants			
Project Description:	The county will partner with cities to develop an ordinance to require incorporating drought tolerant landscape design into all new county and city owned properties.			
Responsible Entity:	City managers and local departments			
Losses avoided:	Reduce the effects of drought			
Cost Estimate:	$1,000	**Timeframe:**	3 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2	
Potential Funding Sources:	Local budget and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Stagecoach		**Action Number:**	L-13
Hazard(s) Addressed:	Hail			
Project Title:	Hail damage protection			
Project Description:	The county and partnering jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail damage.			
Responsible Entity:	Mayor, Emergency Coordinator, local building departments			
Losses avoided:	Buildings, residents, and city employees in county and city buildings when a hail storm hits			
Cost Estimate:	$50,000	**Timeframe:**	24-36 Months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	1	
Potential Funding Sources:	HMGP, housing preservation grants, weatherization assistance program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Stagecoach	**Action Number:**	L-14
Hazard(s) Addressed:	Hurricane/ Tropical Storms Winter Weather		
Project Title:	Hurricane resistant powerline poles		
Project Description:	All new powerline poles installed within the jurisdiction will be wind resistant or buried underground		
Responsible Entity:	Engineering Department		
Losses avoided:	Homes, businesses, and public facilities		
Cost Estimate:	$120,000	**Timeframe:**	36 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	0
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Stagecoach	**Action Number:**	L-15
Hazard(s) Addressed:	Severe Thunderstorms Hail Winter Weather		
Project Title:	Educate public of home improvement opportunities		
Project Description:	Educate elderly, low-income residents of grant funding opportunities to insulate the foundation of pier and beam homes, and update homes to withstand hurricane force winds and hail		
Responsible Entity:	Mayor, City Council, Code Enforcement and Building Departments		
Losses avoided:	Life, health, safety of vulnerable populations and property damage		
Cost Estimate:	$2,500	**Timeframe:**	6-12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	-1
Potential Funding Sources:	HMGP, USDA, Home Repair Grant	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Stagecoach	**Action Number:**	L-16
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for expansive soils to reduce loss of life and property.		
Responsible Entity:	City Managers office or Mayor		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Willis

Jurisdiction:	City of Willis		**Action Number:**	M-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms			
Project Title:	Collection Improvements			
Project Description:	#14 Rogers Rd. LS 803 E Rogers Rd., Generator/By-pass pump install			
Responsible Entity:	Willis Wastewater Department			
Losses avoided:	Protect infrastructure, mitigate flooding, protect property			
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10	
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Willis		**Action Number:**	M-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms			
Project Title:	Collection Improvements			
Project Description:	#16 Willwood LS 101 Willwood, Generator/By-pass pump install			
Responsible Entity:	Willis Wastewater Department			
Losses avoided:	Protect infrastructure, mitigate flooding, protect property			
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10	
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Willis		**Action Number:**	M-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms			
Project Title:	Collection Improvements			
Project Description:	#8 FM 1097 West LS 9620 FM 1097 West, Generator/ By-pass pump install			
Responsible Entity:	Willis Wastewater Department			
Losses avoided:	Protect Infrastructure, mitigate flooding, protect property			
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10	
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Willis	**Action Number:**	M-4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#13 13654 Old US Highway 75 Willis, 77378, Generator/By-pass pump install		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect Infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-5
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#15 South Bend LS 110 South Bend, Generator/By-pass pump install		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$45,000 - $75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-6
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#18 11117 East 1097 E Stewart Creek Lift Station, Generator/By-pass pump install		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-7
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Treatment Plant Improvements		
Project Description:	#19 Main life station at the WWTP, Generator		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-8
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#5 Big Pin Oaks LS 9514 Cypress Drive, Generator/By-pass pump install		
Responsible Entity:	Willis wastewater department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, city	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-9
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#2 Best Western LS 12323 I-45 North, Generator / By-pass pump install		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, city	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-10
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Drainage Improvements		
Project Description:	Replace steel culverts across street to improve drainage, install cement liner to mitigateerosion		
Responsible Entity:	Willis Street Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$500,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-11
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Drainage Improvements		
Project Description:	5 Galvanized drainage pipe eroding and rusting, recommend lining in place and repair storm inlets & boxes		
Responsible Entity:	Willis Street Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$600,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-12
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Drainage Improvements		
Project Description:	Replace inlet structure to improve neighborhood drainage		
Responsible Entity:	Willis Street Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$25,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes

Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?	Yes

Jurisdiction:	City of Willis	**Action Number:**	M-13
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Water Treatment Plant Improvements		
Project Description:	Water Plant 3 Generator		
Responsible Entity:	Willis Water Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$300,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-14
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Water Treatment Plant Improvements		
Project Description:	Water Plant 1 Generator		
Responsible Entity:	Willis Water Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$300,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-15
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#4 Big North Forest LS 707 Pine Circle, Generator/By-pass pump install		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-16
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#7 FM 1097 E LS 10371 FM 1097 East, Generator/By-pass pump install		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect Infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-17
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#9 Hill St. LS 888 N Danville, Generator/By-pass pump install		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect Infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-18
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Collection Improvements		
Project Description:	#10 Kroger LS 12731 I-45 North, Generator/By-pass pump install		
Responsible Entity:	Willis Wastewater Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$75,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-19
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Drainage Improvements		
Project Description:	104 Philpot to MLK & Kennedy, Install permanent underground drainage to mitigate flooding of MLK that is a thoroughfare street.		
Responsible Entity:	Willis Street Department		
Losses avoided:	Protect infrastructure, mitigate flooding		
Cost Estimate:	$85,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	Federal, State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-20
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Community Shelter Facility Development		
Project Description:	Identify and develop community shelters to use in a disaster or event that displaces people from their homes; supply and equip the identified locations with provisions, cots, blankets, etc., and backup power; identify and train shelter volunteers to stand		
Responsible Entity:	City and county emergency management officials		
Losses avoided:	Injuries and deaths due to lack of shelter during and following a disaster or incident that renders habitation of residential space untenable		
Cost Estimate:	$100,000	**Timeframe:**	within 12 months of funding
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	City and county budget, state and federal grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-21
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Hail Winter Weather		
Project Title:	Educate public on home improvement opportunities that mitigate hazards		
Project Description:	Educate elderly, low-income residents of grant opportunities to insulate foundation of pier and beam homes, and update homes to withstand hurricane force winds and hail		
Responsible Entity:	City of Willis		
Losses avoided:	Life, health, and safety threats to vulnerable populations; prevent loss of water pressure due to broken pipes; prevent or reduce need for sheltering affected people		
Cost Estimate:	$5,000	**Timeframe:**	Within 12 months of funding
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	10

Potential Funding Sources:	State and federal grants	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Willis	**Action Number:**	M-22
Hazard(s) Addressed:	Hail		
Project Title:	Hail Damage Protection		
Project Description:	Retrofit city and county owned structures with roofs and window panes that can withstand hail damage		
Responsible Entity:	City of Willis		
Losses avoided:	Damage to buildings and windows, and city owned vehicles, and injuries to building and vehicle occupants during a hail storm.		
Cost Estimate:	$100,000	**Timeframe:**	within 12 months of funding
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	City budget, state and federal grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Willis	**Action Number:**	M-23
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Drainage Improvements		
Project Description:	9518 Maple Ridge Drive & at 30 25'32.11"N, 95 29'46.02"W. Place cement on bottom and sides of drainage culverts inlets and discharges for road to prevent street and utilities from washing out and protect property. If utilities wash out, subdivision will b		
Responsible Entity:	Willis Street Department		
Losses avoided:	Protect infrastructure, mitigate flooding, protect property		
Cost Estimate:	$50,000 not a verified estimate from Engineers	**Timeframe:**	6 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	Federal , State, and City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-24
Hazard(s) Addressed:	Heat Events		
Project Title:	Window unit and fan program		
Project Description:	The city will develop a program to provide a window air conditioning unit and fan to residents who do not have air conditioning and are especially vulnerable to heat, illnesses, such as the elderly, small children, and those with chronic illnesses.		
Responsible Entity:	City of Willis		
Losses avoided:	Mitigateor reduce loss of life or injuries from prolonged exposure to extreme temperatures		
Cost Estimate:	$10,000.00	**Timeframe:**	Within 3 months of funding
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8

Potential Funding Sources:	HMGP, local budget, local charities	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Willis	**Action Number:**	M-25
Hazard(s) Addressed:	Tornado		
Project Title:	Rebate program for tornado mitigation		
Project Description:	The city will develop a rebate program for building owners who install straps, structural bracing, window shutters, interlocking shingles, or tornado safe rooms in new construction or when renovating businesses or residences		
Responsible Entity:	City of Willis		
Losses avoided:	Mitigateor reduce loss of life or injuries; Mitigateor reduce damage to current and future buildings.		
Cost Estimate:	$25,000	**Timeframe:**	Within 3 months of funding
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, Local budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Willis	**Action Number:**	M-26
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Police Station Flood Mitigation		
Project Description:	Construct concrete lined trenches to capture runoff and channel it into drains; direct downfall from gutters into channels and drains; reduce height and slope of grade that is above height of building slab.		
Responsible Entity:	City of Willis		
Losses avoided:	Water damage to building and contents		
Cost Estimate:	$25,000	**Timeframe:**	within 2 months of funding
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	City budget, hazard mitigation grants	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Willis	**Action Number:**	M-27
Hazard(s) Addressed:	Wildfire		
Project Title:	Reducing underbrush for wildfire prevention		
Project Description:	The city and county will work to reduce underbrush on identified wild-urban interface areas through techniques such as using skid steers or goats		
Responsible Entity:	City of Willis		
Losses avoided:	Current and future buildings and residents in wild-urban interface areas.		
Cost Estimate:	$5,000	**Timeframe:**	within 12 months of funding.
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	HMGP, Local Budget, Fire Prevention and safety grants	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio

Does this action reduce effects of hazards on existing buildings?	Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?	Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?	No

Jurisdiction:	City of Willis		**Action Number:**	M-28
Hazard(s) Addressed:	Drought			
Project Title:	Drought proofing the community			
Project Description:	The city will work with the county office of emergency management to provide education to the community on ways and methods to conserve water, how to use water more effectively during periods of scarcity, how to collect and store rainwater to use for irri			
Responsible Entity:	City of Willis			
Losses avoided:	Reduce the effects of drought			
Cost Estimate:	$5,000	**Timeframe:**	Within 3 months of funding	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	7	
Potential Funding Sources:	HMGP, local budget	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Willis		**Action Number:**	M-29
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms			
Project Title:	Install 6 permanent flood area signs			
Project Description:	Install permanent road signs to warn traffic of flooded street when a flood event happens			
Responsible Entity:	Willis Street Department			
Losses avoided:	Protect life, warn drivers of possible flooded road			
Cost Estimate:	$2,000	**Timeframe:**	6 months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4	
Potential Funding Sources:	Federal , State, City	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Willis		**Action Number:**	M-30
Hazard(s) Addressed:	Expansive Soils			
Project Title:	Structural and Foundation Protection			
Project Description:	Install moisture sensing irrigation systems at all existing and future county, local, and critical facilities. Irrigation systems automatically water building to reduce the impacts of shrinking and swelling soils during drought			
Responsible Entity:	Mayors Office, Public Works			
Losses avoided:	Structural foundations and anticipated cost of repairs			
Cost Estimate:	$175,000.00	**Timeframe:**	36-48 months	
Priority:	3 = Mid-Level Priority Rating	**Feasibility Score**	7	
Potential Funding Sources:	Local budgets and HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Willis	**Action Number:**	M-31
Hazard(s) Addressed:	Lightning		
Project Title:	Lightning and Fire Protection		
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	homes and residents who could be affected by lightening throughout the		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Priority:	3 = Highest Priority Rating	**Feasibility Score**	-4
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Willis	**Action Number:**	M-32
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for expansive soils to reduce loss of life and property.		
Responsible Entity:	City Managers office or Mayor		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Willis	**Action Number:**	M-33
Hazard(s) Addressed:	Drought		
Project Title:	Adopting ordinance for water sensing irrigation systems		
Project Description:	The city will develop an ordinance to require incorporating water sensing irrigation systems in all public areas.		
Responsible Entity:	City Manager		
Losses avoided:	Monetary loss/ Water Conservation		
Cost Estimate:	$1,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	City Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Willis	**Action Number:**	M-34
Hazard(s) Addressed:	Winter Weather		
Project Title:	Infrastructure Improvements		
Project Description:	All participating jurisdictions will burying power-lines to prevent power outages from falling limbs during Winter Weather.		
Responsible Entity:	County OEM and Mayor's office for each participating jurisdiction		
Losses avoided:	Preventing the loss of life of vulnerable residents that lose power during Winter Weather.		
Cost Estimate:	$1,500,000	**Timeframe:**	36-48 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Woodbranch Village

Jurisdiction:	City of Woodbranch	**Action Number:**	N-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Lightning Dam/ Levee Failure Heat Event Hail Winter Weather		
Project Title:	Emergency Pubic Warning System		
Project Description:	Purchase and deployment of secondary public emergency notification system		
Responsible Entity:	City Council / Mayor		
Losses avoided:	life safety		
Cost Estimate:	$2,000,000	**Timeframe:**	12-60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	Available FEMA grant programs	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of Woodbranch	**Action Number:**	N-2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms		
Project Title:	Property Protection		
Project Description:	Removal of debris, silt, and vegetation obstacles in drainage ways. Project will clear obstacles, mow and reshape ditches, and upgrade culverts to restore adequate drainage to mitigate flooding.		
Responsible Entity:	City Council / Mayor, City Engineer, County Commissioner		
Losses avoided:	Homes, businesses, and public facilities.		
Cost Estimate:	$500,000	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	HMGP, city budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of Woodbranch		**Action Number:**	N-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms			
Project Title:	City Ordinance			
Project Description:	The city shall adopt a land use ordinance which requires any structure within the 100 year floodplain to be elevated 2 feet above base flood elevation			
Responsible Entity:	City Council / Mayor			
Losses avoided:	Homes, businesses, and residents within the 100 year floodplain			
Cost Estimate:	$5,000	**Timeframe:**	6 months	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	2	
Potential Funding Sources:	HMGP, city budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				Yes

Jurisdiction:	City of Woodbranch		**Action Number:**	N-4
Hazard(s) Addressed:	Drought			
Project Title:	City Ordinance			
Project Description:	The county will partner with cities to develop an ordinance to require incorporating drought tolerant landscape design into all new county and city owned properties.			
Responsible Entity:	City Council / Mayor			
Losses avoided:	Homes, businesses			
Cost Estimate:	$1,000	**Timeframe:**	3 months	
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	2	
Potential Funding Sources:	HMGP, city budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Woodbranch		**Action Number:**	N-5
Hazard(s) Addressed:	Tornado			
Project Title:	City Ordinance			
Project Description:	The city shall adopt and enforce a building code ordinance which requires any structure within the city limits to comply with windstorm construction requirements and inspections			
Responsible Entity:	City Council / Mayor			
Losses avoided:	Homes , businesses			
Cost Estimate:	$5,000	**Timeframe:**	6 months	
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	3	
Potential Funding Sources:	HMGP, city budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
Does this action reduce effects of hazards on existing buildings?				Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?				Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?				No

Jurisdiction:	City of Woodbranch	**Action Number:**	N-6
Hazard(s) Addressed:	Hail		
Project Title:	Hail Damage Protection		
Project Description:	The county and partnering jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail damage.		
Responsible Entity:	City Council / Mayor		
Losses avoided:	Buildings, residents, and city employees in city buildings when a hail storm hits.		
Cost Estimate:	$20,000.00	**Timeframe:**	24-36 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2
Potential Funding Sources:	HMGP, Housing Preservation Grants, Weatherization Assistance Program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

The Woodlands

Jurisdiction:	The Woodlands Township	**Action Number:**	O-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire		
Project Title:	Property Protection		
Project Description:	Removal of debris, silt and vegetation obstacles in drainageways. Project will clear obstacles, mow and reshape and widen ditches, and upgrade culverts to restore adequate drainage to mitigate flooding		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life, homes, businesses, and infrastructure		
Cost Estimate:	$3,000,000	**Timeframe:**	24 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	10
Potential Funding Sources:	FEMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-2
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado Winter Weather		
Project Title:	Emergency Services		
Project Description:	Purchase two (2) mobile power generators to assist senior/assisted living centers and MUD's		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life and property		
Cost Estimate:	$400,000	**Timeframe:**	2 Months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, PDM, HLS-UASI	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Lightning Dam/ Levee Failure Heat Event Hail Winter Weather		
Project Title:	Public Information and Awareness		
Project Description:	Develop and install a community hazard detective and audio warning system to alert community of imminent danger.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human Life, Homes, Personal Property, Business		
Cost Estimate:	$ 2,000,000.00	**Timeframe:**	
Priority:	1 = Highest Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, PPDM, Emergency Operations Center Funding, HLS-UASI, Emergency Management Performance Grant (EMPG), All Hazards Operation Planning	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-4
Hazard(s) Addressed:	Dam/ Levee Failure		
Project Title:	Structural		
Project Description:	Incorporate routine repairs and structural renovation efforts of dams and levee into capital improvement plans.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life, homes, businesses, public facilities		
Cost Estimate:	$5,000,000	**Timeframe:**	60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, PPDM, Emergency Operations Center Funding, HLS-USAI	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-5
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Property Protection		
Project Description:	Removal of debris, silt and vegetation obstacles in drainage ways. Project will clear obstacles and reshape ditches and upgrade culverts to restore adequate drainage to mitigate flooding.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Homes, Businesses and Public Facilities		
Cost Estimate:	$ 500,000.00	**Timeframe:**	24 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-7
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado		
Project Title:	Property Protection		
Project Description:	Purchase and install 500 kw building generator and transfer switch for Emergency Training Center and utilize for county/local/private/emergency/utility vehicle staging.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human Life, Property		
Cost Estimate:	$ 750,000.00	**Timeframe:**	6 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, Emergency Operations Funding, HLS-UASI	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-9
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms		
Project Title:	Property Damage		
Project Description:	Buyout of numerous previously and recently identified flood homes throughout the Woodlands Township		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life, property and emergency service equipment		
Cost Estimate:	$17,000,000	**Timeframe:**	12-60 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, PDM, HLS-UASI	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-10
Hazard(s) Addressed:	Wildfire		
Project Title:	"Ready, Set, Go" or similar program. Technical support for residents in order to reduce the risk of wildfire		
Project Description:	The county and partnering cities will provide incentives and technical support for property owners to reduce underbrush throughout the county to properly cut back trees, upgrade fences, and replace landscape materials with nonflammable materials		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Homes within the wild-urban interface and residents living within these areas		
Cost Estimate:	$8,000	**Timeframe:**	3 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, Township	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-11
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire		
Project Title:	Emergency Services and Property Protection		
Project Description:	Purchase a small fireboat to be utilized on the waterway for rescue and structural exposure protect.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life, structure, businesses, infrastructure		
Cost Estimate:	$ 450,000.00	**Timeframe:**	12 - 18 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, PPDM, Emergency Operations Center Funding, HLS-UASI, Emergency Operations Planning Hazard Mitigation Grant, Brazos Transit Authority	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-12
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire		
Project Title:	Emergency Services and Property Protection		
Project Description:	Purchase a small fireboat to be utilized on the waterway for rescue and structural exposure protection		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life, structure, businesses, infrastructure		
Cost Estimate:	$450,000	**Timeframe:**	12-18 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, PPDM, Emergency Operations Center Funding, HLS-UASI, Emergency Operations Planning Hazard Mitigation Grant, Brazos Transit Authority	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-13
Hazard(s) Addressed:	Wildfire		
Project Title:	Reducing underbrush for wildfire prevention		
Project Description:	The city and county will work to reduce underbrush on identified wild-urban interface areas through techniques such as using skid steers or goats		
Responsible Entity:	The Woodlands Township, County, Forestry Service		
Losses avoided:	Human Life, current and future buildings in wild-urban interface areas		
Cost Estimate:	$2,500,000	**Timeframe:**	12-24 Months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, Fire prevention and safety grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-15
Hazard(s) Addressed:	Severe Thunderstorms		
Project Title:	Lightning and Fire Protection		
Project Description:	The county will work with local jurisdictions to develop a program that offers reduced price lightening rods and technical assistance for homeowners throughout the county.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Homes and residents that would be affected by lightning		
Cost Estimate:	$250,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP, FF&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-16
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Structural and Foundation Protection		
Project Description:	Install moisture sensing irrigation systems at all existing and future county, local, and critical facilities. Irrigation systems automatically water building to reduce the impacts of shrinking and swelling soils during drought.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Structural foundations and cost of repairs		
Cost Estimate:	$325,000	**Timeframe:**	36-48 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	9
Potential Funding Sources:	HMGP and Local Budgets	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-17
Hazard(s) Addressed:	Heat Event		
Project Title:	Installing Misting Stations		
Project Description:	The county and partnering cities will install misting stations throughout city and county owned parks and property.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life and health		
Cost Estimate:	$200,000	**Timeframe:**	6-12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-18
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire		
Project Title:	Structural Projects		
Project Description:	Raise pedestrian bridges that block drainage ways to prevent blockage and increase drainage flow.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Property		
Cost Estimate:	$300,000	**Timeframe:**	24 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, PDM,HLS-UASI	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-19
Hazard(s) Addressed:	Wildfire		
Project Title:	Property Protection		
Project Description:	Purchase two (2) wildfire suppression vehicles with 4 wheel drive and pump and roll capability.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life and property		
Cost Estimate:	$350,000	**Timeframe:**	12 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	HMGP, PDM, HLS-UASI	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-20
Hazard(s) Addressed:	Hurricane/ Tropical Storms Tornado		
Project Title:	Emergency Services		
Project Description:	Construct and integrate a safe room design within Township facilities		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Human life, property, and infrastructure		
Cost Estimate:	$2,000,00	**Timeframe:**	6-12 Months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	7
Potential Funding Sources:	HMGP, PDM, HLS-UASI	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-21
Hazard(s) Addressed:	Drought		
Project Title:	Adopting an ordinance for drought tolerant plants.		
Project Description:	The Township will develop a plan to require incorporating drought tolerant landscape design into all new Township and existing owned properties.		
Responsible Entity:	The Woodlands Township		
Losses avoided:	Property		
Cost Estimate:	$ 10,000.00	**Timeframe:**	3 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	5
Potential Funding Sources:	Local Budget	**Benefit-Cost Ratio:**	Less than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	The Woodlands Township	**Action Number:**	O-22
Hazard(s) Addressed:	Dams and Levee Failure		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for dam and Levee failure to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Woodloch

Jurisdiction:	Town of Woodloch	**Action Number:**	P-1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Drought Lightning Dam/ Levee Failure Expansive Soils Heat Event Hail Winter Weather		
Project Title:	Emergency Services		
Project Description:	Install a public mass notification audible siren.		
Responsible Entity:	Mayor, Emergency Manager		
Losses avoided:	Mitigate the loss of life and property		
Cost Estimate:	$ 50,000.00	**Timeframe:**	6 - 12 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	8
Potential Funding Sources:	FEMA, local budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Town of Woodloch	**Action Number:**	P-2
Hazard(s) Addressed:	Floods		
Project Title:	Structural Project		
Project Description:	Upgrade storm drain at east end of North Woodloch to reduce flooding.		
Responsible Entity:	Town of Woodloch		
Losses avoided:	Life, Homes		
Cost Estimate:	$ 100,000	**Timeframe:**	6 - 12 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	6
Potential Funding Sources:	PDM, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Town of Woodloch	**Action Number:**	P-3
Hazard(s) Addressed:	Floods Wildfire Drought		
Project Title:	Property Protection		
Project Description:	Remove hazardous fuels, trash and debris in drainage ditches and create fire break/ allow for storm water to drain faster.		
Responsible Entity:	Town of Woodloch		
Losses avoided:	Life, homes		
Cost Estimate:	$ 50,000.00	**Timeframe:**	6 - 12 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	3
Potential Funding Sources:	PDM, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Town of Woodloch	**Action Number:**	P-4
Hazard(s) Addressed:	Tornado		
Project Title:	Tornado mitigation through rebate program		
Project Description:	The city will develop a rebate program for building owners who install straps, structural bracings, window shutters, or interlocking roof shingles in new construction or when renovating residences or businesses.		
Responsible Entity:	City Manager, Office of Code Enforcement		
Losses avoided:	Residents, homes, business, and local facilities		
Cost Estimate:	$ 10,000.00	**Timeframe:**	3 months
Priority:	1 = Highest Priority Rating	**Feasibility Score**	-2
Potential Funding Sources:	HMGP, Current city budget and salary	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Town of Woodloch	**Action Number:**	P-5
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado		
Project Title:	Hurricane resistant power poles		
Project Description:	Develop a program with local power companies to relocate power lines underground.		
Responsible Entity:	Engineering department		
Losses avoided:	Homes, businesses and public facilities		
Cost Estimate:	$ 500,000.000	**Timeframe:**	60 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score**	2
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Town of Woodloch	**Action Number:**	P-6
Hazard(s) Addressed:	Wildfire		
Project Title:	Rebate Program for Wildfire Protection		
Project Description:	The city will develop a rebate program for residents who use non-combustible material when renovating properties or building new homes.		
Responsible Entity:	Mayor		
Losses avoided:	Residents and existing and new properties		
Cost Estimate:	$ 200,000.00	**Timeframe:**	12 - 24 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	4
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Town of Woodloch	**Action Number:**	P-7
Hazard(s) Addressed:	Drought		
Project Title:	Adopting ordinance for drought tolerant plants		
Project Description:	The city will work to develop an ordinance to require incorporating drought tolerant landscape design into all new city owned properties.		
Responsible Entity:	City Managers and Local Planning Departments		
Losses avoided:	Reduce the effects of drought		
Cost Estimate:	$ 1,000.00	**Timeframe:**	3 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	2
Potential Funding Sources:	Local budget and staff	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Town of Woodloch	**Action Number:**	P-8
Hazard(s) Addressed:	Hail		
Project Title:	Hail Damage Protection		
Project Description:	Partnering jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail damage.		
Responsible Entity:	Mayor, Emergency Coordinator, local building departments		
Losses avoided:	Buildings, residents, and city employees in county and city buildings when a hail storm hits.		
Cost Estimate:	$ 50,000.00	**Timeframe:**	24 - 36 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	1
Potential Funding Sources:	HMGP, Housing Preservation Grants, Weatherization Assistance Program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Town of Woodloch	**Action Number:**	P-9
Hazard(s) Addressed:	Expansive Soils		

Project Title:	Structural and Foundation Protection		
Project Description:	Install moisture sensing irrigation systems at all existing and future county, local, and critical facilities. Irrigation systems automatically water building to reduce the impacts of shrinking and swelling soils during drought.		
Responsible Entity:	Facilities and building departments of participating jurisdictions		
Losses avoided:	Structural foundations and anticipated cost of repairs		
Cost Estimate:	$ 175,000.00	**Timeframe:**	36 - 48 months
Priority:	3 = Lowest Priority Rating	**Feasibility Score**	-8
Potential Funding Sources:	Local budgets and HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Town of Woodloch	**Action Number:**	P-10
Hazard(s) Addressed:	Dams and Levee Failure		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for dam and Levee failure to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Town of Woodloch	**Action Number:**	P-11
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Education and Mitigation Techniques		
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for expansive soils to reduce loss of life and property.		
Responsible Entity:	County OEM and City Managers office or Mayor for each participating jurisdiction.		
Partner(s):			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries.		
Cost Estimate:	$7,000	**Timeframe:**	12-24 months
Priority:	2 = Mid-Level Priority Rating	**Feasibility Score:**	8
Potential Funding Sources:	Local budget and salary, HMPG, USACE, Fire Prevention and Safety Grants	**Benefit-Cost Ratio**	More than a 1:4 cost-benefit ratio
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

2017

Part 8: Plan Maintenance

Part 8: PLAN MAINTENANCE

To remain an effective tool, the HMAP will undergo continuous review and updates. This practice is known as plan maintenance and requires monitoring, evaluating, updating, and implementing the plan. To accomplish this, a Plan Maintenance Team (PMT) has been determined and is comprised of representatives from each of the County's participating jurisdictions.

Plan Maintenance Team	
Plan Maintenance Team Leader: Montgomery County Emergency Management Coordinator	
Jurisdiction	**Responsible Entity**
Montgomery County	Montgomery County EMC and County Judge
City of Conroe	Fire Chief
City of Cut and Shoot	Police Chief
City of Magnolia	City Administrator
City of Montgomery	City Administrator
City of Oak Ridge North	Police Chief
City of Panorama Village	Mayor
City of Patton Village	Mayor
Town of Roman Forest	City Administrator
City of Shenandoah	Finance Director
City of Splendora	Police Chief
City of Stagecoach	Mayor
City of Willis	Police Chief
City of Woodbranch Village	Mayor
The Woodlands Township	Fire Chief
Town of Woodloch	Mayor

Meeting Schedule

The Plan Maintenance Team will hold its first meeting within one year after the plan's approval date and will continue to meet every 18 months. A special meeting will be held 12 months prior to the plan's expiration to develop a timeline and strategy to update the plan in accordance with TDEM and FEMA's requirements.

Public Involvement

Continued stakeholder and public involvement will remain a vital component of the HMAP. The PMT will seek public input at all Plan Maintenance meetings and all public hearings related to the HMAP. The PMT Leader will also conduct outreach and invite the public to each Plan Maintenance meetings. The PMT Leader will advertise all meetings in local news outlets, on county and city social media pages and websites, and coordinate with all participating jurisdictions to post the meeting agenda 30 days prior to the meetings.

In addition, each participating jurisdiction will seek input from the public on the status of existing hazards, emerging vulnerabilities, and evaluate the HMAP's strategy with the public. During each meeting, the PMT will provide an open comment forum for an interactive discussion with the public. The development of new goals and strategies will be a joint effort between the PMT and public participants.

Procedures

The PMT will meet every 18 months to address necessary revisions to the whole planning and public participation process, and the entirety of the written plan including developing amendments, assessing the implementation progress, and identifying emerging risks and vulnerabilities in the county. Each participating jurisdiction is responsible for reporting and requesting updates to the HMAP, and the team will explore multi-jurisdictional solutions when applicable. Any new mitigation actions, strategies, or required studies will be submitted to the PMT Leader. The PMT leader will evaluate the items for compliance with TDEM and FEMA regulations before leading the process to adopt or approve the new items.

Recommended changes, updates, and revisions will be implemented based on available funding to support revisions, and updates and will be assigned to appropriate officials with pre-determined timelines for completion. Updates to the HMAP will then be adoption by the appropriate governing body.

Progress Monitoring

It's important to monitor the progress each jurisdiction has made toward implementing the HMAP. This ensures goals, objectives, and the mitigation strategy are regularly re-evaluated and reviewed for feasibility. Each participating jurisdiction will provide a progress report on completed or ongoing mitigation projects at each Plan Maintenance meeting. Unaddressed mitigation actions will be evaluated for relevancy and/or amended to increase feasibility.

Plan Evaluation

Procedures to monitor and evaluate the HMAP were determined during the December 18th meeting. This ensures that the goals, objectives, and the mitigation strategy are regularly examined for feasibility, and that the HMAP remains a relevant and adaptive tool. An additional meeting will be held 12-months prior to the plan's expiration to develop a timeline and strategy to update the HMAP.

Plan Maintenance: Evaluation & Monitoring Procedures

Method and Procedures	Schedule	Responsible Entity
The PMT Leader will advertise all annual meetings in local newspapers, post invitations on the County social media pages, and post fliers at city and county buildings 30 days prior to the meetings.	30 days prior to public PMT meetings	Plan Maintenance Team Leader
Emerging risks and vulnerabilities will be identified and discussed. 1) PMT members are responsible for monitoring each hazard in their jurisdiction, and providing a written and/or verbal update on any new occurrences and emerging risks. 2) The PMT Leader will seek input from participants and the public at the annual meetings by opening the meeting for public comment.	Every 18 months	PMT representative from each participating jurisdiction
The PMT will monitor the entirety of the planning process and the written plan to ensure the HMAP remains relevant and the strategy continues to be effective. 1) PMT members will identify new projects and/or re-prioritize existing strategies based on changes in their jurisdiction. 2) Funding sources and multijurisdictional cooperation for new initiatives will be determined. 3) PMT members will review public participation outreach strategies in order to identify new or different methods of outreach in order to reach more community members. 4) The Plan Maintenance Team Leader will report on any suggestions for changing the whole written plan, planning, maintenance, or implementation process for the plan received by PMT members throughout the year. The PMT members will discuss which revisions/ suggestions they would like to implement.	Every 18 months	PMT representative from each participating jurisdiction
Each participating jurisdiction will evaluate their progress implementing the mitigation strategy. 1) Representatives will publicly discuss progress and submit written progress reports to the team leader. 2) Completed and ongoing mitigation actions will be discussed by responsible entity. 3) Unaddressed mitigation actions will be evaluated for relevancy and/or amended to increase feasibility. 4) Feasibility of the mitigation strategy will be evaluated, and any necessary revisions will be proposed. 5) The team leader will seek comment from the public after each participating jurisdiction's presentation.	Annually	PMT, the responsible department identified in the mitigation action up for discussion, and the public.

The PMT will develop a timeline and strategy to update the plan 12 months before it expires. The update strategy will include: 1) Identify entities responsible for drafting and submitting the update to TDEM 2) Send appropriate representatives to G-318 training. 3) Determine funding needs and funding sources for plan update.	12 months prior to HMAP's expiration	PMT

Existing Plans & Regulations

Several existing plans and programs that require integration of the HMAP have been identified by the participating jurisdictions. These known planning mechanisms will be amended to support mitigation efforts, and both plans will be reviewed for contradictions.

DRP: Disaster Recovery Plan
CP: Comprehensive Plan
FMP: Floodplain Management Plan
SMP Stormwater Management Plan
EOP: Emergency Operations Plan
COOP: Continuity of Operations Plan
TP: Transportation Plan
SO: Subdivision Ordinance
AB: Annual Budget
MUA: Mutual Aid Agreement
FDPO: Flood Damage Prevention Ordinance
CIP: Capital Improvements Plan

Jurisdiction	DRP	CP	FMP	SMP	EOP	COOP	TP	SO	AB	MUA	FDPO	CIP
Unincorporated Montgomery County			x		x	x			x	x		
Conroe	x	x	x	x	x	x	x	x	x	x	x	
Cut and Shoot			x		x				x	x	x	
Magnolia			x		x				x	x	x	
Montgomery			x		x			x	x	x		x
Oak Ridge North	x	x	x	x	x		x	x	x	x	x	x
Panorama Village			x		x			x	x	x	x	
Patton Village			x		x	x	x	x	x	x		
Roman Forest	x	x	x	x	x	x			x	x	x	
Shenandoah	x	x		x	x	x	x	x	x	x	x	
Splendora			x	x	x	x	x	x	x	x		x
Stagecoach			x		x				x	x	x	
Willis	x	x	x	x	x	x	x	x	x	x	x	x
Woodbranch Village									x	x		
Woodlands Township					x		x	x	x	x		x
Woodloch									x	x		

Plan Integration

Integrating the HMAP into county and local planning mechanisms is key to its success. Effective integration allows communities to benefit from existing plans and procedures to further reduce their vulnerability and risk. Upon approval of the plan and approval of updates or revisions as proposed by the PMT, each participating jurisdiction will follow the pre-determined actions:

To update and revise existing planning mechanisms to further integrate the HMAP, all participating jurisdictions will follow a basic process(es) described in this section.

1.) Propose a policy, strategy, or regulatory amendment to the proper governing body.
2.) Advertise the amendment a minimum of 30 days before the meeting where it will be discussed. Advertising procedures for the public meeting(s) is outlined in the public involvement measures described in Section 8 of this plan, and will also abide by each jurisdiction's local regulations.
3.) Provide the public, elected officials, and governing bodies the opportunity to discuss and comment upon proposed change(s).
4.) If the proposal is accepted, the change is implemented by the appropriate governing authority.

Unincorporated Montgomery County
The Montgomery County EMC will coordinate with the entity responsible for maintaining the EOP, COOP, and MUA to review the HMAP. They will coordinate efforts to link and/or integrate their content of their plans, and present the proposed changes to the appropriate governing authority within the county. The PMT Leader will also continually evaluate, reference, and reprioritize mitigation activities as funding becomes available and the strategies are implemented.

Conroe
Plan integration will occur under Home rule, V.T.C.A., Local Government Code § 5.004.The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, and an agenda will be posted 14 days in advance.

Cut and Shoot
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration on the second Thursday of the month.

Magnolia
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms specifically the unified municipal code. The proposal will be presented to the City Council for consideration, and an agenda will be posted 30 days in advance. Upon approval, the city administrator will initiate the process to incorporate the HMAP into their existing planning mechanisms.

Montgomery
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, Community Development Cooperation and Planning and Zoning Commission. An agenda will be posted 14 days in advance of any hearing. Upon approval, the city administrator will initiate the process to incorporate the HMAP into their existing planning mechanisms.

Oak Ridge North
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, and an agenda will be posted 30 days in advance. Upon approval, the city manager will initiate the process to incorporate the HMAP into their existing planning mechanisms.

Panorama Village
Plan integration will occur under Type A General Law Municipality. The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, and an agenda will be posted 14 days in advance.

Patton Village
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration. An agenda will be posted 30 days in advance of any hearings, and the Mayor and City manager will initiate the process to incorporate the HMAP into their existing planning mechanisms.

Roman Forest
The City Administrator will draft a proposal for incorporating the HMAP's mitigation strategy into their existing planning mechanisms. The proposal will be presented to the City Council and mayor for consideration. The city will post an agenda for the public hearing no less than 14 days before the meeting when it will be considered. Upon approval, the city administrator will initiate the process to incorporate the HMAP into their existing planning mechanisms.

Shenandoah
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented at a Town Hall Meeting for consideration. An agenda will be posted 14 days in advance of any hearings.

Splendora
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, and an agenda will be posted 14 days in advance.

Stagecoach
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, and an agenda will be posted 30 days in advance.

Willis
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, Community Development Cooperation, Planning and Zoning Commission, and the Economic Development Corporation. An agenda will be posted 14 days in advance of any hearing.

Woodbranch Village
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, and an agenda will be posted 30 days in advance.

Woodlands Township
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the Board of Directors and development Standards Committee for consideration. Both agendas will be posted 14 days in advance.

Woodloch
The PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration, and an agenda will be posted 30 days in advance.

2017

Appendix A: Planning Process

APPENDIX A: Planning Process Documentation

Public Meeting Attendees: October 16, 2017

Representative Name & Position/Title	Agency/Office
Darren Hess, Emergency Management Coordinator	Montgomery County Office of Homeland Security and Emergency Management
Morgan Lumbley, Community Planner	Montgomery County Office of Homeland Security and Emergency Management
Megan Lowery, Administrative Assistant	Montgomery County Office of Homeland Security and Emergency Management
Josh Owens, Senior Regional Planner	Houston- Galveston Area Council
Joey Kaspar, Senior Regional Planner	Houston- Galveston Area Council
Amy Combs, Regional Planner	Houston- Galveston Area Council

Multi-jurisdictional Meeting Attendees: December 18, 2017

Name	Organization
Brian Cantrell	Waller County Office of Emergency Management
Glenn LaMont	Brazoria County Office of Emergency Management
Ray Chislett	Austin County Office of Emergency Management
Butch Davis	Walker County Office of Emergency Management
Sherri Pegoda	Walker County Office of Emergency Management
Morgan Lumbley	Montgomery County Office of Emergency Management
Darren Hess	Montgomery County Office of Emergency Management
Tom Branch	Liberty County Office of Emergency Management
Yancy Scott	Waller County Office of Emergency Management
Joey Kaspar	Houston - Galveston Area Council
Amy Combs	Houston - Galveston Area Council
Cheryl Mergo	Houston - Galveston Area Council
Jeff Taebel	Houston - Galveston Area Council

Public Meeting Press Release & Advertisement

Press releases and advertisements were submitted to the city secretaries of participating jurisdictions, to eight news outlets, and to one local radio station.

Contact List:

Contact	Title	Organization
Amy L. Wade	City Secretary	Town of Cut and Shoot
Brenda Rutt	City Secretary	City of Stagecoach
Charlotte Smith	City Secretary/Treasurer	City of Woodbranch Village
Danna Welter	City Secretary	City of Splendora
Kathie Reyer	City Secretary	City of Shenandoah
Laura Calcote	City Secretary	City of Oak Ridge North
Lisa Evans	City Secretary	City of Panorama Village
Lynne George	City Secretary	City of Magnolia
Marissa Quintanilla	City Secretary	City of Willis
Sheryl Muro	City Secretary	City of Roman Forest
Soco M. Gorjon	City Secretary	City of Conroe
Sudie Dawson	City Secretary	City of Patton Village
Susan Hensley	City Secretary	City of Montgomery
Tina M. Williams	City Secretary	Town of Woodloch
Andy DuBois	Executive Editor	Spring Observer
Andy DuBois	Editor	Conroe Courier
Andy DuBois	Executive Editor	Woodlands Villager
Catherine Dominguez	Editor	Spring Observer
Catherine Dominguez	Managing Editor	Woodlands Villager
Monte D. West	Publisher	Montgomery County News
Nancy Flake	City Editor	Conroe Courier
Sondra Hernandez	Editor	Greater Houston Weekly
Rich Geary	News Director	KVST Radio 103.5 FM
Sondra Hernandez	Editor	Greater Houston Weekly

HOUSTON-GALVESTON AREA COUNCIL

PO Box 22777 • Houston, Texas 77227-2777• 713-627-3200

NEWS RELEASE

FOR IMMEDIATE RELEASE
September 29, 2017

Contact: Joey Kaspar: (713) 993-4547 or Joey.Kaspar@h-gac.com

Becki Begley: (713) 993-2410 or Becki.Begley@h-gac.com (Media Inquiries Only)

MONTGOMERY COUNTY HAZARD MITIGATION PLAN KICK-OFF MEETING

The Houston-Galveston Area Council (H-GAC), in partnership with Montgomery County, City of Conroe, City of Cut and Shoot, City of Magnolia, City of Montgomery, City of Oak Ridge North, City of Panorama Village, City of Patton Village, Town of Roman Forest, City of Shenandoah, City of Splendora, City of Stagecoach, City of Willis, City of Woodbranch Village, The Woodlands Township, and Town of Woodlock, is hosting the first public meeting to develop Montgomery County's Hazard Mitigation Plan. The meeting will be held from 1:00 p.m. to 4 pm, October 16, at the Lone Star Convention Center, Conroe, TX, 77303.

A Hazard Mitigation Plan is a strategic plan that proposes actions to reduce or eliminate long-term risk to people and property from future natural disasters. Public input and involvement is important for developing a comprehensive approach to reduce the effects of natural disasters on communities.

All Montgomery County residents are invited to participate and contribute their local expertise during the planning process. Mitigation actions developed by participants will be considered for inclusion in the County's Hazard Mitigation Plan to be submitted to the Federal Emergency Management Agency (FEMA).

The meeting agenda is available on H-GAC's website at http://www.h-gac.com/community/community/hazard/documents/10-16-17-Montgomery-County-Meeting-Agenda.pdf

More information on hazard mitigation plans is available on FEMA's website at https://www.fema.gov/hazard-mitigation-planning.

For more information about the meeting, contact Joey Kaspar at (713) 993-4547 or at Joey.Kaspar@h-gac.com, or Amy Combs, (713) 993-4544 or at Amy.Combs@h-gac.com.

Houston-Galveston Area Council

The Houston-Galveston Area Council (www.h-gac.com) is a voluntary association of local governments in the 13-county Gulf Coast Planning Region—an area of 12,500 square miles and more than 6 million people. H-GAC works to promote efficient and accountable use of local, state, and federal tax dollars and serves as a problem-solving and information forum for local government needs.

Hazard Mitigation Kick-off Meeting Agenda: October 16, 2017

Montgomery County
Hazard Mitigation Plan Kick-Off Meeting

October 16, 2017
1:00 pm – 4:00 pm
Lone Star Convention Center
9055 Airport Road
Conroe, TX 77303

Agenda

12:30-1:00 pm **Registration**

1:00 pm **Welcome & Overview of Hazard Mitigation Plans & Procedures**
H-GAC Staff will provide an overview of meeting objectives, activities, and H-GAC's planning process. The presentation will also include project timelines, partner roles and responsibilities, and in-kind match requirements.

1:15 pm **Review 2017 Risk Assessment**
H-GAC staff will present the County's draft risk assessment. Attendees will participate in a breakout session to review the draft risk assessment maps, charts, and provide feedback.

2:10 pm **Local Risk Assessment & Capability Form**
Meeting attendees will fill out a form describing the frequency of a hazard, and rate their mitigation capabilities in their jurisdiction.

2:15 pm **15-minute Break**

2:30 pm **Mitigation Actions Presentation & Activity**
H-GAC staff will give a presentation on creating mitigation actions and facilitate a practice exercise in writing a mitigation action.

3:00 pm **Update 2011 Mitigation Actions & Write New Actions**
Review 2011 mitigation actions for viability, and update actions to meet new FEMA standards. With remaining time, draft new mitigations for 2017.

4:00 pm **Adjourn**

Multi-jurisdictional Meeting Agenda: December 18, 2017

Hazard Mitigation Plan Meeting

December 18, 2017
1:30 pm – 3:30 pm
Conference Room D
Houston-Galveston Area Council
3555 Timmons Lane, 2nd Floor
Houston, TX 77027

Agenda

1:15pm **Registration**

1:30pm **Welcome by Jeff Taebel, Director of Community & Environmental Planning**

1:35pm **Progress Update& Meeting Objectives**

1:40pm **Mitigation Strategy &Goals Presentation**
A brief presentation over mitigation strategy goals, and the importance of multi-jurisdictional coordination.

1:50pm – 2:15pm **Goal Development Activity**
H-GAC staff will guide an activity that demonstrates how to draft goals for a Mitigation Strategy. Participants will then draft their County specific goals to be included in their plan's Mitigation Strategy.

2:15pm **15Minute Break**

2:30pm **Plan Maintenance Presentation**
Maintenance Plans are a required component of every Hazard Mitigation Plan. H-GAC staff will give a presentation on the required components and provide example maintenance plans.

2:40pm – 3:00pm **Plan Maintenance Activity**
Participants will develop and draft their 5-year Hazard Mitigation Maintenance Plans.

3:00pm **Project Checklist Review**
A review of the required components for the Hazard Mitigation Plan will be provided for each county. This checklist will provide guidance on completed and remaining tasks. H-GAC staff will field questions and comments regarding the checklist.

3:30pm **Adjourn**

Hazard Mitigation Planning Team

Jurisdiction:	

Primary Point of Contact

Name:	
Title:	
Email:	
Phone:	

Please include the information of your jurisidiction's planning team. The planning team consists of anyone who will help your jurisdiction with the Hazard Mitigation Plan:

Other Team Members:

Name:	
Title:	
Email:	

Name:	
Title:	
Email:	

Name:	
Title:	
Email:	

Name:	
Title:	
Email:	

Capability Assessment

City Name (if applicable)

County representatives should list the county

Name

First Name Last Name

Your Title *

Please review the plans and programs listed below. Check which plans and programs your county/city currently has in place.

- [ ] HMP: Hazard Mitigation Plan
- [ ] DRP: Disaster Recovery Plan
- [ ] COMP: Comprehensive Land Use Plan
- [ ] FMP: Floodplain Management Plan
- [ ] SMP: Stormwater Management Plan
- [ ] EOP: Emergency Operations Plan
- [ ] COOP: Continuity of Operations Plan
- [ ] REP: Radiological Emergency Plan
- [ ] SARA: SARA Title III Emergency Response Plan
- [ ] TRANS: Transportation Plan
- [ ] REG-PL: Regional Planning
- [ ] HPP: Historic Preservation Plan
- [ ] SO: Subdivision Ordinance
- [ ] FDPO: Flood Damage Prevention Ordinance
- [ ] CRS: Community Rating System
- [ ] CIP: Capital Improvements Plan (that regulates infrastructure in hazard areas)

Does your county/city have current building codes in place?

○ Yes ○ No ○ Unsure

Does your county/city have current fire codes in place?

○ Yes ○ No ○ Unsure

For codes that apply to your jurisdiction, please indicate their effectiveness in mitigating damages.

	High	Medium	Low	None	Not Applicable
IRC (International Residential Code)	○	○	○	○	○
National Flood Insurance Program Compliance	○	○	○	○	○
Fire Protection Compliance	○	○	○	○	○
Cities zoning, building codes, upgraded NFIP ordinances	○	○	○	○	○

Risk Assessment Survey

Hazard	Planning Area Affected (Jurisdiction/Geographic Area)	Probability (How Likely)	Frequency (How Often)	Extent (Severity of Hazard)	Impact (Severity over Planning Area)	Vulnerability (Risk Assessment)
Floods						
Hurricane/Tropical Storms				Category: 1 2 3 4 or 5		
Wildfire						
Severe Thunderstorms						
Tornado				F1 F2 F3 F4 or F5		
Drought						
Coastal Erosion						
Dam/Levee Failure						
Expansive Soils						
Extreme Heat						
Hail						
Winter Storms						

Score	Area Ratings	Probability Ratings	Frequency Ratings	Extent Ratings	Impact Ratings	Vulnerability Ratings
1	**Negligible:** Less than 10 percent of planning area.	**Unlikely:** Less than 1 percent probability of occurrence in the next 5 years.	**Rare** and isolated occurrences	**Weak:** Limited classification on scientific scale. Results in little to no damage.	**Negligible:** Less than 10 percent of property and population impacted in the planning area.	**Low:** Hazard results in little to no damage, and negligible loss of property, services, and no loss of life. Planning area is not vulnerable to this hazard.
2	**Limited:** 10 to 25 percent of the planning area	**Occasional:** 1 to 10 percent probability of occurrence in the next 5 years	**Infrequent** and irregular occurrences	**Moderate:** classification on scientific scale. Results in some damage and temporary loss of services.	**Limited:** 10 to 25 percent of property and population impacted in the planning area	**Moderate:** Hazard results in some damage, and moderate loss of property, services, and potentially loss of life. Planning area is moderately vulnerable to this hazard.
3	**Significant:** 25 to 75 percent of planning area or	**Likely:** 10 to 90 percent probability of occurrence in the next 5 years.	**Frequent** and regular occurrences	**Severe:** classification on scientific scale. Results in devastating damage and loss of services for weeks or months	**Significant:** 25 to 75 percent of property and population impacted in the planning area	**High:** Hazard results in extensive damage, and extensive loss of property, services, and potentially loss of life. Planning area is highly vulnerable to this hazard.
4	**Extensive:** 75 to 100 percent of planning area	**Highly Likely**: 90 to 100 percent probability of occurrence in the next 5 years	**Consistent** and Predictable Occurrences	**Extreme:** classification on scientific scale. Results in catastrophic damage and uninhabitable conditions	**Extensive:** 75 to 100 percent of property and population impacted in the planning area	**Extreme:** Hazard results in catastrophic damage, loss of property, services, and loss of life. Planning area is extremely vulnerable to this hazard.

Local Risk & Capability Survey

Please rate the cities/ counties ability to reduce the impact of the listed natural hazards.

Hazard	Applicable to your Community?			Current Perceived Risk			Current Ability to Reduce Damages from Hazard			Future Ability to Reduce Damages from Hazard		
Floods	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hurricane/Tropical Storms	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Wildfire	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Severe Thunderstorms	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Tornado	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Drought	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Coastal Erosion	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Dam/Levee Failure	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Expansive Soils	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Extreme Heat	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hail	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Winter Storms	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High

Please rate the cities/ counties ability to reduce the impact of the listed natural hazards.

Hazard	Local Budget			Administrative Staffing			Technical Staffing			Political Determination/Resolve		
Floods	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hurricane/Tropical Storms	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Wildfire	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Severe Thunderstorms	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Tornado	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Drought	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Coastal Erosion	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Dam/Levee Failure	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Expansive Soils	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Extreme Heat	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hail	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Winter Storms	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High

NFIP & Flood Plain Management Capability

Name

First Name Last Name

Your Title *

Email

example@example.com

Name of Jurisdiction

County representatives should list the county

Is your jurisdiction a National Flood Insurance Program (NFIP) Participant?

Yes No

NFIP Policy Summary

	Total Number of Policies	Total Coverage	Total Number of Losses	Total Dollars Paid
Summary				

NFIP Staff Assessment

The following questions seek information on your community's participation in and continued compliance with the NFIP. Indicate the source of information.

Is the Community FPA or NFIP Coordinator certified?

Yes No

Source Information

Community FPA

Comments

Is floodplain management an auxiliary function?

Yes No

Source Information

Community FPA

Comments

Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)

Source Information

Community FPA

What are the barriers to running an effective NFIP program in the community, if any?

Source Information

Community FPA

NFIP Compliance History

The following questions seek information on your community's participation in and continued compliance with the NFIP. Indicate the source of information.

Is the community in good standing with the NFIP?

- Yes
- No

Source Information

State NFIP Coordinator, FEMA NFIP Specialist, community records

Comments

Are there any outstanding compliance issues (i.e., current violations)?

- Yes
- No

When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?

Source Information

Comments

Is a CAV or CAC scheduled or needed?

Source Information

2017

Appendix B: Critical Facilities

APPENDIX B: Critical Facilities

Facility Name or Type	Jurisdiction
City Hall/Emergency Operation Centers	Conroe
Brownfields	Conroe
Brownfields	Conroe
Cercla(Superfund) National Priorities List	Conroe
Cercla(Superfund) National Priorities List	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
College University Campus and Buildings	Conroe
College University Campus and Buildings	Conroe
Correctional Facilities	Conroe
Correctional Facilities	Conroe
Correctional Facilities	Conroe
County Emergency Operation Center	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
Dam	Conroe
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Dam	Conroe
Electric Substation	Conroe
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Electric Substation	Conroe
Emergency Room	Conroe
Fire Station	Conroe
Fire Station	Conroe
Fire Station	Conroe
Fire Station	Conroe
Fire Station	Conroe
Fire Station	Conroe
Fire Station	Conroe
Fire Station	Conroe
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Hospital	Conroe
Hospital	Conroe
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Hospital	Conroe
Hospital	Conroe
Mental Health Facility	Conroe
Mental Health Facility	Conroe
Mental Health Facility	Conroe
Nursing Home	Conroe
Nursing Home	Conroe
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Schools	Conroe
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Solid Waste Landfill	Conroe

Solid Waste Landfill	Conroe
Utility Station or Facility	Conroe
Utility Station or Facility	Conroe
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Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
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Child Day Care Centers and Preschools - Montgomery County	Conroe
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Child Day Care Centers and Preschools - Montgomery County	Conroe

Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
Child Day Care Centers and Preschools - Montgomery County	Conroe
City Hall/Emergency Operation Centers	Conroe
City Hall/Emergency Operation Centers	Conroe
School	Conroe
School	Conroe
School	Conroe
School	Conroe
School	Conroe
School	Conroe
School	Conroe
Police Station	Cut and Shoot
School	Cut and Shoot
Hospital	Houston
College University Campus and Buildings	Kingwood
Emergency Room	Kingwood
Emergency Room	Kingwood
Hospital	Kingwood
Hospital	Kingwood
Hospital	Kingwood
Hospital	Kingwood
Hospital	Kingwood
Police Station	Kingwood
School	Kingwood
School	Kingwood
Utility Station or Facility	Kingwood
Utility Station or Facility	Kingwood
Child Day Care Centers and Preschools - Montgomery County	Magnolia
Child Day Care Centers and Preschools - Montgomery County	Magnolia
Child Day Care Centers and Preschools - Montgomery County	Magnolia
Dam	Magnolia
Dam	Magnolia
Dam	Magnolia
Dam	Magnolia
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Electric Substation	Magnolia

Emergency Room	Magnolia
Fire Station	Magnolia
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Fire Station	Magnolia
Police Station	Magnolia
Police Station	Magnolia
School	Magnolia
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Utility Station or Facility	Magnolia
Utility Station or Facility	Magnolia
Utility Station or Facility	Magnolia
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Utility Station or Facility	Magnolia
Child Day Care Centers and Preschools - Montgomery County	Magnolia
Child Day Care Centers and Preschools - Montgomery County	Magnolia
Child Day Care Centers and Preschools - Montgomery County	Magnolia
Child Day Care Centers and Preschools - Montgomery County	Magnolia
Child Day Care Centers and Preschools - Montgomery County	Magnolia
City Hall/Emergency Operation Centers	Magnolia
School	Magnolia
Utility Station or Facility	Magnolia,
Utility Station or Facility	Magnolia,
Utility Station or Facility	Magnolia,
Child Day Care Centers and Preschools - Montgomery County	Montgomery
Child Day Care Centers and Preschools - Montgomery County	Montgomery
Child Day Care Centers and Preschools - Montgomery County	Montgomery
Child Day Care Centers and Preschools - Montgomery County	Montgomery
Child Day Care Centers and Preschools - Montgomery County	Montgomery
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Fire Station	Montgomery
Police Station	Montgomery
School	Montgomery
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Utility Station or Facility	Montgomery
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Utility Station or Facility	Montgomery
Child Day Care Centers and Preschools - Montgomery County	Montgomery
Child Day Care Centers and Preschools - Montgomery County	Montgomery
City Hall/Emergency Operation Centers	Montgomery
School	Montgomery
Utility Station or Facility	Montgomery
Electric Substation	New Caney
Fire Station	New Caney
Fire Station	New Caney
Fire Station	New Caney
Natural Gas Receipt Delivery	New Caney
Natural Gas Receipt Delivery	New Caney
Police Station	New Caney
Police Station	New Caney
Police Station	New Caney
Police Station	New Caney
School	New Caney
School	New Caney
School	New Caney
School	New Caney
School	New Caney
School	New Caney
Schools	New Caney
Schools	New Caney
Utility Station or Facility	New Caney
Utility Station or Facility	New Caney
Utility Station or Facility	New Caney
Utility Station or Facility	New Caney
Utility Station or Facility	New Caney
Utility Station or Facility	New Caney

Utility Station or Facility	New Caney
City Hall/Emergency Operation Centers	New Caney
City Hall/Emergency Operation Centers	Oak Ridge North
School	Oak Ridge North
Fire Station	Panorama Village
Dam	Pinehurst
Dam	Pinehurst
Fire Station	Pinehurst
School	Pinehurst
Utility Station or Facility	Pinehurst
Utility Station or Facility	Pinehurst
Fire Station	Porter
School	Porter
School	Porter
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School	Porter
School	Porter
School	Porter
Schools	Porter
Utility Station or Facility	Porter
Utility Station or Facility	Porter
Utility Station or Facility	Porter
Utility Station or Facility	Porter
Utility Station or Facility	Porter
Utility Station or Facility	Porter
Utility Station or Facility	Porter,
Utility Station or Facility	Richards
Utility Station or Facility	Roman Forest
City Hall/Emergency Operation Centers	Roman Forest
Utility Station or Facility	Roman Forest
Child Day Care Centers and Preschools - Montgomery County	Shenandoah
Hospital	Shenandoah
Hospital	Shenandoah
Mental Health Facility	Shenandoah
Nursing Home	Shenandoah
Police Station	Shenandoah
City Hall/Emergency Operation Centers	Shenandoah
Electric Substation	Splendora
Dam	Splendora
Dam	Splendora
Fire Station	Splendora
Police Station	Splendora
Police Station	Splendora
Police Station	Splendora
School	Splendora
School	Splendora
School	Splendora
School	Splendora
School	Splendora
Schools	Splendora
Utility Station or Facility	Splendora

Utility Station or Facility	Splendora
City Hall/Emergency Operation Centers	Splendora
City Hall/Emergency Operation Centers	Splendora
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Electric Substation	Spring
Electric Substation	Spring
Emergency Room	Spring
Emergency Room	Spring
Emergency Room	Spring
Fire Station	Spring
Fire Station	Spring
Fire Station	Spring
Fire Station	Spring
Fire Station	Spring
Fire Station	Spring
Hospital	Spring
Hospital	Spring
Nursing Home	Spring
Nursing Home	Spring
Nursing Home	Spring
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Utility Station or Facility	Spring
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Utility Station or Facility	Spring
Utility Station or Facility	Spring
Utility Station or Facility	Spring
Wastewater Treatments Plant	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
Child Day Care Centers and Preschools - Montgomery County	Spring
School	Spring
School	Spring
School	Spring
School	Spring
School	Spring
Utility Station or Facility	Spring
Utility Station or Facility	Spring
Utility Station or Facility	Spring
Utility Station or Facility	Spring,
Police Station	Stagecoach
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
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Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
College University Campus and Buildings	The Woodlands
Dam	The Woodlands

Dam	The Woodlands
Dam	The Woodlands
Electric Substation	The Woodlands
Fire Station	The Woodlands
Fire Station	The Woodlands
Fire Station	The Woodlands
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Hospital	The Woodlands
Nursing Home	The Woodlands
Nursing Home	The Woodlands
Nursing Home	The Woodlands
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Nursing Home	The Woodlands
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Police Station	The Woodlands
Police Station	The Woodlands
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Utility Station or Facility	The Woodlands
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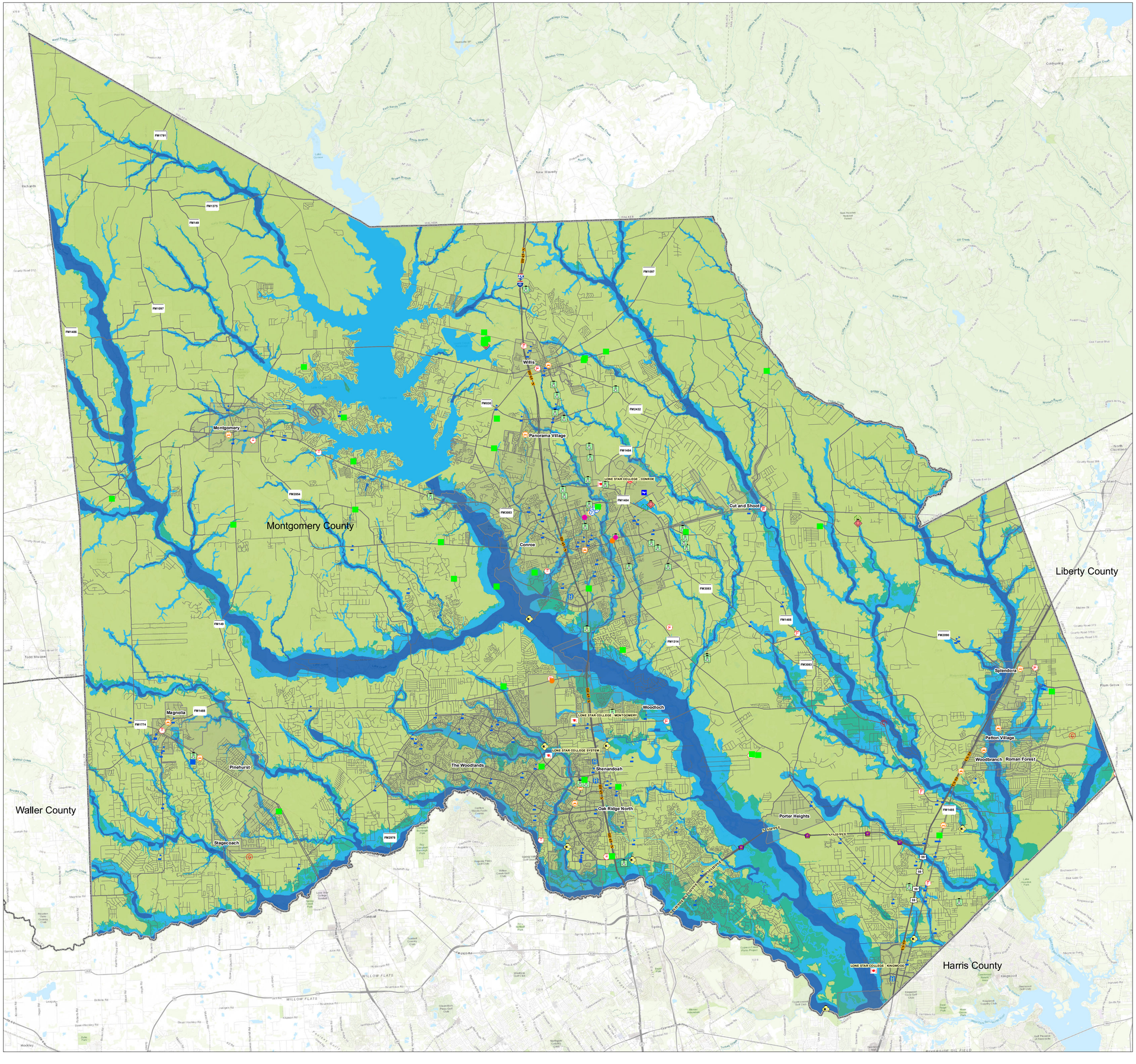
Utility Station or Facility	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
Child Day Care Centers and Preschools - Montgomery County	The Woodlands
College University Campus and Buildings	The Woodlands
Emergency Room	The Woodlands
School	The Woodlands
School	The Woodlands
School	The Woodlands
School	The Woodlands
School	The Woodlands
School	The Woodlands
School	The Woodlands
School	The Woodlands
Emergency Room	Tomball
Mental Health Facility	Tomball
Hospital	Tomball
School	Tomball
Medic 10/19	Unincorporated Montgomery County
Medic 11/Service Center	Unincorporated Montgomery County
Medic 12	Unincorporated Montgomery County
Medic 13	Unincorporated Montgomery County
Medic 14	Unincorporated Montgomery County
Medic 20	Unincorporated Montgomery County
Medic 21	Unincorporated Montgomery County
Medic 22	Unincorporated Montgomery County
Medic 23	Unincorporated Montgomery County
Medic 24	Unincorporated Montgomery County
Medic 25	Unincorporated Montgomery County
Medic 30/ Squad 39	Unincorporated Montgomery County
Medic 31	Unincorporated Montgomery County
Medic 32	Unincorporated Montgomery County
Medic 33	Unincorporated Montgomery County
Medic 34	Unincorporated Montgomery County
Medic 41	Unincorporated Montgomery County
Medic 42	Unincorporated Montgomery County
Medic 43	Unincorporated Montgomery County

Medic 45	Unincorporated Montgomery County
Medic 46	Unincorporated Montgomery County
Squad 44	Unincorporated Montgomery County
Station 40/ Medic 49	Unincorporated Montgomery County
City Hall/Emergency Operation Centers	Willis
Child Day Care Centers and Preschools - Montgomery County	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Dam	Willis
Electric Substation	Willis
Electric Substation	Willis
Electric Substation	Willis
Electric Substation	Willis
Electric Substation	Willis
Electric Substation	Willis
Electric Substation	Willis
Electric Substation	Willis
Electric Substation	Willis
Fire Station	Willis
Fire Station	Willis
Fire Station	Willis
Nursing Home	Willis
Nursing Home	Willis
Nursing Home	Willis
Nursing Home	Willis
Police Station	Willis
Police Station	Willis
Power Plant	Willis
School	Willis
School	Willis
School	Willis
School	Willis
School	Willis
School	Willis
School	Willis
School	Willis
School	Willis
Schools	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis

Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Utility Station or Facility	Willis
Child Day Care Centers and Preschools - Montgomery County	Willis
Utility Station or Facility	Willis

Floodplain Map : Montgomery County



Legend

Public Safety and Security

Type

- Disaster Recovery Center
- Local Emergency Operation Center

Utilities

Type

- Electric Substation
- Natural Gas Receipt Delivery
- Power Plant
- Wastewater Treatments Plant

Industrial

Type

- Brownfields
- CERCLA(Superfund) National Priorities List
- Hazardous Waste Teratment Facility
- Solid Waste Landfill
- Toxic Release Inventory Facility
- College Universities
- Correctional Facilities
- Airport
- Police Stations
- Hospitals
- EMS
- FireStations
- High Schools
- Schools
- Roads
- County Boundary
- Cities

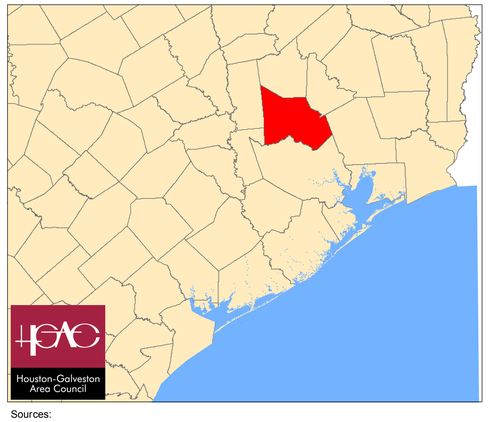
FEMA Floodplains NFHL 2015

Type

- Floodway
- 100YR
- 500YR
- Minimal
- Levee Zone

N

0 2.5 5 10 Miles



Sources:
Facilities : Regional Land Use Information System, H-GAC, 2017
National Flood Hazard Layer (NFHL) : Federal Emergency Management Agency (FEMA), 2017

Wildfire : Montgomery County

Legend

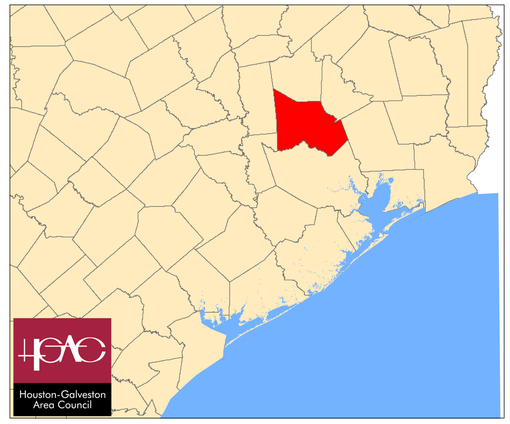
- College Universities
- Correctional Facilities
- Airport
- Police Stations
- Hospitals
- EMS
- FireStations
- Schools
- Vulnerable Population
- Roads
- County Boundary
- Cities

Characteristic Fire Intensity Scale

- 1 (Very Low)
- 1.5
- 2 (Low)
- 2.5
- 3 (Moderate)
- 3.5
- 4 (High)
- 4.5
- 5 (Very High)

N

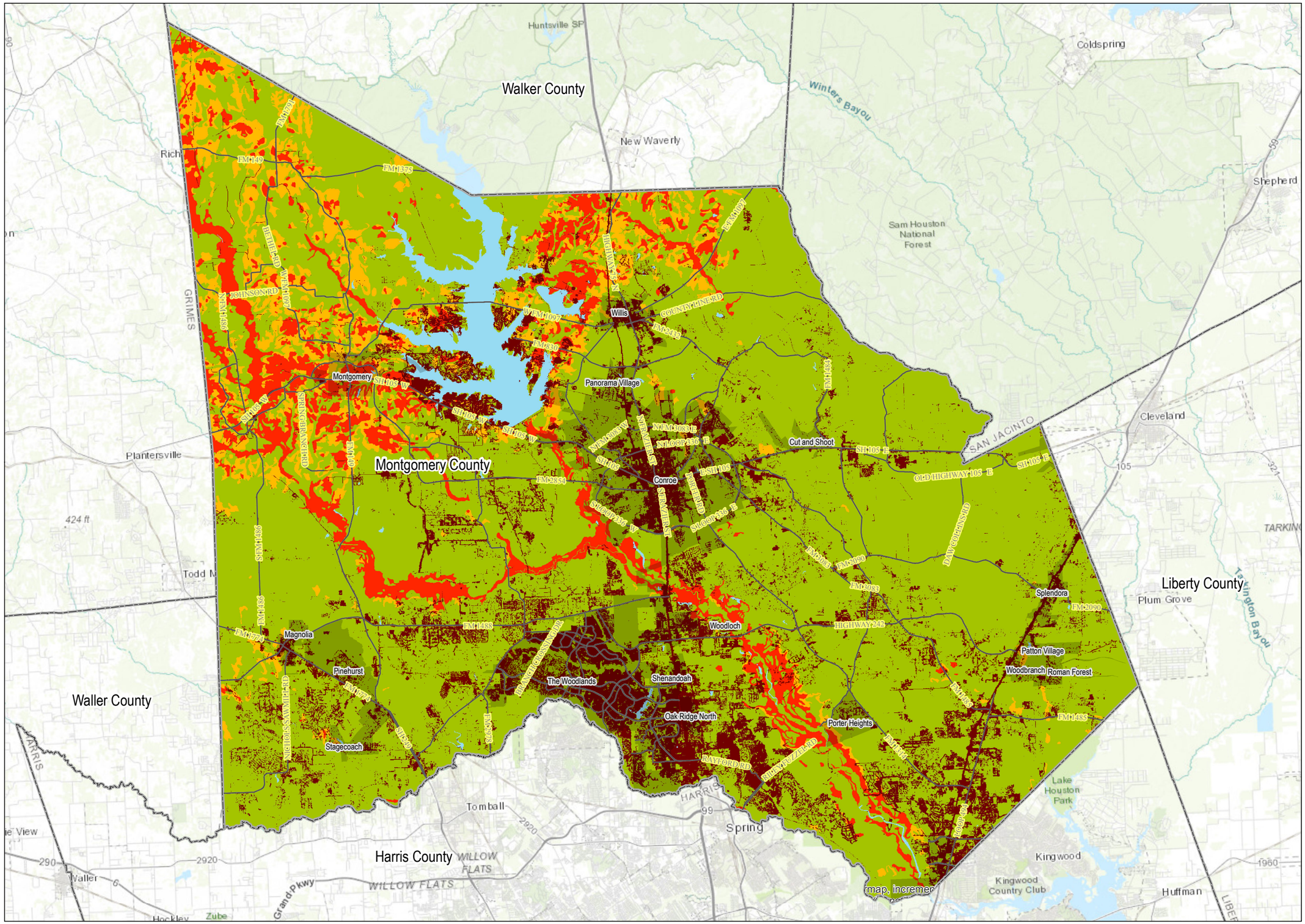
0 2 4 8 Miles



Houston-Galveston Area Council

Sources:
Facilities : Regional Land Use Information System, H-GAC, 2017
Texas Wildfire Risk Assessment : Texas A&M Forest Service, 2017

Expansive Soil Map : Montgomery County



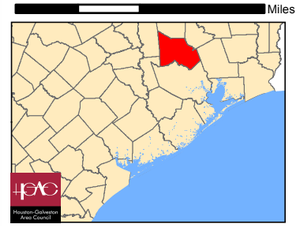
Legend

Expansive Soils Type

- Water
- Moderate swelling potential
- Low swelling potential
- High swelling potential
- Developed
- Cities
- County Boundary

N

0 1.75 3.5 7 Miles



Sources:
HGAC Natural Resource Conservation Service

2017

Appendix C: Hazus Analysis

Hazus-MH: Flood Global Risk Report

Region Name: MG_1acre

Flood Scenario: MG_all_streams

Print Date: Tuesday, November 07, 2017

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Texas

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,077 square miles and contains 7,219 census blocks. The region contains over 163 thousand households and has a total population of 455,746 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 165,054 buildings in the region with a total building replacement value (excluding contents) of 48,566 million dollars (2010 dollars). Approximately 94.18% of the buildings (and 87.93% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 165,054 buildings in the region which have an aggregate total replacement value of 48,566 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	42,702,039	87.9%
Commercial	3,681,350	7.6%
Industrial	1,158,285	2.4%
Agricultural	138,959	0.3%
Religion	411,084	0.8%
Government	118,889	0.2%
Education	354,929	0.7%
Total	**48,565,535**	**100.0%**

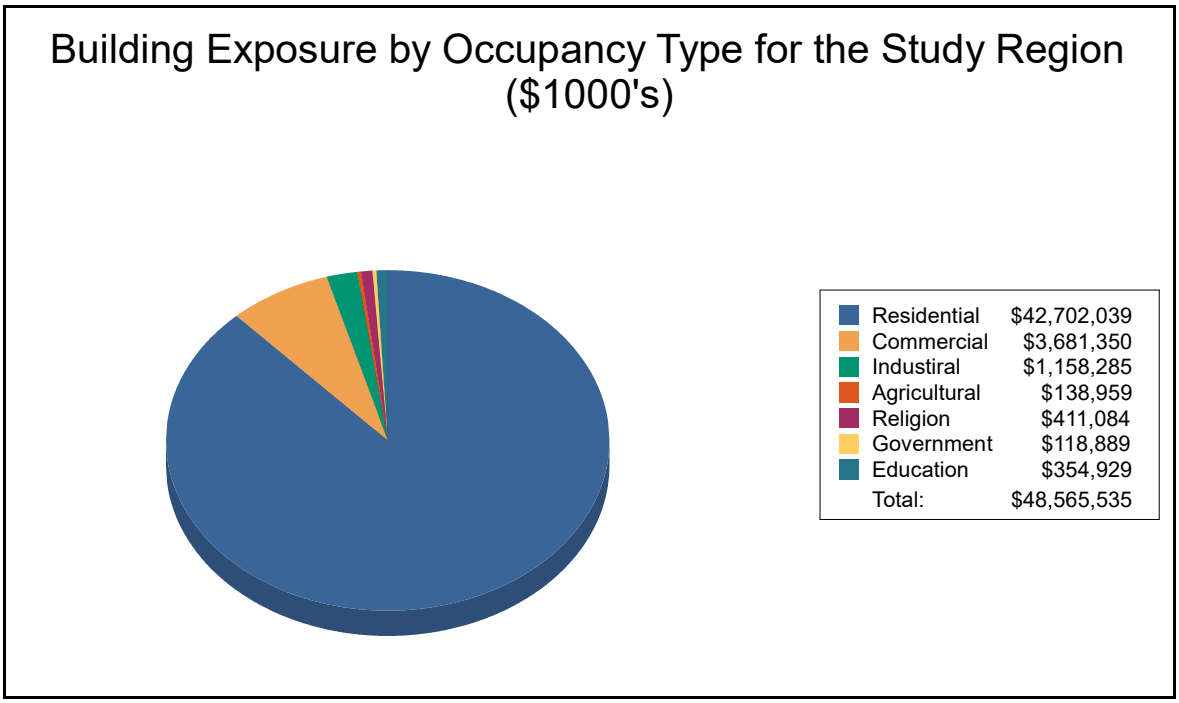
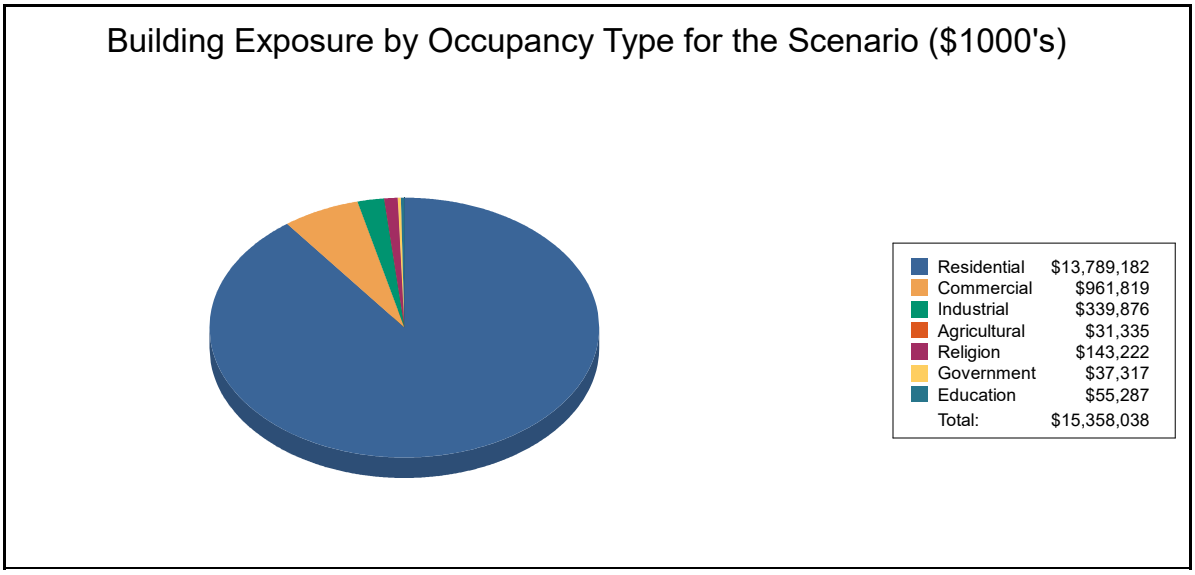


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	13,789,182	89.8%
Commercial	961,819	6.3%
Industrial	339,876	2.2%
Agricultural	31,335	0.2%
Religion	143,222	0.9%
Government	37,317	0.2%
Education	55,287	0.4%
Total	**15,358,038**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 584 beds. There are 121 schools, 23 fire stations, 14 police stations and no emergency operation centers.

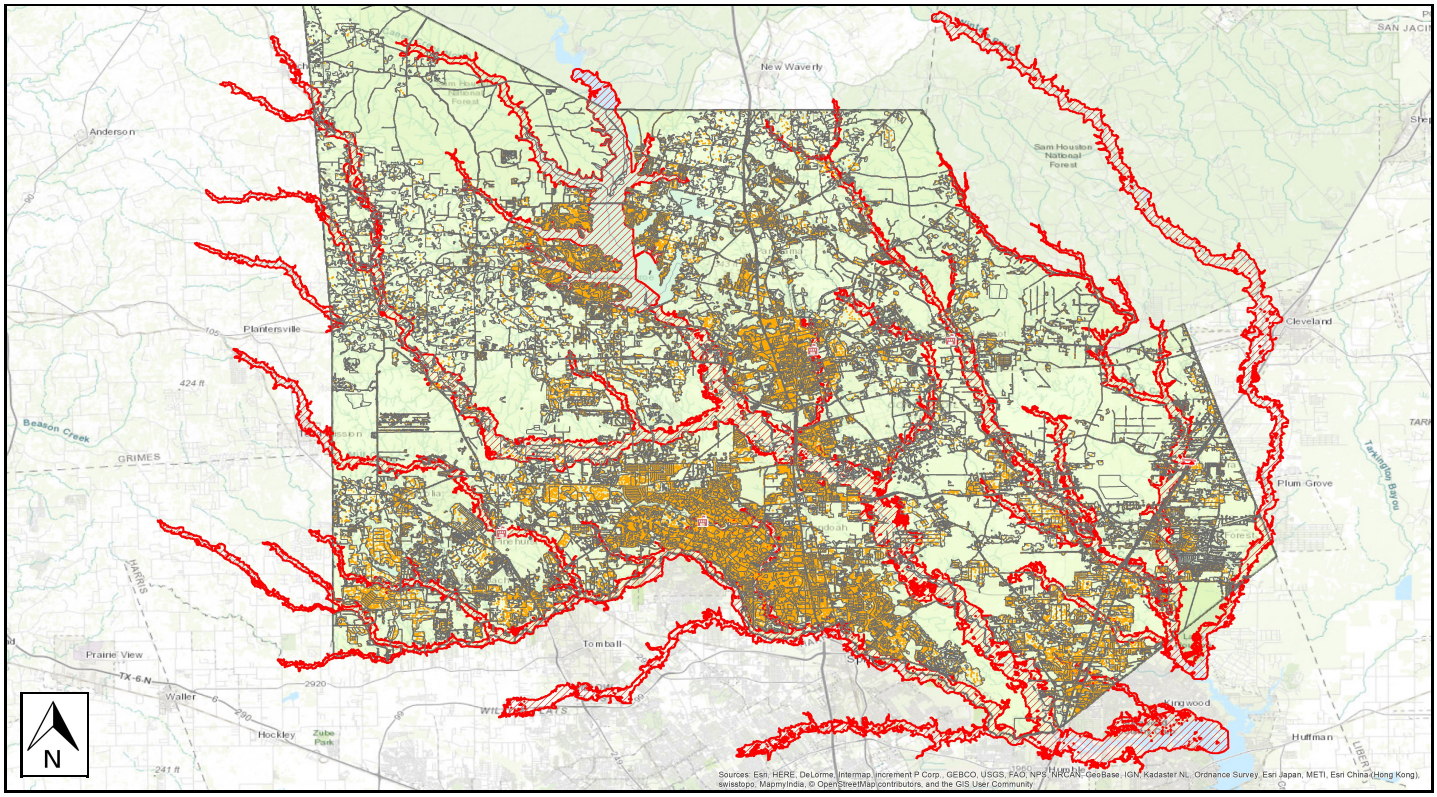
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MG_1acre
Scenario Name:	MG_all_streams
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 2,227 buildings will be at least moderately damaged. This is over 54% of the total number of buildings in the scenario. There are an estimated 454 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

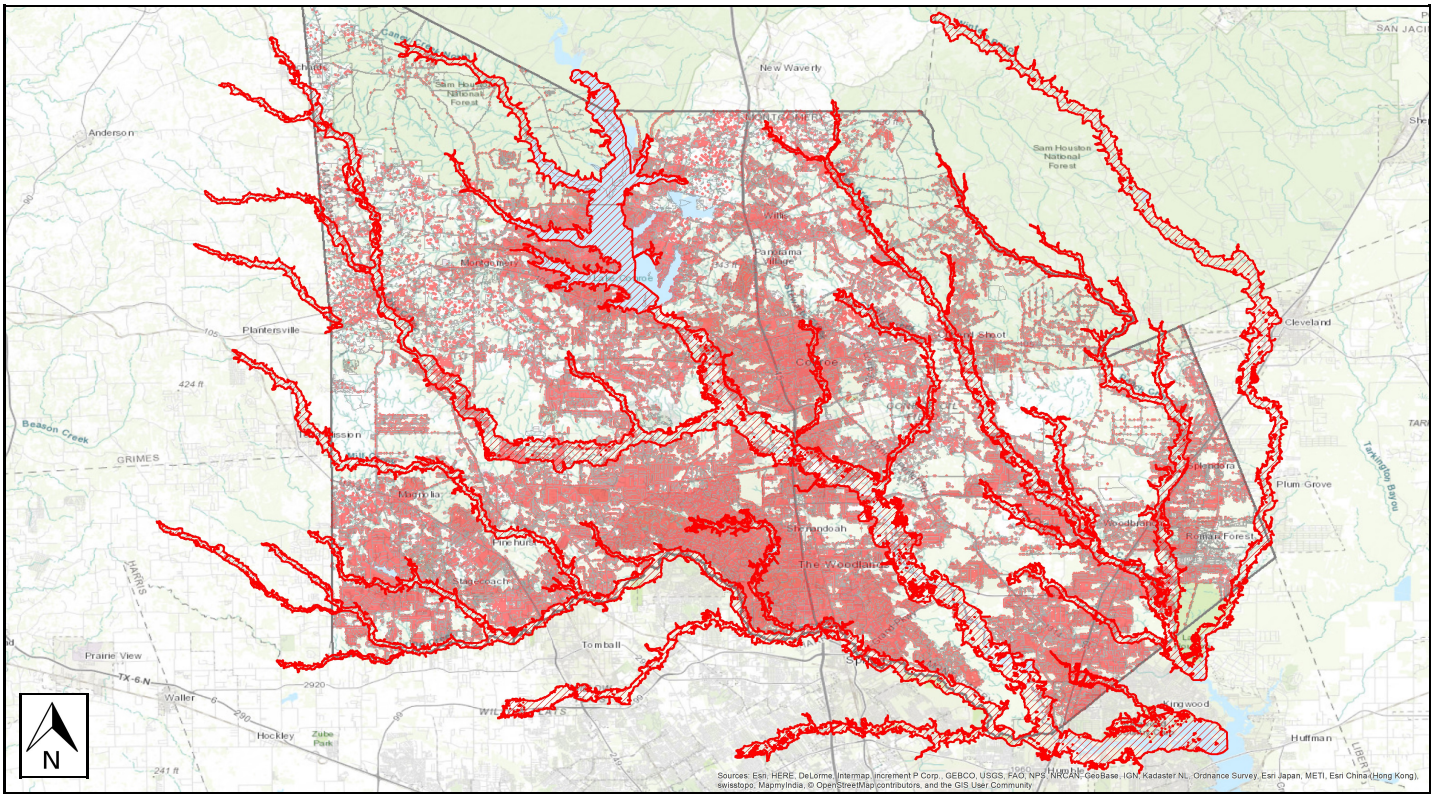


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	2	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	517	18.85	824	30.04	389	14.18	330	12.03	229	8.35	454	16.55
Total	**519**		**825**		**389**		**330**		**229**		**454**	

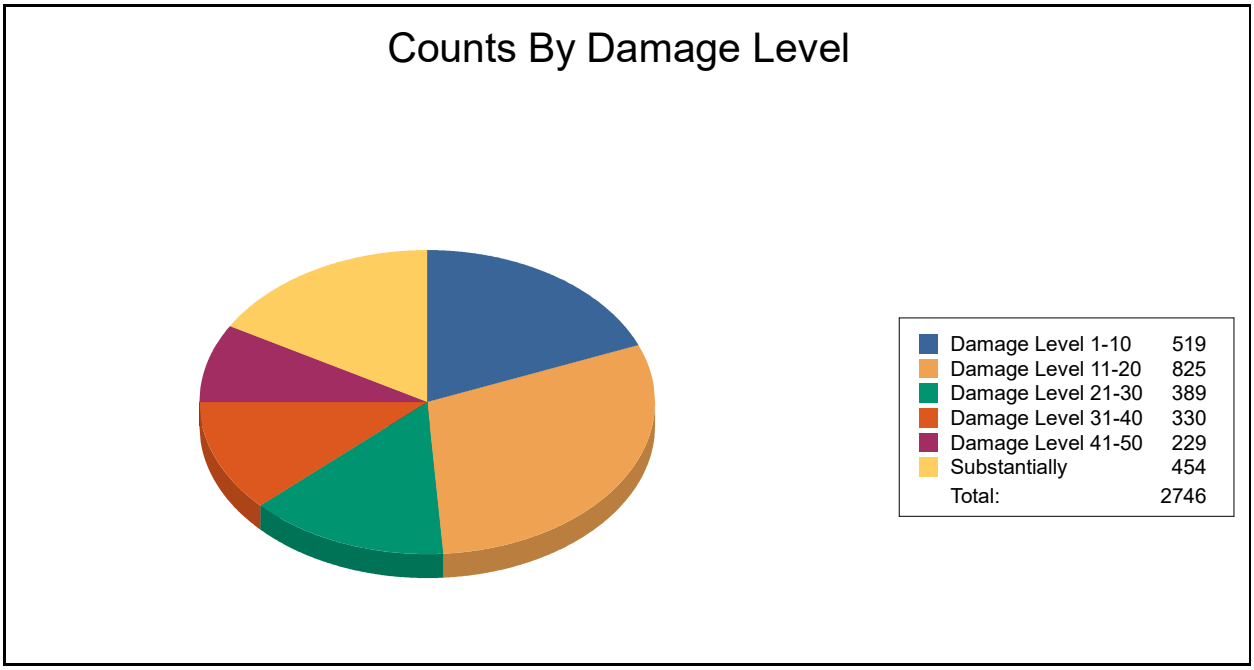


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	25	9	15	5	18	6	0	0	16	6	213	74
Masonry	30	19	62	40	23	15	22	14	13	8	6	4
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	462	20	748	33	348	15	308	13	200	9	235	10

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 584 hospital beds available for use. On the day of the scenario flood event, the model estimates that 584 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	23	0	0	0
Hospitals	5	0	0	0
Police Stations	14	0	0	0
Schools	121	3	0	3

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

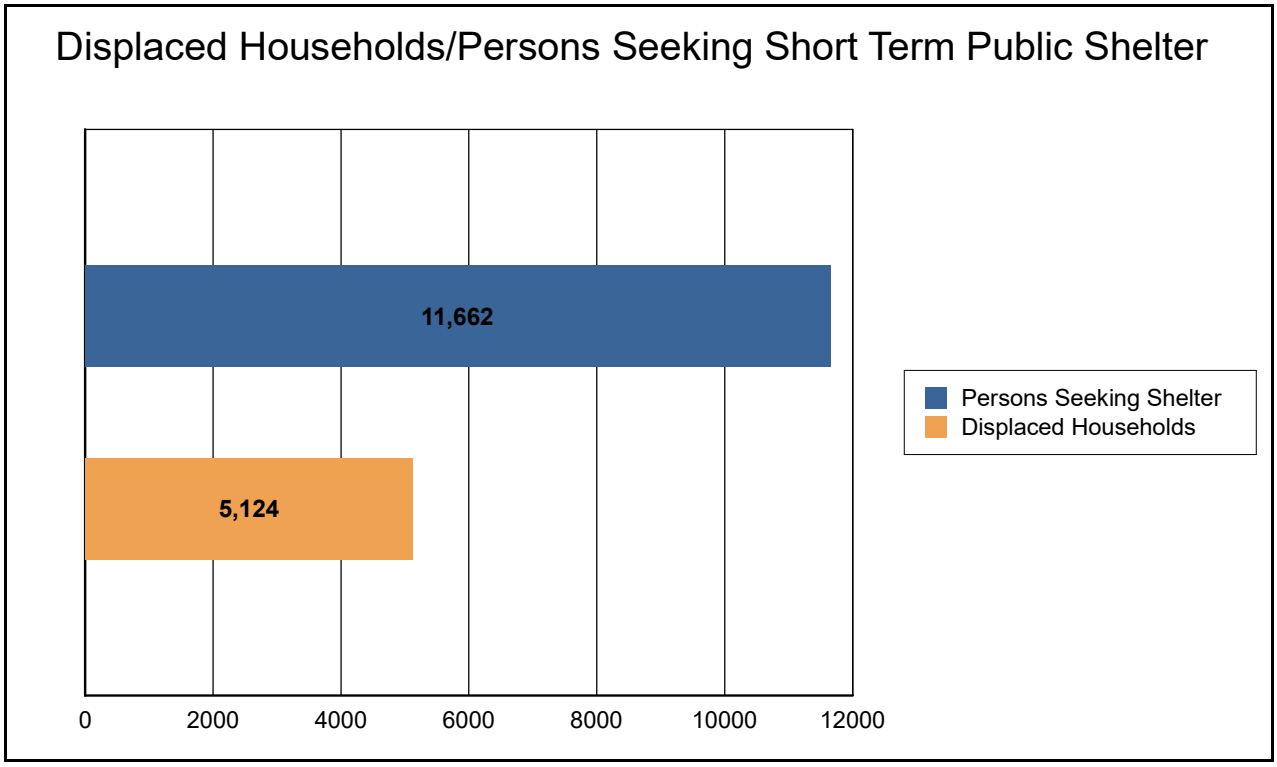
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

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 displaced people that will require accommodations in temporary public shelters. The model estimates 5,124 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 11,662 people (out of a total population of 455,746) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 640.54 million dollars, which represents 4.17 % of the total replacement value of the scenario buildings.

Building-Related Losses

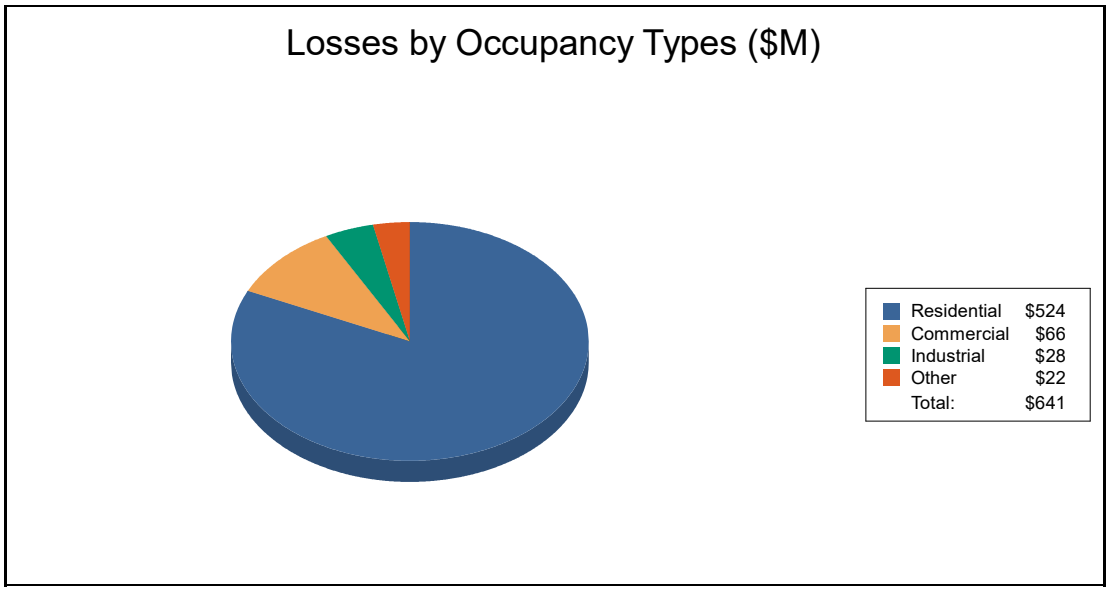
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 638.55 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 81.87% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	335.93	18.13	8.27	4.03	366.36
	Content	187.65	46.27	16.60	17.04	267.56
	Inventory	0.00	1.39	3.04	0.21	4.63
	Subtotal	**523.57**	**65.79**	**27.91**	**21.27**	**638.55**
Business Interruption						
	Income	0.00	0.22	0.00	0.05	0.27
	Relocation	0.68	0.04	0.00	0.03	0.74
	Rental Income	0.13	0.02	0.00	0.00	0.15
	Wage	0.01	0.20	0.00	0.62	0.83
	Subtotal	**0.82**	**0.47**	**0.00**	**0.70**	**1.99**
ALL	**Total**	**524.39**	**66.26**	**27.91**	**21.98**	**640.54**



Appendix A: County Listing for the Region

Texas

- Montgomery

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Texas				
Montgomery	455,746	42,702,039	5,863,496	48,565,535
Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**
Total Study Region	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**

Quick Assessment Report

November 7, 2017

Study Region : MG_1acre
Scenario : MG_all_streams
Return Period: 100
Analysis Option: 0

Regional Statistics

Area (Square Miles)	1,077
Number of Census Blocks	7,219
Number of Buildings	
Residential	155,454
Total	165,054
Number of People in the Region (x 1000)	456
Building Exposure ($ Millions)	
Residential	42,702
Total	48,566

Scenario Results

Shelter Requirements

Displaced Population (# Households)	5,124
Short Term Shelter (# People)	11,662

Economic Loss

Residential Property (Capital Stock) Losses ($ Millions)	524
Total Property (Capital Stock) Losses ($ Millions)	639
Business Interruption (Income) Losses ($ Millions)	2

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific flood. These results can be improved by using enhanced inventory data and flood hazard information.

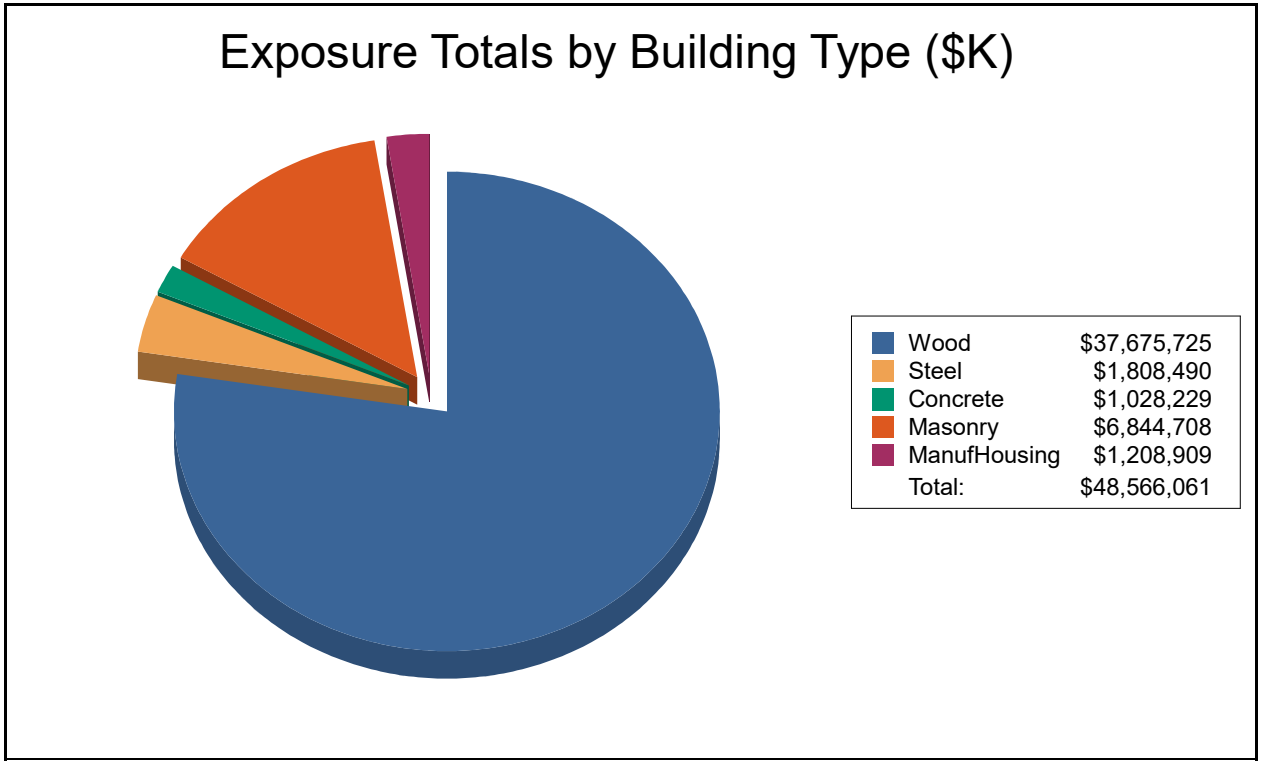
Building Stock Exposure by Building Type

November 07, 2017

All values are in thousands of dollars

	Wood	Steel	Concrete	Masonry	Manuf. Housing	Total
Texas						
Montgomery	37,675,725	1,808,490	1,028,229	6,844,708	1,208,909	48,566,061
Total	**37,675,725**	**1,808,490**	**1,028,229**	**6,844,708**	**1,208,909**	**48,566,061**
Study Region Total	**37,675,725**	**1,808,490**	**1,028,229**	**6,844,708**	**1,208,909**	**48,566,061**

Building Stock Exposure by Building Type



Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

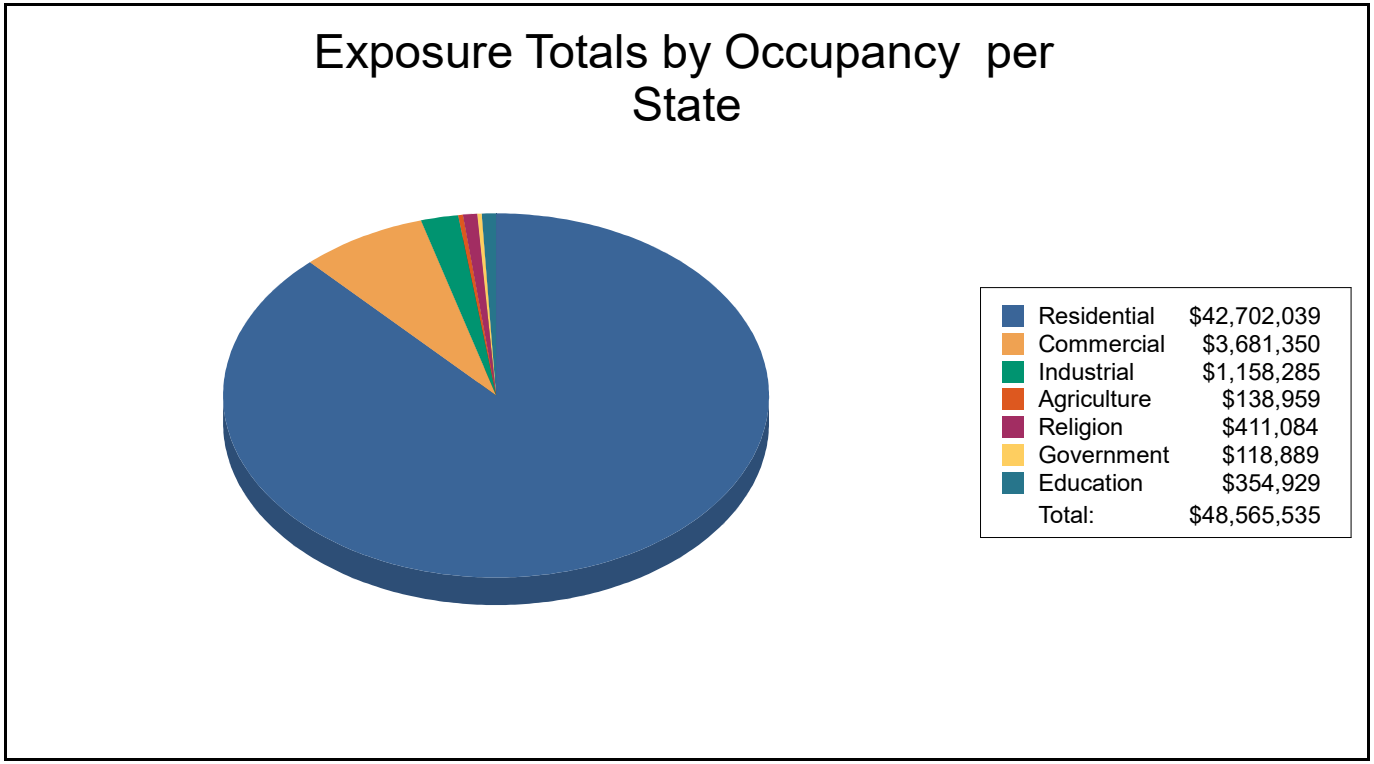
Building Stock Exposure by General Occupancy

November 07, 2017

All values are in thousands of dollars

	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
Texas								
Montgomery	42,702,039	3,681,350	1,158,285	138,959	411,084	118,889	354,929	48,565,535
Total	**42,702,039**	**3,681,350**	**1,158,285**	**138,959**	**411,084**	**118,889**	**354,929**	**48,565,535**
Study Region Total	**42,702,039**	**3,681,350**	**1,158,285**	**138,959**	**411,084**	**118,889**	**354,929**	**48,565,535**

Building Stock Exposure by General Occupancy



Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Depreciated Direct Economic Losses for Buildings

November 07, 2017

All values are in thousands of dollars

	Capital Stock Losses		
	Building Loss	Contents Loss	Total Loss
Texas			
Montgomery	423,243	307,760	731,003
Total	**423,243**	**307,760**	**731,003**
Scenario Total	**423,243**	**307,760**	**731,003**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

Direct Economic Annualized Losses for Buildings

November 07, 2017

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				
	Building Loss	Contents Loss	Inventory Loss	Building Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total Loss
Texas									
Montgomery	592,447	425,890	7,103	3.9	1,201	442	1,310	257	1,028,650
Total	**592,447**	**425,890**	**7,103**	**3.9**	**1,201**	**442**	**1,310**	**257**	**1,028,650**
Scenario Total	**592,447**	**425,890**	**7,103**	**3.9**	**1,201**	**442**	**1,310**	**257**	**1,028,650**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

Direct Economic Loss For Transportation

November 07, 2017

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
Texas								
Montgomery								
Segments	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Bridges	$434.20	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$434.20
Tunnels	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Facilities	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$434.20**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$434.20**
Total	**$434.20**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$434.20**
Scenario Total	**$434.20**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$434.20**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

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FEMA

Direct Economic Losses for Buildings

RiskMAP
Increasing Resilience Together

November 07, 2017

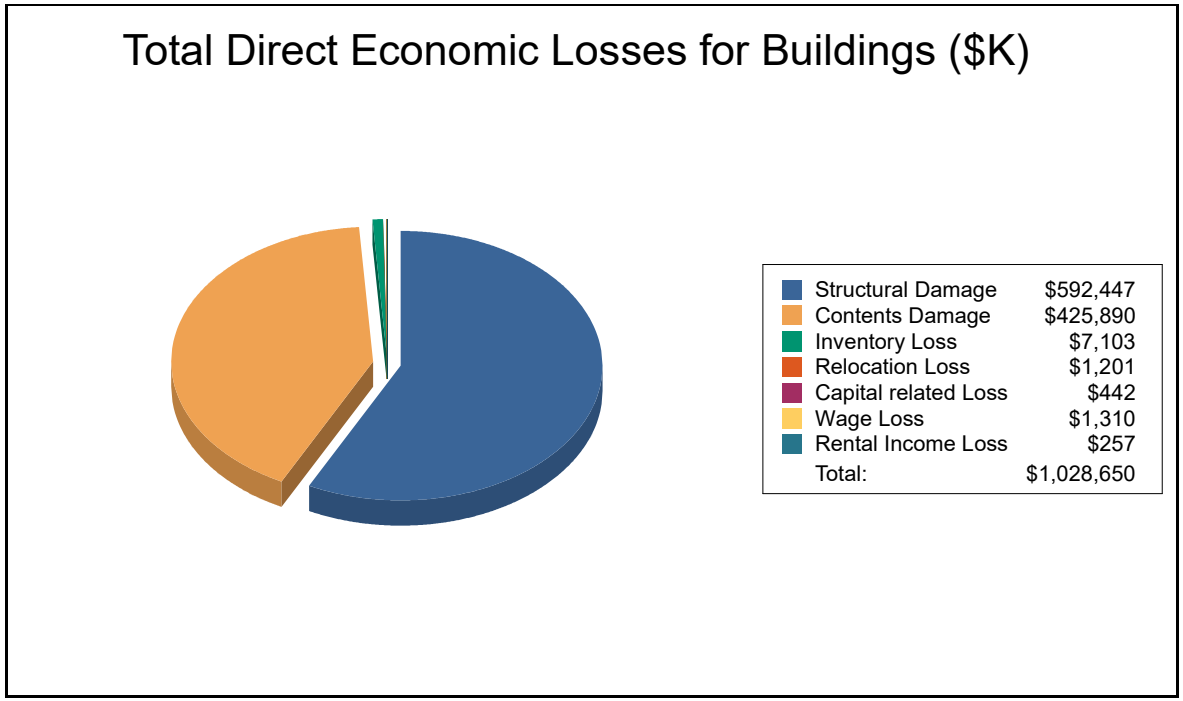
All values are in thousands of dollars

	Capital Stock Losses				Income Losses				
	Building Loss	Contents Loss	Inventory Loss	Building Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total Loss
Texas									
Montgomery	592,447	425,890	7,103	3.90	1,201	442	1,310	257	1,028,650
Total	**592,447**	**425,890**	**7,103**	**3.90**	**1,201**	**442**	**1,310**	**257**	**1,028,650**
Scenario Total	**592,447**	**425,890**	**7,103**	**3.90**	**1,201**	**442**	**1,310**	**257**	**1,028,650**

Direct Economic Losses for Buildings

November 07, 2017

All values are in thousands of dollars

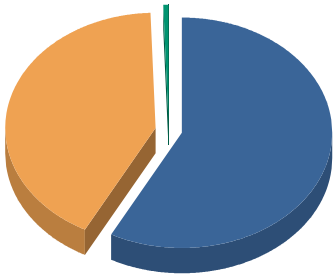


Direct Economic Losses for Buildings

November 07, 2017

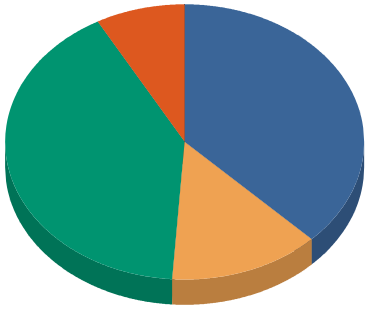
All values are in thousands of dollars

Loss by Capital Stock Categories ($K)



Structural Damage	$592,447
Contents Damage	$425,890
Inventory Loss	$7,103
Total:	$1,025,440

Income Losses by Categories ($K)



Relocation Loss	$1,201
Capital Related Loss	$442
Wage Loss	$1,310
Rental Income Loss	$257
Total:	$3,210

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

Direct Economic Losses for Utilities

November 07, 2017

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
Texas							
Montgomery							
Facilities	$0.00	$0.00	$0.00	$48.67	$0.00	$0.00	$48.67
Pipelines	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$0.00**	**$0.00**	**$0.00**	**$48.67**	**$0.00**	**$0.00**	**$48.67**
Total	**$0.00**	**$0.00**	**$0.00**	**$48.67**	**$0.00**	**$0.00**	**$48.67**
Scenario Total	**$0.00**	**$0.00**	**$0.00**	**$48.67**	**$0.00**	**$0.00**	**$48.67**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

Direct Economic Losses For Vehicles (Day)

November 07, 2017

All values are in dollars.

	Car	Light Truck	Heavy Truck	Total Loss
Texas				
Montgomery	67,151,811	37,792,013	6,369,374	111,313,198
Total	**67,151,811**	**37,792,013**	**6,369,374**	**111,313,198**
Scenario Total	**67,151,811**	**37,792,013**	**6,369,374**	**111,313,198**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Direct Economic Losses For Vehicles (Night)

November 07, 2017

All values are in dollars.

	Car	Light Truck	Heavy Truck	Total Loss
Texas				
Montgomery	91,225,366	51,484,904	6,851,343	149,561,613
Total	**91,225,366**	**51,484,904**	**6,851,343**	**149,561,613**
Scenario Total	**91,225,366**	**51,484,904**	**6,851,343**	**149,561,613**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Fire Station Facilities Damage and Functionality

November 07, 2017

Dollar values are in thousands.

	Count of Fire Stations	Total Building Damage ($)	Total Content Damage ($)	Non-Functional Fire Stations	Average Restoration Time
Texas					
Montgomery					
Fire Station	1	0	0	1	480
Total	**1**	**0**	**0**	**1**	**480**
Total	**1**	**0**	**0**	**1**	**480**
Scenario Total	**1**	**0**	**0**	**1**	**480**

If this report displays all zeros, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Hazus-MH: Flood Global Risk Report

Region Name: MG_1acre

Flood Scenario: MG_all_streams

Print Date: Tuesday, November 07, 2017

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Texas

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,077 square miles and contains 7,219 census blocks. The region contains over 163 thousand households and has a total population of 455,746 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 165,054 buildings in the region with a total building replacement value (excluding contents) of 48,566 million dollars (2010 dollars). Approximately 94.18% of the buildings (and 87.93% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 165,054 buildings in the region which have an aggregate total replacement value of 48,566 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	42,702,039	87.9%
Commercial	3,681,350	7.6%
Industrial	1,158,285	2.4%
Agricultural	138,959	0.3%
Religion	411,084	0.8%
Government	118,889	0.2%
Education	354,929	0.7%
Total	**48,565,535**	**100.0%**

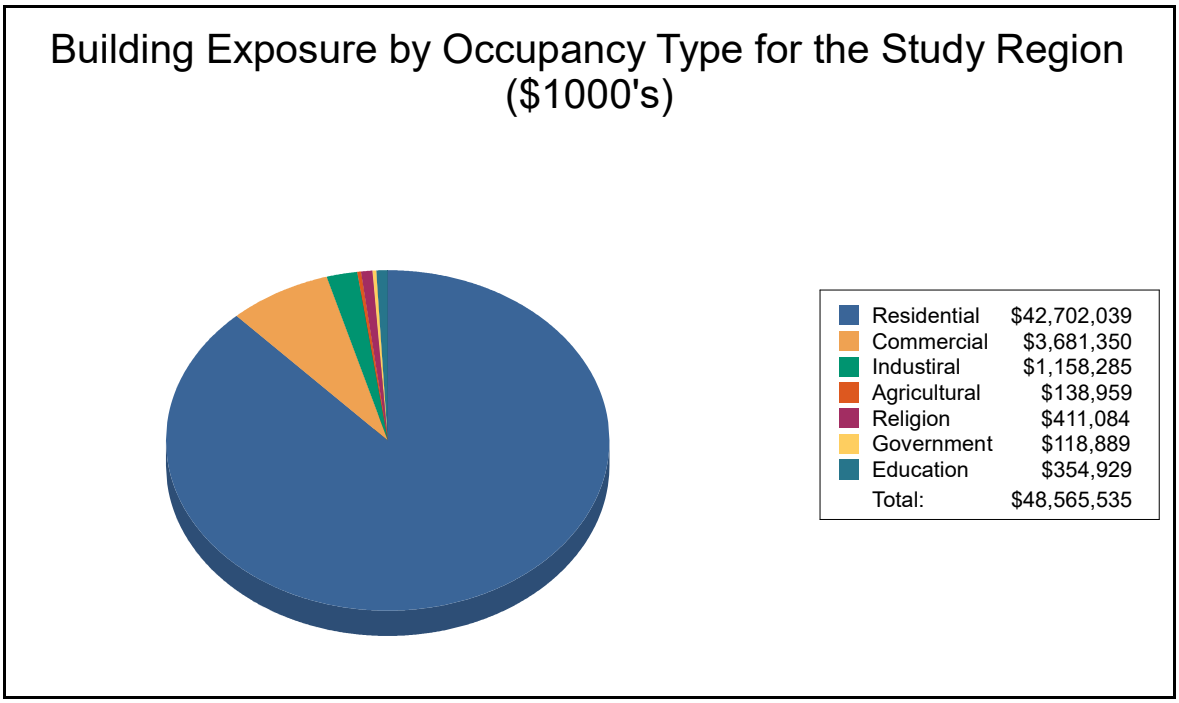
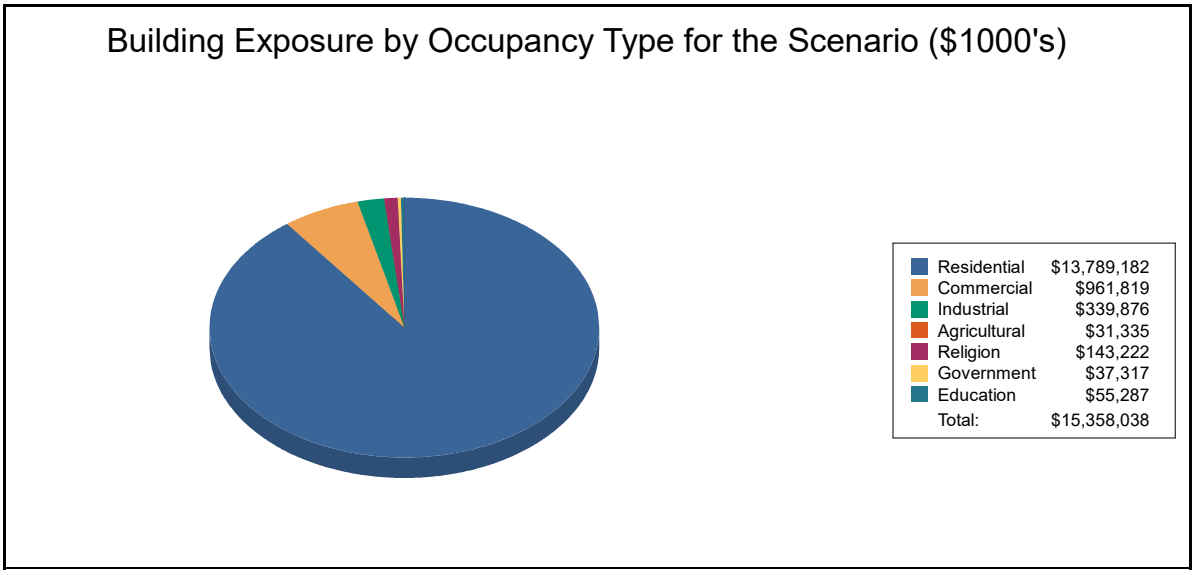


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	13,789,182	89.8%
Commercial	961,819	6.3%
Industrial	339,876	2.2%
Agricultural	31,335	0.2%
Religion	143,222	0.9%
Government	37,317	0.2%
Education	55,287	0.4%
Total	**15,358,038**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 584 beds. There are 121 schools, 23 fire stations, 14 police stations and no emergency operation centers.

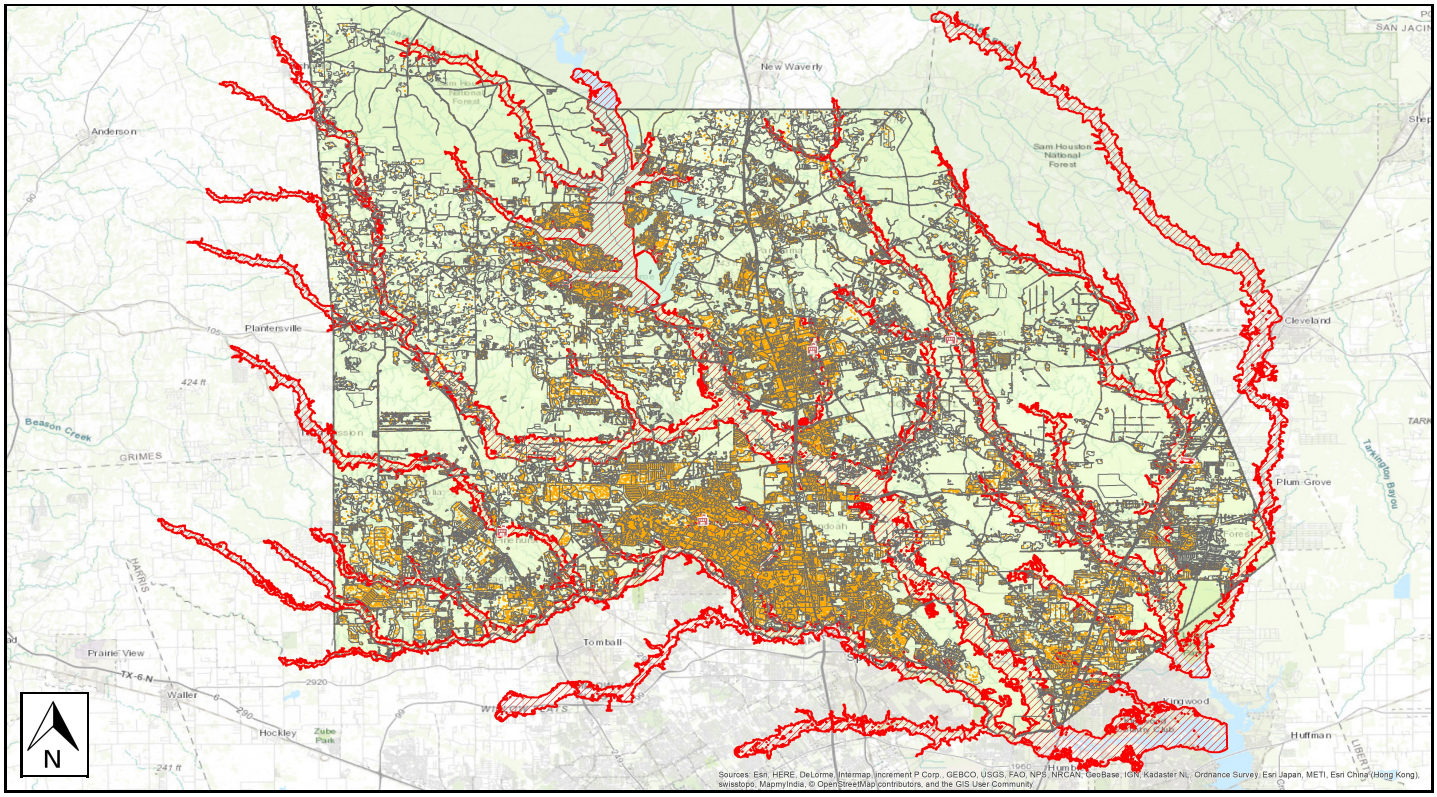
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MG_1acre
Scenario Name:	MG_all_streams
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 3,628 buildings will be at least moderately damaged. This is over 49% of the total number of buildings in the scenario. There are an estimated 1,028 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

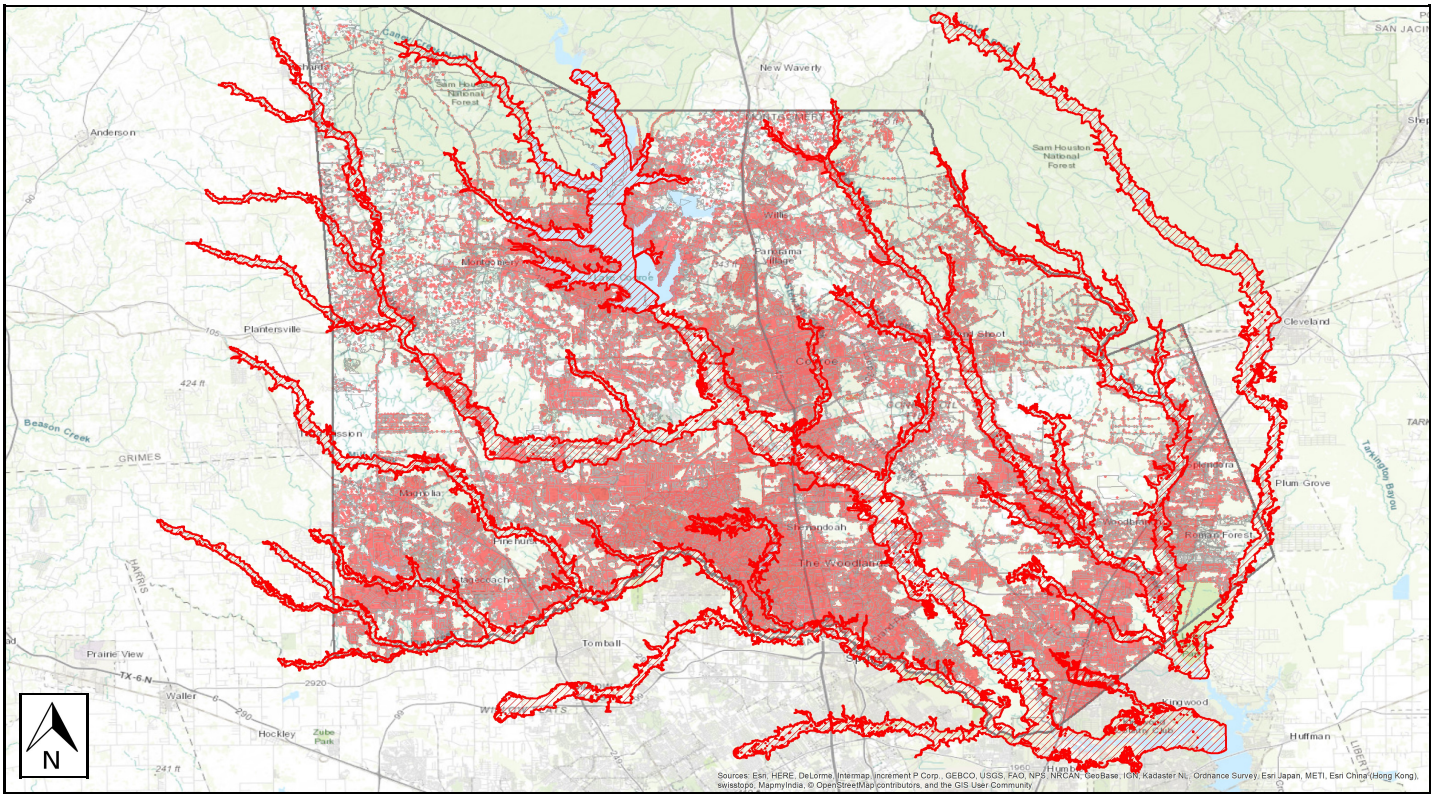


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	4	80.00	1	20.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	705	16.28	1,076	24.84	629	14.52	498	11.50	395	9.12	1,028	23.74
Total	**710**		**1,078**		**629**		**498**		**395**		**1,028**	

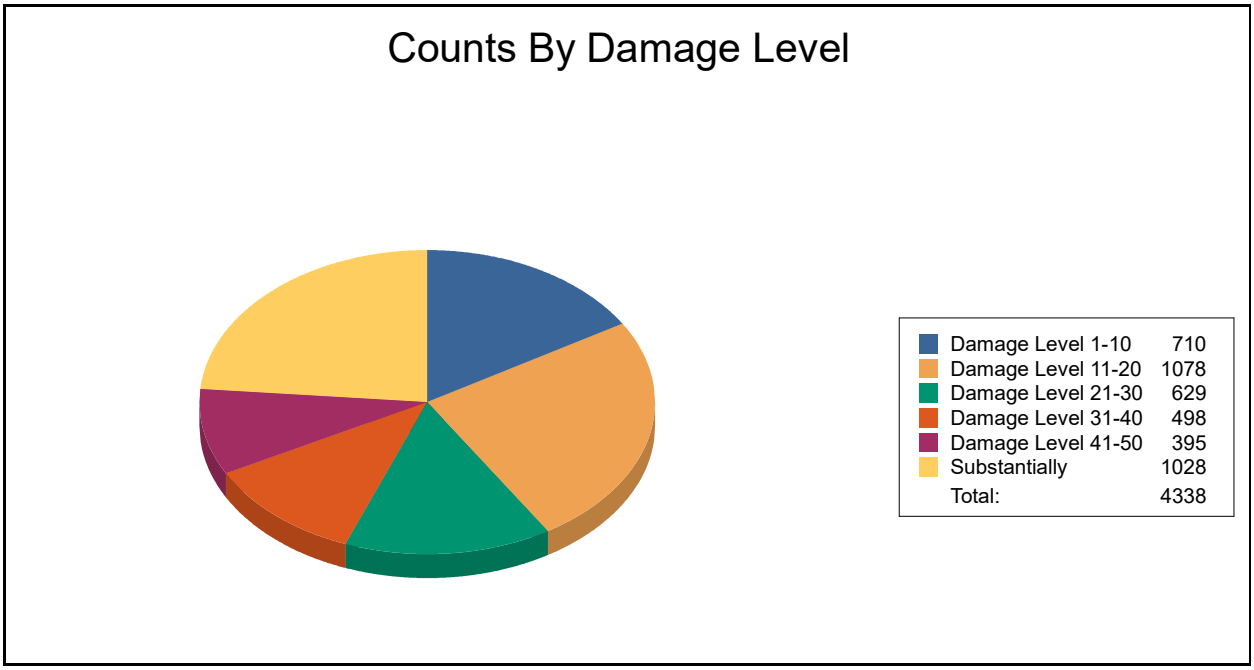


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	32	6	32	6	33	6	0	0	28	5	436	78
Masonry	47	19	79	32	39	16	27	11	24	10	32	13
Steel	1	100	0	0	0	0	0	0	0	0	0	0
Wood	627	18	966	27	557	16	471	13	343	10	560	16

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 584 hospital beds available for use. On the day of the scenario flood event, the model estimates that 584 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	23	1	0	1
Hospitals	5	0	0	0
Police Stations	14	0	0	0
Schools	121	3	0	4

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

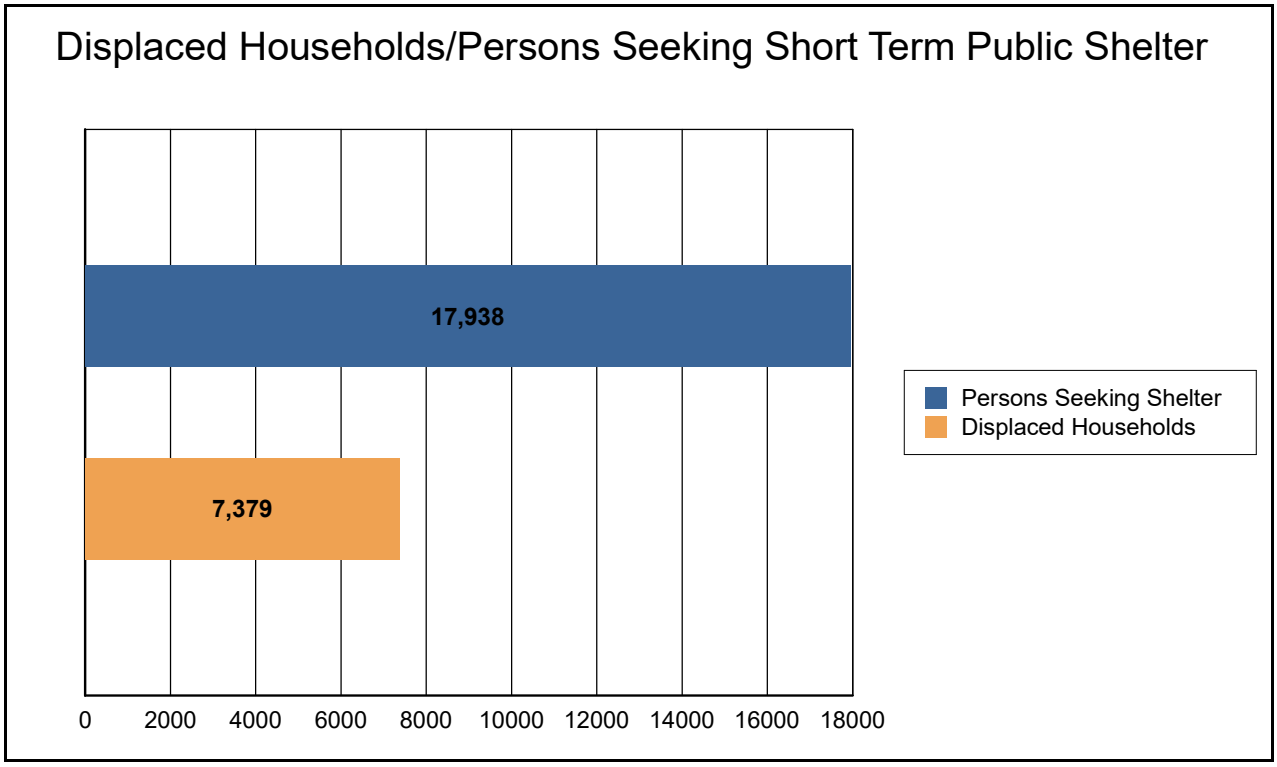
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

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 displaced people that will require accommodations in temporary public shelters. The model estimates 7,379 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 17,938 people (out of a total population of 455,746) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 1,028.65 million dollars, which represents 6.70 % of the total replacement value of the scenario buildings.

Building-Related Losses

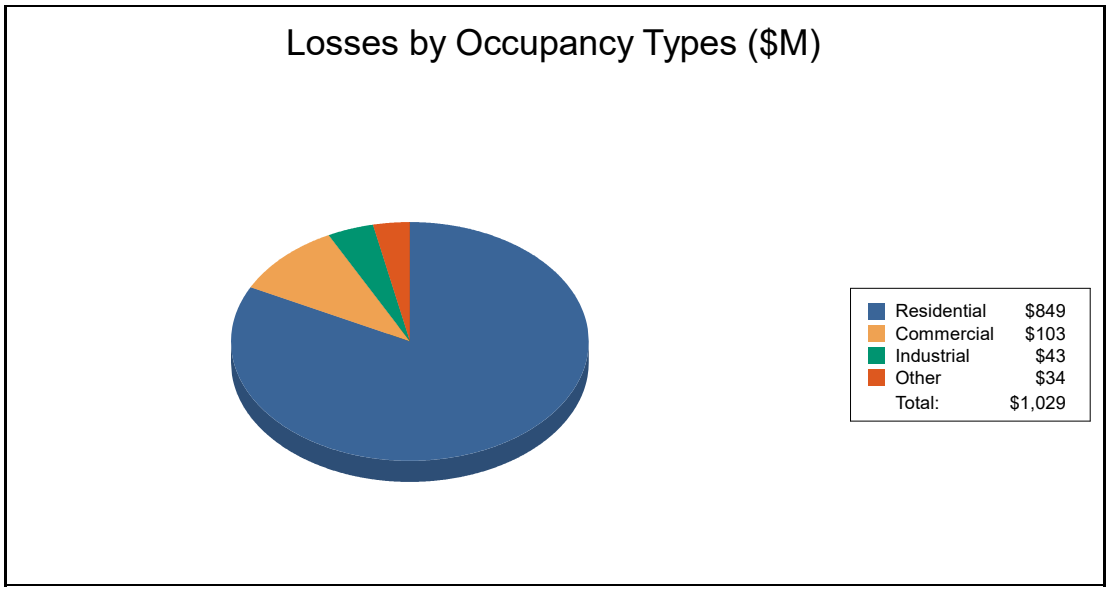
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 1,025.44 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 82.50% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	543.88	29.08	12.93	6.56	592.45
	Content	303.36	71.13	25.81	25.59	425.89
	Inventory	0.00	2.10	4.68	0.32	7.10
	Subtotal	**847.23**	**102.32**	**43.43**	**32.46**	**1,025.44**
Business Interruption						
	Income	0.00	0.36	0.00	0.08	0.44
	Relocation	1.12	0.05	0.00	0.03	1.20
	Rental Income	0.22	0.03	0.00	0.00	0.26
	Wage	0.01	0.36	0.00	0.94	1.31
	Subtotal	**1.36**	**0.80**	**0.00**	**1.05**	**3.21**
ALL	**Total**	**848.59**	**103.12**	**43.43**	**33.52**	**1,028.65**



Appendix A: County Listing for the Region

Texas

- Montgomery

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Texas				
Montgomery	455,746	42,702,039	5,863,496	48,565,535
Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**
Total Study Region	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**

Highway Bridge Damage and Functionality

November 07, 2017

Dollar values are in thousands.

	# of Bridges	Average Damage (%)	Total Loss ($)	Count-Non-Functional
Texas				
Montgomery	73	0.81	434	0
Total	**73**	**0.81**	**434**	**0**
Scenario Total	**73**	**0.81**	**434**	**0**

If this report displays all zeros, two possibilities can explain this.
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

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Quick Assessment Report

November 7, 2017

Study Region : MG_1acre
Scenario : MG_all_streams
Return Period: 500
Analysis Option: 0

Regional Statistics

Area (Square Miles)	1,077
Number of Census Blocks	7,219
Number of Buildings	
Residential	155,454
Total	165,054
Number of People in the Region (x 1000)	456
Building Exposure ($ Millions)	
Residential	42,702
Total	48,566

Scenario Results

Shelter Requirements

Displaced Population (# Households)	7,379
Short Term Shelter (# People)	17,938

Economic Loss

Residential Property (Capital Stock) Losses ($ Millions)	847
Total Property (Capital Stock) Losses ($ Millions)	1,025
Business Interruption (Income) Losses ($ Millions)	3

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific flood. These results can be improved by using enhanced inventory data and flood hazard information.

School Damage and Functionality

November 07, 2017

Dollar values are in thousands.

	Count of Schools	Total Building Damage ($)	Total Content Damage ($)	Non-Functional Schools	Average Restoration Time
Texas					
Montgomery					
Grade Schools (Primary and High Schools)	5	1,636.29	10,650.65	4	570
Total	**5**	**1,636.29**	**10,650.65**	**4**	**570**
Total	**5**	**1,636.29**	**10,650.65**	**4**	**570**
Scenario Total	**5**	**1,636.29**	**10,650.65**	**4**	**570**

If this report displays all zeros, two possibilities can explain this.

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(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

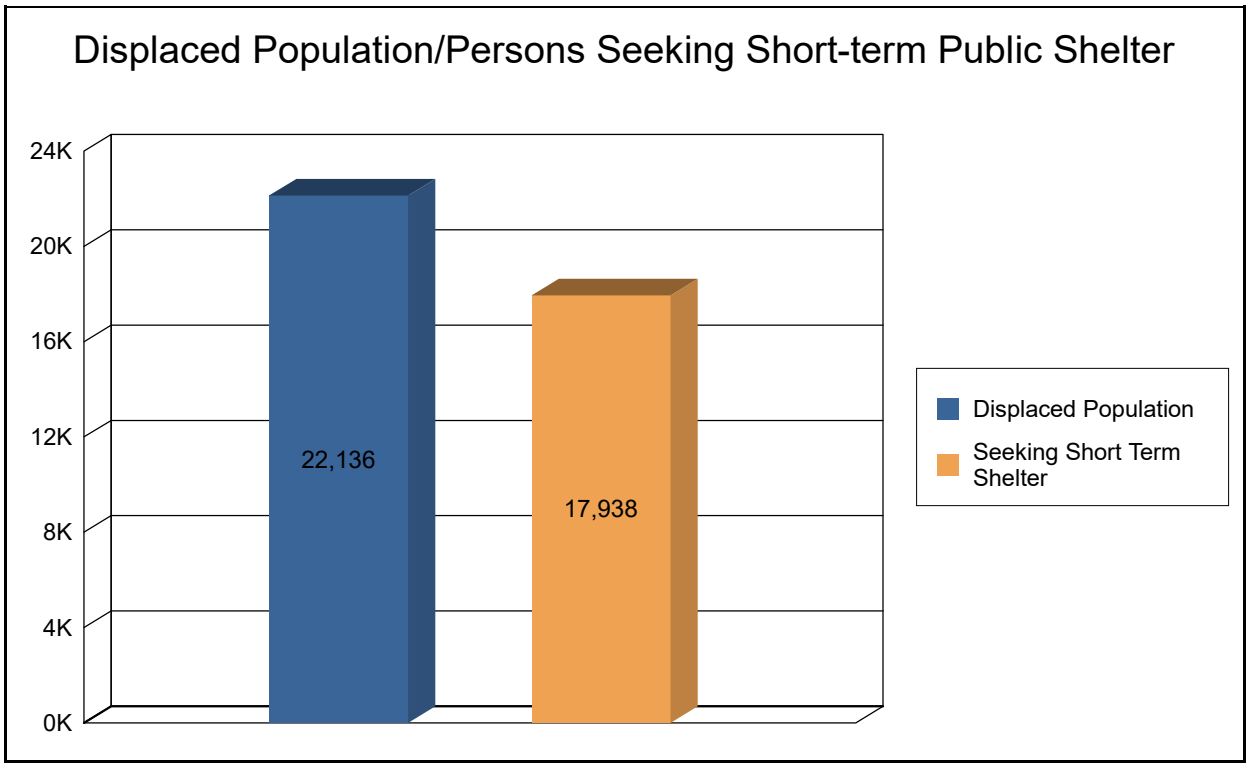
Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

Shelter Summary Report

November 07, 2017

	# of Displaced People	# of People Needing Short Term Shelter
Texas		
Montgomery	22,136	17,938
Total	**22,136**	**17,938**
Scenario Total	**22,136**	**17,938**



Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

Transportation System Dollar Exposure

November 07, 2017

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
Texas								
Montgomery								
Segments	2,292,918	204,753	0	0	0	0	75,928	2,573,599
Bridges	477,390	158	0	0	0	0	0	477,547
Tunnels	0	0	0	0	0	0	0	0
Facilities	0	0	0	970	0	0	10,651	11,621
Total	**2,770,308**	**204,910**	**0**	**970**	**0**	**0**	**86,579**	**3,062,768**
Total	**2,770,308**	**204,910**	**0**	**970**	**0**	**0**	**86,579**	**3,062,768**
Study Region Total	**2,770,308**	**204,910**	**0**	**970**	**0**	**0**	**86,579**	**3,062,768**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

Utility System Dollar Exposure

November 07, 2017

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
Texas							
Montgomery							
Facilities	0	3,082,248	0	970	97,900	801	3,181,919
Pipelines	0	0	0	0	0	0	0
Total	**0**	**3,082,248**	**0**	**970**	**97,900**	**801**	**3,181,919**
Total	**0**	**3,082,248**	**0**	**970**	**97,900**	**801**	**3,181,919**
Study Region Total	**0**	**3,082,248**	**0**	**970**	**97,900**	**801**	**3,181,919**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: MG_1acre
Scenario: MG_all_streams
Return Period: 500

Vehicle Dollar Exposure (Day)

November 07, 2017

All values are in dollars.

	Cars	Light Trucks	Heavy Trucks	Total
Texas				
Montgomery	$1,835,900,337	$1,271,914,159	$404,302,968	$3,512,117,464
Total	**$1,835,900,337**	**$1,271,914,159**	**$404,302,968**	**$3,512,117,464**
Study Region Total	**$1,835,900,337**	**$1,271,914,159**	**$404,302,968**	**$3,512,117,464**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Vehicle Dollar Exposure (Night)

November 07, 2017

All values are in dollars.

	Cars	Light Trucks	Heavy Trucks	Total
Texas				
Montgomery	$2,208,575,624	$1,530,283,643	$427,996,875	$4,166,856,142
Total	**$2,208,575,624**	**$1,530,283,643**	**$427,996,875**	**$4,166,856,142**
Study Region Total	**$2,208,575,624**	**$1,530,283,643**	**$427,996,875**	**$4,166,856,142**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Quick Assessment Report

November 7, 2017

Study Region : MG_1acre

Scenario : Probabilistic

Regional Statistics

Area (Square Miles)	1,077
Number of Census Tracts	59
Number of People in the Region	455,746

General Building Stock

Occupancy	*Building Count*	*Dollar Exposure ($ K)*
Residential	155,454	42,702,039
Commercial	6,192	3,681,350
Other	3,408	2,182,146
Total	165,054	48,565,535

Scenario Results

Number of Residential Buildings Damaged

Return Period	*Minor*	*Moderate*	*Severe*	*Destruction*	*Total*
10	22	1	0	0	23
20	491	17	0	0	508
50	8,237	690	10	6	8,943
100	19,841	2,436	68	53	22,398
200	31,799	6,284	423	269	38,774
500	43,921	12,838	1,650	1,000	59,410
1000	51,738	20,569	3,710	2,454	78,471

Number of Buildings Damaged

Return Period	*Minor*	*Moderate*	*Severe*	*Destruction*	*Total*
10	38	1	0	0	39
20	554	19	0	0	573
50	8,652	760	14	6	9,433
100	20,852	2,706	93	54	23,706
200	33,375	6,939	522	273	41,109
500	46,002	14,094	1,963	1,014	63,073
1000	54,165	22,496	4,414	2,479	83,554

Shelter Requirements

Return Period	*Displaced Households (#Households)*	*Short Term Shelter (#People)*
10	0	0
20	0	0
50	94	19
100	222	50
200	654	142
500	1,469	295
1000	3,540	741

Economic Loss (x 1000)

	Property Damage (Capital Stock) Losses		***Business Interruption***
ReturnPeriod	***Residential***	***Total***	***(Income) Losses***
10	4,043	4,073	2
20	83,121	84,167	830
50	393,016	402,815	20,324
100	733,326	763,314	52,300
200	1,315,406	1,394,514	137,584
500	2,580,550	2,771,933	340,059
1000	3,763,797	4,124,323	578,953
Annualized	33,077	34,917	3,136

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Hazus-MH: Hurricane Global Risk Report

Region Name: MG_1acre

Hurricane Scenario: Probabilistic 10-year Return Period

Print Date: Tuesday, November 07, 2017

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Texas

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,076.87 square miles and contains 59 census tracts. There are over 162 thousand households in the region and has a total population of 455,746 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 165 thousand buildings in the region with a total building replacement value (excluding contents) of 48,566 million dollars (2014 dollars). Approximately 94% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 165,054 buildings in the region which have an aggregate total replacement value of 48,566 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

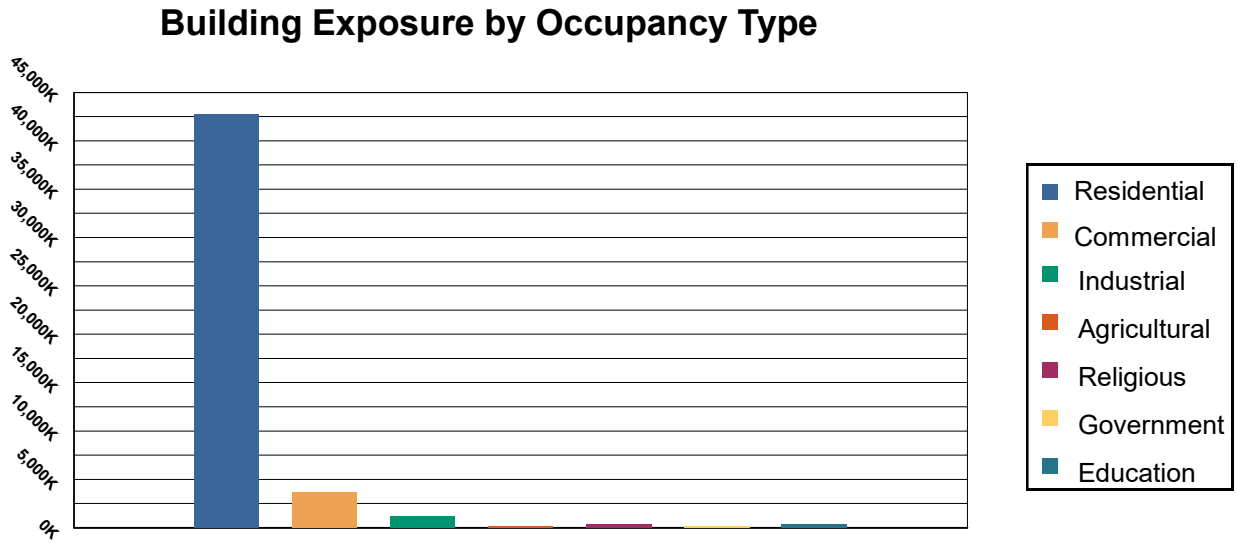


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	42,702,039	87.93 %
Commercial	3,681,350	7.58%
Industrial	1,158,285	2.38%
Agricultural	138,959	0.29%
Religious	411,084	0.85%
Government	118,889	0.24%
Education	354,929	0.73%
Total	**48,565,535**	**100.00%**

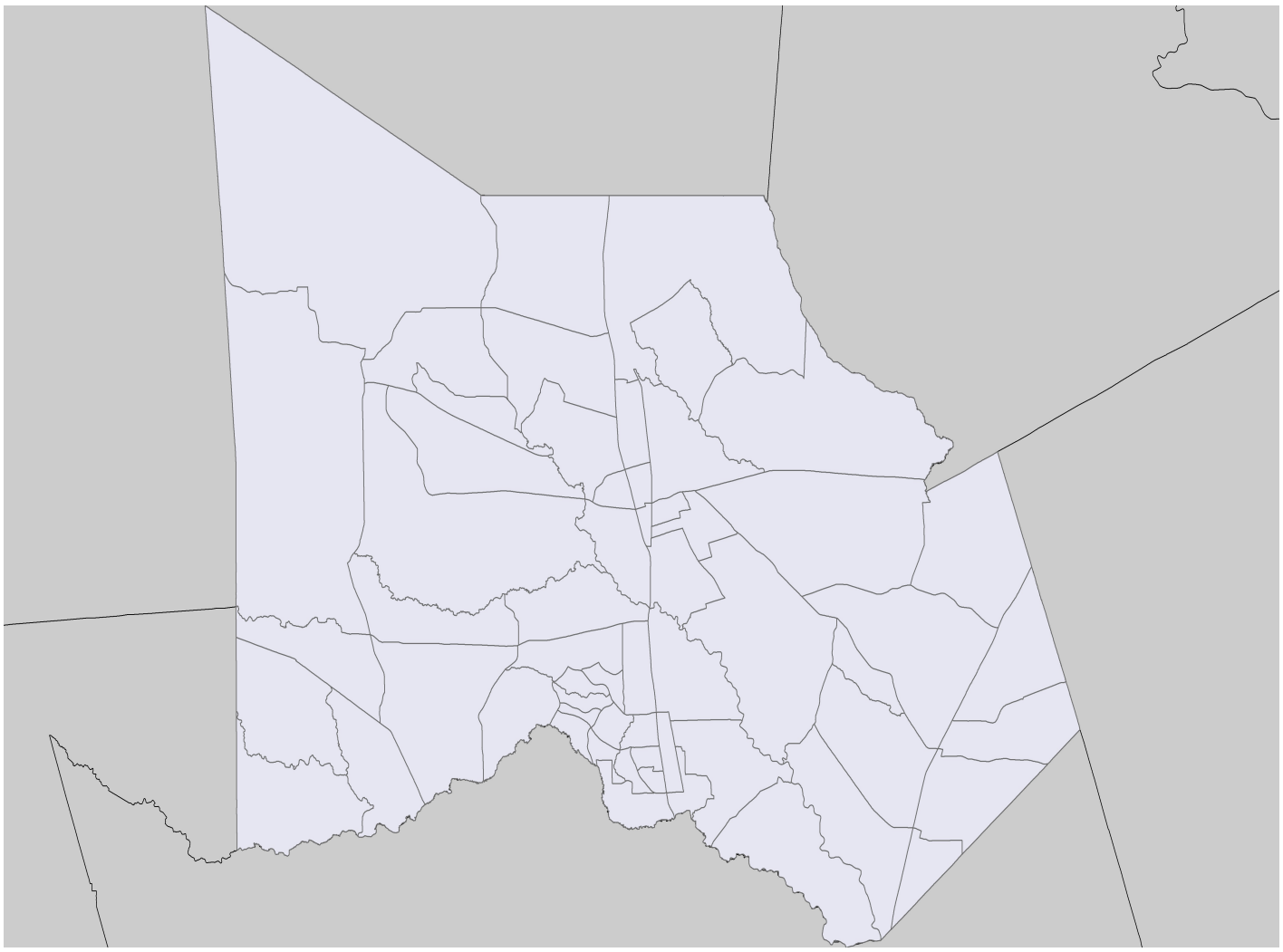
Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 584 beds. There are 121 schools, 23 fire stations, 14 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Thematic Map with peak gust windfield and HU track



Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 1 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

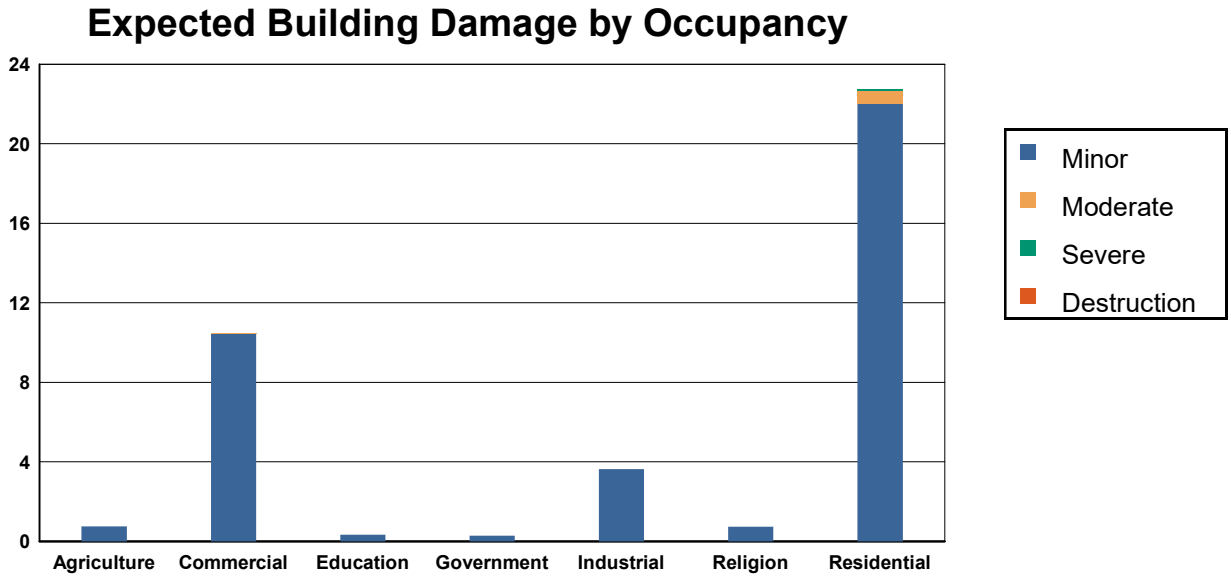


Table 2: Expected Building Damage by Occupancy : 10 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	441	99.83	1	0.17	0	0.00	0	0.00	0	0.00
Commercial	6,182	99.83	10	0.17	0	0.00	0	0.00	0	0.00
Education	202	99.83	0	0.17	0	0.00	0	0.00	0	0.00
Government	134	99.79	0	0.21	0	0.00	0	0.00	0	0.00
Industrial	2,129	99.83	4	0.17	0	0.00	0	0.00	0	0.00
Religion	496	99.85	1	0.15	0	0.00	0	0.00	0	0.00
Residential	155,431	99.99	22	0.01	1	0.00	0	0.00	0	0.00
Total	**165,015**		**38**		**1**		**0**		**0**	

Table 3: Expected Building Damage by Building Type : 10 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,020	99.78	2	0.22	0	0.00	0	0.00	0	0.00
Masonry	15,617	99.91	14	0.09	0	0.00	0	0.00	0	0.00
MH	26,570	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	2,254	99.78	5	0.22	0	0.00	0	0.00	0	0.00
Wood	115,761	99.99	8	0.01	1	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had 584 hospital beds available for use. On the day of the hurricane, the model estimates that 584 hospital beds (only 100.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

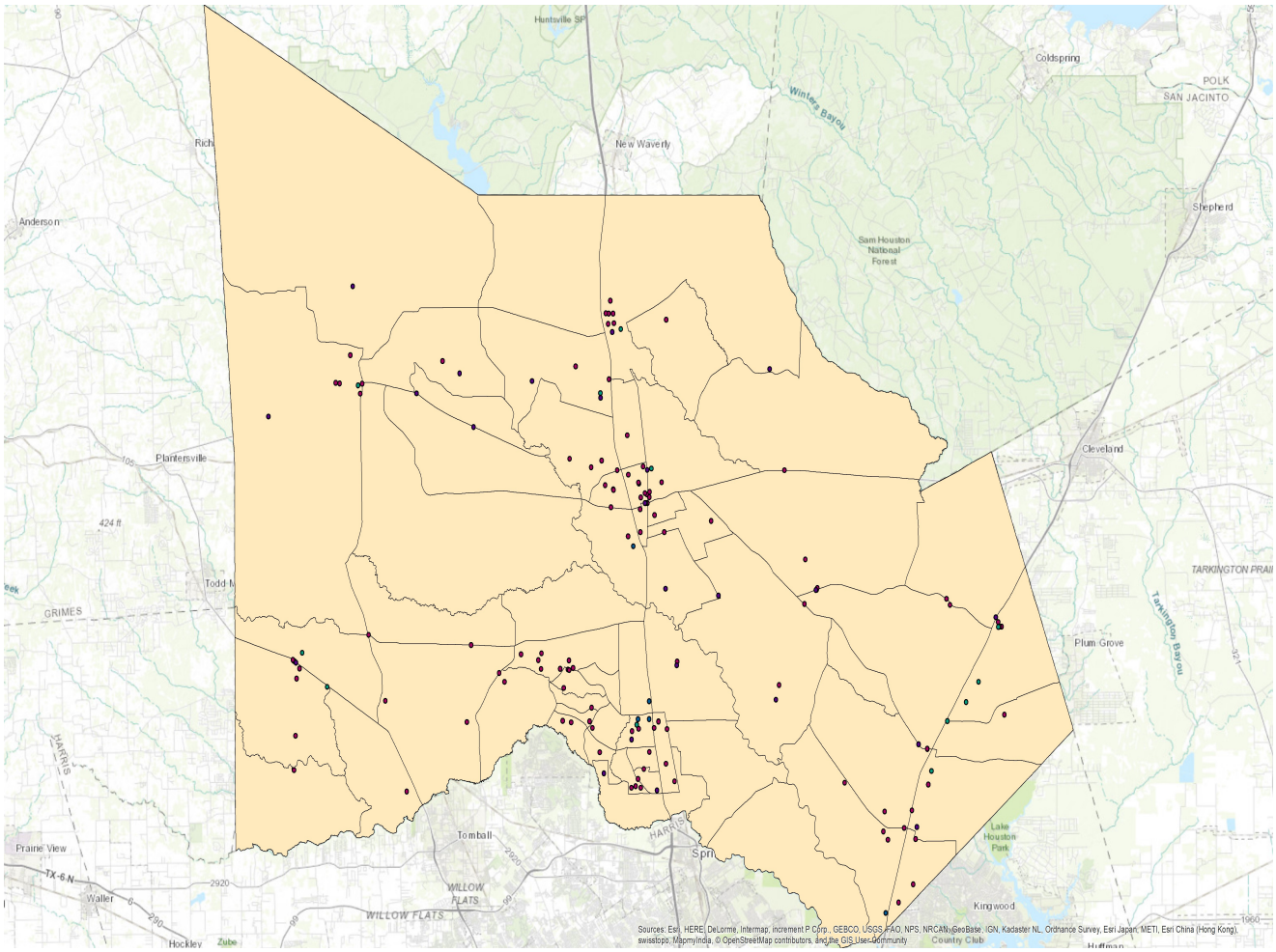
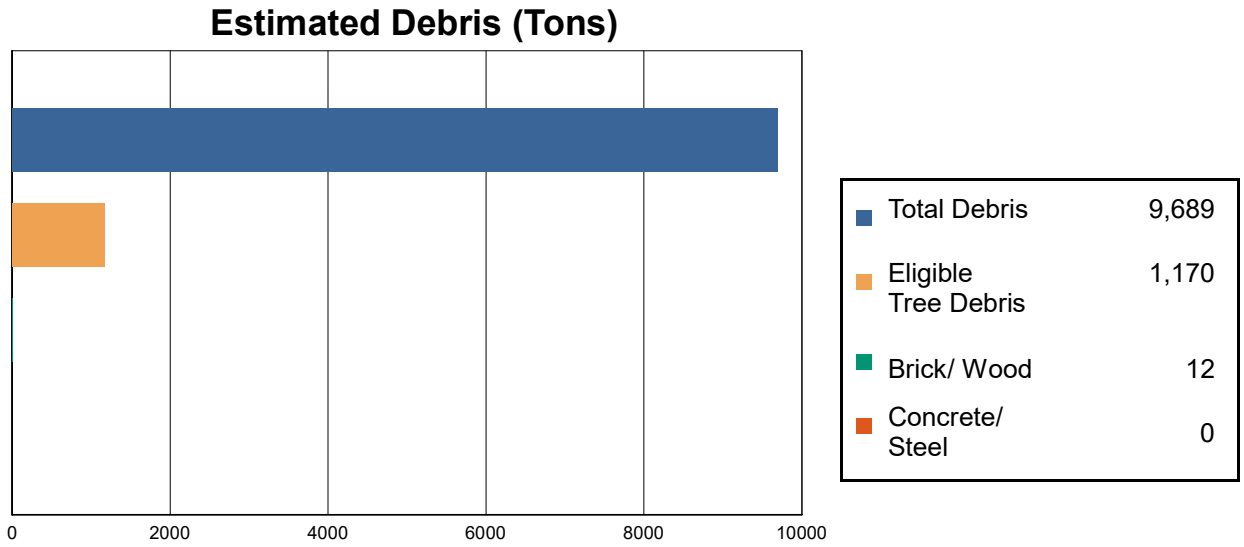


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	23	0	0	23
Hospitals	5	0	0	5
Police Stations	14	0	0	14
Schools	121	0	0	121

Induced Hurricane Damage

Debris Generation

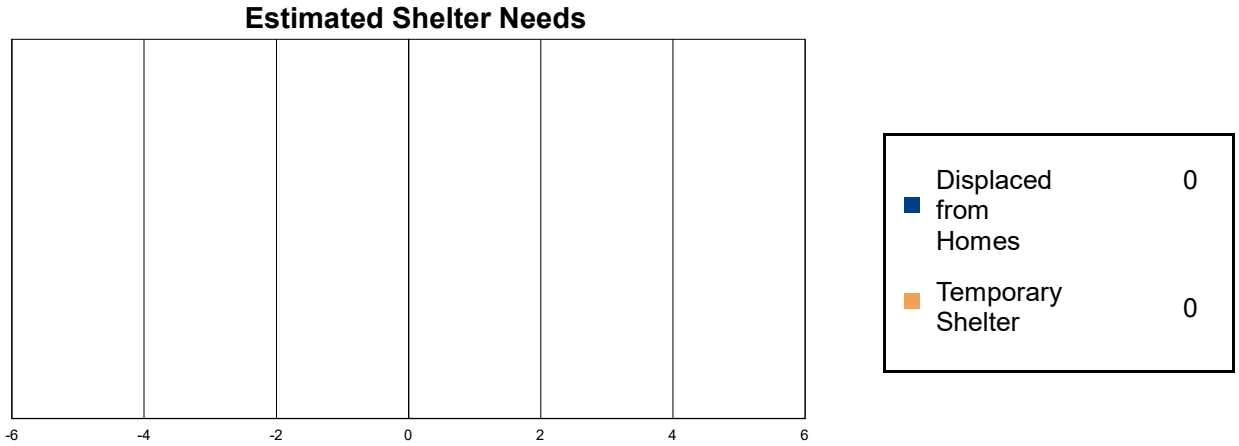


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 9,689 tons of debris will be generated. Of the total amount, 8,503 tons (88%) is Other Tree Debris. Of the remaining 1,186 tons, Brick/Wood comprises 1% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 1 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 1,170 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



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 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 455,746) will seek temporary shelter in public shelters.

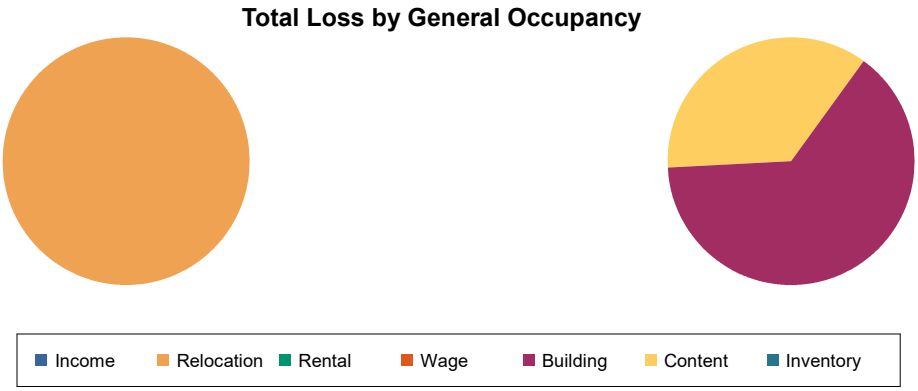
Economic Loss

The total economic loss estimated for the hurricane is 4.1 million dollars, which represents 0.01 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 4 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 99% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



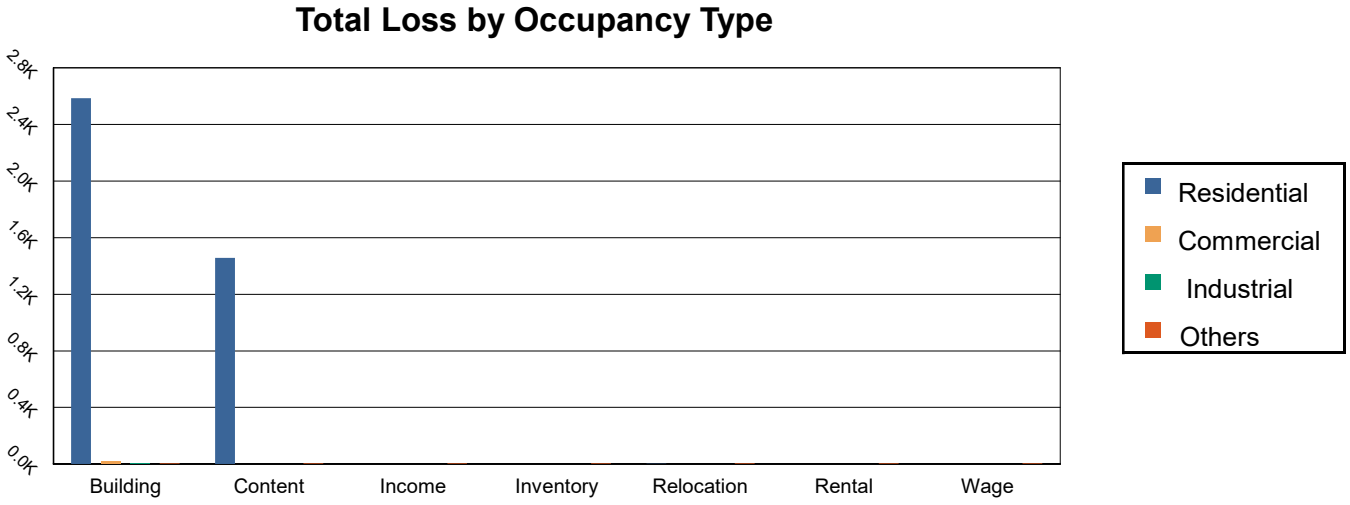


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	2,585.09	17.92	5.87	5.85	2,614.74
	Content	1,458.32	0.00	0.00	0.00	1,458.32
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**4,043.41**	**17.92**	**5.87**	**5.85**	**4,073.05**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	1.85	0.04	0.00	0.00	1.90
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**1.85**	**0.04**	**0.00**	**0.00**	**1.90**
Total						
	Total	**4,045.26**	**17.97**	**5.87**	**5.85**	**4,074.95**

Appendix A: County Listing for the Region

Texas
- Montgomery

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Texas				
Montgomery	455,746	42,702,039	5,863,496	48,565,535
Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**
Study Region Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**

Hazus-MH: Hurricane Global Risk Report

Region Name: MG_1acre

Hurricane Scenario: Probabilistic 50-year Return Period

Print Date: Tuesday, November 07, 2017

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The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

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Note:
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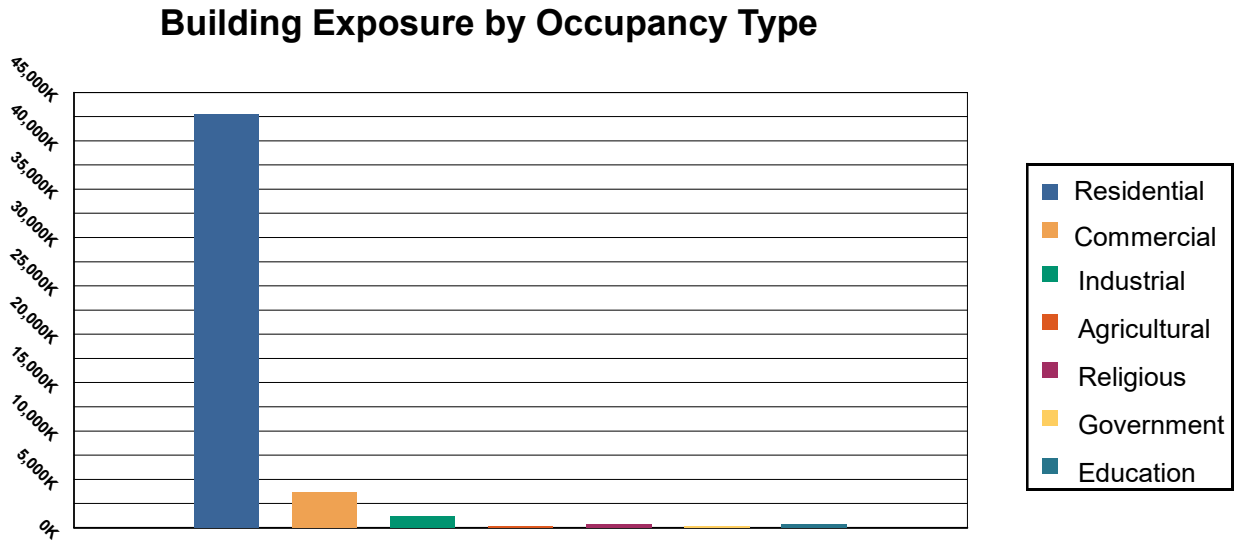
General Building Stock

Hazus estimates that there are 165,054 buildings in the region which have an aggregate total replacement value of 48,566 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.



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Religious	411,084	0.85%
Government	118,889	0.24%
Education	354,929	0.73%
Total	**48,565,535**	**100.00%**

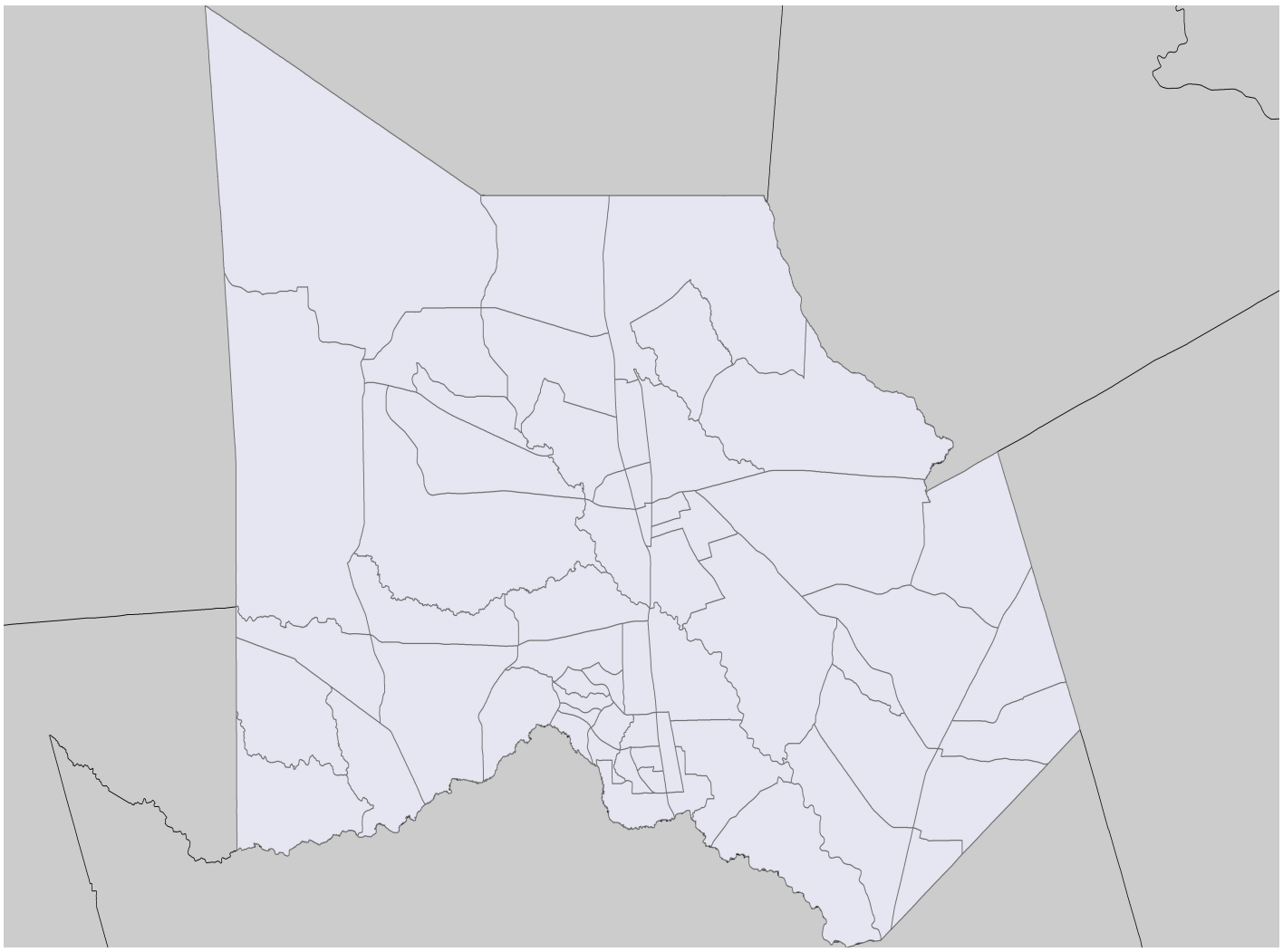
Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 584 beds. There are 121 schools, 23 fire stations, 14 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Thematic Map with peak gust windfield and HU track



Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 781 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 6 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

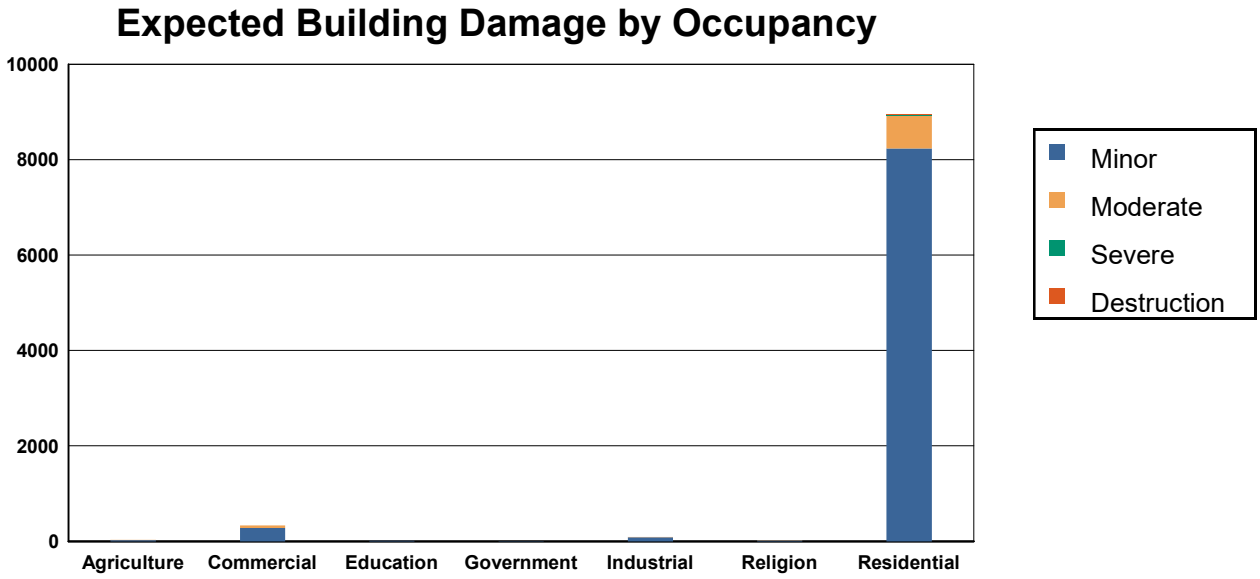


Table 2: Expected Building Damage by Occupancy : 50 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	411	93.08	22	4.94	6	1.38	2	0.56	0	0.03
Commercial	5,859	94.62	278	4.49	53	0.86	2	0.03	0	0.00
Education	193	95.65	8	3.98	1	0.36	0	0.01	0	0.00
Government	128	95.81	5	3.82	0	0.36	0	0.01	0	0.00
Industrial	2,043	95.76	82	3.85	8	0.36	1	0.03	0	0.00
Religion	475	95.67	20	4.00	2	0.32	0	0.01	0	0.00
Residential	146,511	94.25	8,237	5.30	690	0.44	10	0.01	6	0.00
Total	**155,621**		**8,652**		**760**		**14**		**6**	

Table 3: Expected Building Damage by Building Type : 50 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	968	94.75	47	4.58	7	0.66	0	0.01	0	0.00
Masonry	14,643	93.68	806	5.16	179	1.14	3	0.02	0	0.00
MH	26,531	99.85	30	0.11	7	0.03	0	0.00	1	0.01
Steel	2,134	94.46	99	4.40	25	1.10	1	0.04	0	0.00
Wood	108,363	93.60	6,981	6.03	412	0.36	10	0.01	3	0.00

Essential Facility Damage

Before the hurricane, the region had 584 hospital beds available for use. On the day of the hurricane, the model estimates that 394 hospital beds (only 67.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

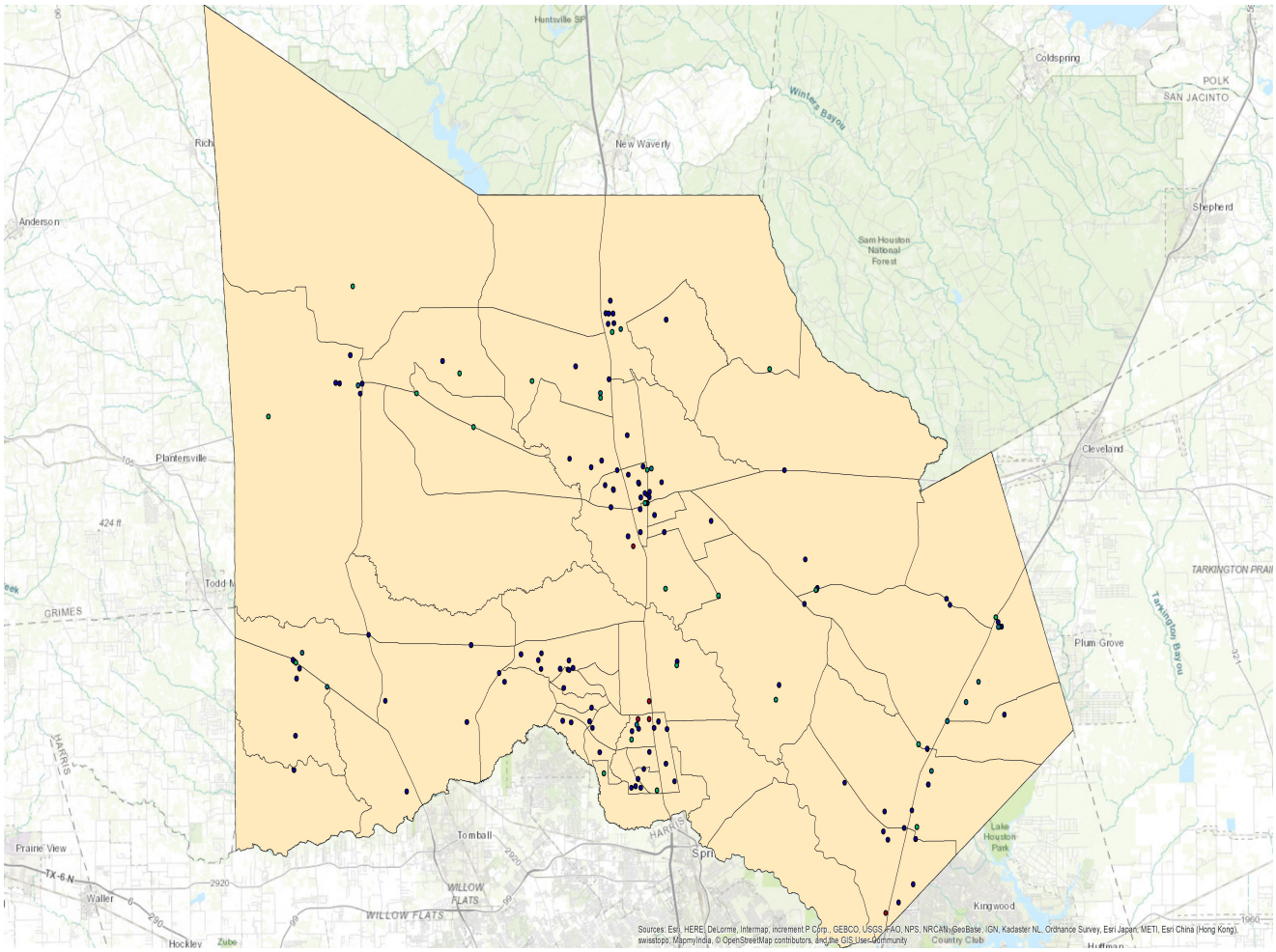
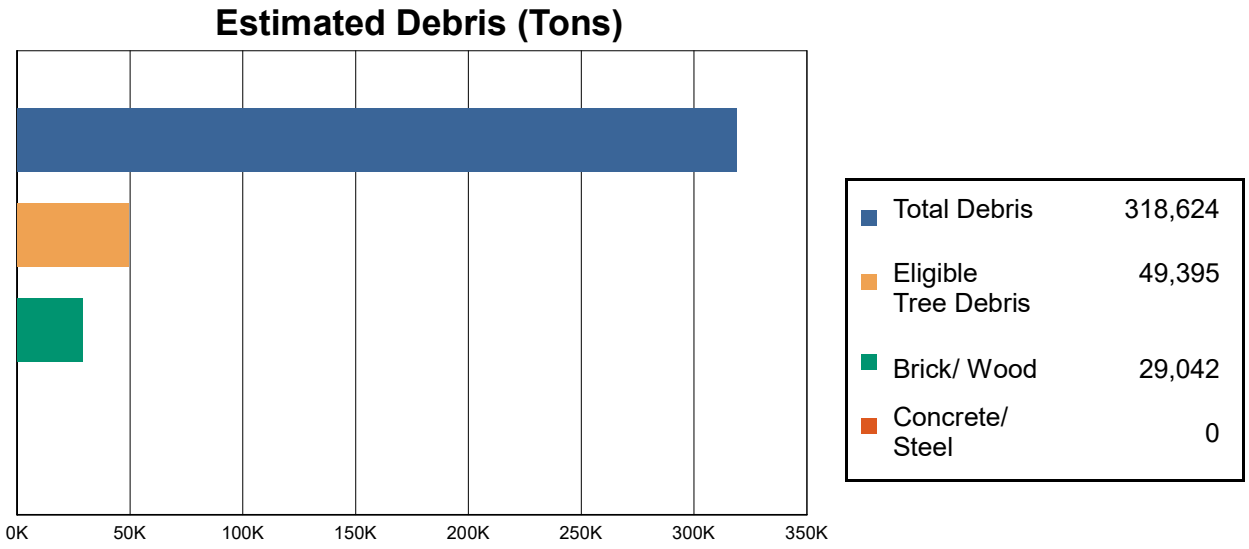


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	23	0	0	23
Hospitals	5	2	0	4
Police Stations	14	0	0	14
Schools	121	0	0	121

Induced Hurricane Damage

Debris Generation

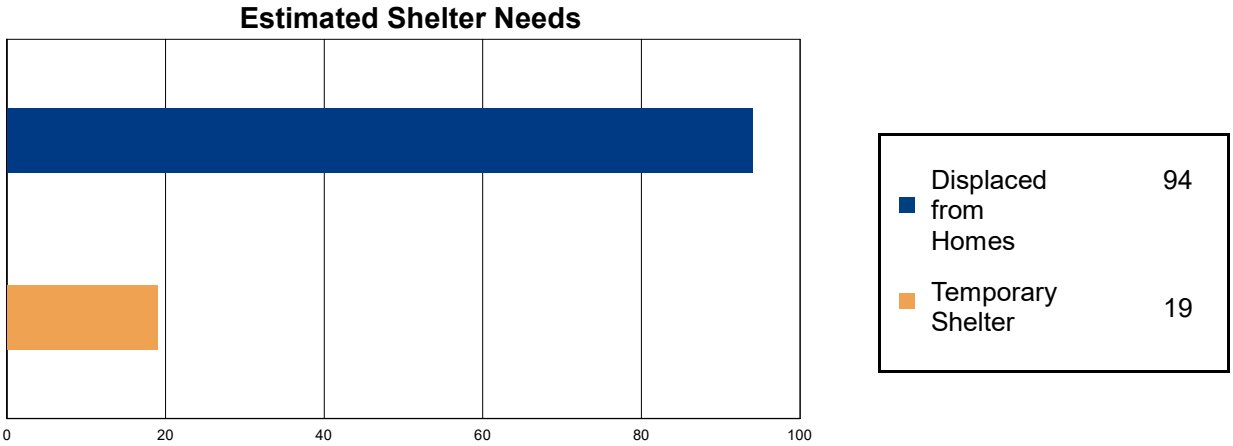


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 318,624 tons of debris will be generated. Of the total amount, 240,131 tons (75%) is Other Tree Debris. Of the remaining 78,493 tons, Brick/Wood comprises 37% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 1164 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 49,395 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



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 94 households to be displaced due to the hurricane. Of these, 19 people (out of a total population of 455,746) will seek temporary shelter in public shelters.

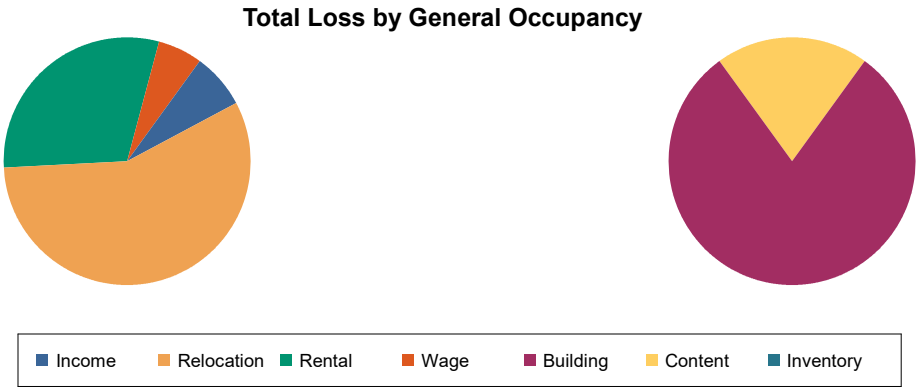
Economic Loss

The total economic loss estimated for the hurricane is 423.1 million dollars, which represents 0.87 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 423 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 97% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



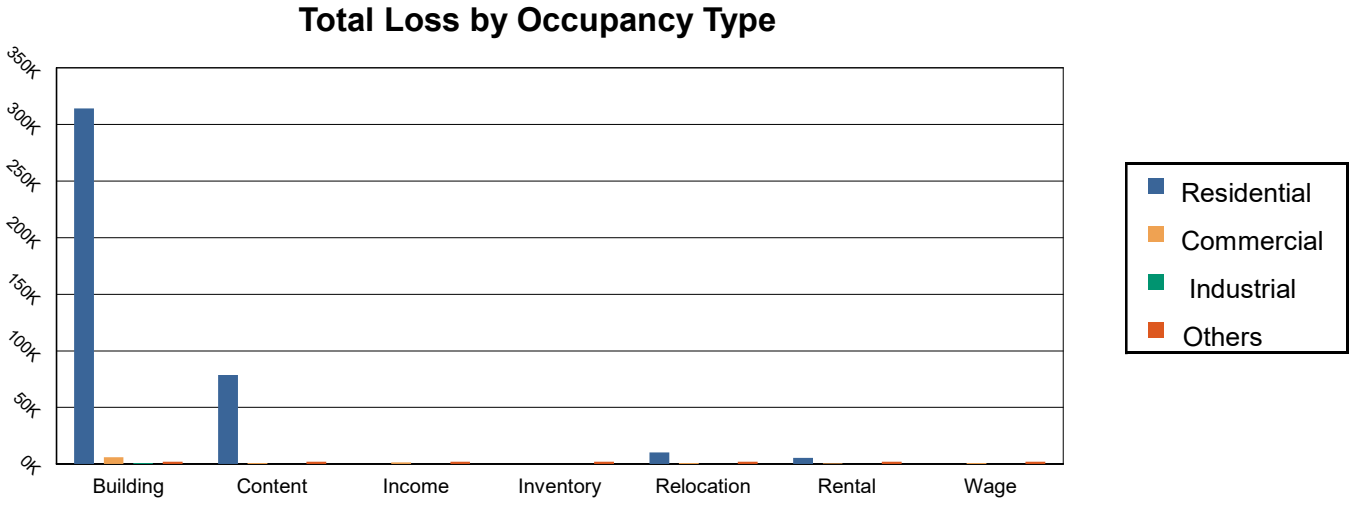


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	314,283.49	6,020.84	906.51	1,147.51	322,358.35
	Content	78,732.89	1,075.89	172.41	398.88	80,380.08
	Inventory	0.00	18.19	30.88	27.33	76.40
	Subtotal	**393,016.38**	**7,114.93**	**1,109.80**	**1,573.73**	**402,814.83**
Business Interruption Loss						
	Income	0.15	1,388.77	6.59	70.71	1,466.21
	Relocation	10,277.35	1,041.56	43.74	211.46	11,574.11
	Rental	5,501.72	602.99	4.24	11.66	6,120.61
	Wage	0.34	932.17	10.10	220.31	1,162.93
	Subtotal	**15,779.55**	**3,965.48**	**64.68**	**514.14**	**20,323.85**
Total						
	Total	**408,795.93**	**11,080.41**	**1,174.47**	**2,087.87**	**423,138.68**

Appendix A: County Listing for the Region

Texas
- Montgomery

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Texas				
Montgomery	455,746	42,702,039	5,863,496	48,565,535
Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**
Study Region Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**

Hazus-MH: Hurricane Global Risk Report

Region Name: MG_1acre

Hurricane Scenario: Probabilistic 100-year Return Period

Print Date: Tuesday, November 07, 2017

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Texas

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,076.87 square miles and contains 59 census tracts. There are over 162 thousand households in the region and has a total population of 455,746 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 165 thousand buildings in the region with a total building replacement value (excluding contents) of 48,566 million dollars (2014 dollars). Approximately 94% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 165,054 buildings in the region which have an aggregate total replacement value of 48,566 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

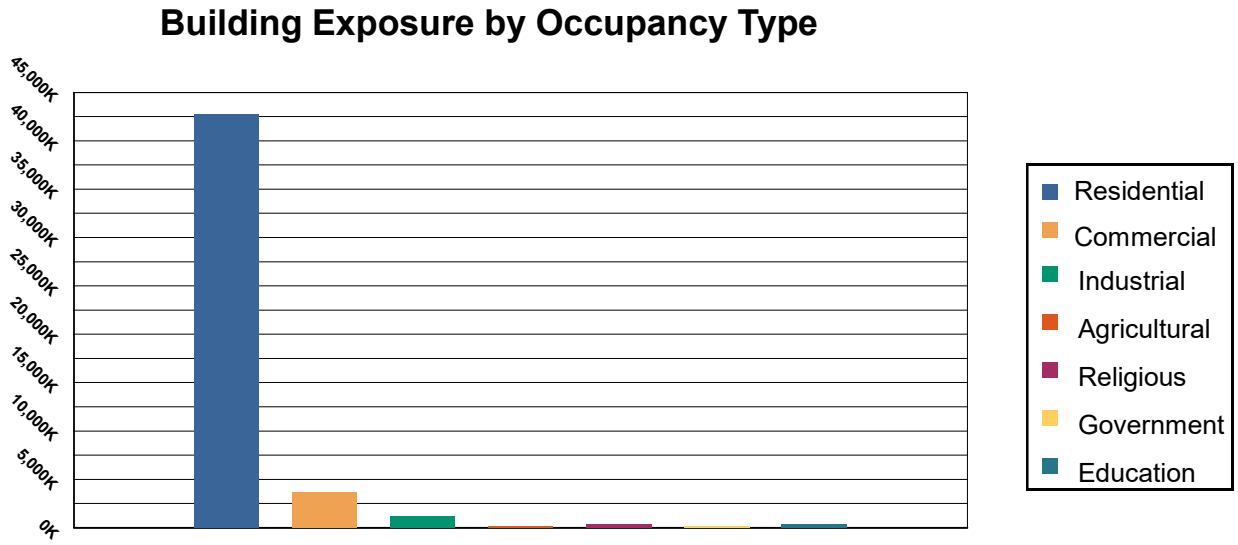


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	42,702,039	87.93 %
Commercial	3,681,350	7.58%
Industrial	1,158,285	2.38%
Agricultural	138,959	0.29%
Religious	411,084	0.85%
Government	118,889	0.24%
Education	354,929	0.73%
Total	**48,565,535**	**100.00%**

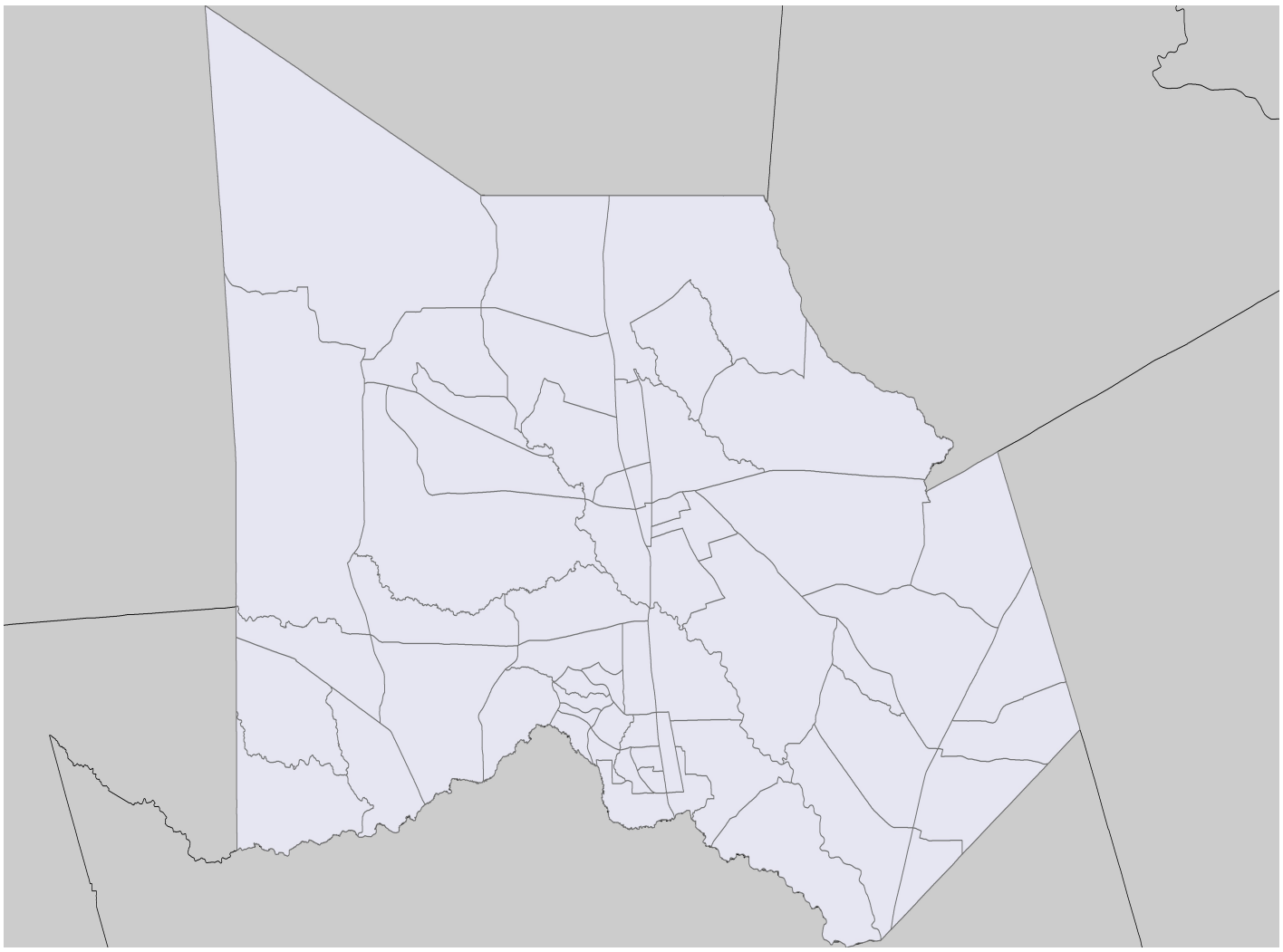
Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 584 beds. There are 121 schools, 23 fire stations, 14 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Thematic Map with peak gust windfield and HU track



Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 2,854 buildings will be at least moderately damaged. This is over 2% of the total number of buildings in the region. There are an estimated 54 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

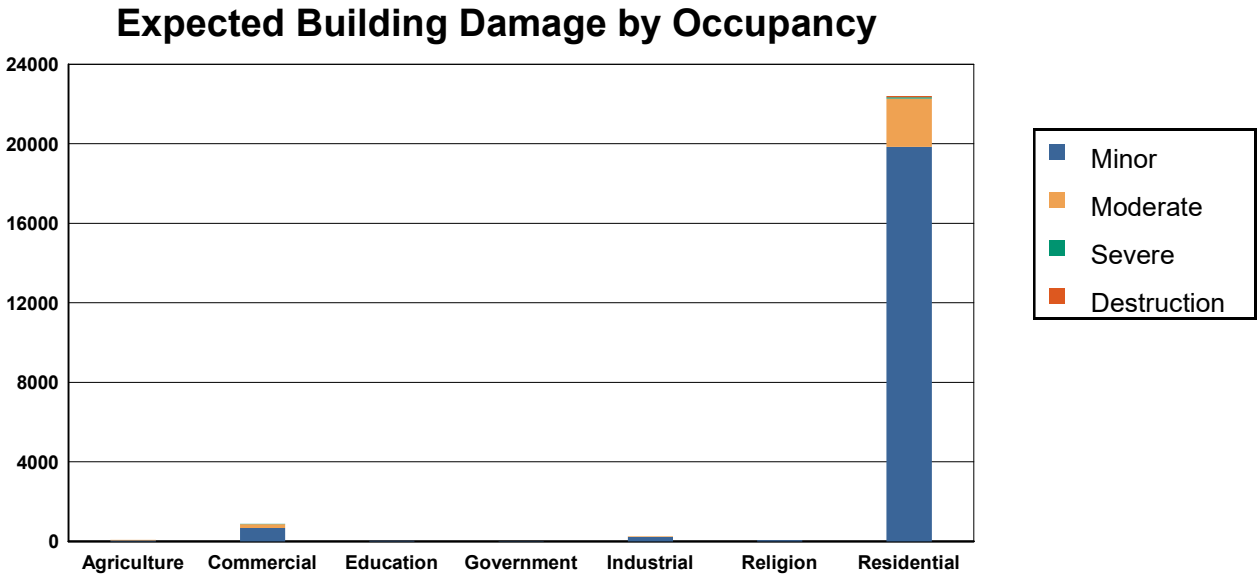


Table 2: Expected Building Damage by Occupancy : 100 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	364	82.32	47	10.67	20	4.60	10	2.20	1	0.21
Commercial	5,320	85.92	668	10.78	193	3.11	11	0.18	0	0.00
Education	178	88.30	20	9.67	4	1.93	0	0.10	0	0.00
Government	118	88.15	13	9.86	3	1.89	0	0.09	0	0.00
Industrial	1,874	87.86	212	9.94	43	2.00	4	0.18	0	0.01
Religion	437	87.97	51	10.25	8	1.69	0	0.09	0	0.00
Residential	133,056	85.59	19,841	12.76	2,436	1.57	68	0.04	53	0.03
Total	**141,348**		**20,852**		**2,706**		**93**		**54**	

Table 3: Expected Building Damage by Building Type : 100 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	884	86.47	108	10.54	29	2.88	1	0.11	0	0.00
Masonry	13,288	85.01	1,849	11.83	477	3.05	15	0.10	2	0.01
MH	26,383	99.30	134	0.50	42	0.16	1	0.00	11	0.04
Steel	1,943	86.00	223	9.86	87	3.84	7	0.30	0	0.00
Wood	97,234	83.99	16,794	14.51	1,655	1.43	58	0.05	28	0.02

Essential Facility Damage

Before the hurricane, the region had 584 hospital beds available for use. On the day of the hurricane, the model estimates that 21 hospital beds (only 4.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

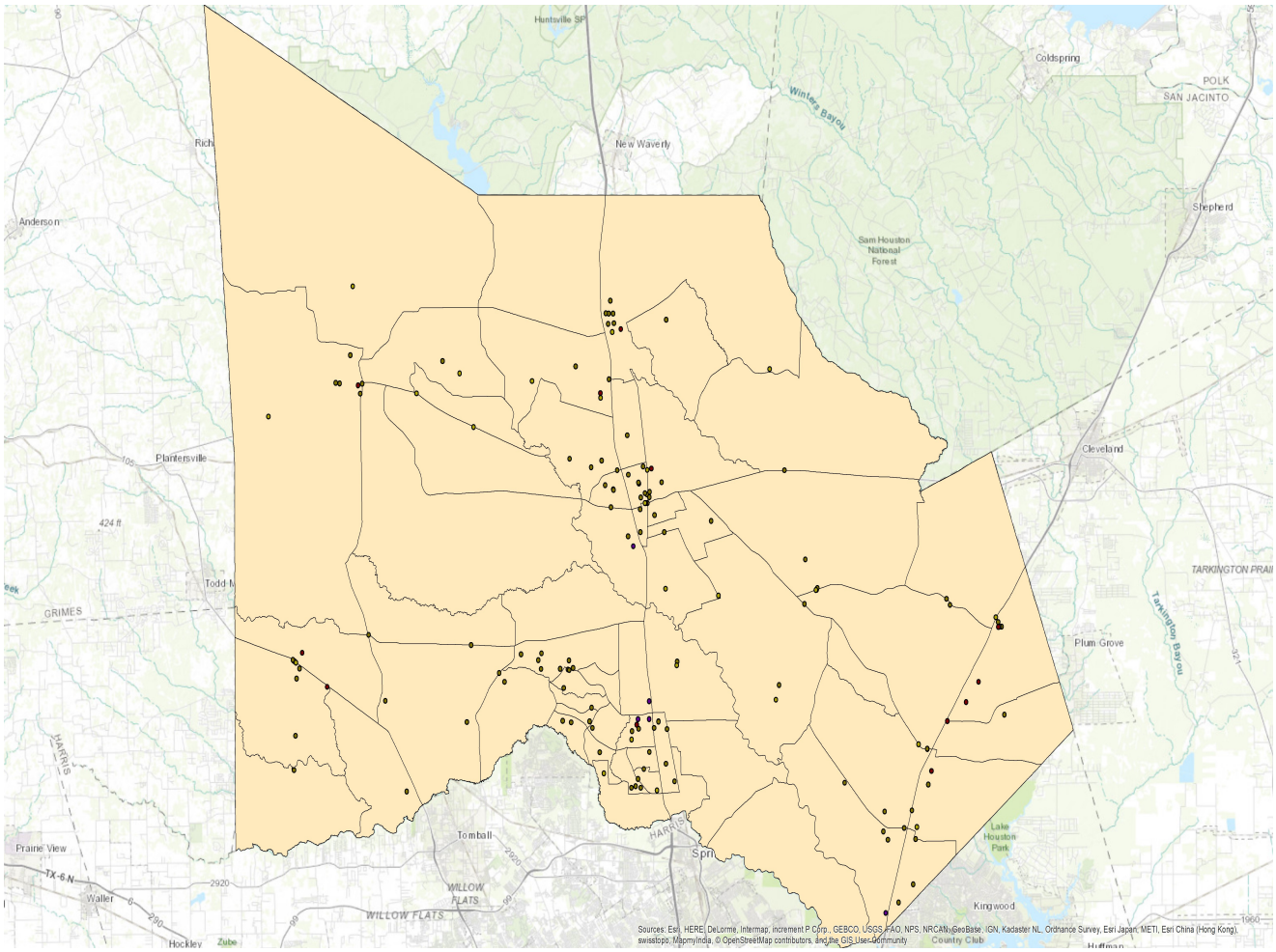
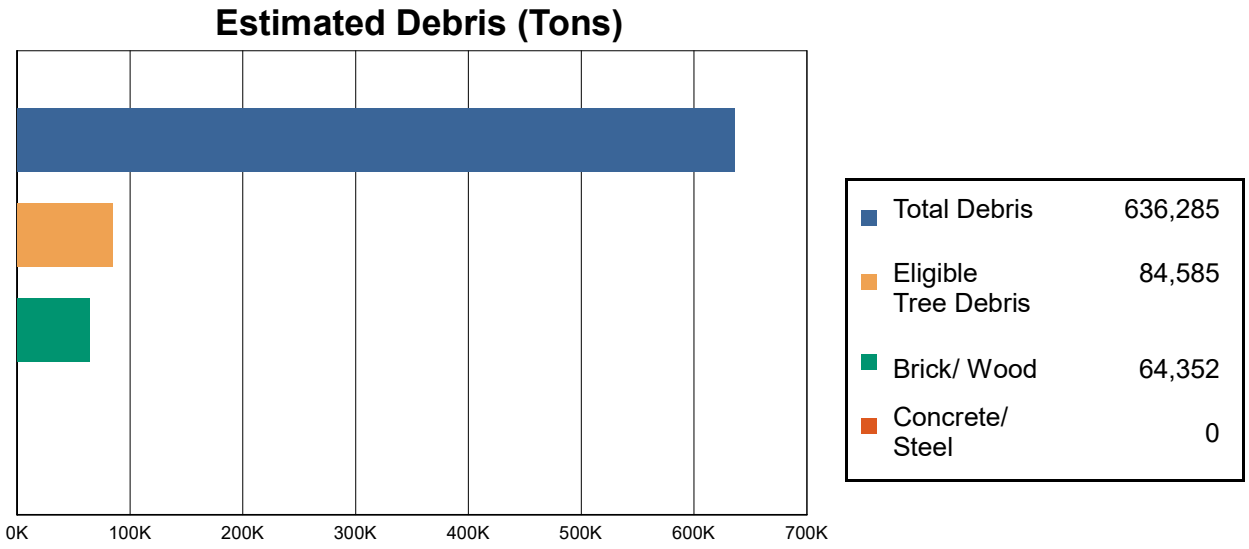


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	23	0	0	23
Hospitals	5	2	0	1
Police Stations	14	0	0	14
Schools	121	0	0	115

Induced Hurricane Damage

Debris Generation

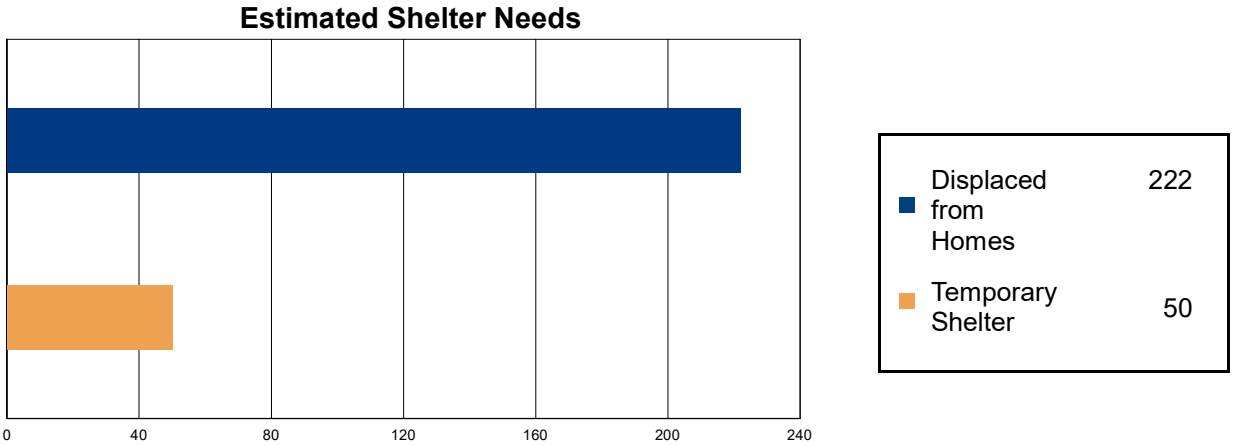


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 636,285 tons of debris will be generated. Of the total amount, 486,630 tons (76%) is Other Tree Debris. Of the remaining 149,655 tons, Brick/Wood comprises 43% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 2603 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 84,585 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



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 222 households to be displaced due to the hurricane. Of these, 50 people (out of a total population of 455,746) will seek temporary shelter in public shelters.

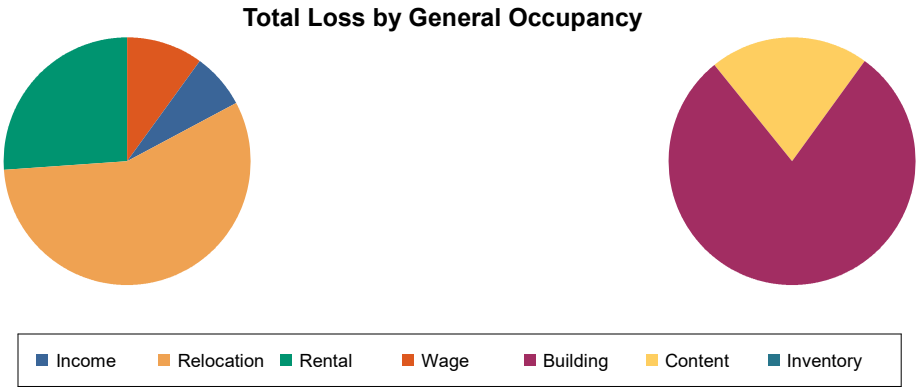
Economic Loss

The total economic loss estimated for the hurricane is 815.6 million dollars, which represents 1.68 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 816 million dollars. 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 94% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



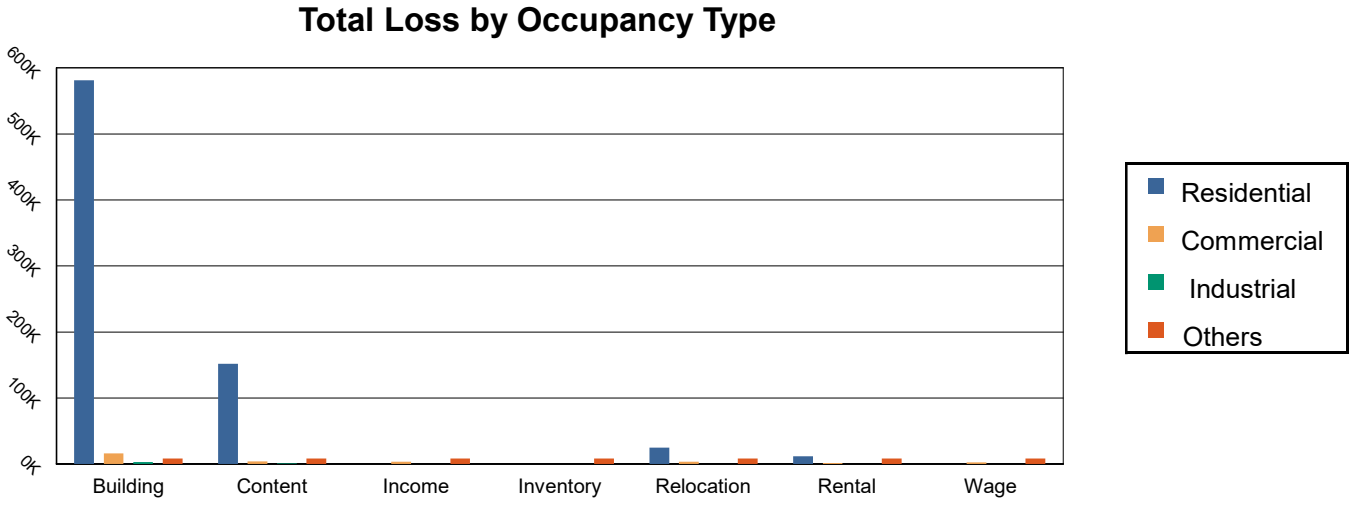


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	581,518.25	16,285.13	3,242.10	3,380.67	604,426.15
	Content	151,807.44	4,054.54	1,205.60	1,420.04	158,487.62
	Inventory	0.00	101.61	213.15	85.16	399.92
	Subtotal	**733,325.69**	**20,441.28**	**4,660.85**	**4,885.87**	**763,313.69**
Business Interruption Loss						
	Income	13.26	3,335.94	58.27	413.17	3,820.64
	Relocation	25,066.25	3,384.62	303.49	839.50	29,593.87
	Rental	11,787.38	1,845.14	40.21	56.58	13,729.31
	Wage	31.06	2,767.33	87.16	2,270.38	5,155.93
	Subtotal	**36,897.96**	**11,333.04**	**489.13**	**3,579.63**	**52,299.75**
Total						
	Total	**770,223.65**	**31,774.31**	**5,149.99**	**8,465.49**	**815,613.44**

Appendix A: County Listing for the Region

Texas
- Montgomery

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Texas				
Montgomery	455,746	42,702,039	5,863,496	48,565,535
Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**
Study Region Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**

Hazus-MH: Hurricane Global Risk Report

Region Name: MG_1acre

Hurricane Scenario: Probabilistic 200-year Return Period

Print Date: Tuesday, November 07, 2017

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Appendix A contains a complete listing of the counties contained in the region.

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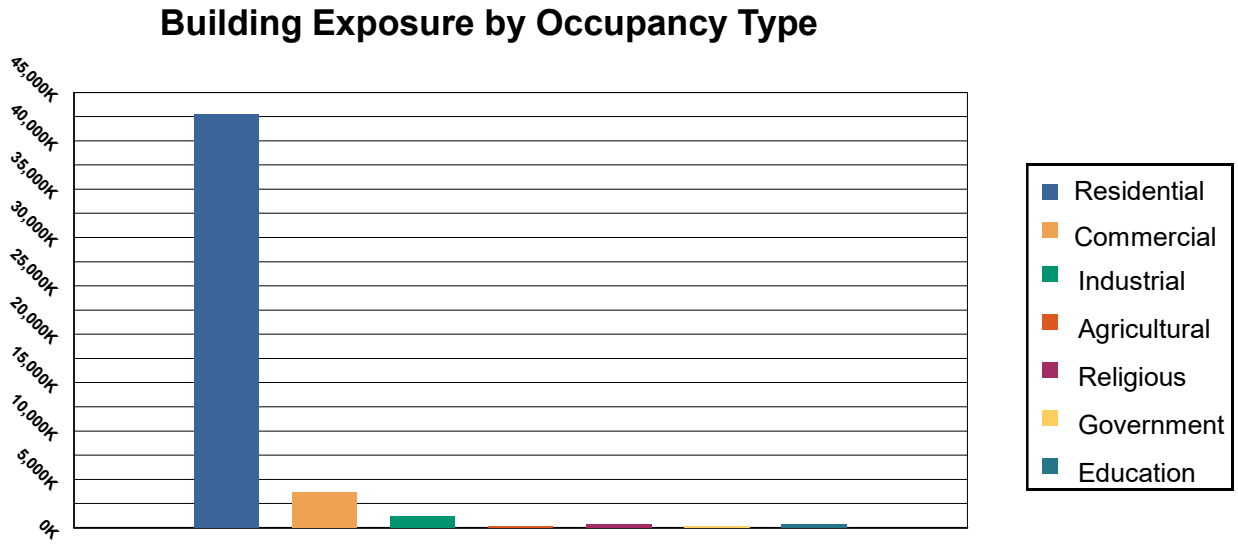
There are an estimated 165 thousand buildings in the region with a total building replacement value (excluding contents) of 48,566 million dollars (2014 dollars). Approximately 94% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 165,054 buildings in the region which have an aggregate total replacement value of 48,566 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.



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Occupancy	Exposure ($1000)	Percent of Tot
Residential	42,702,039	87.93 %
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Agricultural	138,959	0.29%
Religious	411,084	0.85%
Government	118,889	0.24%
Education	354,929	0.73%
Total	**48,565,535**	**100.00%**

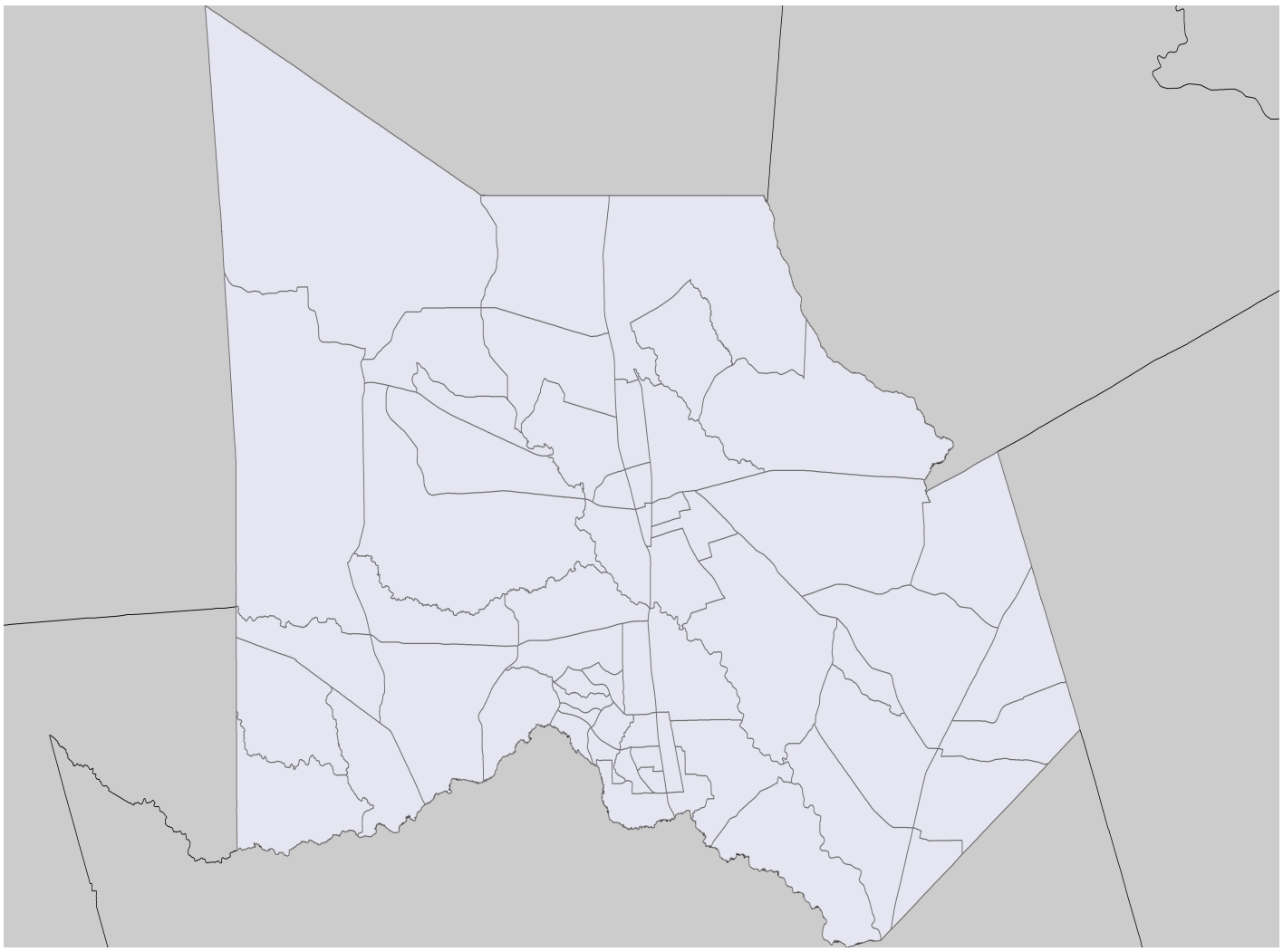
Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 584 beds. There are 121 schools, 23 fire stations, 14 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Thematic Map with peak gust windfield and HU track



Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 7,734 buildings will be at least moderately damaged. This is over 5% of the total number of buildings in the region. There are an estimated 273 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

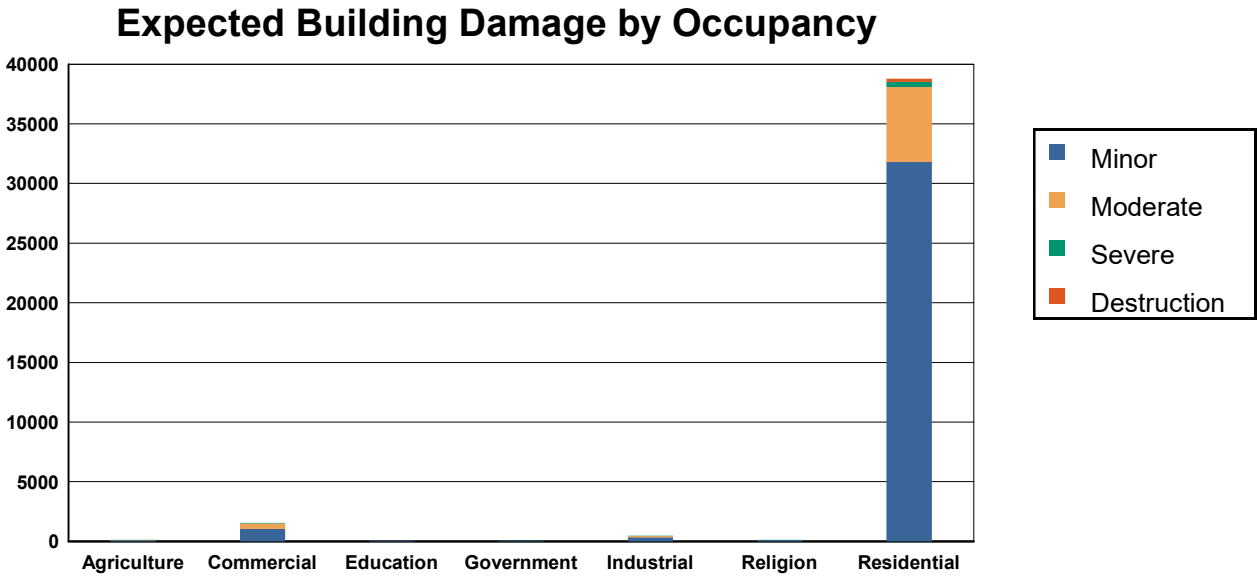


Table 2: Expected Building Damage by Occupancy : 200 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	313	70.90	66	14.87	38	8.67	22	4.91	3	0.66
Commercial	4,651	75.11	1,037	16.74	452	7.30	52	0.84	1	0.01
Education	157	77.56	32	15.73	12	5.90	2	0.82	0	0.00
Government	104	77.79	21	15.58	8	5.77	1	0.86	0	0.00
Industrial	1,657	77.68	337	15.78	120	5.62	19	0.90	1	0.02
Religion	383	77.09	84	16.98	26	5.24	3	0.69	0	0.00
Residential	116,680	75.06	31,799	20.46	6,284	4.04	423	0.27	269	0.17
Total	**123,945**		**33,375**		**6,939**		**522**		**273**	

Table 3: Expected Building Damage by Building Type : 200 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	768	75.17	164	16.08	80	7.87	9	0.88	0	0.00
Masonry	11,598	74.20	2,946	18.84	1,013	6.48	63	0.41	11	0.07
MH	26,041	98.01	313	1.18	162	0.61	7	0.03	47	0.18
Steel	1,699	75.19	330	14.62	199	8.81	31	1.35	1	0.02
Wood	83,937	72.50	26,816	23.16	4,504	3.89	359	0.31	154	0.13

Essential Facility Damage

Before the hurricane, the region had 584 hospital beds available for use. On the day of the hurricane, the model estimates that 21 hospital beds (only 4.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 32.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

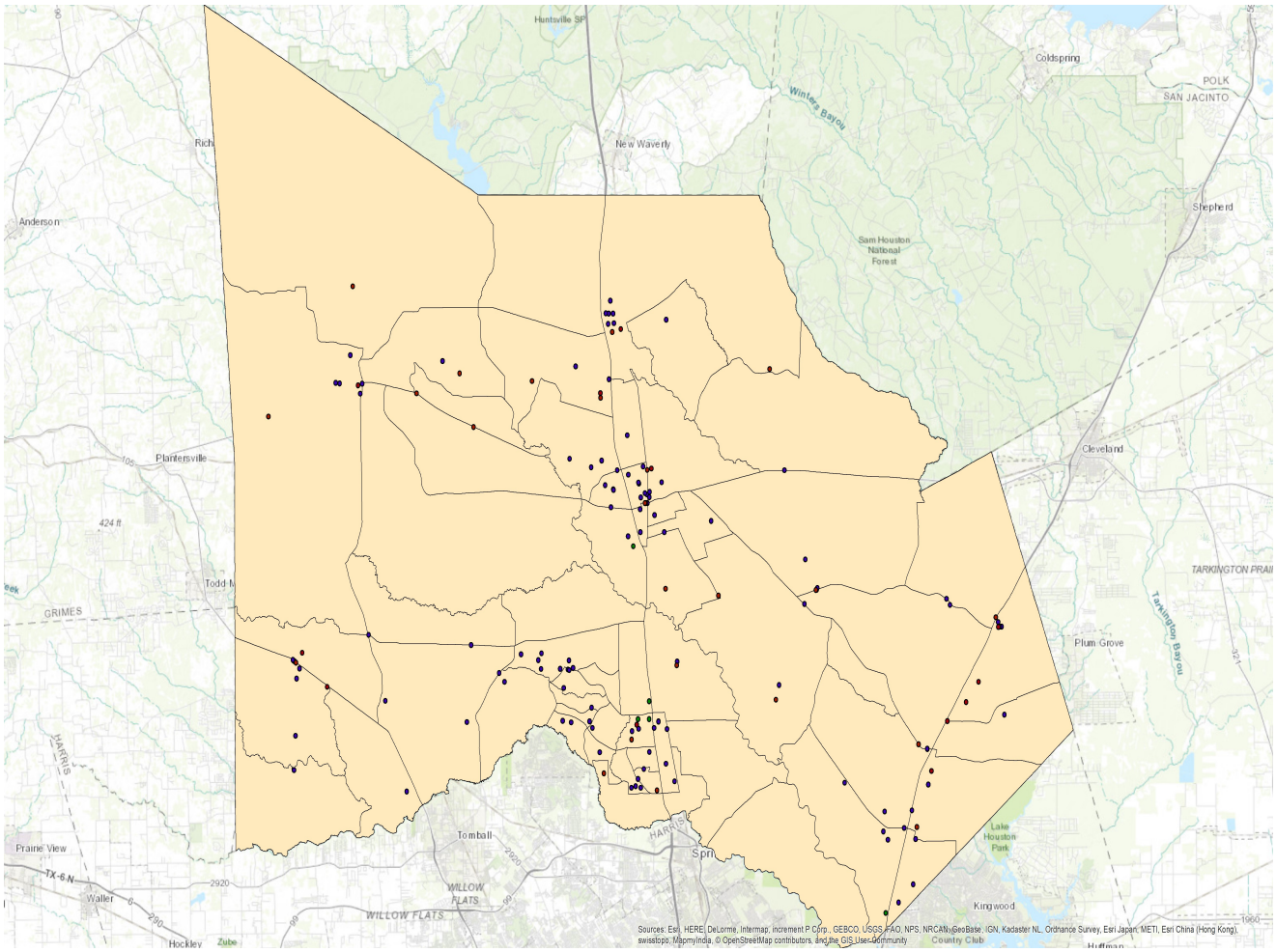
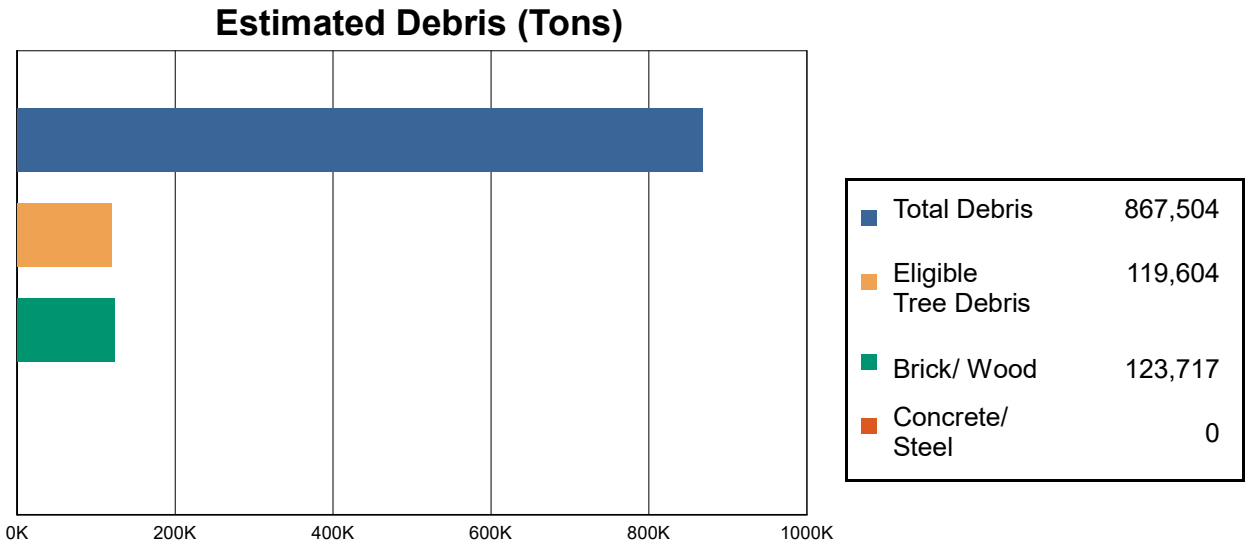


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	23	0	0	23
Hospitals	5	4	0	1
Police Stations	14	0	0	14
Schools	121	1	0	36

Induced Hurricane Damage

Debris Generation

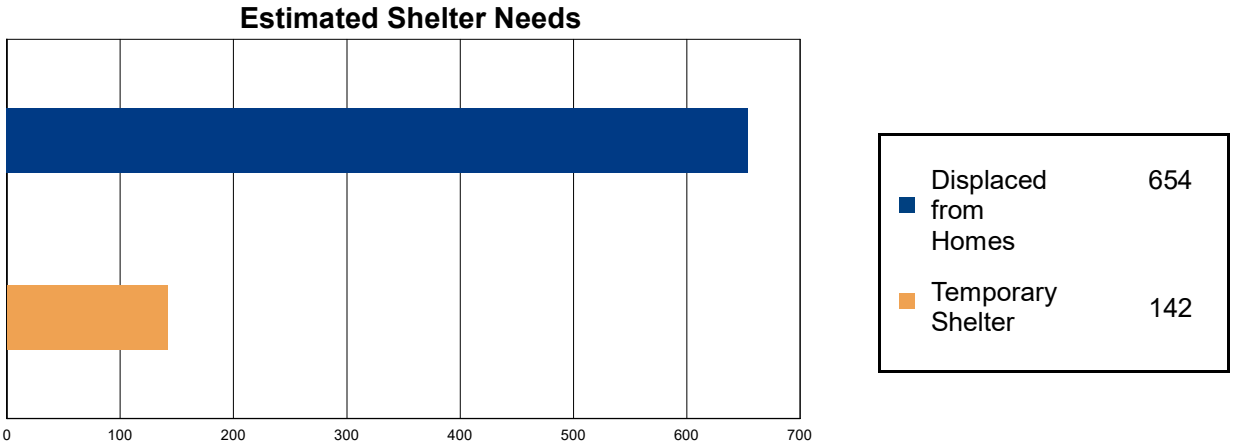


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 867,504 tons of debris will be generated. Of the total amount, 624,922 tons (72%) is Other Tree Debris. Of the remaining 242,582 tons, Brick/Wood comprises 51% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 4919 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 119,604 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



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 654 households to be displaced due to the hurricane. Of these, 142 people (out of a total population of 455,746) will seek temporary shelter in public shelters.

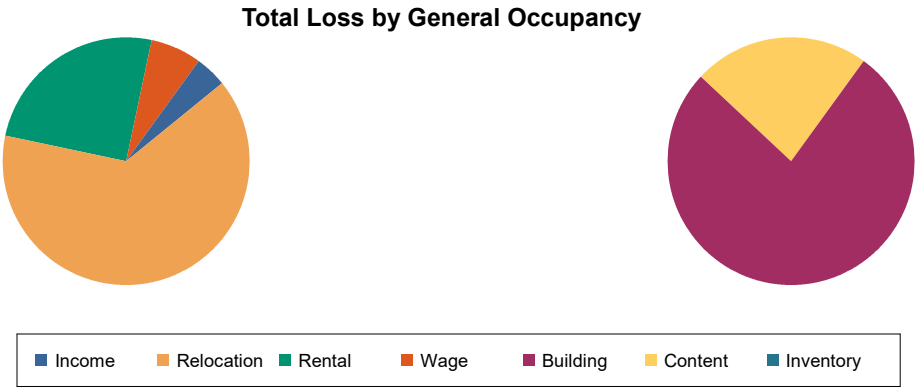
Economic Loss

The total economic loss estimated for the hurricane is 1532.1 million dollars, which represents 3.15 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 1,532 million dollars. 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 93% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



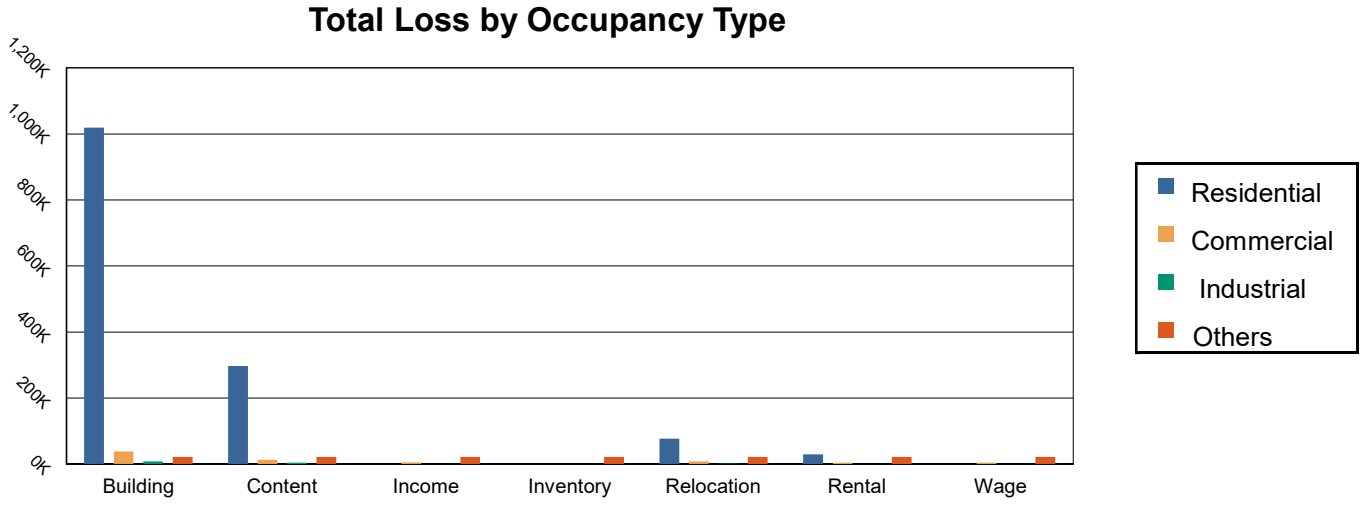


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	1,018,745.18	37,842.38	8,515.77	9,232.06	1,074,335.39
	Content	296,661.09	13,127.34	4,400.68	4,653.68	318,842.79
	Inventory	0.00	370.34	733.93	231.19	1,335.46
	Subtotal	**1,315,406.27**	**51,340.05**	**13,650.38**	**14,116.93**	**1,394,513.63**
Business Interruption Loss						
	Income	96.33	4,692.39	136.88	841.14	5,766.74
	Relocation	76,958.01	8,146.60	934.81	2,357.98	88,397.39
	Rental	29,605.90	4,262.66	116.85	166.55	34,151.96
	Wage	225.62	4,562.34	207.12	4,273.04	9,268.11
	Subtotal	**106,885.86**	**21,663.99**	**1,395.66**	**7,638.70**	**137,584.21**
Total						
	Total	**1,422,292.13**	**73,004.05**	**15,046.04**	**21,755.63**	**1,532,097.84**

Appendix A: County Listing for the Region

Texas
- Montgomery

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Texas				
Montgomery	455,746	42,702,039	5,863,496	48,565,535
Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**
Study Region Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**

Hazus-MH: Hurricane Global Risk Report

Region Name: MG_1acre

Hurricane Scenario: Probabilistic 500-year Return Period

Print Date: Tuesday, November 07, 2017

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Texas

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 1,076.87 square miles and contains 59 census tracts. There are over 162 thousand households in the region and has a total population of 455,746 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 165 thousand buildings in the region with a total building replacement value (excluding contents) of 48,566 million dollars (2014 dollars). Approximately 94% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 165,054 buildings in the region which have an aggregate total replacement value of 48,566 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

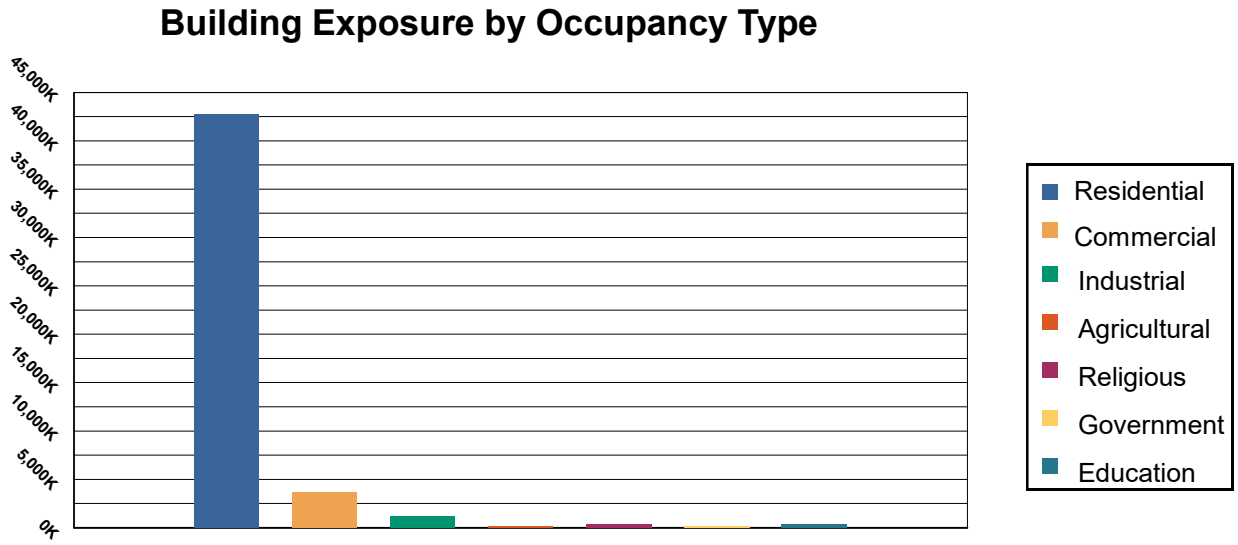


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	42,702,039	87.93 %
Commercial	3,681,350	7.58%
Industrial	1,158,285	2.38%
Agricultural	138,959	0.29%
Religious	411,084	0.85%
Government	118,889	0.24%
Education	354,929	0.73%
Total	**48,565,535**	**100.00%**

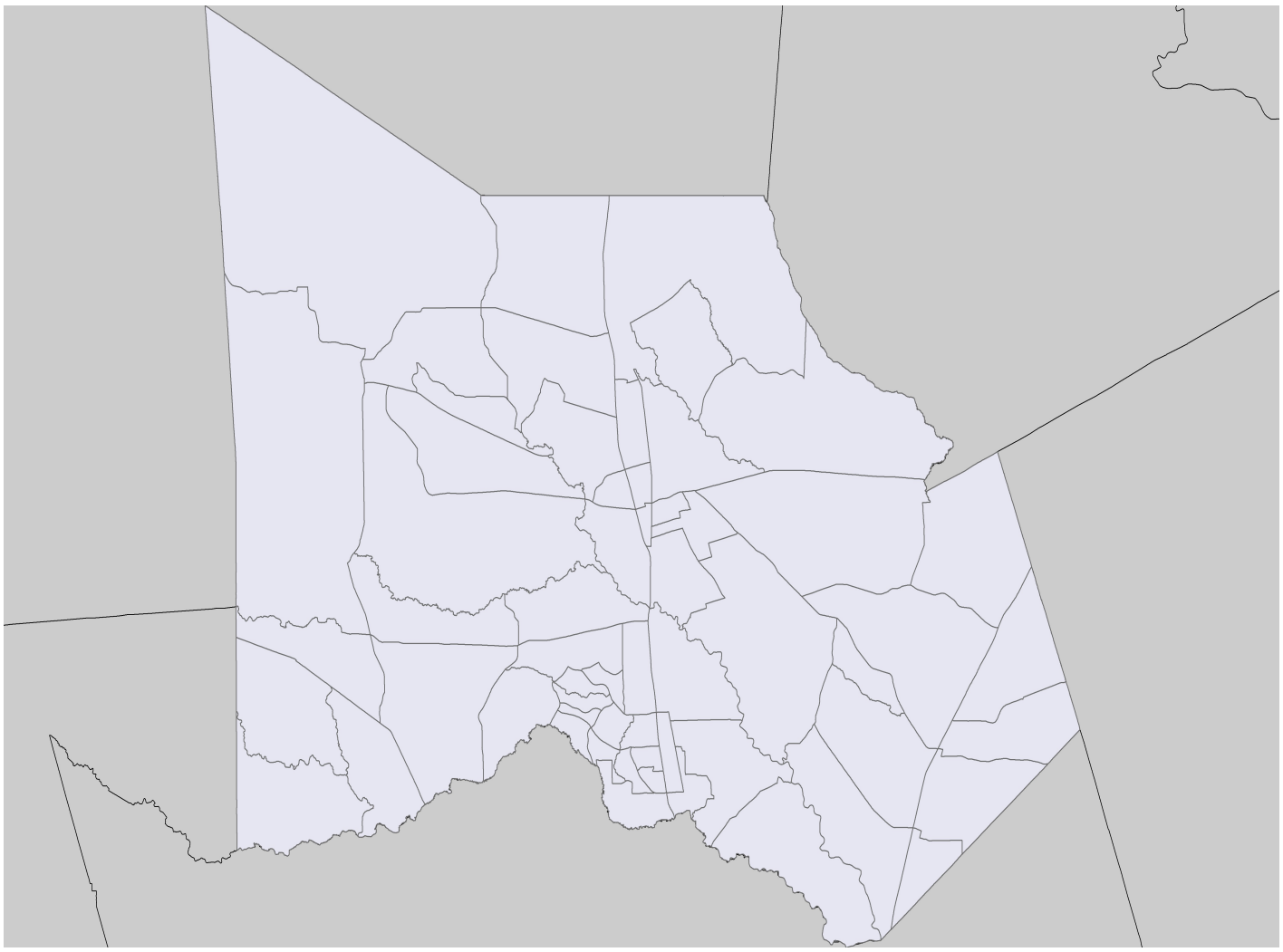
Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 584 beds. There are 121 schools, 23 fire stations, 14 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Thematic Map with peak gust windfield and HU track



Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 17,071 buildings will be at least moderately damaged. This is over 10% of the total number of buildings in the region. There are an estimated 1,014 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

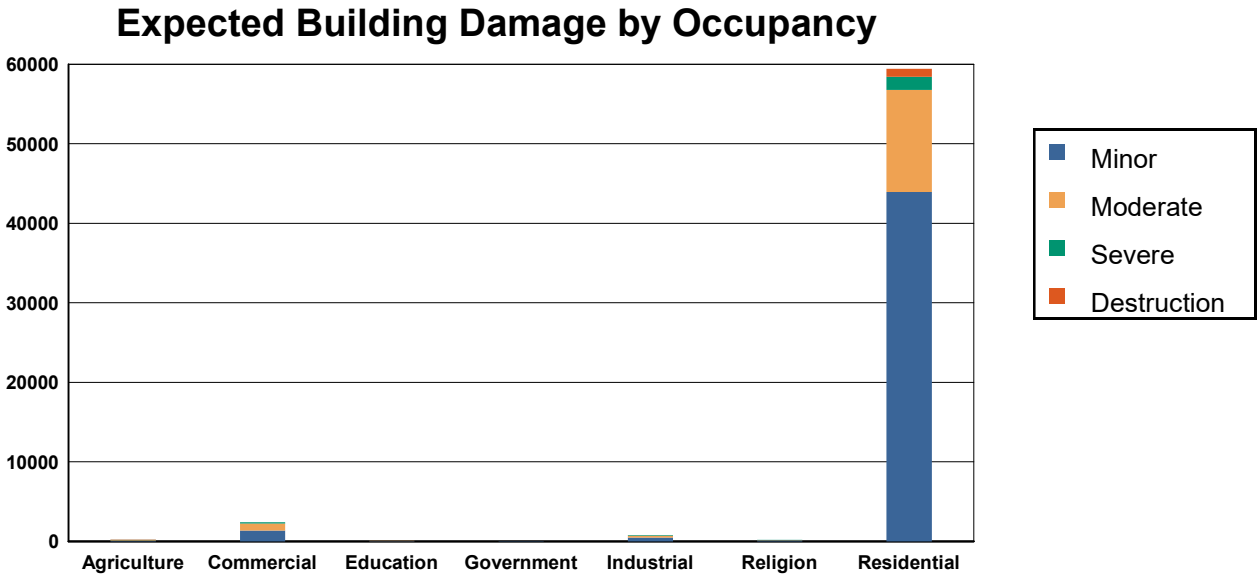


Table 2: Expected Building Damage by Occupancy : 500 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	236	53.39	82	18.58	66	14.99	48	10.84	10	2.20
Commercial	3,791	61.22	1,369	22.11	856	13.82	173	2.80	3	0.04
Education	132	65.47	41	20.37	23	11.32	6	2.85	0	0.00
Government	90	67.34	27	20.00	14	10.25	3	2.41	0	0.00
Industrial	1,361	63.80	452	21.18	248	11.63	71	3.32	1	0.06
Religion	326	65.58	111	22.24	49	9.90	11	2.27	0	0.00
Residential	96,044	61.78	43,921	28.25	12,838	8.26	1,650	1.06	1,000	0.64
Total	**101,981**		**46,002**		**14,094**		**1,963**		**1,014**	

Table 3: Expected Building Damage by Building Type : 500 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	628	61.49	205	20.07	154	15.03	35	3.40	0	0.00
Masonry	9,443	60.41	4,134	26.45	1,787	11.43	222	1.42	45	0.29
MH	25,523	96.06	503	1.89	365	1.37	32	0.12	147	0.55
Steel	1,391	61.59	411	18.21	359	15.88	96	4.25	2	0.07
Wood	67,197	58.04	36,950	31.92	9,609	8.30	1,389	1.20	625	0.54

Essential Facility Damage

Before the hurricane, the region had 584 hospital beds available for use. On the day of the hurricane, the model estimates that 21 hospital beds (only 4.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 4.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

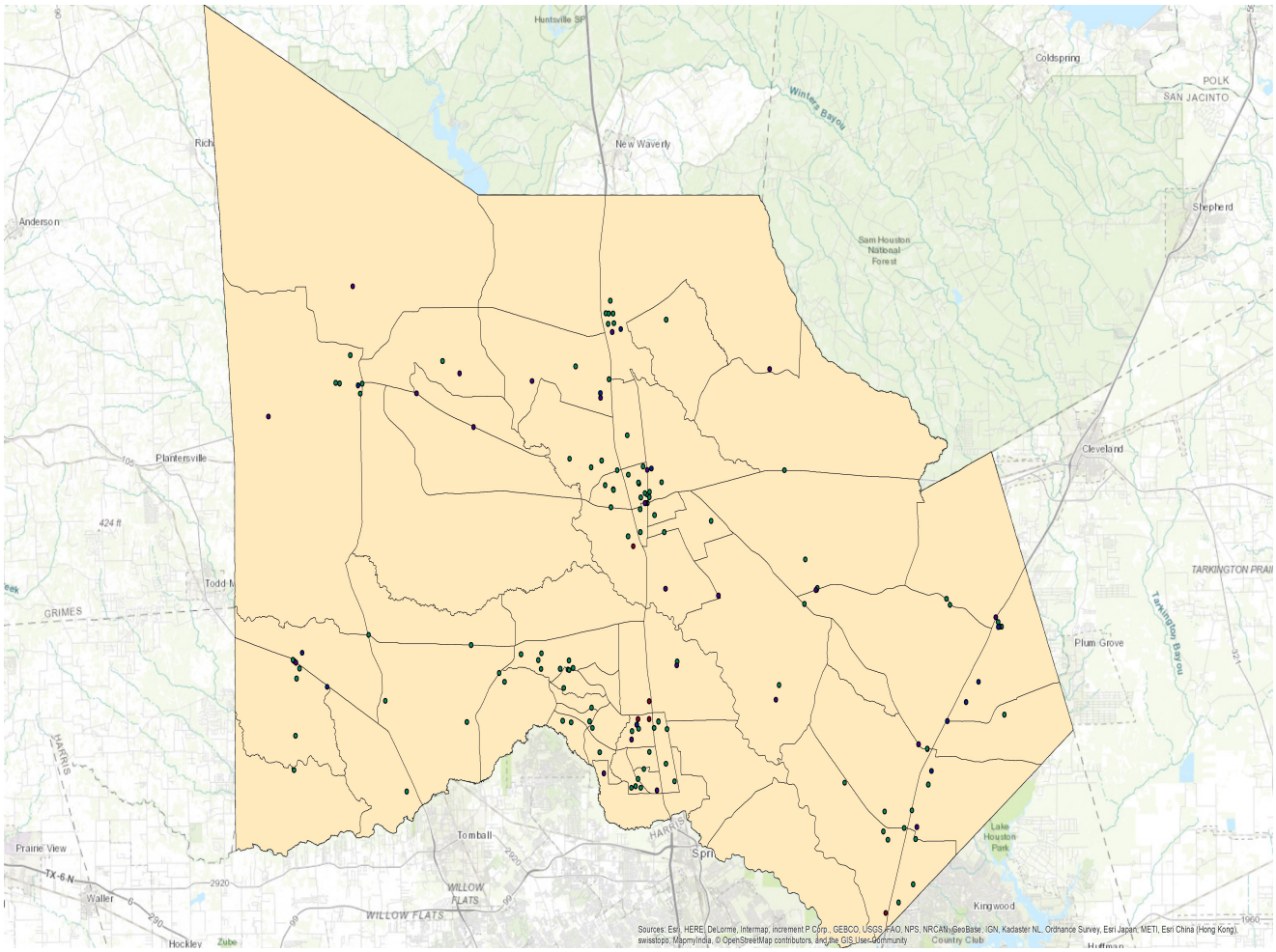
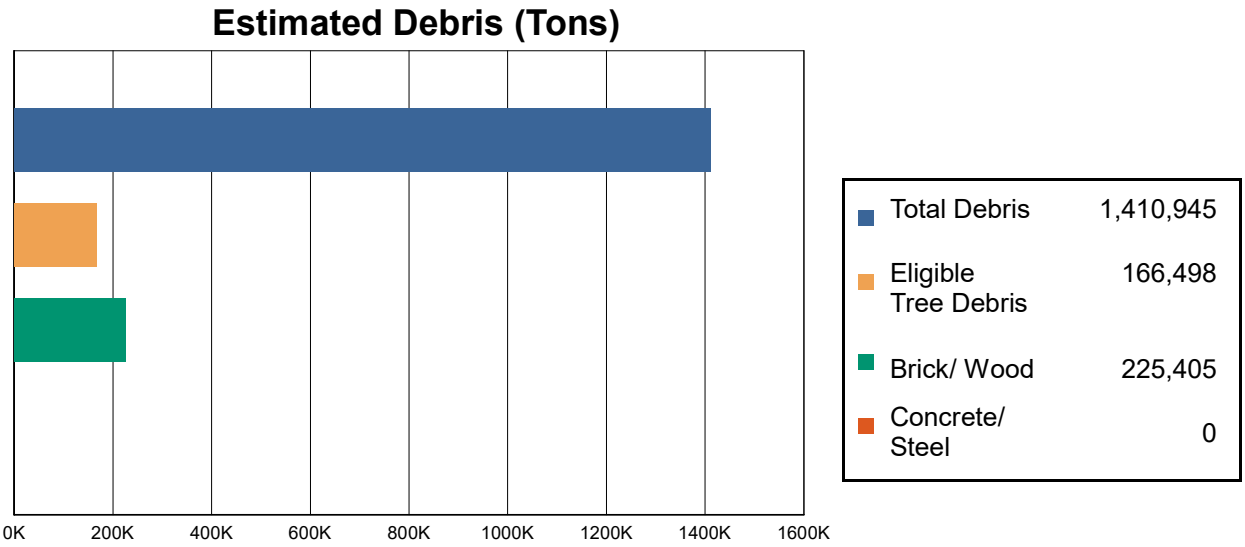


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	23	0	0	23
Hospitals	5	4	0	1
Police Stations	14	0	0	14
Schools	121	19	0	16

Induced Hurricane Damage

Debris Generation

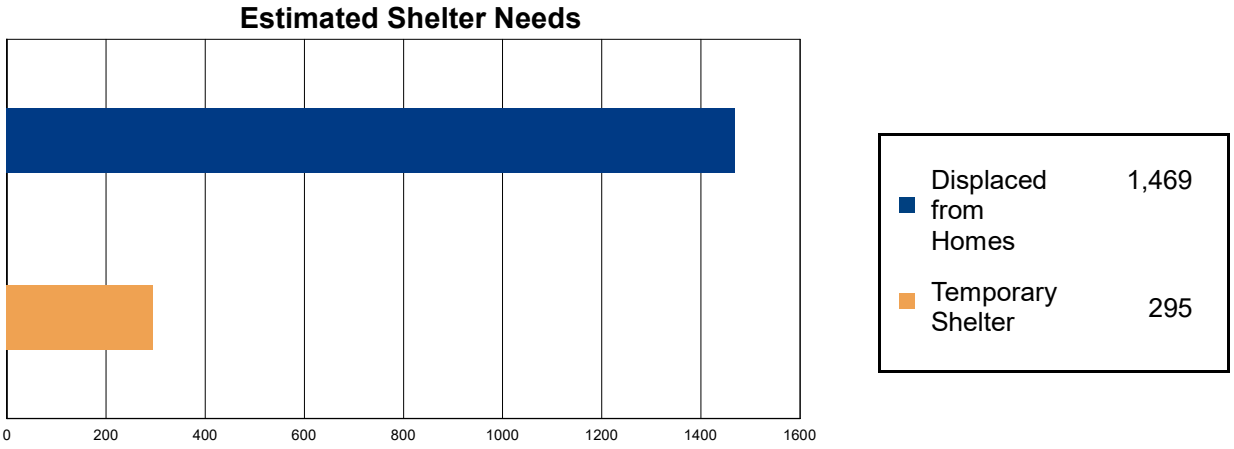


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 1,410,945 tons of debris will be generated. Of the total amount, 1,015,498 tons (72%) is Other Tree Debris. Of the remaining 395,447 tons, Brick/Wood comprises 57% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 9158 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 166,498 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



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 1,469 households to be displaced due to the hurricane. Of these, 295 people (out of a total population of 455,746) will seek temporary shelter in public shelters.

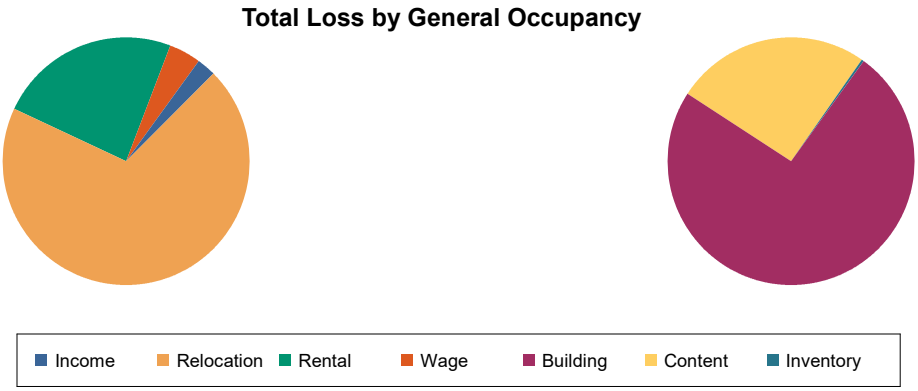
Economic Loss

The total economic loss estimated for the hurricane is 3112.0 million dollars, which represents 6.41 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 3,112 million dollars. 2% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 92% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



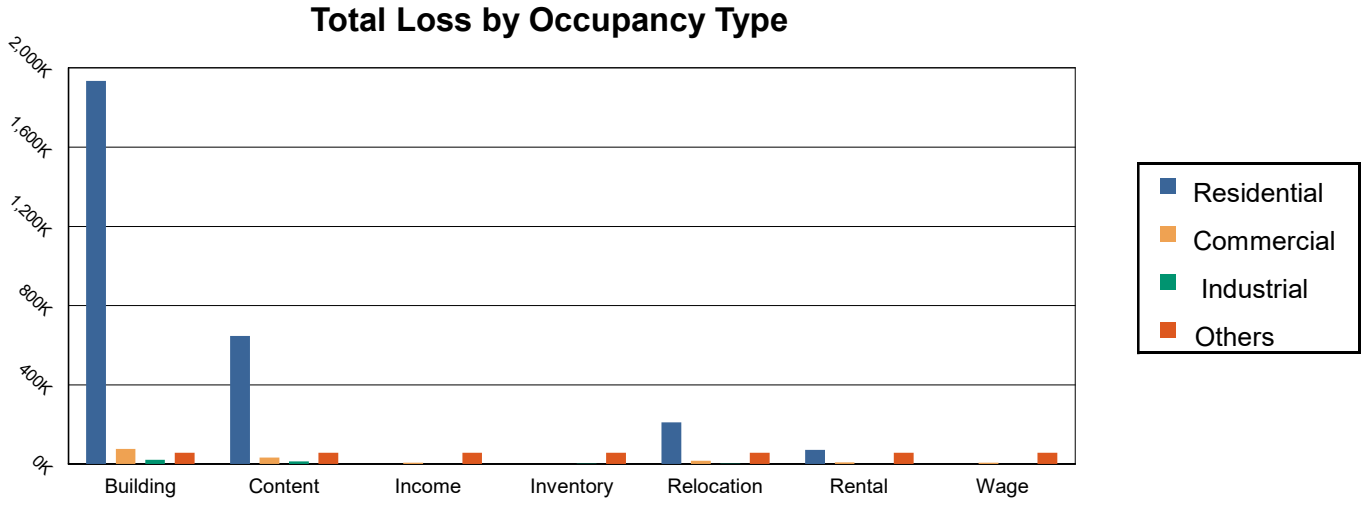


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	1,934,148.61	76,725.20	21,714.55	25,127.62	2,057,715.98
	Content	646,401.89	32,871.02	13,942.35	16,840.09	710,055.35
	Inventory	0.00	911.57	2,314.75	935.22	4,161.53
	Subtotal	**2,580,550.51**	**110,507.78**	**37,971.65**	**42,902.92**	**2,771,932.86**
Business Interruption Loss						
	Income	280.79	6,563.31	309.32	1,309.01	8,462.44
	Relocation	210,971.57	16,486.80	2,355.71	6,226.84	236,040.91
	Rental	71,547.69	8,800.76	316.47	405.25	81,070.16
	Wage	657.66	6,789.06	475.22	6,563.27	14,485.20
	Subtotal	**283,457.71**	**38,639.93**	**3,456.71**	**14,504.37**	**340,058.71**
Total						
	Total	**2,864,008.22**	**149,147.71**	**41,428.36**	**57,407.29**	**3,111,991.57**

Appendix A: County Listing for the Region

Texas
- Montgomery

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Texas				
Montgomery	455,746	42,702,039	5,863,496	48,565,535
Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**
Study Region Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**

Hazus-MH: Hurricane Global Risk Report

Region Name: MG_1acre

Hurricane Scenario: Probabilistic 1000-year Return Period

Print Date: Tuesday, November 07, 2017

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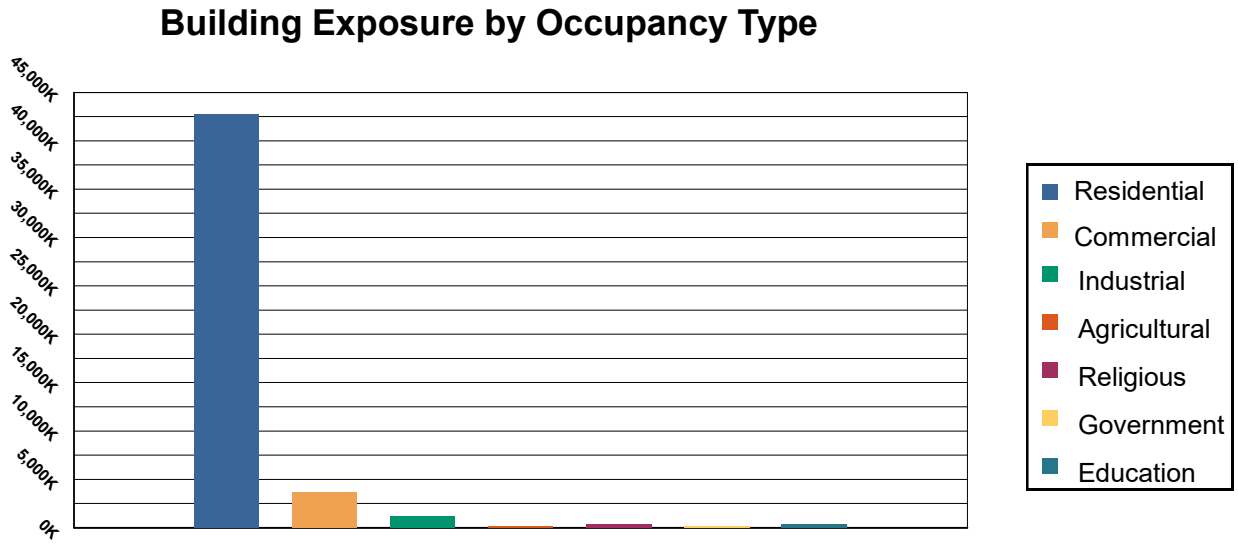
Hazus estimates that there are 165,054 buildings in the region which have an aggregate total replacement value of 48,566 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.



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Religious	411,084	0.85%
Government	118,889	0.24%
Education	354,929	0.73%
Total	**48,565,535**	**100.00%**

Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 584 beds. There are 121 schools, 23 fire stations, 14 police stations and no emergency operation facilities.

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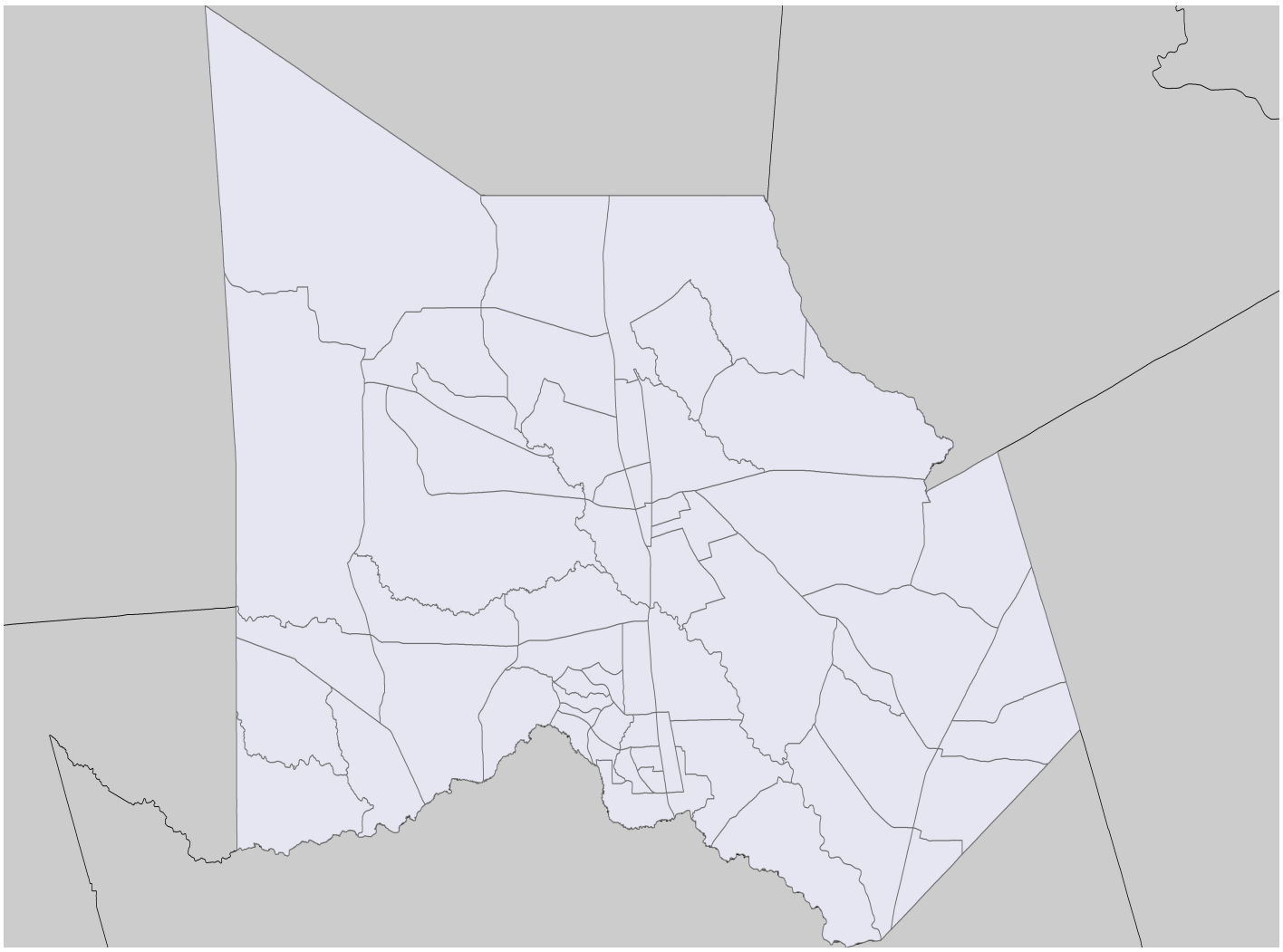
Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Thematic Map with peak gust windfield and HU track



Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 29,389 buildings will be at least moderately damaged. This is over 18% of the total number of buildings in the region. There are an estimated 2,479 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

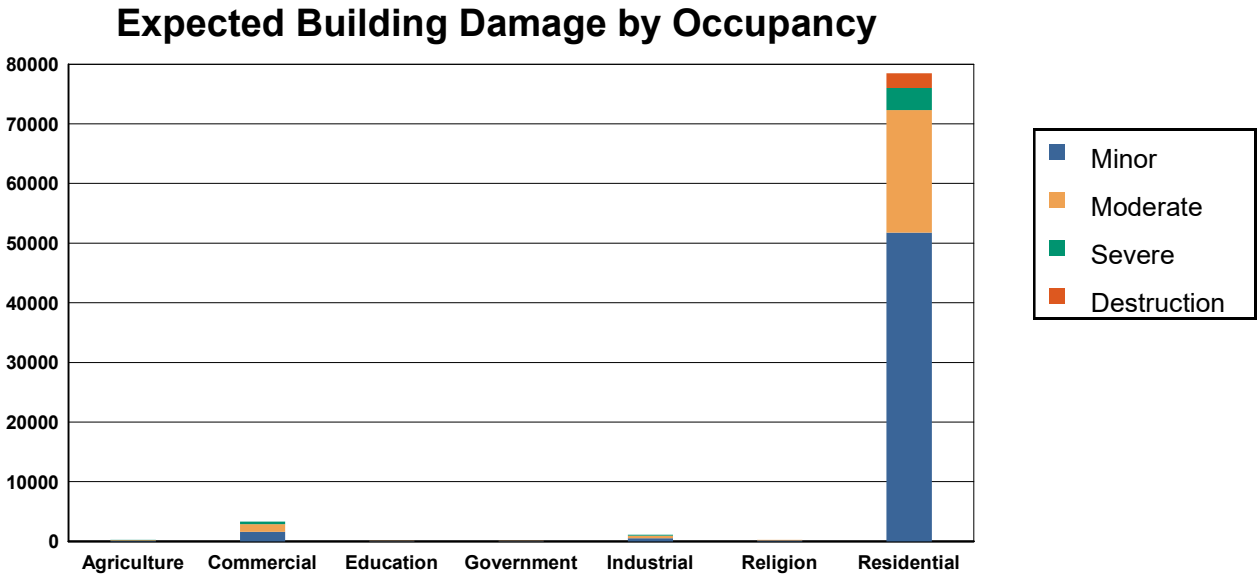


Table 2: Expected Building Damage by Occupancy : 1000 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	190	42.90	88	19.95	83	18.74	66	15.04	15	3.38
Commercial	2,898	46.81	1,590	25.68	1,290	20.83	407	6.57	7	0.12
Education	101	50.17	49	24.04	38	18.63	14	7.16	0	0.00
Government	62	46.40	33	24.80	27	20.09	12	8.72	0	0.00
Industrial	1,025	48.04	530	24.85	402	18.87	172	8.08	3	0.15
Religion	240	48.39	137	27.47	88	17.64	32	6.51	0	0.00
Residential	76,983	49.52	51,738	33.28	20,569	13.23	3,710	2.39	2,454	1.58
Total	**81,500**		**54,165**		**22,496**		**4,414**		**2,479**	

Table 3: Expected Building Damage by Building Type : 1000 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	477	46.63	227	22.23	235	22.95	84	8.19	0	0.00
Masonry	7,683	49.15	4,789	30.64	2,589	16.56	478	3.06	93	0.59
MH	24,337	91.60	820	3.09	845	3.18	116	0.44	452	1.70
Steel	1,052	46.59	455	20.13	527	23.35	221	9.76	4	0.17
Wood	54,013	46.66	42,779	36.95	14,712	12.71	2,923	2.53	1,343	1.16

Essential Facility Damage

Before the hurricane, the region had 584 hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (only 0.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 4.00% of the beds will be in service. By 30 days, 32.00% will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

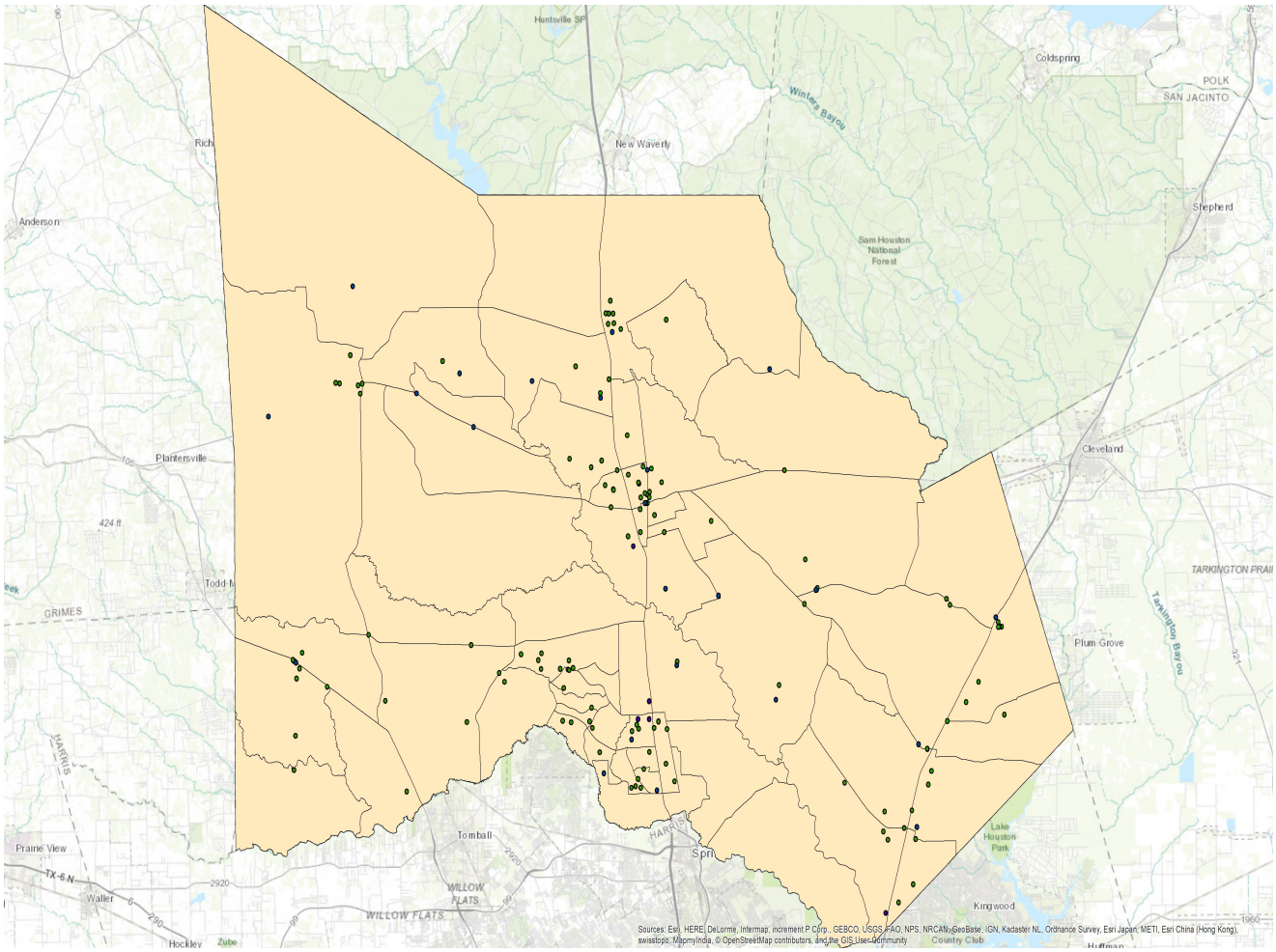
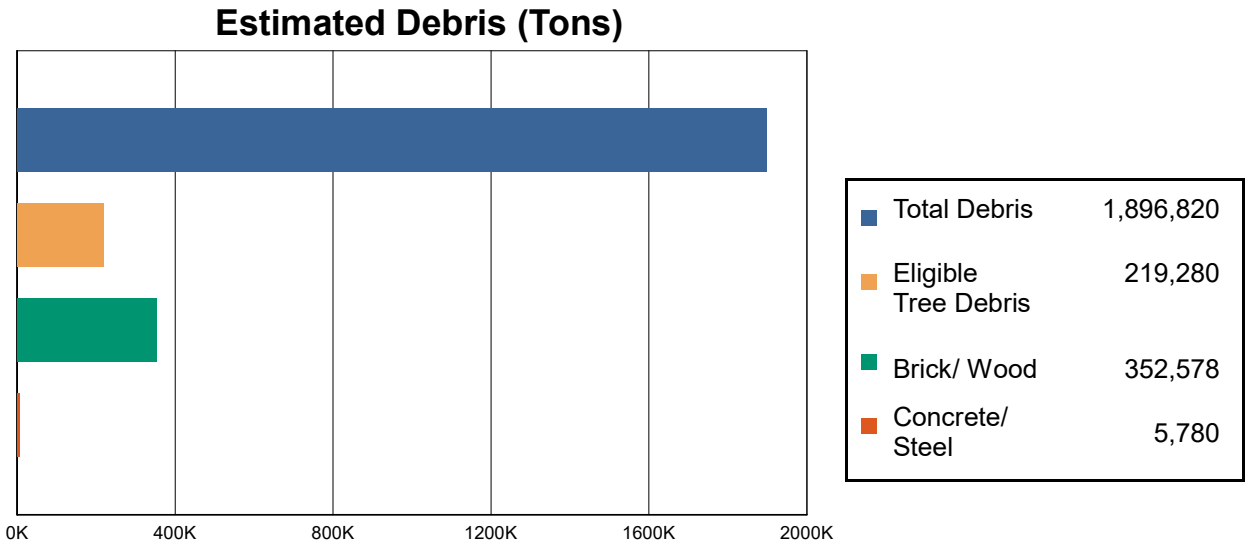


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	23	0	0	23
Hospitals	5	4	2	0
Police Stations	14	4	0	14
Schools	121	57	0	1

Induced Hurricane Damage

Debris Generation

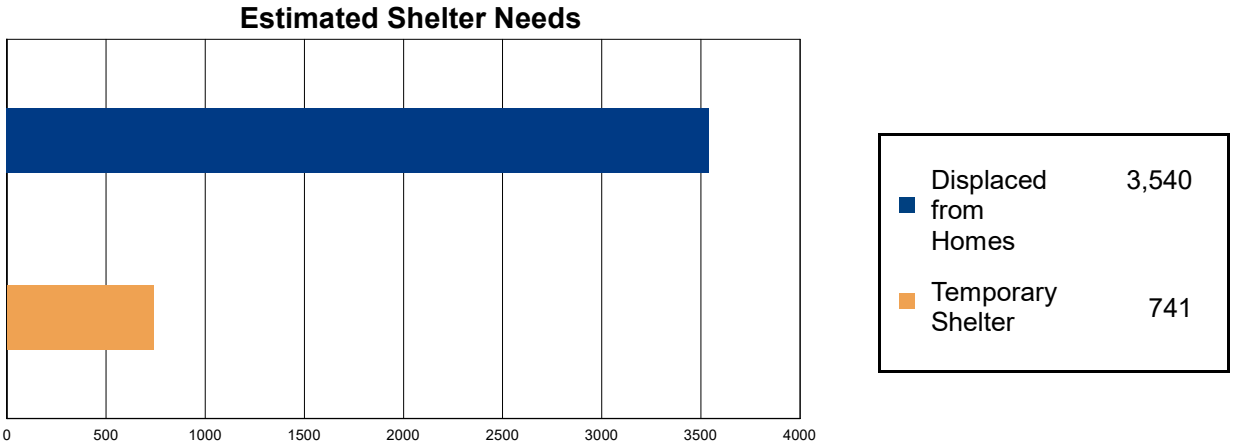


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 1,896,820 tons of debris will be generated. Of the total amount, 1,318,823 tons (70%) is Other Tree Debris. Of the remaining 577,997 tons, Brick/Wood comprises 61% of the total, Reinforced Concrete/Steel comprises of 1% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 14349 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 219,280 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



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 3,540 households to be displaced due to the hurricane. Of these, 741 people (out of a total population of 455,746) will seek temporary shelter in public shelters.

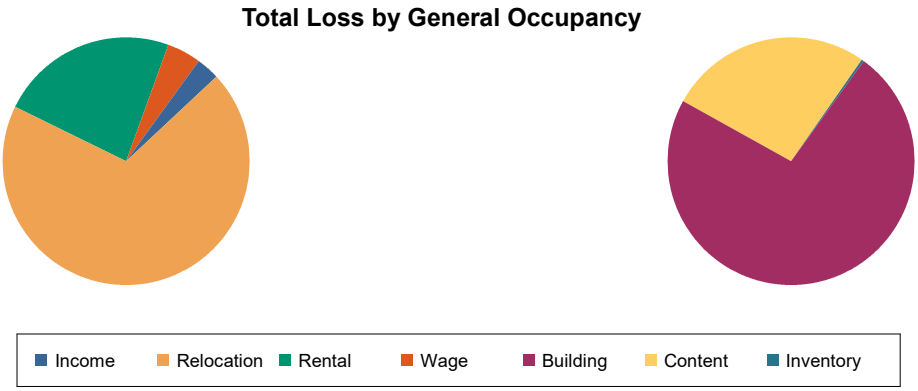
Economic Loss

The total economic loss estimated for the hurricane is 4703.3 million dollars, which represents 9.68 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 4,703 million dollars. 2% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 90% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



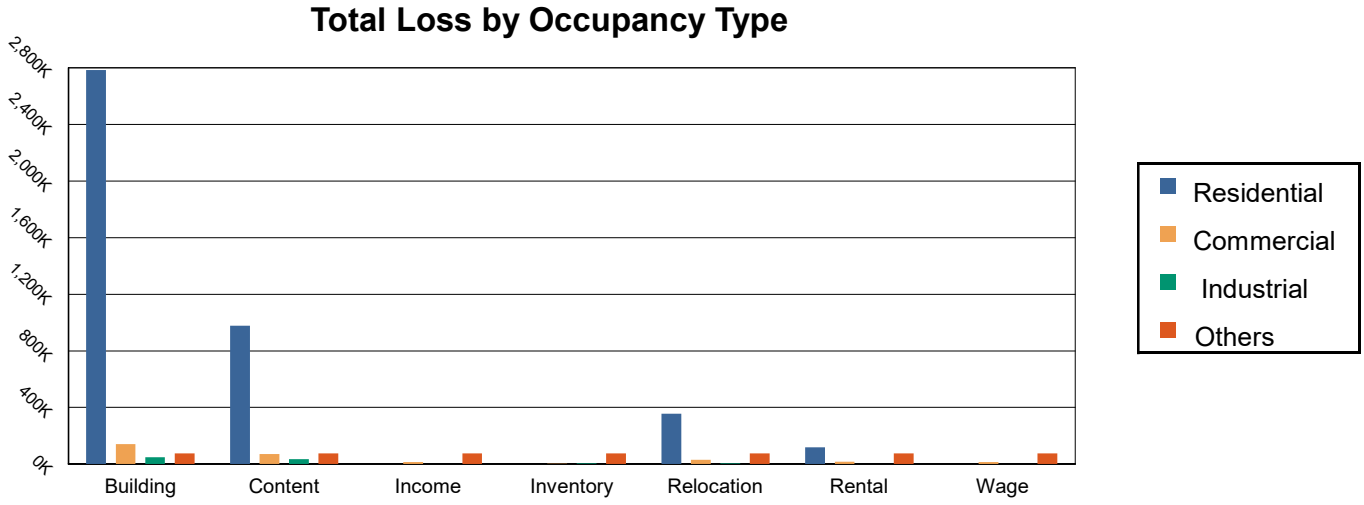


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	2,785,627.85	141,651.29	48,376.88	36,079.99	3,011,736.00
	Content	978,168.78	69,928.64	35,460.49	20,052.83	1,103,610.74
	Inventory	0.00	2,272.80	6,055.88	647.40	8,976.08
	Subtotal	**3,763,796.63**	**213,852.72**	**89,893.25**	**56,780.22**	**4,124,322.81**
Business Interruption Loss						
	Income	615.07	15,003.10	807.32	1,289.23	17,714.71
	Relocation	356,870.81	29,584.92	4,659.52	9,083.56	400,198.82
	Rental	118,203.17	16,290.17	718.83	746.93	135,959.10
	Wage	1,440.61	15,092.29	1,272.91	7,274.50	25,080.31
	Subtotal	**477,129.66**	**75,970.47**	**7,458.59**	**18,394.22**	**578,952.94**
Total						
	Total	**4,240,926.29**	**289,823.19**	**97,351.83**	**75,174.44**	**4,703,275.76**

Appendix A: County Listing for the Region

Texas
- Montgomery

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Texas				
Montgomery	455,746	42,702,039	5,863,496	48,565,535
Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**
Study Region Total	**455,746**	**42,702,039**	**5,863,496**	**48,565,535**

2017

Appendix D: Repetitive Loss Properties

APPENDIX D: Repetitive Loss Properties

County	City	RL #	SRL Id	Occupancy	# Claims	Total Paid
Montgomery	Conroe, City Of	0005580	MVU	Single Fmly	16	123,471.52
Montgomery	Conroe, City Of	0005675		Other - Nonresidential	9	107,443.13
Montgomery	Conroe, City Of	0006553		Other - Nonresidential	4	217,985.38
Montgomery	Conroe, City Of	0018463	VNU	Other - Nonresidential	5	283,589.90
Montgomery	Conroe, City Of	0026736		Single Fmly	5	96,883.33
Montgomery	Conroe, City Of	0026855		Single Fmly	4	89,151.19
Montgomery	Conroe, City Of	0038793		Assmd Condo	2	73,653.56
Montgomery	Conroe, City Of	0039292		Single Fmly	2	8,387.22
Montgomery	Conroe, City Of	0040999		Single Fmly	2	4,932.06
Montgomery	Conroe, City Of	0053846		Assmd Condo	2	41,712.80
Montgomery	Conroe, City Of	0068559		Single Fmly	3	52,284.73
Montgomery	Conroe, City Of	0068569		Single Fmly	3	26,760.42
Montgomery	Conroe, City Of	0070308	PNU	Busi-Nonres	9	382,677.18
Montgomery	Conroe, City Of	0071572	MVU	Single Fmly	4	59,865.69
Montgomery	Conroe, City Of	0071774		Other - Nonresidential	2	36,326.94
Montgomery	Conroe, City Of	0073521	V	Single Fmly	7	414,791.23
Montgomery	Conroe, City Of	0097188	V	Single Fmly	7	191,832.32
Montgomery	Conroe, City Of	0097229		Single Fmly	3	69,387.17
Montgomery	Conroe, City Of	0097566		Single Fmly	4	180,232.30
Montgomery	Conroe, City Of	0098402		Single Fmly	2	51,900.89
Montgomery	Conroe, City Of	0111709		Single Fmly	2	8,830.16
Montgomery	Conroe, City Of	0113274		Single Fmly	2	19,820.13
Montgomery	Conroe, City Of	0113901		Single Fmly	2	39,197.36
Montgomery	Conroe, City Of	0113902		Single Fmly	4	57,775.63
Montgomery	Conroe, City Of	0114165		Single Fmly	2	63,435.11
Montgomery	Conroe, City Of	0114687		Single Fmly	2	10,949.67
Montgomery	Conroe, City Of	0115766		2-4 Family	5	112,693.10
Montgomery	Conroe, City Of	0120300		Single Fmly	2	24,272.87
Montgomery	Conroe, City Of	0122063		Single Fmly	2	6,963.89
Montgomery	Conroe, City Of	0127099		Single Fmly	3	66,376.97
Montgomery	Conroe, City Of	0168056		Single Fmly	2	17,946.78
Montgomery	Conroe, City Of	0168444		Single Fmly	3	25,527.52
Montgomery	Conroe, City Of	0168445		Single Fmly	2	105,962.95
Montgomery	Conroe, City Of	0168900		Other - Nonresidential	2	21,292.08
Montgomery	Conroe, City Of	0213230		Single Fmly	2	3,701.22
Montgomery	Conroe, City Of	0213290		Single Fmly	3	41,013.67
Montgomery	Conroe, City Of	0213334		Single Fmly	2	21,012.83
Montgomery	Conroe, City Of	0239620		Single Fmly	2	8,480.97
Montgomery	Conroe, City Of	0242906		Single Fmly	3	22,878.11
Montgomery	Conroe, City Of	0243765		Single Fmly	3	270,849.54
Montgomery	Conroe, City Of	0247048		Single Fmly	3	74,225.34
Montgomery	Conroe, City Of	0248842		Single Fmly	3	104,460.67
Montgomery	Conroe, City Of	0248997		Single Fmly	2	57,127.90
Montgomery	Conroe, City Of	0249326		Single Fmly	3	254,986.76

Montgomery	Conroe, City Of	0249745		Single Fmly	2	39,180.02
Montgomery	Conroe, City Of	0249957		Busi-Nonres	2	87,834.50
Montgomery	Conroe, City Of	0249962		Single Fmly	2	199,072.07
Montgomery	Conroe, City Of	0250035		2-4 Family	2	92,986.44
Montgomery	Conroe, City Of	0250064		Single Fmly	2	125,104.36
Montgomery	Conroe, City Of	0250203		Single Fmly	2	78,061.11
Montgomery	Conroe, City Of	0250205		Single Fmly	2	42,059.26
Montgomery	Conroe, City Of	0250208		Single Fmly	2	95,864.98
Montgomery	Conroe, City Of	0250209		Single Fmly	2	50,279.20
Montgomery	Conroe, City Of	0250454		Busi-Nonres	2	74,305.87
Montgomery	Conroe, City Of	0258611		Single Fmly	2	50,348.81
Montgomery	Conroe, City Of	0262512		Single Fmly	2	160,587.64
Montgomery	Conroe, City Of	0262513		Single Fmly	2	81,518.22
Montgomery	Cut And Shoot, City Of	0037411	VU	Single Fmly	6	152,826.24
Montgomery	Magnolia, City Of	0114118		Single Fmly	2	120,136.42
Montgomery	Montgomery County*	0000106	MVU	Single Fmly	5	141,305.87
Montgomery	Montgomery County*	0000473	V	Single Fmly	12	519,015.51
Montgomery	Montgomery County*	0001131	VU	Single Fmly	4	42,862.67
Montgomery	Montgomery County*	0001518	VU	Single Fmly	6	41,176.12
Montgomery	Montgomery County*	0001894		Single Fmly	8	54,999.41
Montgomery	Montgomery County*	0001921	MVU	Single Fmly	6	340,869.10
Montgomery	Montgomery County*	0002360		Single Fmly	3	10,483.77
Montgomery	Montgomery County*	0002364		Single Fmly	3	18,278.60
Montgomery	Montgomery County*	0002388	VU	Single Fmly	10	134,198.16
Montgomery	Montgomery County*	0002628	V	Single Fmly	8	404,413.94
Montgomery	Montgomery County*	0002636		Single Fmly	4	20,593.78
Montgomery	Montgomery County*	0003024		Single Fmly	2	9,727.92
Montgomery	Montgomery County*	0003188		Single Fmly	2	4,222.02
Montgomery	Montgomery County*	0003543	V	Single Fmly	5	155,415.76
Montgomery	Montgomery County*	0003565		Single Fmly	2	86,686.53
Montgomery	Montgomery County*	0003652	VU	Single Fmly	11	115,975.87
Montgomery	Montgomery County*	0003926		Single Fmly	3	107,622.81
Montgomery	Montgomery County*	0004230	VU	Single Fmly	6	125,189.16
Montgomery	Montgomery County*	0005530		Single Fmly	2	9,403.97
Montgomery	Montgomery County*	0005533		Single Fmly	5	40,893.82
Montgomery	Montgomery County*	0005547		Single Fmly	4	29,541.71
Montgomery	Montgomery County*	0005795	PU	Assmd Condo	10	307,807.22
Montgomery	Montgomery County*	0005797		Single Fmly	4	20,987.29
Montgomery	Montgomery County*	0006517	VU	Single Fmly	13	273,735.89
Montgomery	Montgomery County*	0006576		Single Fmly	3	8,362.96
Montgomery	Montgomery County*	0006685		Single Fmly	4	18,239.06
Montgomery	Montgomery County*	0007167	VU	Single Fmly	7	73,429.16
Montgomery	Montgomery County*	0007429		Single Fmly	2	6,586.14
Montgomery	Montgomery County*	0007460		Single Fmly	4	96,499.50
Montgomery	Montgomery County*	0007538	VU	2-4 Family	7	283,073.20
Montgomery	Montgomery County*	0008363	VU	Single Fmly	9	64,361.35
Montgomery	Montgomery County*	0008424		Single Fmly	3	37,297.77
Montgomery	Montgomery County*	0009480		Other - Nonresidential	2	24,295.11
Montgomery	Montgomery County*	0010424		Single Fmly	4	30,635.93
Montgomery	Montgomery County*	0012845		Single Fmly	2	10,368.31

Montgomery	Montgomery County*	0012872		Single Fmly	2	9,939.34
Montgomery	Montgomery County*	0012883	V	Single Fmly	6	138,278.78
Montgomery	Montgomery County*	0012897		Single Fmly	3	29,441.70
Montgomery	Montgomery County*	0012976		Single Fmly	4	13,600.55
Montgomery	Montgomery County*	0013009	PU	Single Fmly	3	38,508.61
Montgomery	Montgomery County*	0013014		Single Fmly	4	26,518.93
Montgomery	Montgomery County*	0013016	V	Single Fmly	19	276,028.17
Montgomery	Montgomery County*	0013055		Single Fmly	2	26,611.09
Montgomery	Montgomery County*	0013108		Single Fmly	2	7,449.98
Montgomery	Montgomery County*	0013129		Single Fmly	2	34,449.03
Montgomery	Montgomery County*	0013136		Single Fmly	3	41,922.82
Montgomery	Montgomery County*	0013155		Single Fmly	2	23,826.92
Montgomery	Montgomery County*	0013166	VU	Single Fmly	9	80,304.79
Montgomery	Montgomery County*	0013178	VU	Single Fmly	11	69,044.09
Montgomery	Montgomery County*	0013208	V	Single Fmly	7	327,096.21
Montgomery	Montgomery County*	0013257		Single Fmly	8	42,787.34
Montgomery	Montgomery County*	0013259	VU	Single Fmly	5	74,141.53
Montgomery	Montgomery County*	0013270		Single Fmly	5	13,832.17
Montgomery	Montgomery County*	0013490	V	Single Fmly	9	225,038.77
Montgomery	Montgomery County*	0013677	VU	Single Fmly	11	161,106.91
Montgomery	Montgomery County*	0014088		Single Fmly	4	125,877.80
Montgomery	Montgomery County*	0014101	V	Single Fmly	12	172,678.02
Montgomery	Montgomery County*	0014119	VU	Single Fmly	8	246,442.99
Montgomery	Montgomery County*	0017765	PU	Single Fmly	5	206,751.60
Montgomery	Montgomery County*	0017772		Single Fmly	2	73,236.85
Montgomery	Montgomery County*	0017774	PU	Single Fmly	7	592,630.27
Montgomery	Montgomery County*	0017778		Single Fmly	3	155,138.56
Montgomery	Montgomery County*	0017779	VU	Single Fmly	5	232,253.69
Montgomery	Montgomery County*	0017780	V	Single Fmly	7	336,510.70
Montgomery	Montgomery County*	0017787	P	Single Fmly	11	684,007.98
Montgomery	Montgomery County*	0017791	V	Single Fmly	5	124,745.69
Montgomery	Montgomery County*	0017792		Single Fmly	3	157,259.88
Montgomery	Montgomery County*	0017794		Single Fmly	3	51,954.48
Montgomery	Montgomery County*	0017796	P	Single Fmly	22	518,535.17
Montgomery	Montgomery County*	0017799		Single Fmly	3	12,107.03
Montgomery	Montgomery County*	0017800	VU	Single Fmly	4	45,147.48
Montgomery	Montgomery County*	0017801		Single Fmly	2	58,652.55
Montgomery	Montgomery County*	0017802		Single Fmly	3	55,650.51
Montgomery	Montgomery County*	0017803	VU	Single Fmly	7	666,519.66
Montgomery	Montgomery County*	0017805		Single Fmly	8	18,741.10
Montgomery	Montgomery County*	0017815		Single Fmly	3	15,185.06
Montgomery	Montgomery County*	0018277		Single Fmly	2	34,653.57
Montgomery	Montgomery County*	0018278		Single Fmly	2	61,871.28
Montgomery	Montgomery County*	0018279		Single Fmly	2	46,195.32
Montgomery	Montgomery County*	0018280		Single Fmly	2	65,019.00
Montgomery	Montgomery County*	0018281		Single Fmly	3	41,549.59
Montgomery	Montgomery County*	0018282		Single Fmly	3	24,341.94
Montgomery	Montgomery County*	0018283		Single Fmly	3	137,866.45
Montgomery	Montgomery County*	0018284	V	Single Fmly	8	420,689.34
Montgomery	Montgomery County*	0018285		Single Fmly	2	59,990.23
Montgomery	Montgomery County*	0018287		Single Fmly	2	61,018.90

Montgomery	Montgomery County*	0018288		Single Fmly	2	20,423.51
Montgomery	Montgomery County*	0018295		Single Fmly	2	12,034.48
Montgomery	Montgomery County*	0018297		Single Fmly	4	220,087.18
Montgomery	Montgomery County*	0018298	PU	Single Fmly	4	69,369.43
Montgomery	Montgomery County*	0018300	V	Single Fmly	4	219,763.46
Montgomery	Montgomery County*	0018301	PU	Single Fmly	3	67,895.28
Montgomery	Montgomery County*	0018302		Single Fmly	2	27,414.45
Montgomery	Montgomery County*	0018305	V	Single Fmly	7	437,576.56
Montgomery	Montgomery County*	0018307	VU	Single Fmly	7	200,679.99
Montgomery	Montgomery County*	0018308		Single Fmly	2	46,177.57
Montgomery	Montgomery County*	0018310		Single Fmly	3	11,859.90
Montgomery	Montgomery County*	0018311		Single Fmly	2	7,504.86
Montgomery	Montgomery County*	0018313		Single Fmly	2	20,818.27
Montgomery	Montgomery County*	0018314	VU	Single Fmly	6	376,433.67
Montgomery	Montgomery County*	0018315		Single Fmly	3	65,603.87
Montgomery	Montgomery County*	0018316	VU	Single Fmly	4	176,660.11
Montgomery	Montgomery County*	0018318		Single Fmly	4	55,008.04
Montgomery	Montgomery County*	0018325		Single Fmly	4	123,304.06
Montgomery	Montgomery County*	0018326		Single Fmly	3	81,157.21
Montgomery	Montgomery County*	0018329		Single Fmly	4	152,229.26
Montgomery	Montgomery County*	0018330		Single Fmly	5	116,794.95
Montgomery	Montgomery County*	0018333		Single Fmly	2	28,912.00
Montgomery	Montgomery County*	0018334		Single Fmly	2	41,124.63
Montgomery	Montgomery County*	0018335		Single Fmly	3	33,154.21
Montgomery	Montgomery County*	0018340		Single Fmly	2	44,163.15
Montgomery	Montgomery County*	0018341		Single Fmly	5	121,777.62
Montgomery	Montgomery County*	0018342		Single Fmly	2	66,442.76
Montgomery	Montgomery County*	0018349		Single Fmly	3	20,055.54
Montgomery	Montgomery County*	0018350		Single Fmly	2	17,621.94
Montgomery	Montgomery County*	0018351		Single Fmly	2	31,250.85
Montgomery	Montgomery County*	0018354		Single Fmly	2	5,615.71
Montgomery	Montgomery County*	0018355		Single Fmly	4	23,003.89
Montgomery	Montgomery County*	0018356		Single Fmly	3	14,202.43
Montgomery	Montgomery County*	0018357		Single Fmly	2	62,627.42
Montgomery	Montgomery County*	0018358		Single Fmly	3	9,704.36
Montgomery	Montgomery County*	0018359		Single Fmly	2	5,397.07
Montgomery	Montgomery County*	0018360		Single Fmly	4	20,491.12
Montgomery	Montgomery County*	0018361		Single Fmly	5	31,180.07
Montgomery	Montgomery County*	0018362		Single Fmly	5	23,301.24
Montgomery	Montgomery County*	0018363		Single Fmly	3	9,714.13
Montgomery	Montgomery County*	0018366		Single Fmly	3	54,375.48
Montgomery	Montgomery County*	0018368	VU	Single Fmly	6	42,646.14
Montgomery	Montgomery County*	0018369	V	Single Fmly	8	449,364.19
Montgomery	Montgomery County*	0018371		Single Fmly	3	60,372.19
Montgomery	Montgomery County*	0018372		Single Fmly	3	13,754.55
Montgomery	Montgomery County*	0018383		Single Fmly	3	7,150.65
Montgomery	Montgomery County*	0018386		Single Fmly	3	65,442.40
Montgomery	Montgomery County*	0018389	VU	Single Fmly	5	64,637.53
Montgomery	Montgomery County*	0018390		Single Fmly	3	40,683.85
Montgomery	Montgomery County*	0018391		Single Fmly	4	32,843.92
Montgomery	Montgomery County*	0018403		Single Fmly	3	9,499.09

Montgomery	Montgomery County*	0018406		Single Fmly	3	18,156.09
Montgomery	Montgomery County*	0018411	P	Single Fmly	11	447,751.96
Montgomery	Montgomery County*	0018420	PU	Single Fmly	2	13,132.40
Montgomery	Montgomery County*	0018422		Single Fmly	9	202,350.09
Montgomery	Montgomery County*	0018431		Single Fmly	2	58,405.22
Montgomery	Montgomery County*	0018451		Single Fmly	2	20,914.90
Montgomery	Montgomery County*	0018468		Single Fmly	2	20,827.29
Montgomery	Montgomery County*	0018476		Assmd Condo	4	26,178.67
Montgomery	Montgomery County*	0018477		Single Fmly	3	10,033.42
Montgomery	Montgomery County*	0018480		Single Fmly	3	21,731.58
Montgomery	Montgomery County*	0018485		Single Fmly	3	6,534.73
Montgomery	Montgomery County*	0018488	PU	Single Fmly	4	41,201.72
Montgomery	Montgomery County*	0018534		Single Fmly	3	11,035.15
Montgomery	Montgomery County*	0018565	MVU	Single Fmly	4	138,828.81
Montgomery	Montgomery County*	0018568		Single Fmly	3	78,002.75
Montgomery	Montgomery County*	0018602		Single Fmly	3	299,127.08
Montgomery	Montgomery County*	0018636		Single Fmly	3	98,208.84
Montgomery	Montgomery County*	0018637	PU	Single Fmly	4	319,696.14
Montgomery	Montgomery County*	0018665		Single Fmly	3	24,614.65
Montgomery	Montgomery County*	0018673		Single Fmly	2	16,252.54
Montgomery	Montgomery County*	0018700		Single Fmly	3	36,617.19
Montgomery	Montgomery County*	0018702	VU	Single Fmly	4	106,991.55
Montgomery	Montgomery County*	0018710		Single Fmly	2	7,325.64
Montgomery	Montgomery County*	0018718	PU	Single Fmly	4	64,717.26
Montgomery	Montgomery County*	0018768		Single Fmly	2	5,471.74
Montgomery	Montgomery County*	0025078		Single Fmly	3	43,964.36
Montgomery	Montgomery County*	0025079	V	Single Fmly	19	462,206.15
Montgomery	Montgomery County*	0025085		Single Fmly	3	21,639.97
Montgomery	Montgomery County*	0025096		Single Fmly	2	37,896.75
Montgomery	Montgomery County*	0025139		Single Fmly	3	52,075.20
Montgomery	Montgomery County*	0025149		Single Fmly	5	29,312.20
Montgomery	Montgomery County*	0025183		Single Fmly	3	69,708.54
Montgomery	Montgomery County*	0025424	V	Single Fmly	20	291,885.03
Montgomery	Montgomery County*	0025441	V	Single Fmly	25	523,836.41
Montgomery	Montgomery County*	0025446		Single Fmly	2	4,910.68
Montgomery	Montgomery County*	0025450		Single Fmly	2	34,999.50
Montgomery	Montgomery County*	0025471	V	Single Fmly	11	122,077.49
Montgomery	Montgomery County*	0025512		Single Fmly	3	24,355.28
Montgomery	Montgomery County*	0025540		Single Fmly	3	35,393.68
Montgomery	Montgomery County*	0025545		Single Fmly	5	23,364.03
Montgomery	Montgomery County*	0025554	VU	Single Fmly	5	92,136.35
Montgomery	Montgomery County*	0025591		Assmd Condo	4	197,800.44
Montgomery	Montgomery County*	0025592	VU	Single Fmly	5	69,274.42
Montgomery	Montgomery County*	0025601		Single Fmly	2	16,959.68
Montgomery	Montgomery County*	0025615		Single Fmly	4	75,528.96
Montgomery	Montgomery County*	0025618		Single Fmly	3	45,064.35
Montgomery	Montgomery County*	0025624	VU	Single Fmly	7	436,736.70
Montgomery	Montgomery County*	0025629	V	Single Fmly	5	183,150.81
Montgomery	Montgomery County*	0025631	PU	Single Fmly	6	292,022.81
Montgomery	Montgomery County*	0025651		Single Fmly	2	16,131.60
Montgomery	Montgomery County*	0025656		Single Fmly	4	60,943.09

Montgomery	Montgomery County*	0025659		Single Fmly	3	32,550.20
Montgomery	Montgomery County*	0025661		Single Fmly	2	25,150.55
Montgomery	Montgomery County*	0025691		Single Fmly	5	52,946.60
Montgomery	Montgomery County*	0025700		Single Fmly	2	84,327.50
Montgomery	Montgomery County*	0025703	MVU	Single Fmly	8	429,958.13
Montgomery	Montgomery County*	0025731		Single Fmly	3	25,206.38
Montgomery	Montgomery County*	0025735		Single Fmly	3	88,899.26
Montgomery	Montgomery County*	0025760	VU	Single Fmly	5	74,349.06
Montgomery	Montgomery County*	0025764	VU	Single Fmly	4	186,628.63
Montgomery	Montgomery County*	0025778		Single Fmly	5	192,605.99
Montgomery	Montgomery County*	0025790		Single Fmly	2	54,060.11
Montgomery	Montgomery County*	0025791		Single Fmly	3	46,164.77
Montgomery	Montgomery County*	0025801		Assmd Condo	4	24,771.05
Montgomery	Montgomery County*	0025816	VU	Single Fmly	4	54,745.19
Montgomery	Montgomery County*	0025822		Single Fmly	2	9,283.66
Montgomery	Montgomery County*	0025825		Single Fmly	2	15,992.00
Montgomery	Montgomery County*	0025829	VU	Single Fmly	5	97,085.05
Montgomery	Montgomery County*	0025832	V	Single Fmly	7	120,819.32
Montgomery	Montgomery County*	0025837		Single Fmly	3	41,502.88
Montgomery	Montgomery County*	0025846		Single Fmly	3	14,751.55
Montgomery	Montgomery County*	0025867		Single Fmly	2	90,000.00
Montgomery	Montgomery County*	0025872		Single Fmly	2	5,393.39
Montgomery	Montgomery County*	0025881		Single Fmly	2	36,707.61
Montgomery	Montgomery County*	0025888		Single Fmly	3	18,147.27
Montgomery	Montgomery County*	0026071		Single Fmly	2	63,098.36
Montgomery	Montgomery County*	0026086		Single Fmly	3	177,371.12
Montgomery	Montgomery County*	0026093	V	Single Fmly	7	535,421.07
Montgomery	Montgomery County*	0026117	PU	Single Fmly	6	85,359.24
Montgomery	Montgomery County*	0026119		Single Fmly	3	176,400.00
Montgomery	Montgomery County*	0026136		Single Fmly	3	26,492.04
Montgomery	Montgomery County*	0026155		Single Fmly	4	22,476.73
Montgomery	Montgomery County*	0026169	V	Single Fmly	5	181,826.53
Montgomery	Montgomery County*	0026204		Single Fmly	2	70,127.64
Montgomery	Montgomery County*	0026246		Single Fmly	3	42,186.22
Montgomery	Montgomery County*	0026254		Single Fmly	4	92,445.44
Montgomery	Montgomery County*	0026257		Single Fmly	3	46,955.15
Montgomery	Montgomery County*	0026274	V	Single Fmly	7	391,108.43
Montgomery	Montgomery County*	0026333		Single Fmly	4	181,061.10
Montgomery	Montgomery County*	0026341	PU	Single Fmly	2	57,605.74
Montgomery	Montgomery County*	0026350		Single Fmly	2	69,343.22
Montgomery	Montgomery County*	0026360	V	Single Fmly	6	215,433.19
Montgomery	Montgomery County*	0026369		Single Fmly	3	32,095.79
Montgomery	Montgomery County*	0026392		Single Fmly	3	62,407.03
Montgomery	Montgomery County*	0026396		Assmd Condo	3	58,781.76
Montgomery	Montgomery County*	0026408	V	Single Fmly	4	84,126.49
Montgomery	Montgomery County*	0026443		Single Fmly	4	62,581.88
Montgomery	Montgomery County*	0026459		Single Fmly	2	50,059.40
Montgomery	Montgomery County*	0026462	PU	Single Fmly	10	141,510.67
Montgomery	Montgomery County*	0026473		Single Fmly	2	17,453.34
Montgomery	Montgomery County*	0026474		Single Fmly	2	3,732.79
Montgomery	Montgomery County*	0026620	PU	Single Fmly	3	115,253.73

Montgomery	Montgomery County*	0026705		Single Fmly	2	19,661.83
Montgomery	Montgomery County*	0026752		Single Fmly	3	49,447.09
Montgomery	Montgomery County*	0026759		Single Fmly	2	84,363.09
Montgomery	Montgomery County*	0026775		Single Fmly	4	32,769.34
Montgomery	Montgomery County*	0026785		Single Fmly	2	17,090.89
Montgomery	Montgomery County*	0026791		Single Fmly	3	17,397.97
Montgomery	Montgomery County*	0026856		Single Fmly	3	105,607.90
Montgomery	Montgomery County*	0033277	V	Single Fmly	6	278,134.43
Montgomery	Montgomery County*	0034223	V	Single Fmly	4	197,579.27
Montgomery	Montgomery County*	0034224		Single Fmly	2	2,593.65
Montgomery	Montgomery County*	0034353	PU	Assmd Condo	6	58,215.81
Montgomery	Montgomery County*	0034359	V	Single Fmly	7	197,207.26
Montgomery	Montgomery County*	0034722		Single Fmly	2	36,500.00
Montgomery	Montgomery County*	0034859		Single Fmly	2	36,605.31
Montgomery	Montgomery County*	0035013	VU	Single Fmly	5	380,041.29
Montgomery	Montgomery County*	0035035		Single Fmly	4	119,372.51
Montgomery	Montgomery County*	0035563		Single Fmly	3	34,067.31
Montgomery	Montgomery County*	0035903	VU	Single Fmly	8	492,925.41
Montgomery	Montgomery County*	0036118	V	Single Fmly	8	609,888.98
Montgomery	Montgomery County*	0036233	VU	Single Fmly	4	120,579.61
Montgomery	Montgomery County*	0036350		Single Fmly	2	27,487.09
Montgomery	Montgomery County*	0036360	VU	Single Fmly	9	195,409.79
Montgomery	Montgomery County*	0036403		Single Fmly	2	21,863.22
Montgomery	Montgomery County*	0036448		Single Fmly	7	38,262.62
Montgomery	Montgomery County*	0036470	V	Single Fmly	7	185,375.15
Montgomery	Montgomery County*	0036540		Single Fmly	5	279,673.86
Montgomery	Montgomery County*	0036544		Single Fmly	3	61,148.09
Montgomery	Montgomery County*	0036587	MVU	Single Fmly	5	113,326.10
Montgomery	Montgomery County*	0036662		Single Fmly	3	77,892.87
Montgomery	Montgomery County*	0036940		Assmd Condo	3	185,690.26
Montgomery	Montgomery County*	0036941	V	Single Fmly	7	221,628.82
Montgomery	Montgomery County*	0036942	V	Single Fmly	8	316,349.85
Montgomery	Montgomery County*	0036943	V	Single Fmly	6	175,275.87
Montgomery	Montgomery County*	0036956		Single Fmly	2	61,224.38
Montgomery	Montgomery County*	0037013	MVU	Single Fmly	5	94,158.80
Montgomery	Montgomery County*	0037104		Single Fmly	4	192,737.99
Montgomery	Montgomery County*	0037188		Single Fmly	3	73,882.54
Montgomery	Montgomery County*	0037253		Single Fmly	3	33,569.16
Montgomery	Montgomery County*	0037273	V	Single Fmly	7	126,039.24
Montgomery	Montgomery County*	0037283	VU	Single Fmly	9	233,449.53
Montgomery	Montgomery County*	0037293		Single Fmly	2	5,581.54
Montgomery	Montgomery County*	0037379		Single Fmly	4	20,774.96
Montgomery	Montgomery County*	0037380		Single Fmly	5	26,402.40
Montgomery	Montgomery County*	0037416		Single Fmly	4	21,843.31
Montgomery	Montgomery County*	0037428		Single Fmly	4	28,060.54
Montgomery	Montgomery County*	0037443		2-4 Family	2	41,381.37
Montgomery	Montgomery County*	0037446		Single Fmly	3	41,449.00
Montgomery	Montgomery County*	0037484		Single Fmly	3	22,638.32
Montgomery	Montgomery County*	0037486	VU	Single Fmly	7	158,300.93
Montgomery	Montgomery County*	0037501		Single Fmly	7	100,100.94
Montgomery	Montgomery County*	0037503		Single Fmly	3	37,227.16

Montgomery	Montgomery County*	0037504		Single Fmly	2	23,142.70
Montgomery	Montgomery County*	0037515	VU	Single Fmly	9	91,291.53
Montgomery	Montgomery County*	0037527		Single Fmly	2	46,460.15
Montgomery	Montgomery County*	0037535		Single Fmly	3	28,657.68
Montgomery	Montgomery County*	0037563	V	Single Fmly	7	218,434.33
Montgomery	Montgomery County*	0037572		Single Fmly	5	96,734.01
Montgomery	Montgomery County*	0037627		Single Fmly	2	12,795.88
Montgomery	Montgomery County*	0037726	VU	Single Fmly	9	111,879.78
Montgomery	Montgomery County*	0037803		Single Fmly	3	29,714.97
Montgomery	Montgomery County*	0037936	VU	Single Fmly	10	159,282.99
Montgomery	Montgomery County*	0037937		Assmd Condo	2	55,442.74
Montgomery	Montgomery County*	0037945		Single Fmly	2	19,108.92
Montgomery	Montgomery County*	0037951		Single Fmly	2	25,089.40
Montgomery	Montgomery County*	0038022	VU	Single Fmly	4	218,941.97
Montgomery	Montgomery County*	0038086	VU	Single Fmly	8	133,566.18
Montgomery	Montgomery County*	0038139		Single Fmly	2	11,320.17
Montgomery	Montgomery County*	0038147		Single Fmly	2	23,347.27
Montgomery	Montgomery County*	0038157		Single Fmly	2	23,746.93
Montgomery	Montgomery County*	0038290		Single Fmly	2	8,174.00
Montgomery	Montgomery County*	0038343		Single Fmly	2	5,895.25
Montgomery	Montgomery County*	0038344		Single Fmly	2	12,373.04
Montgomery	Montgomery County*	0038543		Single Fmly	2	38,467.55
Montgomery	Montgomery County*	0038544		Assmd Condo	2	75,238.88
Montgomery	Montgomery County*	0038562		Single Fmly	3	8,772.77
Montgomery	Montgomery County*	0038568		Single Fmly	2	52,431.77
Montgomery	Montgomery County*	0038655		Single Fmly	3	18,229.76
Montgomery	Montgomery County*	0038725		Single Fmly	2	4,046.18
Montgomery	Montgomery County*	0038870		Single Fmly	2	5,506.32
Montgomery	Montgomery County*	0039240		Single Fmly	2	47,582.00
Montgomery	Montgomery County*	0039354		Assmd Condo	4	218,882.86
Montgomery	Montgomery County*	0039591		Single Fmly	2	36,258.26
Montgomery	Montgomery County*	0039752		Single Fmly	2	67,373.33
Montgomery	Montgomery County*	0039757	VU	Single Fmly	5	177,551.75
Montgomery	Montgomery County*	0039855		Single Fmly	2	12,054.00
Montgomery	Montgomery County*	0040257	VU	Single Fmly	4	58,422.29
Montgomery	Montgomery County*	0040341		Single Fmly	6	25,087.67
Montgomery	Montgomery County*	0040488		Single Fmly	3	85,173.31
Montgomery	Montgomery County*	0040501		Single Fmly	3	61,960.10
Montgomery	Montgomery County*	0040673		Single Fmly	2	21,956.38
Montgomery	Montgomery County*	0040715		Single Fmly	2	28,690.21
Montgomery	Montgomery County*	0040946	V	Single Fmly	7	534,973.26
Montgomery	Montgomery County*	0041063	VU	Single Fmly	6	102,476.69
Montgomery	Montgomery County*	0041207		Single Fmly	2	4,594.75
Montgomery	Montgomery County*	0041282		Single Fmly	4	60,104.49
Montgomery	Montgomery County*	0041332		Single Fmly	4	56,173.84
Montgomery	Montgomery County*	0041518	PU	Single Fmly	2	41,556.68
Montgomery	Montgomery County*	0041914		Single Fmly	2	47,410.11
Montgomery	Montgomery County*	0042047		Single Fmly	2	46,337.80
Montgomery	Montgomery County*	0042052	PU	Single Fmly	5	121,105.90
Montgomery	Montgomery County*	0042286		Single Fmly	2	54,218.70
Montgomery	Montgomery County*	0042365	PU	Single Fmly	3	123,742.81

Montgomery	Montgomery County*	0042399		Single Fmly	6	34,514.65
Montgomery	Montgomery County*	0042527	P	Single Fmly	14	895,010.73
Montgomery	Montgomery County*	0042543		Single Fmly	3	7,246.14
Montgomery	Montgomery County*	0042557		Single Fmly	2	57,213.54
Montgomery	Montgomery County*	0042600		Single Fmly	4	57,671.01
Montgomery	Montgomery County*	0042711		Single Fmly	2	46,742.62
Montgomery	Montgomery County*	0042969		Single Fmly	3	20,164.78
Montgomery	Montgomery County*	0043074		Single Fmly	3	6,782.10
Montgomery	Montgomery County*	0043159	V	Single Fmly	5	134,930.32
Montgomery	Montgomery County*	0043265		Single Fmly	2	17,097.60
Montgomery	Montgomery County*	0043440		Single Fmly	4	35,700.67
Montgomery	Montgomery County*	0043589		Single Fmly	2	19,198.00
Montgomery	Montgomery County*	0043782		Single Fmly	2	6,166.71
Montgomery	Montgomery County*	0043872	VU	Single Fmly	7	60,490.53
Montgomery	Montgomery County*	0044083		Single Fmly	4	78,228.30
Montgomery	Montgomery County*	0044204		Single Fmly	2	27,129.90
Montgomery	Montgomery County*	0044267	VU	Single Fmly	4	114,605.11
Montgomery	Montgomery County*	0044414		Single Fmly	5	36,513.88
Montgomery	Montgomery County*	0045293		Single Fmly	2	22,244.05
Montgomery	Montgomery County*	0045315		Single Fmly	2	13,703.25
Montgomery	Montgomery County*	0045370		Single Fmly	2	13,465.76
Montgomery	Montgomery County*	0045497		Single Fmly	5	34,821.44
Montgomery	Montgomery County*	0045584		Single Fmly	5	31,686.71
Montgomery	Montgomery County*	0045698	PU	Single Fmly	4	98,681.89
Montgomery	Montgomery County*	0045753		Single Fmly	3	14,611.83
Montgomery	Montgomery County*	0047050		Single Fmly	2	31,047.18
Montgomery	Montgomery County*	0047051		Single Fmly	2	20,944.40
Montgomery	Montgomery County*	0047086		Single Fmly	2	25,387.54
Montgomery	Montgomery County*	0048217		Single Fmly	2	2,595.00
Montgomery	Montgomery County*	0048848		Single Fmly	3	11,774.66
Montgomery	Montgomery County*	0048900		Single Fmly	4	40,571.99
Montgomery	Montgomery County*	0049557	VU	Single Fmly	4	116,028.98
Montgomery	Montgomery County*	0050264	MVU	Single Fmly	4	87,382.71
Montgomery	Montgomery County*	0050384		Single Fmly	2	38,017.98
Montgomery	Montgomery County*	0050414	V	Single Fmly	8	341,523.03
Montgomery	Montgomery County*	0051422	PU	Single Fmly	8	142,472.80
Montgomery	Montgomery County*	0051428		Single Fmly	3	32,668.97
Montgomery	Montgomery County*	0051702		Single Fmly	2	22,750.07
Montgomery	Montgomery County*	0052121	V	Single Fmly	6	90,488.52
Montgomery	Montgomery County*	0052560	V	Single Fmly	7	216,526.43
Montgomery	Montgomery County*	0052685	VU	Single Fmly	4	96,939.63
Montgomery	Montgomery County*	0052708	PU	Single Fmly	2	19,151.43
Montgomery	Montgomery County*	0053657		Single Fmly	2	6,379.84
Montgomery	Montgomery County*	0053868	VU	Single Fmly	6	116,952.96
Montgomery	Montgomery County*	0054892	V	Single Fmly	6	85,793.66
Montgomery	Montgomery County*	0055530	MVU	Single Fmly	4	127,661.12
Montgomery	Montgomery County*	0055818		Single Fmly	2	58,524.64
Montgomery	Montgomery County*	0056191		Single Fmly	4	40,362.02
Montgomery	Montgomery County*	0056639		Single Fmly	3	68,889.02
Montgomery	Montgomery County*	0056753		Single Fmly	3	60,871.13
Montgomery	Montgomery County*	0056828		Single Fmly	5	14,637.17

Montgomery	Montgomery County*	0057522		Single Fmly	3	122,123.05
Montgomery	Montgomery County*	0068039		Single Fmly	3	29,090.33
Montgomery	Montgomery County*	0068040	VU	Single Fmly	6	161,620.17
Montgomery	Montgomery County*	0068239		Single Fmly	2	36,216.00
Montgomery	Montgomery County*	0068240	VU	Single Fmly	4	171,761.35
Montgomery	Montgomery County*	0068244		Single Fmly	2	54,014.24
Montgomery	Montgomery County*	0068293		Single Fmly	3	25,094.25
Montgomery	Montgomery County*	0068300		Single Fmly	2	14,245.41
Montgomery	Montgomery County*	0068302		Single Fmly	2	19,450.80
Montgomery	Montgomery County*	0068304		Single Fmly	2	57,818.65
Montgomery	Montgomery County*	0068311	VU	Single Fmly	8	275,991.63
Montgomery	Montgomery County*	0068312	VU	Single Fmly	7	201,304.97
Montgomery	Montgomery County*	0068313	PU	Single Fmly	3	110,054.60
Montgomery	Montgomery County*	0068318	V	Single Fmly	5	165,565.43
Montgomery	Montgomery County*	0068325	VU	Single Fmly	6	138,020.14
Montgomery	Montgomery County*	0068326		Single Fmly	2	6,406.32
Montgomery	Montgomery County*	0068330	VU	Single Fmly	4	70,225.86
Montgomery	Montgomery County*	0068558	PU	Single Fmly	3	96,872.97
Montgomery	Montgomery County*	0068560	V	Single Fmly	4	371,277.52
Montgomery	Montgomery County*	0068562	V	Single Fmly	6	399,435.20
Montgomery	Montgomery County*	0068563		Single Fmly	3	130,477.52
Montgomery	Montgomery County*	0068564		Single Fmly	3	16,310.37
Montgomery	Montgomery County*	0068565		Single Fmly	3	5,800.35
Montgomery	Montgomery County*	0068567		Single Fmly	3	129,297.10
Montgomery	Montgomery County*	0068568	VU	Single Fmly	5	122,777.81
Montgomery	Montgomery County*	0068570	VU	Single Fmly	6	221,255.50
Montgomery	Montgomery County*	0068571		Single Fmly	3	43,692.70
Montgomery	Montgomery County*	0068572		Single Fmly	3	24,450.59
Montgomery	Montgomery County*	0068574	PU	Single Fmly	3	159,259.16
Montgomery	Montgomery County*	0068575		Single Fmly	2	40,500.00
Montgomery	Montgomery County*	0068576		Single Fmly	3	49,084.48
Montgomery	Montgomery County*	0068577		Single Fmly	2	25,892.86
Montgomery	Montgomery County*	0068578		Single Fmly	3	75,377.21
Montgomery	Montgomery County*	0068579		Single Fmly	2	22,267.28
Montgomery	Montgomery County*	0068942		Single Fmly	3	72,710.20
Montgomery	Montgomery County*	0068944	PU	Single Fmly	3	196,203.99
Montgomery	Montgomery County*	0068945		2-4 Family	3	71,260.13
Montgomery	Montgomery County*	0068946	VU	Single Fmly	8	338,259.75
Montgomery	Montgomery County*	0068947	V	Single Fmly	7	282,566.62
Montgomery	Montgomery County*	0068948		Single Fmly	3	68,923.69
Montgomery	Montgomery County*	0068949		Single Fmly	3	53,866.69
Montgomery	Montgomery County*	0068950		Single Fmly	2	44,235.83
Montgomery	Montgomery County*	0068995		Single Fmly	3	48,529.86
Montgomery	Montgomery County*	0068996	P	Single Fmly	4	268,025.19
Montgomery	Montgomery County*	0069588	PU	Single Fmly	3	267,648.73
Montgomery	Montgomery County*	0069643	VU	Single Fmly	4	70,605.03
Montgomery	Montgomery County*	0069700		Single Fmly	2	12,949.17
Montgomery	Montgomery County*	0069701		Single Fmly	2	20,520.54
Montgomery	Montgomery County*	0069715		Single Fmly	2	114,739.32
Montgomery	Montgomery County*	0069719		Single Fmly	2	87,262.00
Montgomery	Montgomery County*	0069720		Single Fmly	2	31,102.91

Montgomery	Montgomery County*	0069799		Single Fmly	4	94,005.51
Montgomery	Montgomery County*	0069822	MVU	Single Fmly	4	58,753.38
Montgomery	Montgomery County*	0069848		Single Fmly	2	41,240.14
Montgomery	Montgomery County*	0069865	PU	Single Fmly	4	274,866.49
Montgomery	Montgomery County*	0069940		Single Fmly	2	57,997.97
Montgomery	Montgomery County*	0069948		Single Fmly	3	63,904.11
Montgomery	Montgomery County*	0069954		Single Fmly	2	55,388.06
Montgomery	Montgomery County*	0069984		Single Fmly	2	78,129.05
Montgomery	Montgomery County*	0070019		Single Fmly	2	69,266.83
Montgomery	Montgomery County*	0070083	VU	Single Fmly	4	155,338.75
Montgomery	Montgomery County*	0070086		Single Fmly	2	80,877.22
Montgomery	Montgomery County*	0070102		Single Fmly	3	87,483.10
Montgomery	Montgomery County*	0070113		Single Fmly	3	86,093.63
Montgomery	Montgomery County*	0070278		Single Fmly	2	108,956.13
Montgomery	Montgomery County*	0070281	PU	Single Fmly	2	98,400.00
Montgomery	Montgomery County*	0070284	V	Single Fmly	4	84,620.97
Montgomery	Montgomery County*	0070286	VU	Single Fmly	4	441,148.86
Montgomery	Montgomery County*	0070304		Single Fmly	2	29,240.42
Montgomery	Montgomery County*	0070317		Single Fmly	2	40,159.85
Montgomery	Montgomery County*	0070467	V	Single Fmly	6	379,098.88
Montgomery	Montgomery County*	0070559	V	Single Fmly	12	411,064.71
Montgomery	Montgomery County*	0070657	VU	Single Fmly	3	237,337.70
Montgomery	Montgomery County*	0070669	PU	Single Fmly	2	71,949.92
Montgomery	Montgomery County*	0070683		Single Fmly	2	89,095.39
Montgomery	Montgomery County*	0070926		Single Fmly	2	31,300.00
Montgomery	Montgomery County*	0071105		Single Fmly	2	45,480.21
Montgomery	Montgomery County*	0071435		Single Fmly	2	59,169.67
Montgomery	Montgomery County*	0071440		Single Fmly	3	338,157.29
Montgomery	Montgomery County*	0071464	PU	Single Fmly	2	41,152.54
Montgomery	Montgomery County*	0071482		Single Fmly	2	184,628.00
Montgomery	Montgomery County*	0071485		Single Fmly	2	54,525.99
Montgomery	Montgomery County*	0071500		Single Fmly	2	24,898.85
Montgomery	Montgomery County*	0071510		Single Fmly	2	32,658.88
Montgomery	Montgomery County*	0071517	VU	Single Fmly	9	328,751.95
Montgomery	Montgomery County*	0071520		Single Fmly	2	61,668.11
Montgomery	Montgomery County*	0071537		Single Fmly	2	163,709.30
Montgomery	Montgomery County*	0071540		Single Fmly	2	14,193.39
Montgomery	Montgomery County*	0071548		Single Fmly	4	73,787.43
Montgomery	Montgomery County*	0071555		Single Fmly	3	75,145.23
Montgomery	Montgomery County*	0071556	V	Single Fmly	7	262,088.35
Montgomery	Montgomery County*	0071574		Single Fmly	3	76,251.16
Montgomery	Montgomery County*	0071576		Single Fmly	5	122,737.39
Montgomery	Montgomery County*	0071582	VU	Single Fmly	3	134,370.76
Montgomery	Montgomery County*	0071584		Single Fmly	3	134,994.92
Montgomery	Montgomery County*	0071589		Single Fmly	2	41,152.92
Montgomery	Montgomery County*	0071784		Single Fmly	3	46,513.95
Montgomery	Montgomery County*	0071991		Single Fmly	3	135,984.68
Montgomery	Montgomery County*	0071993		Single Fmly	2	48,047.84
Montgomery	Montgomery County*	0072012		Single Fmly	2	26,809.05
Montgomery	Montgomery County*	0072013		Single Fmly	2	54,810.40
Montgomery	Montgomery County*	0072081		Single Fmly	3	129,739.49

Montgomery	Montgomery County*	0072133	VU	Single Fmly	4	158,891.83
Montgomery	Montgomery County*	0072150	V	Single Fmly	5	307,035.31
Montgomery	Montgomery County*	0072153		Single Fmly	2	80,664.22
Montgomery	Montgomery County*	0072231		Single Fmly	7	314,569.59
Montgomery	Montgomery County*	0072249		Single Fmly	2	11,877.87
Montgomery	Montgomery County*	0072292		Single Fmly	2	115,963.89
Montgomery	Montgomery County*	0072479		Single Fmly	4	68,849.77
Montgomery	Montgomery County*	0073472		Single Fmly	2	52,951.44
Montgomery	Montgomery County*	0073489	V	Single Fmly	5	315,560.69
Montgomery	Montgomery County*	0073490		Single Fmly	2	92,122.27
Montgomery	Montgomery County*	0073491		Single Fmly	2	161,172.93
Montgomery	Montgomery County*	0073492		Single Fmly	2	105,218.75
Montgomery	Montgomery County*	0073493		Single Fmly	2	40,700.00
Montgomery	Montgomery County*	0073494		Single Fmly	2	46,365.28
Montgomery	Montgomery County*	0073512	VU	Single Fmly	5	288,216.76
Montgomery	Montgomery County*	0073513	V	Single Fmly	5	503,861.62
Montgomery	Montgomery County*	0073519	VU	Single Fmly	5	227,799.50
Montgomery	Montgomery County*	0073520		Single Fmly	4	72,858.71
Montgomery	Montgomery County*	0073522	V	Single Fmly	5	510,996.45
Montgomery	Montgomery County*	0073523	V	Single Fmly	5	398,951.89
Montgomery	Montgomery County*	0073524	V	Single Fmly	5	354,797.67
Montgomery	Montgomery County*	0073526	V	Single Fmly	6	553,899.00
Montgomery	Montgomery County*	0073528		Single Fmly	3	32,350.42
Montgomery	Montgomery County*	0073536	V	Single Fmly	4	90,281.99
Montgomery	Montgomery County*	0073538		Single Fmly	2	69,386.09
Montgomery	Montgomery County*	0073570		Single Fmly	3	170,020.59
Montgomery	Montgomery County*	0073571		Single Fmly	3	201,361.90
Montgomery	Montgomery County*	0073572	VU	Single Fmly	4	116,788.19
Montgomery	Montgomery County*	0073574	VU	Single Fmly	5	254,331.25
Montgomery	Montgomery County*	0073575	VU	Single Fmly	8	573,357.34
Montgomery	Montgomery County*	0073576	V	Single Fmly	3	130,444.05
Montgomery	Montgomery County*	0073578		Single Fmly	2	181,224.78
Montgomery	Montgomery County*	0073584	V	Single Fmly	7	202,492.15
Montgomery	Montgomery County*	0073585	PU	Single Fmly	2	38,553.01
Montgomery	Montgomery County*	0073586		Single Fmly	2	11,188.86
Montgomery	Montgomery County*	0076292	VU	Single Fmly	4	144,054.27
Montgomery	Montgomery County*	0076300		Single Fmly	2	62,867.71
Montgomery	Montgomery County*	0077183		Single Fmly	2	29,676.13
Montgomery	Montgomery County*	0077559		Single Fmly	2	46,971.74
Montgomery	Montgomery County*	0077858		Single Fmly	2	80,009.74
Montgomery	Montgomery County*	0089421		Single Fmly	2	40,851.25
Montgomery	Montgomery County*	0091217		Single Fmly	3	11,903.55
Montgomery	Montgomery County*	0091256	V	Single Fmly	4	261,750.03
Montgomery	Montgomery County*	0091267	PU	Single Fmly	3	96,946.80
Montgomery	Montgomery County*	0091285	PU	Single Fmly	4	107,993.88
Montgomery	Montgomery County*	0091472	V	Single Fmly	6	225,061.35
Montgomery	Montgomery County*	0092003		Single Fmly	5	67,827.85
Montgomery	Montgomery County*	0094665	P	Single Fmly	7	176,657.90
Montgomery	Montgomery County*	0094763		Single Fmly	4	301,937.46
Montgomery	Montgomery County*	0094853		Single Fmly	3	99,191.34
Montgomery	Montgomery County*	0095350	VU	Single Fmly	5	71,823.92

Montgomery	Montgomery County*	0095489		Single Fmly	3	27,326.83
Montgomery	Montgomery County*	0096804	PU	Single Fmly	5	536,945.53
Montgomery	Montgomery County*	0096976	VU	Single Fmly	8	314,922.42
Montgomery	Montgomery County*	0097012		Single Fmly	4	79,071.96
Montgomery	Montgomery County*	0097046	V	Single Fmly	4	530,034.41
Montgomery	Montgomery County*	0097089		Single Fmly	3	27,383.02
Montgomery	Montgomery County*	0097090		Single Fmly	3	97,225.31
Montgomery	Montgomery County*	0097092		Single Fmly	3	142,877.51
Montgomery	Montgomery County*	0097096	VU	Single Fmly	5	146,461.76
Montgomery	Montgomery County*	0097098		Single Fmly	4	158,956.03
Montgomery	Montgomery County*	0097111	VU	Single Fmly	7	96,790.12
Montgomery	Montgomery County*	0097118		Single Fmly	2	68,111.03
Montgomery	Montgomery County*	0097123		Single Fmly	5	34,206.03
Montgomery	Montgomery County*	0097135	VU	Single Fmly	3	120,347.38
Montgomery	Montgomery County*	0097146		Single Fmly	2	125,596.22
Montgomery	Montgomery County*	0097168	VU	2-4 Family	4	42,994.55
Montgomery	Montgomery County*	0097172		Single Fmly	2	15,800.00
Montgomery	Montgomery County*	0097173		Single Fmly	3	103,947.44
Montgomery	Montgomery County*	0097181		Single Fmly	2	144,612.92
Montgomery	Montgomery County*	0097183	VU	Single Fmly	4	150,710.10
Montgomery	Montgomery County*	0097184		Single Fmly	2	36,333.00
Montgomery	Montgomery County*	0097209		Single Fmly	2	20,100.00
Montgomery	Montgomery County*	0097235		Single Fmly	2	66,791.08
Montgomery	Montgomery County*	0097236		Single Fmly	4	28,653.93
Montgomery	Montgomery County*	0097239		Single Fmly	2	168,180.03
Montgomery	Montgomery County*	0097243	V	Single Fmly	3	258,462.89
Montgomery	Montgomery County*	0097246		Single Fmly	2	102,844.96
Montgomery	Montgomery County*	0097247	V	Single Fmly	4	560,397.41
Montgomery	Montgomery County*	0097250	V	Single Fmly	7	356,815.66
Montgomery	Montgomery County*	0097254		Single Fmly	3	32,335.13
Montgomery	Montgomery County*	0097311		Other - Nonresidential	3	47,789.06
Montgomery	Montgomery County*	0097465	V	Single Fmly	4	388,742.24
Montgomery	Montgomery County*	0097485		Single Fmly	2	96,630.16
Montgomery	Montgomery County*	0097494		Single Fmly	2	5,957.96
Montgomery	Montgomery County*	0097501		Single Fmly	2	101,660.73
Montgomery	Montgomery County*	0097508		Single Fmly	2	173,905.04
Montgomery	Montgomery County*	0097513		Single Fmly	3	109,896.55
Montgomery	Montgomery County*	0097535	P	Single Fmly	3	194,037.85
Montgomery	Montgomery County*	0097540	PU	Single Fmly	3	207,335.92
Montgomery	Montgomery County*	0097594		Single Fmly	3	32,820.34
Montgomery	Montgomery County*	0097603		Single Fmly	3	83,353.97
Montgomery	Montgomery County*	0097604		Single Fmly	3	102,767.70
Montgomery	Montgomery County*	0097640		Single Fmly	2	10,614.54
Montgomery	Montgomery County*	0097695	V	Single Fmly	4	459,096.00
Montgomery	Montgomery County*	0097727		Single Fmly	3	56,135.03
Montgomery	Montgomery County*	0097804		Single Fmly	3	244,097.22
Montgomery	Montgomery County*	0097809		Single Fmly	2	14,213.99
Montgomery	Montgomery County*	0098330		Single Fmly	2	169,301.40
Montgomery	Montgomery County*	0098334		Single Fmly	3	229,717.27
Montgomery	Montgomery County*	0098335		Single Fmly	2	32,996.62

Montgomery	Montgomery County*	0098336		Single Fmly	3	87,031.35
Montgomery	Montgomery County*	0098337		Single Fmly	3	87,591.68
Montgomery	Montgomery County*	0098340		Single Fmly	3	142,029.78
Montgomery	Montgomery County*	0098344		Single Fmly	2	83,895.83
Montgomery	Montgomery County*	0098345		Single Fmly	2	66,265.23
Montgomery	Montgomery County*	0098347	V	Single Fmly	2	192,747.20
Montgomery	Montgomery County*	0098348	V	Single Fmly	4	75,154.98
Montgomery	Montgomery County*	0098349	V	Single Fmly	6	299,833.57
Montgomery	Montgomery County*	0098363		Single Fmly	2	139,822.53
Montgomery	Montgomery County*	0098374		Single Fmly	2	122,191.59
Montgomery	Montgomery County*	0098375	V	Single Fmly	4	388,326.70
Montgomery	Montgomery County*	0098378		Single Fmly	3	111,417.31
Montgomery	Montgomery County*	0098380	V	Single Fmly	4	491,533.57
Montgomery	Montgomery County*	0098382		Single Fmly	3	190,631.99
Montgomery	Montgomery County*	0098388		Single Fmly	2	7,128.74
Montgomery	Montgomery County*	0098396	PU	Other Resid	2	94,207.70
Montgomery	Montgomery County*	0098404	V	Single Fmly	4	196,203.38
Montgomery	Montgomery County*	0098408	VU	Single Fmly	6	184,055.95
Montgomery	Montgomery County*	0098413	VU	Single Fmly	5	101,684.45
Montgomery	Montgomery County*	0098419	V	Single Fmly	5	283,105.92
Montgomery	Montgomery County*	0098424	V	Single Fmly	6	242,847.27
Montgomery	Montgomery County*	0098426	VU	Single Fmly	2	146,583.68
Montgomery	Montgomery County*	0098431		Single Fmly	3	67,133.86
Montgomery	Montgomery County*	0098434	V	Single Fmly	4	333,343.55
Montgomery	Montgomery County*	0098438		Single Fmly	2	123,708.44
Montgomery	Montgomery County*	0098441	V	Single Fmly	4	336,155.85
Montgomery	Montgomery County*	0098442	V	Single Fmly	5	350,195.23
Montgomery	Montgomery County*	0098454		Single Fmly	3	182,452.48
Montgomery	Montgomery County*	0098458	PU	Single Fmly	3	155,722.36
Montgomery	Montgomery County*	0098461		Single Fmly	2	184,073.29
Montgomery	Montgomery County*	0098463		Single Fmly	2	8,310.76
Montgomery	Montgomery County*	0098480	V	Single Fmly	4	468,656.49
Montgomery	Montgomery County*	0098483		Single Fmly	2	122,214.51
Montgomery	Montgomery County*	0098497	V	Single Fmly	5	707,485.33
Montgomery	Montgomery County*	0098515		Single Fmly	2	44,445.74
Montgomery	Montgomery County*	0098546		Single Fmly	2	6,494.20
Montgomery	Montgomery County*	0098638		Single Fmly	2	57,854.13
Montgomery	Montgomery County*	0098687	VU	Single Fmly	4	416,227.54
Montgomery	Montgomery County*	0098816		Single Fmly	2	33,214.26
Montgomery	Montgomery County*	0098817		Other - Nonresidential	2	61,062.15
Montgomery	Montgomery County*	0098870	V	Single Fmly	6	681,167.93
Montgomery	Montgomery County*	0098880		Single Fmly	3	90,213.91
Montgomery	Montgomery County*	0098940	VU	Single Fmly	4	103,962.04
Montgomery	Montgomery County*	0098971	V	Single Fmly	5	471,594.44
Montgomery	Montgomery County*	0099008		Single Fmly	2	94,635.93
Montgomery	Montgomery County*	0099047		Single Fmly	3	204,377.37
Montgomery	Montgomery County*	0099064	V	Single Fmly	4	164,602.13
Montgomery	Montgomery County*	0099110		Single Fmly	2	44,290.29
Montgomery	Montgomery County*	0099133	VU	Single Fmly	5	178,698.50
Montgomery	Montgomery County*	0099135		Single Fmly	2	161,735.84

Montgomery	Montgomery County*	0099138		Single Fmly	3	149,575.60
Montgomery	Montgomery County*	0099203		Single Fmly	3	83,221.30
Montgomery	Montgomery County*	0099209	VU	Single Fmly	4	98,056.60
Montgomery	Montgomery County*	0099405		Single Fmly	2	9,427.43
Montgomery	Montgomery County*	0099481		Single Fmly	2	59,501.24
Montgomery	Montgomery County*	0099489	V	Single Fmly	4	774,299.06
Montgomery	Montgomery County*	0100207	V	Single Fmly	8	281,470.37
Montgomery	Montgomery County*	0100215	V	Single Fmly	9	144,738.02
Montgomery	Montgomery County*	0100216	V	Single Fmly	3	172,431.68
Montgomery	Montgomery County*	0100232		Single Fmly	2	90,209.06
Montgomery	Montgomery County*	0100233	V	Single Fmly	5	382,262.47
Montgomery	Montgomery County*	0100236	V	Single Fmly	7	359,209.69
Montgomery	Montgomery County*	0100238	VU	Single Fmly	6	241,972.20
Montgomery	Montgomery County*	0100239		Single Fmly	2	3,487.29
Montgomery	Montgomery County*	0100324	V	Single Fmly	4	194,724.99
Montgomery	Montgomery County*	0100325		Single Fmly	2	109,324.44
Montgomery	Montgomery County*	0100326		Single Fmly	2	76,707.02
Montgomery	Montgomery County*	0100328	V	Single Fmly	5	439,892.16
Montgomery	Montgomery County*	0100329		Single Fmly	3	251,944.41
Montgomery	Montgomery County*	0100330	V	Single Fmly	4	533,016.38
Montgomery	Montgomery County*	0100331		Single Fmly	2	187,295.14
Montgomery	Montgomery County*	0100334	P	Single Fmly	3	162,288.47
Montgomery	Montgomery County*	0100335		Single Fmly	3	106,573.87
Montgomery	Montgomery County*	0100336		Single Fmly	2	164,710.31
Montgomery	Montgomery County*	0100338		Single Fmly	2	98,062.82
Montgomery	Montgomery County*	0100339	V	Single Fmly	4	420,271.02
Montgomery	Montgomery County*	0100340		Single Fmly	2	181,523.11
Montgomery	Montgomery County*	0100341	VU	Single Fmly	4	210,820.35
Montgomery	Montgomery County*	0100364	V	Single Fmly	4	248,608.27
Montgomery	Montgomery County*	0100413		Single Fmly	3	47,366.76
Montgomery	Montgomery County*	0100421	VU	Single Fmly	2	239,077.01
Montgomery	Montgomery County*	0100433	VU	Single Fmly	4	233,711.04
Montgomery	Montgomery County*	0100716		Single Fmly	3	359,755.10
Montgomery	Montgomery County*	0100733	V	Single Fmly	4	312,691.08
Montgomery	Montgomery County*	0100736		Single Fmly	2	11,349.29
Montgomery	Montgomery County*	0101088		Single Fmly	3	227,224.22
Montgomery	Montgomery County*	0101090		Single Fmly	2	20,250.15
Montgomery	Montgomery County*	0101587		Assmd Condo	3	79,259.23
Montgomery	Montgomery County*	0102261	P	Single Fmly	6	368,998.13
Montgomery	Montgomery County*	0103541		Single Fmly	2	46,825.12
Montgomery	Montgomery County*	0104390		Single Fmly	2	82,163.86
Montgomery	Montgomery County*	0104501		Other - Nonresidential	3	12,373.70
Montgomery	Montgomery County*	0104536	V	Single Fmly	4	384,805.53
Montgomery	Montgomery County*	0105269	V	Single Fmly	4	231,815.52
Montgomery	Montgomery County*	0105376	VU	Single Fmly	14	406,895.37
Montgomery	Montgomery County*	0106757		Single Fmly	4	335,387.03
Montgomery	Montgomery County*	0106768		Single Fmly	2	108,181.36
Montgomery	Montgomery County*	0106769		Single Fmly	2	12,181.77
Montgomery	Montgomery County*	0106770	V	Single Fmly	4	345,663.13
Montgomery	Montgomery County*	0106771	V	Single Fmly	4	191,366.83

Montgomery	Montgomery County*	0106772	V	Single Fmly	3	187,207.00
Montgomery	Montgomery County*	0107884		Single Fmly	4	30,353.40
Montgomery	Montgomery County*	0108390		Single Fmly	2	13,789.45
Montgomery	Montgomery County*	0108779	V	Single Fmly	7	344,404.68
Montgomery	Montgomery County*	0109081	VU	Single Fmly	5	243,400.63
Montgomery	Montgomery County*	0112416		Single Fmly	3	50,311.95
Montgomery	Montgomery County*	0112424		Single Fmly	2	41,000.15
Montgomery	Montgomery County*	0112541	P	Assmd Condo	4	129,279.99
Montgomery	Montgomery County*	0112603		Single Fmly	2	95,295.12
Montgomery	Montgomery County*	0112626		Single Fmly	2	105,539.17
Montgomery	Montgomery County*	0112830		Single Fmly	2	9,213.85
Montgomery	Montgomery County*	0112865		Single Fmly	2	139,451.36
Montgomery	Montgomery County*	0112955		Single Fmly	3	96,708.01
Montgomery	Montgomery County*	0112959		Single Fmly	3	404,087.92
Montgomery	Montgomery County*	0112978		Single Fmly	2	58,051.62
Montgomery	Montgomery County*	0112982	V	Single Fmly	7	220,470.41
Montgomery	Montgomery County*	0112985		Single Fmly	2	60,312.08
Montgomery	Montgomery County*	0112994	VU	Single Fmly	5	168,298.54
Montgomery	Montgomery County*	0112995	VU	Single Fmly	3	130,780.88
Montgomery	Montgomery County*	0113027	V	Single Fmly	5	260,403.79
Montgomery	Montgomery County*	0113037	V	Single Fmly	6	254,780.08
Montgomery	Montgomery County*	0113886	V	Single Fmly	7	275,681.50
Montgomery	Montgomery County*	0113887	V	Single Fmly	5	138,519.39
Montgomery	Montgomery County*	0113903	P	Single Fmly	4	671,449.84
Montgomery	Montgomery County*	0113904		Single Fmly	2	97,743.86
Montgomery	Montgomery County*	0113961		Single Fmly	2	133,631.47
Montgomery	Montgomery County*	0114039		Single Fmly	3	828,123.52
Montgomery	Montgomery County*	0114041	V	Single Fmly	7	236,256.45
Montgomery	Montgomery County*	0114173		Single Fmly	2	6,883.54
Montgomery	Montgomery County*	0114351		Single Fmly	2	6,077.17
Montgomery	Montgomery County*	0114355	VU	Single Fmly	4	227,940.79
Montgomery	Montgomery County*	0114397		Single Fmly	2	58,070.31
Montgomery	Montgomery County*	0114854		Single Fmly	3	199,350.32
Montgomery	Montgomery County*	0114873		Single Fmly	2	66,524.30
Montgomery	Montgomery County*	0114908		Single Fmly	3	113,401.53
Montgomery	Montgomery County*	0114951		Single Fmly	2	180,507.99
Montgomery	Montgomery County*	0115009		Other - Nonresidential	2	47,621.46
Montgomery	Montgomery County*	0115110	PU	Assmd Condo	4	172,322.56
Montgomery	Montgomery County*	0115124		Single Fmly	3	139,564.30
Montgomery	Montgomery County*	0115545		Single Fmly	3	131,008.62
Montgomery	Montgomery County*	0115608	V	Single Fmly	6	731,117.07
Montgomery	Montgomery County*	0115619		Single Fmly	2	107,532.70
Montgomery	Montgomery County*	0115620		Single Fmly	2	44,100.00
Montgomery	Montgomery County*	0115624		Single Fmly	3	62,059.23
Montgomery	Montgomery County*	0115657		Single Fmly	2	58,781.69
Montgomery	Montgomery County*	0115658		Single Fmly	2	51,033.40
Montgomery	Montgomery County*	0115696		Single Fmly	2	34,253.25
Montgomery	Montgomery County*	0115708		Single Fmly	2	67,738.81
Montgomery	Montgomery County*	0115773		Single Fmly	3	57,361.98
Montgomery	Montgomery County*	0115957		Single Fmly	3	91,717.85

Montgomery	Montgomery County*	0115995		Single Fmly	4	118,193.61
Montgomery	Montgomery County*	0116009		Single Fmly	2	23,619.07
Montgomery	Montgomery County*	0116027	V	Single Fmly	4	138,152.73
Montgomery	Montgomery County*	0116076	VU	Single Fmly	5	284,316.39
Montgomery	Montgomery County*	0116258		Single Fmly	2	41,073.24
Montgomery	Montgomery County*	0116260	V	Single Fmly	6	483,381.27
Montgomery	Montgomery County*	0116338	V	Single Fmly	5	216,914.19
Montgomery	Montgomery County*	0116380	V	Single Fmly	6	343,046.04
Montgomery	Montgomery County*	0116930		Single Fmly	2	140,457.37
Montgomery	Montgomery County*	0117084		Single Fmly	3	107,961.98
Montgomery	Montgomery County*	0117257		Single Fmly	2	77,409.73
Montgomery	Montgomery County*	0117659		Single Fmly	3	175,858.86
Montgomery	Montgomery County*	0118582	V	Single Fmly	5	145,289.60
Montgomery	Montgomery County*	0119612		Single Fmly	2	91,648.41
Montgomery	Montgomery County*	0120024	VU	Single Fmly	7	108,879.12
Montgomery	Montgomery County*	0120296	VU	Single Fmly	5	204,968.48
Montgomery	Montgomery County*	0120312		Single Fmly	3	212,490.03
Montgomery	Montgomery County*	0120959		Single Fmly	2	90,935.05
Montgomery	Montgomery County*	0121020		Single Fmly	3	55,612.96
Montgomery	Montgomery County*	0121026		Single Fmly	3	180,317.82
Montgomery	Montgomery County*	0121082	V	Single Fmly	7	260,184.82
Montgomery	Montgomery County*	0121393	V	Single Fmly	4	62,093.81
Montgomery	Montgomery County*	0121458	PU	Single Fmly	3	214,701.58
Montgomery	Montgomery County*	0121478		Single Fmly	3	73,691.90
Montgomery	Montgomery County*	0121496		Single Fmly	2	54,780.57
Montgomery	Montgomery County*	0121551	V	Single Fmly	7	169,114.72
Montgomery	Montgomery County*	0121921		Single Fmly	2	45,331.54
Montgomery	Montgomery County*	0121927		Single Fmly	2	122,443.38
Montgomery	Montgomery County*	0122031		Single Fmly	3	167,132.02
Montgomery	Montgomery County*	0122142		Single Fmly	3	190,030.61
Montgomery	Montgomery County*	0122145	V	Single Fmly	7	378,855.26
Montgomery	Montgomery County*	0122274		Single Fmly	2	44,796.73
Montgomery	Montgomery County*	0122377		Single Fmly	3	138,723.60
Montgomery	Montgomery County*	0122378	V	Single Fmly	3	331,759.64
Montgomery	Montgomery County*	0122445	VU	Single Fmly	3	211,336.93
Montgomery	Montgomery County*	0122533	PU	Single Fmly	3	287,169.31
Montgomery	Montgomery County*	0122580	V	Single Fmly	4	213,525.62
Montgomery	Montgomery County*	0122768	V	Single Fmly	5	421,985.63
Montgomery	Montgomery County*	0123072		Single Fmly	4	28,638.60
Montgomery	Montgomery County*	0123730		Single Fmly	3	339,326.69
Montgomery	Montgomery County*	0125985		Single Fmly	2	40,506.13
Montgomery	Montgomery County*	0125993	V	Single Fmly	7	193,312.15
Montgomery	Montgomery County*	0126146	VU	Single Fmly	10	91,559.67
Montgomery	Montgomery County*	0126259		Single Fmly	3	20,326.81
Montgomery	Montgomery County*	0126461		Single Fmly	2	16,010.50
Montgomery	Montgomery County*	0126462		Single Fmly	2	9,164.81
Montgomery	Montgomery County*	0126733		Single Fmly	2	20,893.07
Montgomery	Montgomery County*	0126847		Single Fmly	2	24,687.97
Montgomery	Montgomery County*	0126881		Single Fmly	2	20,466.38
Montgomery	Montgomery County*	0126890	VU	Single Fmly	5	202,565.43
Montgomery	Montgomery County*	0127061		Single Fmly	2	70,877.67

Montgomery	Montgomery County*	0127232		Single Fmly	2	17,259.40
Montgomery	Montgomery County*	0127392	PU	Assmd Condo	8	294,622.67
Montgomery	Montgomery County*	0127851		Single Fmly	2	9,481.89
Montgomery	Montgomery County*	0127945	V	Single Fmly	5	110,497.81
Montgomery	Montgomery County*	0134846		Single Fmly	2	9,704.39
Montgomery	Montgomery County*	0153956	V	Single Fmly	7	133,056.62
Montgomery	Montgomery County*	0158747		Single Fmly	2	4,533.29
Montgomery	Montgomery County*	0167036		Single Fmly	2	39,603.57
Montgomery	Montgomery County*	0167873	VU	Single Fmly	8	394,585.33
Montgomery	Montgomery County*	0168131		Single Fmly	4	40,535.59
Montgomery	Montgomery County*	0168138		Single Fmly	2	10,804.13
Montgomery	Montgomery County*	0168146		Single Fmly	2	17,090.96
Montgomery	Montgomery County*	0168149	VU	Single Fmly	5	147,046.98
Montgomery	Montgomery County*	0168154		Single Fmly	2	4,199.02
Montgomery	Montgomery County*	0168443		Single Fmly	3	64,216.34
Montgomery	Montgomery County*	0168455		Single Fmly	2	29,367.72
Montgomery	Montgomery County*	0168520		Single Fmly	2	11,803.32
Montgomery	Montgomery County*	0168587		Single Fmly	2	29,174.15
Montgomery	Montgomery County*	0168606		Single Fmly	2	55,558.88
Montgomery	Montgomery County*	0168664		Single Fmly	2	53,306.27
Montgomery	Montgomery County*	0168898		Single Fmly	2	132,077.28
Montgomery	Montgomery County*	0168914		Single Fmly	2	11,863.63
Montgomery	Montgomery County*	0168957		Single Fmly	3	293,512.38
Montgomery	Montgomery County*	0169085		Single Fmly	2	72,003.55
Montgomery	Montgomery County*	0169136	VU	Single Fmly	3	35,267.06
Montgomery	Montgomery County*	0169374		Single Fmly	2	255,470.15
Montgomery	Montgomery County*	0169487		2-4 Family	3	49,318.41
Montgomery	Montgomery County*	0169636		Single Fmly	2	21,947.45
Montgomery	Montgomery County*	0172155		Single Fmly	4	22,199.82
Montgomery	Montgomery County*	0177106		Single Fmly	2	13,935.60
Montgomery	Montgomery County*	0177150		Single Fmly	2	9,111.87
Montgomery	Montgomery County*	0178114		Single Fmly	3	219,997.78
Montgomery	Montgomery County*	0178120		Single Fmly	2	105,606.94
Montgomery	Montgomery County*	0178134		Single Fmly	2	99,448.94
Montgomery	Montgomery County*	0178145	V	Single Fmly	5	237,857.24
Montgomery	Montgomery County*	0178205		Single Fmly	3	129,244.20
Montgomery	Montgomery County*	0178297	P	Single Fmly	6	273,320.48
Montgomery	Montgomery County*	0178785		Single Fmly	3	209,268.60
Montgomery	Montgomery County*	0178838		Single Fmly	2	26,803.27
Montgomery	Montgomery County*	0178861	V	Single Fmly	6	223,589.10
Montgomery	Montgomery County*	0178893	V	Single Fmly	4	132,113.99
Montgomery	Montgomery County*	0179689	V	Single Fmly	4	105,177.28
Montgomery	Montgomery County*	0179739		Single Fmly	3	18,859.34
Montgomery	Montgomery County*	0179757		Single Fmly	2	110,425.38
Montgomery	Montgomery County*	0179823		Single Fmly	2	170,638.50
Montgomery	Montgomery County*	0180107		Single Fmly	2	27,667.18
Montgomery	Montgomery County*	0180251	V	Single Fmly	4	416,887.28
Montgomery	Montgomery County*	0180315	V	Single Fmly	4	193,571.57
Montgomery	Montgomery County*	0180891		Single Fmly	2	67,044.73
Montgomery	Montgomery County*	0180892	MV	Single Fmly	4	87,029.20
Montgomery	Montgomery County*	0180898	V	Single Fmly	4	340,270.07

Montgomery	Montgomery County*	0180918	VU	Single Fmly	4	120,630.10
Montgomery	Montgomery County*	0181058		Single Fmly	2	55,272.85
Montgomery	Montgomery County*	0181130	V	Single Fmly	5	223,299.81
Montgomery	Montgomery County*	0181743	V	Other Resid	4	290,578.67
Montgomery	Montgomery County*	0181794		Single Fmly	2	13,513.50
Montgomery	Montgomery County*	0182104	V	Single Fmly	5	330,636.72
Montgomery	Montgomery County*	0182145		Single Fmly	3	74,496.07
Montgomery	Montgomery County*	0182297		Single Fmly	3	137,889.42
Montgomery	Montgomery County*	0182394	V	Single Fmly	5	211,374.12
Montgomery	Montgomery County*	0183283	V	Single Fmly	4	155,683.84
Montgomery	Montgomery County*	0183706		Single Fmly	3	148,278.33
Montgomery	Montgomery County*	0184024	V	Single Fmly	4	173,125.73
Montgomery	Montgomery County*	0184313	V	Single Fmly	5	184,032.81
Montgomery	Montgomery County*	0185299		Single Fmly	2	123,246.74
Montgomery	Montgomery County*	0185552		Single Fmly	2	10,005.46
Montgomery	Montgomery County*	0185835		Single Fmly	2	20,871.87
Montgomery	Montgomery County*	0185901		Single Fmly	2	12,864.42
Montgomery	Montgomery County*	0185986		Single Fmly	2	35,333.16
Montgomery	Montgomery County*	0186110		Single Fmly	3	106,521.09
Montgomery	Montgomery County*	0186731		Single Fmly	2	56,777.59
Montgomery	Montgomery County*	0186800		Single Fmly	2	43,922.51
Montgomery	Montgomery County*	0187013		Single Fmly	2	50,616.22
Montgomery	Montgomery County*	0187423		Single Fmly	2	40,317.79
Montgomery	Montgomery County*	0188091		Single Fmly	2	24,200.66
Montgomery	Montgomery County*	0188332		Single Fmly	2	57,318.76
Montgomery	Montgomery County*	0188813		Single Fmly	2	46,699.54
Montgomery	Montgomery County*	0188852		Single Fmly	2	11,993.51
Montgomery	Montgomery County*	0193176		Single Fmly	2	24,113.38
Montgomery	Montgomery County*	0196715		Single Fmly	2	32,358.11
Montgomery	Montgomery County*	0212148		Single Fmly	2	17,224.47
Montgomery	Montgomery County*	0212161	V	Single Fmly	5	218,687.15
Montgomery	Montgomery County*	0212290		Single Fmly	2	23,528.59
Montgomery	Montgomery County*	0212440		Single Fmly	2	9,354.05
Montgomery	Montgomery County*	0213040		Single Fmly	2	11,563.38
Montgomery	Montgomery County*	0213050		Single Fmly	4	131,051.67
Montgomery	Montgomery County*	0213200		Single Fmly	3	93,240.47
Montgomery	Montgomery County*	0213205		Single Fmly	2	18,105.20
Montgomery	Montgomery County*	0213274		Single Fmly	3	95,009.57
Montgomery	Montgomery County*	0213323		Single Fmly	2	106,396.51
Montgomery	Montgomery County*	0213345		Single Fmly	3	156,640.30
Montgomery	Montgomery County*	0213513	V	Single Fmly	4	142,840.68
Montgomery	Montgomery County*	0213517	P	Single Fmly	4	272,928.56
Montgomery	Montgomery County*	0213518		Single Fmly	4	89,158.04
Montgomery	Montgomery County*	0213519	V	Single Fmly	5	210,836.73
Montgomery	Montgomery County*	0213521		Single Fmly	4	178,275.86
Montgomery	Montgomery County*	0213523		Single Fmly	3	262,130.92
Montgomery	Montgomery County*	0213759		Single Fmly	2	79,487.50
Montgomery	Montgomery County*	0214087		Single Fmly	2	134,236.12
Montgomery	Montgomery County*	0214089	V	Single Fmly	4	324,040.46
Montgomery	Montgomery County*	0239619	V	Single Fmly	4	218,803.72
Montgomery	Montgomery County*	0239756		Single Fmly	3	25,310.91

Montgomery	Montgomery County*	0239952		Single Fmly	3	55,156.04
Montgomery	Montgomery County*	0240098		Single Fmly	3	133,477.49
Montgomery	Montgomery County*	0240158		Single Fmly	3	189,756.89
Montgomery	Montgomery County*	0240285	V	Single Fmly	4	114,948.38
Montgomery	Montgomery County*	0240345	V	Single Fmly	4	248,022.44
Montgomery	Montgomery County*	0240429		Single Fmly	2	36,649.81
Montgomery	Montgomery County*	0240678		Single Fmly	2	102,007.39
Montgomery	Montgomery County*	0240835		Single Fmly	2	61,639.20
Montgomery	Montgomery County*	0240898		Single Fmly	4	82,970.20
Montgomery	Montgomery County*	0241452		Single Fmly	3	157,180.92
Montgomery	Montgomery County*	0241591		Single Fmly	3	53,554.51
Montgomery	Montgomery County*	0241879		Single Fmly	2	25,917.90
Montgomery	Montgomery County*	0241880		Single Fmly	2	49,207.85
Montgomery	Montgomery County*	0241881		Single Fmly	3	42,719.26
Montgomery	Montgomery County*	0241882		Single Fmly	3	78,076.33
Montgomery	Montgomery County*	0241967		Single Fmly	2	7,217.32
Montgomery	Montgomery County*	0242727	P	Single Fmly	3	103,958.21
Montgomery	Montgomery County*	0243391		Single Fmly	2	104,591.79
Montgomery	Montgomery County*	0243463		Single Fmly	3	105,125.04
Montgomery	Montgomery County*	0243856		Single Fmly	2	68,370.29
Montgomery	Montgomery County*	0244879		Single Fmly	3	228,333.75
Montgomery	Montgomery County*	0246890		Single Fmly	3	23,124.70
Montgomery	Montgomery County*	0246914	P	Assmd Condo	4	168,955.90
Montgomery	Montgomery County*	0247049		Single Fmly	2	26,111.33
Montgomery	Montgomery County*	0247754		Single Fmly	2	9,535.37
Montgomery	Montgomery County*	0247762	P	Single Fmly	3	201,399.43
Montgomery	Montgomery County*	0247764		Single Fmly	2	56,208.31
Montgomery	Montgomery County*	0247766		Single Fmly	3	134,234.68
Montgomery	Montgomery County*	0247767		Single Fmly	2	13,463.43
Montgomery	Montgomery County*	0247768		Single Fmly	2	46,655.29
Montgomery	Montgomery County*	0247828		Single Fmly	2	126,655.84
Montgomery	Montgomery County*	0247850		Single Fmly	3	504,703.56
Montgomery	Montgomery County*	0247856		Single Fmly	3	92,163.30
Montgomery	Montgomery County*	0247881		Single Fmly	3	387,604.48
Montgomery	Montgomery County*	0247883		Single Fmly	2	91,968.28
Montgomery	Montgomery County*	0247955		Single Fmly	2	82,357.39
Montgomery	Montgomery County*	0247971		Single Fmly	2	9,756.04
Montgomery	Montgomery County*	0248006	V	Single Fmly	4	227,992.58
Montgomery	Montgomery County*	0248021	P	Single Fmly	3	267,665.58
Montgomery	Montgomery County*	0248026		Single Fmly	2	32,159.94
Montgomery	Montgomery County*	0248051	P	Single Fmly	3	88,616.20
Montgomery	Montgomery County*	0248052		Single Fmly	3	204,294.66
Montgomery	Montgomery County*	0248053	V	Single Fmly	4	173,475.16
Montgomery	Montgomery County*	0248100		Single Fmly	2	158,421.80
Montgomery	Montgomery County*	0248113		Single Fmly	2	53,029.07
Montgomery	Montgomery County*	0248124		Single Fmly	2	43,951.56
Montgomery	Montgomery County*	0248146		Single Fmly	2	59,500.64
Montgomery	Montgomery County*	0248232		Single Fmly	2	52,984.55
Montgomery	Montgomery County*	0248277		Single Fmly	2	122,858.12
Montgomery	Montgomery County*	0248320	V	Single Fmly	4	204,017.96
Montgomery	Montgomery County*	0248337		Single Fmly	2	102,942.47

Montgomery	Montgomery County*	0248781	P	Single Fmly	3	140,103.61
Montgomery	Montgomery County*	0248782		Single Fmly	2	91,327.90
Montgomery	Montgomery County*	0248784		Single Fmly	2	55,654.44
Montgomery	Montgomery County*	0248785		Single Fmly	3	34,718.94
Montgomery	Montgomery County*	0248807		Single Fmly	3	163,871.80
Montgomery	Montgomery County*	0248808		Single Fmly	3	172,728.45
Montgomery	Montgomery County*	0248824		Single Fmly	3	133,737.61
Montgomery	Montgomery County*	0248826		Single Fmly	3	210,491.86
Montgomery	Montgomery County*	0248843		Single Fmly	2	59,599.99
Montgomery	Montgomery County*	0248860		Single Fmly	2	77,416.16
Montgomery	Montgomery County*	0248861		Single Fmly	3	218,657.85
Montgomery	Montgomery County*	0248862		Single Fmly	3	102,207.86
Montgomery	Montgomery County*	0248863	V	Single Fmly	4	248,392.77
Montgomery	Montgomery County*	0248864		Single Fmly	2	21,886.78
Montgomery	Montgomery County*	0248865		Single Fmly	3	132,422.40
Montgomery	Montgomery County*	0248897		Single Fmly	2	43,103.94
Montgomery	Montgomery County*	0248902		Single Fmly	3	315,074.25
Montgomery	Montgomery County*	0248905		Single Fmly	2	234,759.24
Montgomery	Montgomery County*	0248925	P	Single Fmly	3	230,385.12
Montgomery	Montgomery County*	0248937		Single Fmly	2	43,110.84
Montgomery	Montgomery County*	0248939		Other - Nonresidential	2	122,881.41
Montgomery	Montgomery County*	0248945		Single Fmly	2	43,103.51
Montgomery	Montgomery County*	0248957		Single Fmly	2	200,625.23
Montgomery	Montgomery County*	0248962		Single Fmly	2	65,905.45
Montgomery	Montgomery County*	0248966		Single Fmly	2	72,312.44
Montgomery	Montgomery County*	0248975	V	Single Fmly	4	153,427.20
Montgomery	Montgomery County*	0249009		Single Fmly	2	97,662.42
Montgomery	Montgomery County*	0249019		Single Fmly	3	171,415.60
Montgomery	Montgomery County*	0249033		Single Fmly	2	53,157.38
Montgomery	Montgomery County*	0249034		Single Fmly	2	71,230.71
Montgomery	Montgomery County*	0249035		Single Fmly	3	216,723.05
Montgomery	Montgomery County*	0249037		Single Fmly	2	62,962.45
Montgomery	Montgomery County*	0249040		Single Fmly	2	71,863.29
Montgomery	Montgomery County*	0249084		Single Fmly	2	121,546.41
Montgomery	Montgomery County*	0249089		Single Fmly	3	47,565.41
Montgomery	Montgomery County*	0249100		Single Fmly	2	102,467.90
Montgomery	Montgomery County*	0249101		Single Fmly	2	53,095.27
Montgomery	Montgomery County*	0249104	P	Single Fmly	3	153,644.19
Montgomery	Montgomery County*	0249107		Single Fmly	3	98,210.79
Montgomery	Montgomery County*	0249112		Single Fmly	2	60,934.75
Montgomery	Montgomery County*	0249113	PU	Single Fmly	2	221,031.96
Montgomery	Montgomery County*	0249120		Single Fmly	2	153,327.83
Montgomery	Montgomery County*	0249124		Single Fmly	3	111,490.69
Montgomery	Montgomery County*	0249178		Single Fmly	2	38,817.31
Montgomery	Montgomery County*	0249220		Single Fmly	2	134,164.49
Montgomery	Montgomery County*	0249227	P	Single Fmly	3	194,730.39
Montgomery	Montgomery County*	0249228		Single Fmly	2	34,983.25
Montgomery	Montgomery County*	0249243		Single Fmly	2	104,560.15
Montgomery	Montgomery County*	0249255		Single Fmly	2	38,010.97
Montgomery	Montgomery County*	0249261		Single Fmly	2	59,878.00

Montgomery	Montgomery County*	0249270		Single Fmly	2	27,151.11
Montgomery	Montgomery County*	0249294		Single Fmly	3	71,088.07
Montgomery	Montgomery County*	0249303		Single Fmly	3	340,207.48
Montgomery	Montgomery County*	0249312		Single Fmly	2	49,890.17
Montgomery	Montgomery County*	0249328		Single Fmly	2	133,486.88
Montgomery	Montgomery County*	0249332		Single Fmly	2	91,026.28
Montgomery	Montgomery County*	0249342		Single Fmly	2	76,498.72
Montgomery	Montgomery County*	0249356		Single Fmly	2	21,005.71
Montgomery	Montgomery County*	0249370		Single Fmly	3	430,425.08
Montgomery	Montgomery County*	0249378		Single Fmly	2	22,721.58
Montgomery	Montgomery County*	0249379		Single Fmly	2	26,934.26
Montgomery	Montgomery County*	0249381		Single Fmly	3	56,887.75
Montgomery	Montgomery County*	0249644	V	Single Fmly	4	397,428.15
Montgomery	Montgomery County*	0249654		Single Fmly	2	5,531.02
Montgomery	Montgomery County*	0249666		Single Fmly	2	110,100.09
Montgomery	Montgomery County*	0249667	P	Single Fmly	3	253,721.79
Montgomery	Montgomery County*	0249668		Single Fmly	3	117,657.74
Montgomery	Montgomery County*	0249688		Single Fmly	3	57,661.12
Montgomery	Montgomery County*	0249689		Single Fmly	3	260,692.48
Montgomery	Montgomery County*	0249691		Single Fmly	3	211,793.15
Montgomery	Montgomery County*	0249703		Single Fmly	3	238,872.98
Montgomery	Montgomery County*	0249721		Single Fmly	2	79,671.76
Montgomery	Montgomery County*	0249722		Single Fmly	2	21,519.66
Montgomery	Montgomery County*	0249749		Single Fmly	2	69,306.35
Montgomery	Montgomery County*	0249756		Single Fmly	2	134,639.50
Montgomery	Montgomery County*	0249778	P	Single Fmly	2	170,504.49
Montgomery	Montgomery County*	0249780	PU	Single Fmly	2	121,631.73
Montgomery	Montgomery County*	0249786		Single Fmly	2	106,003.63
Montgomery	Montgomery County*	0249791	P	Single Fmly	3	424,438.28
Montgomery	Montgomery County*	0249808		Single Fmly	2	245,777.02
Montgomery	Montgomery County*	0249867		Single Fmly	2	79,154.87
Montgomery	Montgomery County*	0249883	P	Single Fmly	3	289,211.13
Montgomery	Montgomery County*	0249891		Single Fmly	2	193,189.32
Montgomery	Montgomery County*	0249897		Single Fmly	2	53,948.58
Montgomery	Montgomery County*	0249903		Single Fmly	3	90,605.99
Montgomery	Montgomery County*	0249908		Single Fmly	2	67,392.86
Montgomery	Montgomery County*	0249915		Single Fmly	2	64,580.69
Montgomery	Montgomery County*	0249916		Single Fmly	3	105,457.50
Montgomery	Montgomery County*	0249925	P	Single Fmly	3	229,527.60
Montgomery	Montgomery County*	0249930		Single Fmly	3	26,402.68
Montgomery	Montgomery County*	0249935		Single Fmly	2	140,311.65
Montgomery	Montgomery County*	0249943		Single Fmly	2	54,934.93
Montgomery	Montgomery County*	0249968		Single Fmly	2	37,942.04
Montgomery	Montgomery County*	0250031		Single Fmly	2	168,661.61
Montgomery	Montgomery County*	0250038	P	Single Fmly	2	244,380.82
Montgomery	Montgomery County*	0250069	P	Single Fmly	3	662,961.10
Montgomery	Montgomery County*	0250072		Single Fmly	2	232,480.54
Montgomery	Montgomery County*	0250073		Single Fmly	2	40,955.09
Montgomery	Montgomery County*	0250175		Single Fmly	2	77,175.26
Montgomery	Montgomery County*	0250180		Single Fmly	2	48,146.38
Montgomery	Montgomery County*	0250182		Single Fmly	2	62,736.54

Montgomery	Montgomery County*	0250185		Single Fmly	2	161,292.56
Montgomery	Montgomery County*	0250201	P	Single Fmly	3	520,700.56
Montgomery	Montgomery County*	0250202		Single Fmly	3	313,817.09
Montgomery	Montgomery County*	0250211		Single Fmly	2	36,579.47
Montgomery	Montgomery County*	0250213		Single Fmly	2	22,305.40
Montgomery	Montgomery County*	0250234		Single Fmly	2	11,731.18
Montgomery	Montgomery County*	0250236		Single Fmly	3	291,035.99
Montgomery	Montgomery County*	0250237		Single Fmly	2	158,208.70
Montgomery	Montgomery County*	0250263		Single Fmly	2	21,316.78
Montgomery	Montgomery County*	0250265		Single Fmly	2	96,420.63
Montgomery	Montgomery County*	0250277		Single Fmly	2	246,066.92
Montgomery	Montgomery County*	0250297		Single Fmly	2	59,420.67
Montgomery	Montgomery County*	0250299		Single Fmly	2	127,094.37
Montgomery	Montgomery County*	0250314		Single Fmly	3	306,956.33
Montgomery	Montgomery County*	0250426		Single Fmly	2	9,206.70
Montgomery	Montgomery County*	0250429		Single Fmly	3	87,234.31
Montgomery	Montgomery County*	0250443		Single Fmly	2	132,765.96
Montgomery	Montgomery County*	0250460		Single Fmly	2	61,541.77
Montgomery	Montgomery County*	0250462		Single Fmly	2	61,092.07
Montgomery	Montgomery County*	0250466		Single Fmly	2	72,458.84
Montgomery	Montgomery County*	0250536		Single Fmly	2	46,777.10
Montgomery	Montgomery County*	0250548		Single Fmly	2	274,572.90
Montgomery	Montgomery County*	0250556		Single Fmly	2	80,792.02
Montgomery	Montgomery County*	0250740		Single Fmly	2	47,093.94
Montgomery	Montgomery County*	0250742		Single Fmly	2	144,820.33
Montgomery	Montgomery County*	0251251		Single Fmly	2	117,169.41
Montgomery	Montgomery County*	0251440	P	Single Fmly	3	411,300.15
Montgomery	Montgomery County*	0251961	P	Single Fmly	3	258,235.10
Montgomery	Montgomery County*	0251962		Single Fmly	3	267,410.53
Montgomery	Montgomery County*	0251967		Single Fmly	2	196,011.92
Montgomery	Montgomery County*	0251972	P	Single Fmly	3	617,572.50
Montgomery	Montgomery County*	0252009		Single Fmly	2	91,455.76
Montgomery	Montgomery County*	0252044		Single Fmly	2	75,504.80
Montgomery	Montgomery County*	0252122	P	Single Fmly	3	489,222.29
Montgomery	Montgomery County*	0252386		Single Fmly	2	124,206.40
Montgomery	Montgomery County*	0252535		Single Fmly	2	114,262.11
Montgomery	Montgomery County*	0253404		Single Fmly	2	57,731.89
Montgomery	Montgomery County*	0253559		Single Fmly	2	90,088.64
Montgomery	Montgomery County*	0253913		Single Fmly	3	246,744.85
Montgomery	Montgomery County*	0253978		Single Fmly	3	131,035.09
Montgomery	Montgomery County*	0255110		Single Fmly	2	124,989.66
Montgomery	Montgomery County*	0255440		Single Fmly	2	222,470.74
Montgomery	Montgomery County*	0255855		Single Fmly	2	11,877.95
Montgomery	Montgomery County*	0255988		Single Fmly	2	171,609.18
Montgomery	Montgomery County*	0257487		Single Fmly	2	19,012.95
Montgomery	Montgomery County*	0257757		Single Fmly	2	31,758.97
Montgomery	Montgomery County*	0257775		Single Fmly	2	265,592.01
Montgomery	Montgomery County*	0257781		Single Fmly	2	218,386.50
Montgomery	Montgomery County*	0257782	P	Single Fmly	2	167,553.44
Montgomery	Montgomery County*	0257872		Single Fmly	2	143,956.80
Montgomery	Montgomery County*	0257922		Single Fmly	2	204,668.29

Montgomery	Montgomery County*	0257941		Single Fmly	2	117,914.18
Montgomery	Montgomery County*	0257943		Single Fmly	2	176,512.93
Montgomery	Montgomery County*	0257945		Single Fmly	2	112,283.35
Montgomery	Montgomery County*	0258249		Single Fmly	2	35,287.98
Montgomery	Montgomery County*	0258260		Single Fmly	2	700,000.00
Montgomery	Montgomery County*	0258279		Single Fmly	2	62,400.00
Montgomery	Montgomery County*	0258286		Single Fmly	2	121,364.59
Montgomery	Montgomery County*	0258296	P	Single Fmly	2	332,610.20
Montgomery	Montgomery County*	0258299		2-4 Family	2	412,702.33
Montgomery	Montgomery County*	0258300		2-4 Family	2	264,872.83
Montgomery	Montgomery County*	0258301		2-4 Family	2	266,583.71
Montgomery	Montgomery County*	0258302		2-4 Family	2	414,783.53
Montgomery	Montgomery County*	0258303		2-4 Family	2	265,611.56
Montgomery	Montgomery County*	0258304		2-4 Family	2	267,249.55
Montgomery	Montgomery County*	0258305		2-4 Family	2	261,891.90
Montgomery	Montgomery County*	0258306		2-4 Family	2	263,436.13
Montgomery	Montgomery County*	0258307		2-4 Family	2	265,014.78
Montgomery	Montgomery County*	0258308		2-4 Family	2	173,992.30
Montgomery	Montgomery County*	0258309		2-4 Family	2	264,072.13
Montgomery	Montgomery County*	0258310		2-4 Family	2	413,267.27
Montgomery	Montgomery County*	0258311		2-4 Family	2	263,915.96
Montgomery	Montgomery County*	0258312		2-4 Family	2	381,027.06
Montgomery	Montgomery County*	0258313		2-4 Family	2	264,862.39
Montgomery	Montgomery County*	0258314		2-4 Family	2	406,787.78
Montgomery	Montgomery County*	0258315		2-4 Family	2	264,790.80
Montgomery	Montgomery County*	0258316	P	2-4 Family	2	416,066.46
Montgomery	Montgomery County*	0258326		Single Fmly	2	275,222.08
Montgomery	Montgomery County*	0258329		Single Fmly	2	282,673.54
Montgomery	Montgomery County*	0258440		Single Fmly	2	190,790.34
Montgomery	Montgomery County*	0258493		Single Fmly	2	195,296.80
Montgomery	Montgomery County*	0258533		Single Fmly	2	38,757.34
Montgomery	Montgomery County*	0258538		Single Fmly	2	463,883.92
Montgomery	Montgomery County*	0258539		Single Fmly	2	302,323.62
Montgomery	Montgomery County*	0258546		Single Fmly	2	60,050.43
Montgomery	Montgomery County*	0258570		Single Fmly	2	121,512.75
Montgomery	Montgomery County*	0258648		Single Fmly	2	146,093.58
Montgomery	Montgomery County*	0258690		Single Fmly	2	156,262.67
Montgomery	Montgomery County*	0258693		Single Fmly	2	193,482.25
Montgomery	Montgomery County*	0258713		Single Fmly	2	30,945.09
Montgomery	Montgomery County*	0258742		Single Fmly	2	203,881.27
Montgomery	Montgomery County*	0258744		Single Fmly	2	262,050.32
Montgomery	Montgomery County*	0258777		Single Fmly	2	307,944.28
Montgomery	Montgomery County*	0258782		Single Fmly	2	195,780.90
Montgomery	Montgomery County*	0258794		Busi-Nonres	2	7,322.27
Montgomery	Montgomery County*	0258867		Single Fmly	2	150,335.66
Montgomery	Montgomery County*	0259085		Single Fmly	2	159,832.31
Montgomery	Montgomery County*	0259160		Single Fmly	2	103,623.47
Montgomery	Montgomery County*	0259230		Single Fmly	2	130,788.73
Montgomery	Montgomery County*	0259249		Single Fmly	2	203,683.58
Montgomery	Montgomery County*	0259336		Single Fmly	2	71,501.31
Montgomery	Montgomery County*	0259340		Single Fmly	2	8,129.47

Montgomery	Montgomery County*	0259359		Single Fmly	2	169,922.55
Montgomery	Montgomery County*	0259361		Single Fmly	2	126,589.45
Montgomery	Montgomery County*	0259363		Single Fmly	2	156,936.25
Montgomery	Montgomery County*	0259399		Single Fmly	2	239,877.78
Montgomery	Montgomery County*	0259411		Single Fmly	2	193,896.59
Montgomery	Montgomery County*	0259413	P	Single Fmly	2	179,647.36
Montgomery	Montgomery County*	0259424		Single Fmly	2	124,918.56
Montgomery	Montgomery County*	0259437		Single Fmly	2	176,965.12
Montgomery	Montgomery County*	0259459		Single Fmly	2	43,000.99
Montgomery	Montgomery County*	0259505		Single Fmly	2	252,078.10
Montgomery	Montgomery County*	0259506		Single Fmly	2	223,954.72
Montgomery	Montgomery County*	0259519		Single Fmly	2	65,334.00
Montgomery	Montgomery County*	0259596		Single Fmly	2	97,372.20
Montgomery	Montgomery County*	0259608		Single Fmly	2	248,276.04
Montgomery	Montgomery County*	0259612		Single Fmly	2	45,985.62
Montgomery	Montgomery County*	0259652		Single Fmly	2	306,538.37
Montgomery	Montgomery County*	0259777		Single Fmly	2	77,161.45
Montgomery	Montgomery County*	0259929		Single Fmly	2	176,333.55
Montgomery	Montgomery County*	0259935		Single Fmly	2	57,726.64
Montgomery	Montgomery County*	0259936		Single Fmly	2	146,586.78
Montgomery	Montgomery County*	0259937		Single Fmly	2	88,268.29
Montgomery	Montgomery County*	0259953		Single Fmly	2	621,080.87
Montgomery	Montgomery County*	0259971		Single Fmly	2	196,341.97
Montgomery	Montgomery County*	0260004		Single Fmly	2	178,522.94
Montgomery	Montgomery County*	0260024		Single Fmly	2	314,498.76
Montgomery	Montgomery County*	0260113	P	Single Fmly	2	298,142.80
Montgomery	Montgomery County*	0260169	P	Single Fmly	2	169,018.31
Montgomery	Montgomery County*	0260179		Single Fmly	2	142,396.41
Montgomery	Montgomery County*	0260199		Single Fmly	2	700,000.00
Montgomery	Montgomery County*	0260204		Single Fmly	2	232,718.20
Montgomery	Montgomery County*	0260207		Single Fmly	2	72,000.00
Montgomery	Montgomery County*	0260221		Single Fmly	2	147,129.96
Montgomery	Montgomery County*	0260222		Single Fmly	2	9,631.12
Montgomery	Montgomery County*	0260232		Single Fmly	2	116,772.02
Montgomery	Montgomery County*	0260234		Single Fmly	2	177,251.88
Montgomery	Montgomery County*	0260240		Single Fmly	2	143,979.00
Montgomery	Montgomery County*	0260278	P	Single Fmly	2	244,837.33
Montgomery	Montgomery County*	0260288		Single Fmly	2	229,899.50
Montgomery	Montgomery County*	0260289		Single Fmly	2	358,667.63
Montgomery	Montgomery County*	0260295		Single Fmly	2	93,949.92
Montgomery	Montgomery County*	0260314		Single Fmly	2	36,139.28
Montgomery	Montgomery County*	0260392		Single Fmly	2	197,445.34
Montgomery	Montgomery County*	0260403		Single Fmly	2	125,958.47
Montgomery	Montgomery County*	0260426		Single Fmly	2	229,340.01
Montgomery	Montgomery County*	0260434		Single Fmly	2	112,347.85
Montgomery	Montgomery County*	0260456		Single Fmly	2	284,977.58
Montgomery	Montgomery County*	0260457		Single Fmly	2	96,878.24
Montgomery	Montgomery County*	0260458		Single Fmly	2	123,124.36
Montgomery	Montgomery County*	0260462		Single Fmly	2	15,759.91
Montgomery	Montgomery County*	0260469		Single Fmly	2	394,923.64
Montgomery	Montgomery County*	0260472		Single Fmly	2	320,790.82

Montgomery	Montgomery County*	0260475		Single Fmly	2	335,289.96
Montgomery	Montgomery County*	0260499		Single Fmly	2	56,761.65
Montgomery	Montgomery County*	0260852		Single Fmly	2	155,382.11
Montgomery	Montgomery County*	0262067	P	Single Fmly	2	634,876.87
Montgomery	Montgomery County*	0262330	P	Single Fmly	2	192,772.36
Montgomery	Montgomery County*	0262359	P	Single Fmly	2	239,918.87
Montgomery	Montgomery County*	0262364		Single Fmly	2	235,388.10
Montgomery	Montgomery County*	0262365		Single Fmly	2	134,903.38
Montgomery	Montgomery County*	0262369		Single Fmly	2	100,591.18
Montgomery	Montgomery County*	0262372		Single Fmly	2	227,000.00
Montgomery	Montgomery County*	0262505		Single Fmly	2	163,054.04
Montgomery	Montgomery County*	0262508		Single Fmly	2	174,782.12
Montgomery	Montgomery County*	0262511		Single Fmly	2	109,237.42
Montgomery	Montgomery County*	0262782		Single Fmly	2	449,853.60
Montgomery	Montgomery County*	0262783		Single Fmly	2	201,343.76
Montgomery	Montgomery County*	0262785		Single Fmly	2	139,876.39
Montgomery	Montgomery County*	0262786		Single Fmly	2	649,601.05
Montgomery	Montgomery County*	0262787		Busi-Nonres	2	209,611.08
Montgomery	Montgomery County*	0262789		Single Fmly	2	82,028.83
Montgomery	Montgomery County*	0262808		Busi-Nonres	2	220,044.74
Montgomery	Montgomery, City Of	0249827		Single Fmly	2	70,127.30
Montgomery	Oak Ridge North, City Of	0001929	VU	Single Fmly	6	53,465.30
Montgomery	Oak Ridge North, City Of	0012836	MVU	Single Fmly	10	62,840.92
Montgomery	Oak Ridge North, City Of	0013008		Single Fmly	2	5,420.42
Montgomery	Oak Ridge North, City Of	0013010		Single Fmly	4	23,883.71
Montgomery	Oak Ridge North, City Of	0013195		Single Fmly	3	10,097.85
Montgomery	Oak Ridge North, City Of	0013196		Single Fmly	10	85,817.30
Montgomery	Oak Ridge North, City Of	0018766	V	Single Fmly	11	162,279.04
Montgomery	Oak Ridge North, City Of	0025099	VU	Single Fmly	9	109,707.36
Montgomery	Oak Ridge North, City Of	0033303	MV	Single Fmly	8	69,389.52
Montgomery	Oak Ridge North, City Of	0038419		Single Fmly	4	27,402.39
Montgomery	Oak Ridge North, City Of	0042937	MVU	Single Fmly	6	101,216.20
Montgomery	Oak Ridge North, City Of	0048629		Single Fmly	6	24,707.33
Montgomery	Oak Ridge North, City Of	0049100		Single Fmly	6	32,732.39
Montgomery	Oak Ridge North, City Of	0249653		Single Fmly	2	59,232.52
Montgomery	Panorama Village, City Of	0242253		Single Fmly	3	116,374.46
Montgomery	Panorama Village, City Of	0242753		Single Fmly	3	27,358.31
Montgomery	Panorama Village, City Of	0243381		Single Fmly	3	141,090.03
Montgomery	Panorama Village, City Of	0249006		Single Fmly	2	75,851.71
Montgomery	Panorama Village, City Of	0249736		Single Fmly	2	44,641.66
Montgomery	Patton Village, City Of	0071474		Single Fmly	3	49,484.45
Montgomery	Patton Village, City Of	0071785	V	Single Fmly	5	219,592.24
Montgomery	Patton Village, City Of	0091480	VU	Single Fmly	5	83,562.12
Montgomery	Patton Village, City Of	0097086		Single Fmly	2	41,439.10
Montgomery	Patton Village, City Of	0098884		Single Fmly	2	83,690.44
Montgomery	Roman Forest, City Of	0073569	VN	Busi-Nonres	4	113,463.59
Montgomery	Roman Forest, City Of	0093922		Single Fmly	3	7,091.70
Montgomery	Roman Forest, City Of	0106782	V	Single Fmly	4	178,051.92
Montgomery	Roman Forest, City Of	0168912		Single Fmly	3	48,789.32
Montgomery	Roman Forest, City Of	0248129		Single Fmly	2	37,974.80
Montgomery	Roman Forest, City Of	0249038		Single Fmly	2	99,169.89

Montgomery	Shenandoah, City Of	0012965	VU	Single Fmly	6	53,467.24
Montgomery	Shenandoah, City Of	0038250		Single Fmly	5	49,529.85
Montgomery	Shenandoah, City Of	0039618		Single Fmly	3	11,966.60
Montgomery	Shenandoah, City Of	0042356		Single Fmly	2	6,406.36
Montgomery	Shenandoah, City Of	0044655		Single Fmly	4	41,089.99
Montgomery	Shenandoah, City Of	0068294		Single Fmly	3	14,522.74
Montgomery	Shenandoah, City Of	0071432		Single Fmly	4	14,428.11
Montgomery	Shenandoah, City Of	0113002		Single Fmly	2	5,970.44
Montgomery	Shenandoah, City Of	0247182		Single Fmly	2	27,091.71
Montgomery	Splendora, City Of	0053282	VNU	Other - Nonresidential	8	142,794.23
Montgomery	Splendora, City Of	0134927		Single Fmly	2	32,383.36
Montgomery	Splendora, City Of	0249041		Other - Nonresidential	2	142,166.47
Montgomery	Splendora, City Of	0249091		Single Fmly	3	41,691.44
Montgomery	Splendora, City Of	0259639		Single Fmly	2	103,092.33
Montgomery	Stagecoach, City Of	0112445		Single Fmly	3	172,659.45
Montgomery	Stagecoach, City Of	0188465		Single Fmly	2	15,039.11
Montgomery	Stagecoach, City Of	0254134		Single Fmly	2	90,317.59
Montgomery	Willis, City Of	0122143		Single Fmly	2	73,913.44
Montgomery	Woodbranch, City Of	0026434		Single Fmly	4	62,853.20
Montgomery	Woodbranch, City Of	0068940	VU	Single Fmly	4	200,436.98
Montgomery	Woodbranch, City Of	0069645	VU	Single Fmly	9	146,857.32
Montgomery	Woodbranch, City Of	0069786		Single Fmly	3	71,963.17
Montgomery	Woodbranch, City Of	0070474		Single Fmly	4	94,196.23
Montgomery	Woodbranch, City Of	0092052		Single Fmly	3	17,726.25
Montgomery	Woodbranch, City Of	0097155		Single Fmly	3	208,406.20
Montgomery	Woodbranch, City Of	0097190		Single Fmly	2	55,773.17
Montgomery	Woodbranch, City Of	0097627		Single Fmly	2	16,203.45
Montgomery	Woodbranch, City Of	0100722		Single Fmly	2	9,267.60
Montgomery	Woodbranch, City Of	0247788		Single Fmly	3	122,681.42
Montgomery	Woodbranch, City Of	0247901		Single Fmly	2	62,750.69
Montgomery	Woodbranch, City Of	0249377		Single Fmly	2	79,490.59
Montgomery	Woodbranch, City Of	0249714	P	Single Fmly	3	273,385.18
Montgomery	Woodbranch, City Of	0251341		Single Fmly	2	126,112.93
Montgomery	Woodbranch, City Of	0258802		Single Fmly	2	274,554.79
Montgomery	Woodbranch, City Of	0259713		Single Fmly	2	197,948.14
Montgomery	Woodbranch, City Of	0259924	P	Single Fmly	2	220,608.48
Montgomery	Woodbranch, City Of	0260213		Single Fmly	2	138,845.78
Montgomery	Woodbranch, City Of	0260454	P	Single Fmly	2	151,387.74
Montgomery	Woodloch, Town Of	0037520		Single Fmly	3	60,615.19
Montgomery	Woodloch, Town Of	0042555		Single Fmly	3	69,287.89
Montgomery	Woodloch, Town Of	0043341		Single Fmly	2	38,146.44
Montgomery	Woodloch, Town Of	0068566		Single Fmly	2	55,000.00
Montgomery	Woodloch, Town Of	0117250		Single Fmly	3	221,202.92

2017

Appendix E: Plan Adoption

#5 982
SEP 25 2018

Consent-Emergency Management

Commissioners' Court-Regular Meeting

TO: Montgomery County Commissioners' Court

FROM: Darren Hess, Director

DATE: 09/25/2018

SUBJECT: CONSIDER AND APPROVE A RESOLUTION FOR THE ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN AS APPROVED THROUGH FEMA.

Attachments

Hazard Mitigation Plan Resolution

#5 9132
SEP 2 5 2018

RESOLUTION NO. [NUMBER]

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of Montgomery County are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, Montgomery County desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED THAT THE COMMISSIONERS COURT OF MONTGOMERY COUNTY TEXAS HEREBY:

Adopts the Montgomery County Hazard Mitigation Plan; and

Vests Director of Homeland Security and Emergency Management Darren Hess with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the counties unique situation warrants such an addendum.

Appoints Director of Homeland Security and Emergency Management Darren Hess to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the Counties addendum to the Hazard Mitigation Plan be developed and presented to the Commissioners Court for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on SEP 2 5 2018

By: Craig Doyal
[Title] County Judge

COMMISSIONER'S COURT MONTGOMERY COUNTY TEXAS

Attest: Mark Turnbull
[Title] County Clerk

#5 9A-P

SEP 2 5 2018

RESOLUTION AND ORDER
APPROVING CONSENT AGENDA ITEMS

On this the 25th day of September, 2018, at a Regular Session Meeting of the Commissioners Court of Montgomery County, Texas, there came on for consideration and approval a motion to unanimously approve by consent all matters and resolutions shown on the Commissioners Court agenda as item number 9 on the Notice of a Regular Meeting for Tuesday, September 25, 2018 (the "Consent Agenda") attached.

Motion was made by Commissioner Noack and seconded by Commissioner Riley to unanimously approve all actions, items, resolutions and authorizations shown on the Consent Agenda and to authorize County Judge Craig Doyal to sign any contracts, approvals and other documents in connection with any item shown on the Consent Agenda SAVE AND EXCEPT the following items hereby removed from the Consent Agenda: NONE except those items listed below

Item No. 9K4 Item No. _____
Item No. _____ Item No. _____

Said Motion being put to a vote, it carried by a vote of four (5) aye votes to zero (0) nay votes.

THEREFORE, IT IS HEREBY APPROVED AND ORDERED that this Commissioners Court unanimously approves all actions, items, resolutions and authorizations shown on the Consent Agenda and County Judge Craig Doyal is hereby appointed and authorized to sign any contracts, approvals and other documents in connection with any item shown on the Consent Agenda SAVE AND EXCEPT the items removed from the Consent Agenda as shown above.

PASSED AND APPROVED this 25th day of September, 2018.

MONTGOMERY COUNTY, TEXAS

Craig Doyal
CRAIG DOYAL, COUNTY JUDGE

MIKE MEADOR, COMMISSIONER PCT. 1

CHARLIE RILEY, COMMISSIONER PCT. 2

JAMES NOACK, COMMISSIONER PCT. 3

JIM CLARK, COMMISSIONER PCT. 4

Attest:
Mark Turnbull
Mark Turnbull, County Clerk

COMMISSIONER'S COURT
TEXAS
MONTGOMERY COUNTY

CERTIFICATE FOR RESOLUTION

I.

On the 25th day of October, 2018, the City Council of the City of Conroe, Texas consisting of the following qualified members, to-wit: **Toby Powell, Mayor; Duke Coon, Mayor Pro Tem, Council Members Seth Gibson, Duane Ham, Jody Czajkoski and Raymond McDonald**, did convene in public session in the Council Chambers of the City Hall at 300 West Davis in Conroe, Texas. The roll being first called, a quorum was established, all members being present. The Meeting was open to the public and public notice of the time, place and purpose of the Meeting was given, all as required by Chapter 551, Texas Government Code.

II.

WHEREUPON, AMONG OTHER BUSINESS transacted, the Council considered adoption of the following written Resolution, to-wit:

RESOLUTION NO. 4404-18

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CONROE, TEXAS, ADOPTING THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN.

III.

Upon motion of Council Member Gibson seconded by Council Member McDonald, all members present voted for adoption of the Resolution, except the following: No one voted against and no one abstained. A majority of those Council Members present having voted for adoption, the presiding officer declared the Resolution passed and adopted.

IV.

A true, full and correct copy of the Resolution adopted at the Meeting is attached to and follows this Certificate.

SIGNED AND SEALED this 25th day of October, 2018.

SOCO M. CORJON, City Secretary

RESOLUTION NO. 4404-18

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CONROE, TEXAS, ADOPTING THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN.

* * * * * * * *

WHEREAS, certain areas of Montgomery County, Texas are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, Montgomery County desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including Montgomery County.

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY OF CONROE, CONROE TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests Mayor Toby Powell with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints Mayor Toby Powell to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the Montgomery County, TX for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

PASSED AND APPROVED this the 25th day of October, 2018.

TOBY POWELL, Mayor

APPROVED AS TO FORM:

MARCUS L. WINBERRY, City Attorney

ATTEST:

SOCO M. GORJON, City Secretary

RESOLUTION NO. 91

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of the City of Cut and Shoot are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, the City of Cut and Shoot desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including Cut and Shoot Texas

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF CUT AND SHOOT, TEXAS HEREBY Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests Mayor Nyla Dalhaus with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints Mayor Nyla Dalhaus to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

PASSED AND APPROVED this the 11th day of October, 2018

Nyla Akin Dalhaus

Nyla Akin Dalhaus, Mayor
Cut and Shoot, TX

ATTEST:

Amy L. Wade

Amy L. Wade, City Secretary

RESOLUTION NO. R-2018-021

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MAGNOLIA, TEXAS, ADOPTING THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN.

* * * * * * *

WHEREAS, certain areas of the City of Magnolia are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, the City of Magnolia desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including City of Magnolia; and

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF THE CITY OF MAGNOLIA, TEXAS HEREBY:

Section 1. Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Section 2. Vests Mayor Todd Kana with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action.

(b) Develop an addendum to this Hazard Mitigation Plan if the city's unique situation warrants such an addendum.

Section 3. Appoints Mayor Todd Kana to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Section 4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

PASSED AND APPROVED October 9, 2018.

THE CITY OF MAGNOLIA

Todd Kana, Mayor

ATTEST:

Lynne George, CPM, TRMC
City Secretary

RESOLUTION NO. 2018-15

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of the City of Montgomery are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, the City of Montgomery desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including the City of Montgomery.

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF MONTGOMERY, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests City Administrator, Jack Yates with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints City Administrator, Jack Yates to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Passed and approved this 25th day of September, 2018.

By: Sara Countryman
Sara Countryman, Mayor

Attest: Susan Hensley
Susan Hensley, City Secretary

CITY OF MONTGOMERY, TEXAS
FOUNDED 1837

RESOLUTION NO. 2018-12

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of Oak Ridge North are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, Oak Ridge North desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including Oak Ridge North

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF OAK RIDGE NORTH, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests City Manager Richard Derr with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints City Manager Richard Derr to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

PASSED, **APPROVED**, and **ADOPTED** this 22nd day of October, 2018.

Jim Knykendall
Mayor

ATTEST:

Elizabeth Harrell
City Secretary

OAK RIDGE NORTH TEXAS

RESOLUTION NO. 2018-549

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of the City of Panorama Village, Texas are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, the City of Panorama Village, Texas desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including the City of Panorama Village, Texas

NOW, THEREFORE, BE IT RESOLVED THAT THE MAYOR AND CITY COUNCILMEMBERS OF THE CITY OF PANORAMA VILLAGE, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests Mayor Lynn Scott with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints Mayor Lynn Scott to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the Councilmembers for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on October 2, 2018

By: _____
Lynn Scott, Mayor

Attest _____
Lisa Evans, City Secretary

CITY OF PATTON VILLAGE

CITY HALL
16940 MAIN ST.
SPLENDORA, TX 77372
(281) 689-9511
FAX (281) 689-2385

RESOLUTION 2018-014

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of the City of Patton Village are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, Patton Village desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including the City of Patton Village

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY OF PATTON VILLAGE OF MONTGOMERY COUNTY, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests the Patton Village Emergency Management Coordinator with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints Patton Village Emergency Management Coordinator to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City of Patton Village for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on 10/04/18

By: Leah Tarrant, CMO

Mayor Leah Tarrant

Attest: Michelle Alcaraz

Michelle Alcaraz, City Secretary

RESOLUTION No. 208-18

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of the City of Roman Forest are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, the City of Roman Forest desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including the City of Roman Forest

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF THE CITY OF ROMAN FOREST, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests Mayor, Chris Parr with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action.

(b) Develop an addendum to this Hazard Mitigation Plan if the city's unique situation warrants such an addendum.

Appoints Mayor, Chris Parr to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on October 16, 2018.

By: _____
Mayor, Chris Parr

Attest: _____
City Secretary, Iliana Bahr

RESOLUTION NO. R-18-018

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SHENANDOAH, TEXAS ADOPTING THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN AND APPOINTING THE POSITIONS OF DESIGNEE AND REVIEWER.

WHEREAS, certain areas of Shenandoah are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, Shenandoah desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including Shenandoah;

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF SHENANDOAH, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and Vests Public Works Director Joseph Peart with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action
(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints Finance Director Lisa Wasner to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

PASSED, APPROVED AND ADOPTED this the 8th day of October, 2018.

CITY OF SHENANDOAH, TEXAS

M. RITCHEY WHEELER, Mayor

ATTEST:

Courtney Clary, City Secretary

APPROVED AS TO FORM:

William C. Ferebee, City Attorney

CITY OF SHENANDOAH TEXAS TEXAS

RESOLUTION NO. 2018-10-15

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SPLENDORA, TEXAS, ADOPTING THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN.

WHEREAS, certain areas of the City of Splendora are subject to periodic flooding and other natural hazards with the potential to cause damages to citizens properties within the area; and

WHEREAS, the City of Splendora desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, H-GAC in partnership with Montgomery County, City of Conroe, City of Cut and Shoot, City of Magnolia, City of Montgomery, City of Oak Ridge North, City of Panorama Village, City of Patton Village, Town of Roman Forest, City of Shenandoah, City of Splendora, City of Stagecoach; City of Willis, City of Woodbranch Village, The Woodlands Township, and Town of Woodloch have developed a Hazard Mitigation for Montgomery County, Texas;

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SPLENDORA, TEXAS, THAT:

Section 1. The City of Splendora hereby adopts the Montgomery County Hazard Mitigation Plan..

Section 2. The City of Splendora vests the Police Chief with the responsibility, authority and means to:

a) Inform all concerned parties of this action;
b) Develop an addendum to this Hazard Mitigation Plan, if a unique situation warrants such an addendum; and
c) Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Section 3. This resolution shall become effective from and after its passage.

PASSED AND APPROVED this 15th day of October, 2018.

Dorothy Welch, Mayor

ATTEST:

Danna Welter, City Secretary

CITY OF STAGECOACH, TEXAS
HAZARD MITIGATION PLAN
RESOLUTION # R-2018-24

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

PURPOSE: A resolution to adopt the hazard mitigation plan for the Montgomery County.

WHEREAS, certain areas of the City of Stagecoach are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, the City of Stagecoach desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including the City of Stagecoach;

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF THE CITY OF STAGECOACH, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests the Mayor Galen Mansee with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action
(b) Develop an addendum to this Hazard Mitigation Plan if the city's unique situation warrants such an addendum.

Appoints Mayor Galen Mansee to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Motioned By: Alderman Jim Cooley
Seconded By: Alderwoman Sharon McClure

Recorded Vote:	For	Against	Abstaining
Alderwoman Sharon McClure	x		
Alderman Jim Cooley	x		
Alderman James Osteen	x		
Alderman Mark McGill (absent)			
Alderman Bill McGahen	x		

PASSED, APPROVED AND ENACTED ON THIS 16TH DAY OF OCTOBER, 2018.

For the City of Stagecoach, TX:

Galen Mansee
Mayor

Attested by:

Brenda Rutt
City Secretary-Treasurer-Court Clerk

SEAL

RESOLUTION NO. R18-1016A

CITY OF WILLIS, TEXAS, ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of the City of Willis, Montgomery County, Texas are subject to periodic flooding and other natural hazards with the potential to cause damage to residents' properties within the area; and

WHEREAS, the City Council for the City of Willis, Texas desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including the City of Willis, Texas,

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF WILLIS, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests the City Manager with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints the City Manager to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the Willis City Council for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

PASSED AND APPROVED on the 16th day of October 2018.

By: _____
LEONARD REED, City Mayor

ATTEST:

_____
Brenda Burns, Acting City Secretary

CITY OF WILLIS SEAL TEXAS

RESOLUTION NO. 0927-2018

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of the City of Woodbranch Village are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, City of Woodbranch Village desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including the City of Woodbranch Village.

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF THE CITY OF WOODBRANCH VILLAGE, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests the City Secretary with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints the City Secretary to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

DULY PASSED AND ADOPTED by the City Council of the City of Woodbranch Village, Texas, on this the 27th day of September, 2018.

Vera Craig, Mayor

ATTEST:

Charlotte Smith, City Secretary

RESOLUTION NO. 013-18

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE WOODLANDS TOWNSHIP ADOPTING THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of The Woodlands Township are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, The Woodlands Township desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including The Woodlands Texas;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE WOODLANDS TOWNSHIP THAT:

The Woodlands Township adopts the Montgomery County Regional Hazard Mitigation Plan; and vests the President/General Manager or his designee with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action; and

(b) Develop an addendum to this Hazard Mitigation Plan if The Woodlands Township's unique situation warrants such an addendum.

The Woodlands Township appoints the President/General Manager or his designee to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to The Woodlands Township's addendum to the Hazard Mitigation Plan be developed and presented to the Township Board of Directors for consideration.

The Woodlands Township agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

PASSED AND ADOPTED this 18th day of October, 2018.

Gordy Bunch
Chairman, Board of Directors

ATTEST:

Ann Snyder
Secretary, Board of Directors

Approved As To Form:

Roberta B. Cross
Township Attorney

RESOLUTION NO. R-10082018|

ADOPTION OF THE MONTGOMERY COUNTY HAZARD MITIGATION PLAN

WHEREAS, certain areas of the Town of Woodloch are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, The Town of Woodloch desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Montgomery County, in order to meet this requirement, has initiated development of a countywide, multi-jurisdictional Hazard Mitigation Plan, including the Town of Woodloch

NOW, THEREFORE, BE IT RESOLVED THAT THE TOWN OF THE WOODLOCH, TEXAS HEREBY:

Adopts the Montgomery County Regional Hazard Mitigation Plan; and

Vests the Mayor of Woodloch with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action

(b) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints the Mayor of the Town of Woodloch to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the Town of Woodloch for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on 10/8/18

By: _____ Attest: _____

Mayor City Secretary